



EXPEDITION ONE PLANET

The design of exploratory journeys through
the exhibition One Planet

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EXECUTIVE SUMMARY

This report describes the design process of a family activity for the exhibition One Planet. One Planet is the main exhibition of the Museon, a culture and science museum in the Hague with the mission to let visitors explore the world and to motivate them to take care of the Planet. The exhibition addresses a variety of global issues as it is based on the seventeen sustainable development goals (SDG's) of the United Nations (UN). Museon aims to involve families in these topics in a playful way.

This graduation project was initiated because several staff members of the Museon, as well as external people in the museum world had remarks on the exhibition. They had the impression that the exhibition does not sufficiently stimulate the visitors to talk about the content and to reflect it on their own daily lives. They also thought that the exhibition could encourage the visitors more to take sustainable actions themselves.

During the research phase of the project, qualitative research was done in the exhibition to find out how people behave in One Planet and why. Observations and interviews with the visitors confirmed the assumption of the lack of dialogue and reflection. Although they were not absent, the research showed that there was opportunity to support the visitors more in their learning experience. A main reason for the lack of reflection was the difficulty

for visitors to focus on a subject. The setup of the exhibition, and the additional activity of the punch card with seventeen yes or no questions, does not encourage visitors to dive deeper in a subject. On the contrary, it stimulates visitors to move on to a next subject. Another reason that hindered dialogue is the one way knowledge transfer from display to visitor. This didactic approach does not motivate people to further explore a subject. The exhibits that required participation from the visitor were much more capable of engaging visitors, especially children, than the ones where you could only listen or look. The exhibits that combined both physical interaction and mental effort were most successful in stimulating conversations about the content between family members. When it comes to encouraging sustainable behaviour, the study in the context showed that currently the visitors do not gain much insight from One Planet in how they can contribute to sustainable development.

Simultaneously, a literature study was done to find out why reflection and dialogue is desirable and how it can be facilitated. It was found that conversations between adults and children during a museum visit are essential. For most families the social interaction is an important aspect of the visit and it supports the meaning making for both adults and children. Designing for dialogue means

designing for an engaging learning experience as reflection and dialogue cannot take place when the visitor does not feel involved in the activity or subject. At the same time, dialogue can enhance and extend the visitor's attention for a subject. Research on how to design for engaging learning experiences and for evoking dialogue resulted in a set of design principles that were used for inspiration during the design phase.

Another part of the research focused on how an exhibition can promote sustainable attitudes and behaviour. This resulted in a second set of design principles that gave direction to the design process.

During the design phase three divergent concepts were created and tested with visitors in the exhibition. These concepts were meant to be used at one place in the exhibition. Although none of the concepts was sufficiently fulfilling the design goal and interaction vision, the tests showed that all three had promising elements. The most important aspect that was missing in these concepts, was a strong link with the exhibition.

The insights from the tested prototypes, a co-creation session with children and additional brainstorm sessions led to a new concept: family expeditions through the ex-

hibition. Instead of creating an activity that would take place at one location in the exhibition, this concept aims to involve people in the subjects while exploring the exhibition. A thematical approach for the creation of the expeditions should support visitors to focus on, and engage with a subject for a longer time. Creating opportunity for reflection and dialogue. Dialogic participation was a leading aspect resulting in opportunity for visitors to make decisions, form their own opinions and coming up with their own ideas. A specific interaction vision was created for this concept, putting the interaction qualities: *guiding, mutual interest, inside information and in control*, central to the development of the concept.

Four themes were chosen for the expeditions in consultation with several Museon employees: Life on Land, Seas & Oceans, Food & Culture, and Inventions & Science. The Seas & Oceans expedition was elaborated to illustrate the concept and to be able to evaluate it. The outline is similar for every theme and consists of the following attributes:

- A starting point (at the entrances of One Planet), where the themes are introduced and visitors can choose an expedition.
- A log book, which you get at the starting point. This booklet contains a map, indicating the stops of the expedition.

- A starting activity to dive into the subject by using multiple senses, like seeing, hearing, touching or smelling objects related to the theme.
- Two exploration boards giving hints on what there is to explore about your chosen theme and where to find it.
- Two question boards where you can answer a personal question and see other people's answers.
- An ending point where you can write down a (personal) challenge or idea to contribute to a sustainable world.

For the evaluation of the concept, eight families were invited to the Museon. Prototypes were built for the different elements of the expedition, however only one exploration board and one question board was made. The participants were observed during the test and they evaluated the expedition afterwards, by means of a survey and an interview.

The findings from the evaluation showed that the concept is promising. The dialogic participation proved its potential to stimulate thought and to evoke conversations about global issues related to One Planet, for both adults and children. The guidance provided by the concept was perceived as supporting the learning experience. This was especially reported by parents, but also some children said that the focus on a specific theme motivated them

to explore or think. The test also showed that quite some improvements are necessary. In particular the purpose and use of the exploration board should be clearer to the visitors. The instructions in the log book, including the floorplan should also be more effortless to understand. Some insights are already taken into account in the suggestions for a redesign, but the concept should be further developed before it can be implemented.

The design is created for the context of the exhibition One Planet, but the insights gained during the design process may be valuable for other exhibit developers who intend to involve their visitors in societal issues.

FOREWORD

This report describes the final project of my master program Design for Interaction at Delft University of Technology. I had the opportunity to perform this design project at Museon. Working on this project was an inspiring and enjoyable experience. Hopefully, reading this report will give inspiration and joy as well.

I would like to thank some people who supported me during the project. First of all, I would like to thank Hub and Judith for giving me the opportunity to do this project, and for giving me the freedom to carry it out in my personal way. I am also thankful to my supervisors. Arnold, I am grateful for your help when I was looking for a graduation project, as well as for your guidance throughout the process. Frans, thank you for your critical feedback and refreshing metaphors.

I would also like to thank all the students from the MuseumFuturesLab, your advice and sharing the experiences of your own projects have been very helpful. Thanks to the families who took the time to participate in interviews, tests and evaluations, and to the children who participated in the co-creation session.

Special thanks to the staff members from Museon, for your practical and intellectual support and, above all, for your enthusiasm, that made it even more fun to work on this project.

Thanks to my friends and family, who not only encouraged me during this project, but for all the years I have studied in Delft. And lastly, I would like to thank you Mark, for all your support.

Anna Koolen, June 2019

1 INTRODUCTION

1.1 INITIAL ASSIGNMENT

This project is a collaboration with Museon. Museon is an interactive culture and science museum in The Hague with the mission to “inspire visitors to explore the world and to develop themselves”. One of their main objectives is to motivate people to take care of the planet. The museum offers activities and exhibitions inviting visitors to learn about societal questions and global themes with the purpose to involve people in these themes in an active manner. Special programs are set up for school-classes and families. Most visitors are families and school classes.

There are two temporary exhibitions and several permanent exhibitions. One Planet is their main exhibition. This permanent exhibition opened in 2016 and addresses global themes by using the seventeen sustainable development goals from the United Nations as a starting point. Every goal is explained on an individual display. The goal is shortly explained in text and additional information is offered by text, images, audio or videos. There is also an interactive installation at every display. The type of installation differs per goal, there are games, quizzes, you can create images, and many more. This results in an engaging experience for all family members. For both children and adults there are interesting things to learn and to do. However, Museon has the mission to make people feel involved

in the themes of the exhibition and currently the museum staff questions whether this is happening. Although a formal visitor evaluation on this subject is not conducted and thus no hard conclusions can be drawn, the overall impression of the museum staff is that only in few occasions people reflect the exhibition content on their own lifestyle or behaviour. Furthermore, colleagues from the museum world visited the exhibition and pointed out that Museon could do more about making the visitors feel involved and encourage them to act.

To stimulate more reflection and involvement the Museum desires to develop an additional element for the exhibition. This addition, which could be digital or physical, should stimulate dialogue between family members and raise questions and ideas about sustainable behaviour. Ultimately, the design should encourage visitors to take concrete actions to help to achieve the sustainable development goals.

1.2 APPROACH

Report structure

The report consists of four parts. The first part describes the museum and the exhibition and serves to identify boundaries for the project. Part two is the research

part. Subjects that are studied are: the visitor, museum learning, evoking dialogue and reflection, promoting sustainable attitudes and behaviour and the current visitor experience of One Planet. This part ends with the presentation of the design brief. Part three describes the steps that were taken during the conceptualisation phase of the project. In the final part, part four, the design will be detailed and evaluated with visitors.

Research plan

The questions on the next page formed the basis for the research. The questions were divided over three themes. The research plan also shows the methods I used for finding answers to these questions.

Theme	Questions	Method
The Visitor	How to encourage social interactions between family members?	
	What are visitors’ motivations to visit the museum?	Literature, interview, observations.
	What are visitors’ concerns and interests? (focus on age difference children)	
	How do visitors currently experience the museum?	Online reviews, interviews
	What are the current interactions between family members?	Observations
	What is important about social interactions in museums?	Literature research
	How to facilitate social interactions between family members?	Literature research, research through design.
The Exhibition One Planet	How to engage visitors in sustainable development?	
	What does sustainable development mean to children between 8-12 years old?	Generative session with children, literature study, interviews
	Which information in the exhibition is already perceived as relevant/applicable to their own lives?	Interviews & experience map
	What do visitors currently learn from One Planet? (And what not?)	
Museum Learning	How to facilitate learning in museums?	
	How do people learn?	Literature
	What are successful ways of learning in (science) museums?	
	How to make visitors feel more involved in the content.	Research through design, co-creation, literature
	How to encourage visitors to adopt sustainable attitudes and behaviour?	Literature
	How to balance a fun and social experience with learning about sustainable development?	Research through design, literature

PART 1

PROJECT OUTLINE

- 012** The Museum
- 015** The Exhibition One Planet
- 020** Conclusion

INTRODUCTION

The design that will be created for this project will be used in an existing exhibition. Namely the exhibition One Planet at the Museon in The Hague. The boundaries that come along with the museum and the exhibition are explored in this part.

Chapter one gives insights in the museums objectives, and what kind of exhibitions, programs and activities are organised in the museum. Chapter two describes the physical context of the exhibition, the content, and the activities related to the exhibition.

2 THE MUSEUM

Museon is an interactive museum for culture and science, located in the international zone in The Hague. Museon's mission is "to inspire visitors to explore the world and to develop themselves." They want to motivate visitors to take care of the planet and they consider it their task to stimulate international involvement. Schools are an important target group of the Museon. They offer educational activities on various themes for both primary and secondary education. The exhibitions and collection items play an important role during those activities. There is for instance a lesson about archaeology in the Netherlands where children can look at but also touch archaeological artefacts. The museum's objective is to involve both schoolchildren as well as families in an active manner in global themes and societal questions.

"Museon, the museum for culture and science, aims at transferring knowledge about man and his relation with nature and culture and provides easily accessible information about topical themes and developments in science and society." (Museon, 2017)



Exterior of the Museon (source: CJP)

2.1 HISTORY

The origin of Museon is the founding of the 'Vereeniging ten bate van het Onderwijs' in 1904. This was an initiative of newspaper director Frits van Paasschen, a supporter of resource-based teaching. He wanted to show children how products were made, with the intention to raise their interest for production techniques. In 1920 the municipality The Hague took over the museum and called it 'Museum for Education'. Due to its continuously expanding collection the museum was forced to relocate a number of times. The current museum, a building designed by ar-

chitect Wim Quist, opened for public in 1986. It received the name Museon, a combination of museum and education (onderwijs).

2.2 FACTS

Museon attracts about 200.000 visitors each year. As it is a family museum it can be crowded during the weekends or school holidays while the weekdays are often quiet. From the founding in 1904 onwards the museum gathered an expansive collection. At the moment the collection counts 273.000 objects in the domains geology, archaeology, bi-

ology ethnology, history and science. A growing part of the items is currently being digitized and can be viewed in the public online database (cc.museon.nl).

2.3 EXHIBITIONS

On the ground floor there is a temporary exhibition that changes once or twice a year. The Museon calls these exhibitions their ‘blockbusters’ and chooses subjects from science and culture that appeal to a diverse public (Museon, 2015, p.5). At the moment there is an exhibition called ‘Reizen in de ruimte, op weg naar een nieuwe

aarde.” (Space Travel, on the way to a new earth). Examples of previous exhibitions are ‘Illusions’ (2016), Dino Jaws (2014) and ‘Ridders en Kastelen’ (2018).

The second exhibition situated on the ground floor is the National Geographic Photography exhibition, the NatGeo Focus Gallery. This exhibition is a collaboration between Museon and National Geographic. The Gallery is permanent but the arrangement of the area and the photographs changes several times a year.

The main exhibition of the museum is One Planet, situated on the first floor. A exhibition based on the 17 sustainable development goals of the United Nations. As this is the focus of the project it will be described in more detail later in this chapter.

One Planet is surrounded by eighteen rooms. Each of these rooms accommodates a permanent exhibition. In some rooms visitors can only look at the content (nature photography exhibition “The Green Camera”, but most of them have interactive installations (e.g. Justice & Peace, and Sound). The exhibitions stand on their own, they do not share an overarching narrative. The topics are fairly broad and relate to themes like history, biology, geology, culture and science. The broadness of the themes and the amount of permanent exhibitions makes it unlikely that visitors will look at all of them in one visit. The elaborate content makes the exhibitions attractive for people who want to learn more about a specific topic. All rooms are rectangular and the sides that borders the One Planet area are completely open (if not used for a lesson) allowing visitors to catch a glimpse of the inside from a distance. This makes the rooms inviting, also for people who did not have the intention to visit that specific exhibition.



A family interacting with an exhibit in the ‘Ridders en Kastelen’ exhibition. (source: meteo hellevoetsluis)



Entrance hall, with the NatGeo Focus Gallery in the background. (source: marcel van balkom)

2.4 PROGRAMS & ACTIVITIES

The eighteen exhibition rooms on the second floor can be used as classrooms for a workshop related to the theme of the exhibition inside the room. Both primary and secondary schools can choose from a broad range of workshops. These workshops are given by educators from Museon and take about one hour. Sometimes a lesson is combined with a visit to the rest of the museum.

For families there are activities every Wednesday and Sunday. In the family workplace children (6+) and adults can build 'space models' together, from cans and parts of old (electronic) devices. Children can also participate in experiments during the Science show or learn about mechanics by making their own space vehicle (9+). The tinkering activities relate to the temporary exhibition so they change overtime.

Besides educating schoolchildren and the regular visitors, Museon supports the conception of lifelong learning by organising weekly lectures. Experts from different fields, for example architects, photographers and historians are invited to speak in the lecture hall of Museon. These lectures allow adults, and especially elderly to stay in contact with an educational institution.



Climate Studio, one of the eighteen exhibition rooms surrounding One Planet, is often used for lessons. (source: Museon)

3 THE EXHIBITION ONE PLANET

One Planet is the main permanent exhibition of the museum. This exhibition opened in 2016 and is based on the 17 sustainable development goals formulated by the United Nations (hereafter SDG's and UN). On their website Museon describes the exhibition as following:

"The Museon has used these 17 goals as the starting point for One Planet. Themes include: over-fishing, water pollution, energy, refugees, climate change and discrimination. The goals are addressed in 17 displays, using text, pictures, interactivity and items from the collection. Each theme is a challenge facing the whole world but the display links it to the Netherlands, so that visitors can compare the situation 'here' and 'there'. One Planet is an exciting and fun-filled educational exhibition for the whole family with many interactive elements offering visitors an entertaining way to find out how we can work together to ensure a healthy and sustainable future for the planet."

It is this exhibition that most clearly emphasizes Museon's mission. With the slogan 'Explore the World' in mind, themes as culture, science and nature are approached from a geographical perspective. With the exhibition the museum focuses on how people respond to environmental and societal questions by addressing global themes

that are affecting the sustainability of our planet. The objective is to make visitors feel involved and to encourage them to contribute to a sustainable planet:

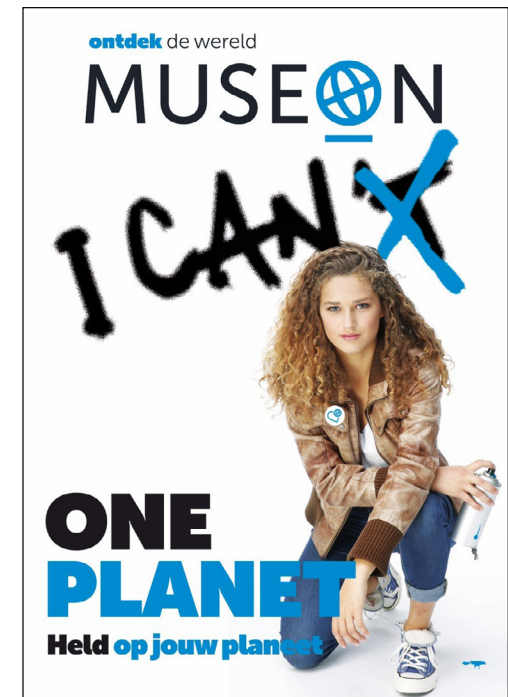
"Na afloop van een bezoek aan 'Your Planet' en het Museon hebben ze het gevoel dat ook zij een bijdrage kunnen leveren aan een leefbare planeet, hoe klein deze misschien ook lijkt" (Museon, 2015).

Earlier in the development phase of the exhibition, the content was not connected to the SDG's. Initially the



Children interacting with the exhibit of SDG 17 in One Planet (source: Museon).

exhibits and content were developed to relate to the themes water, energy, identity and food. For this reason some goal displays have a stronger relation with the corresponding SDG than other displays. Your Planet was the working title of the exhibition (Museon, 2015).

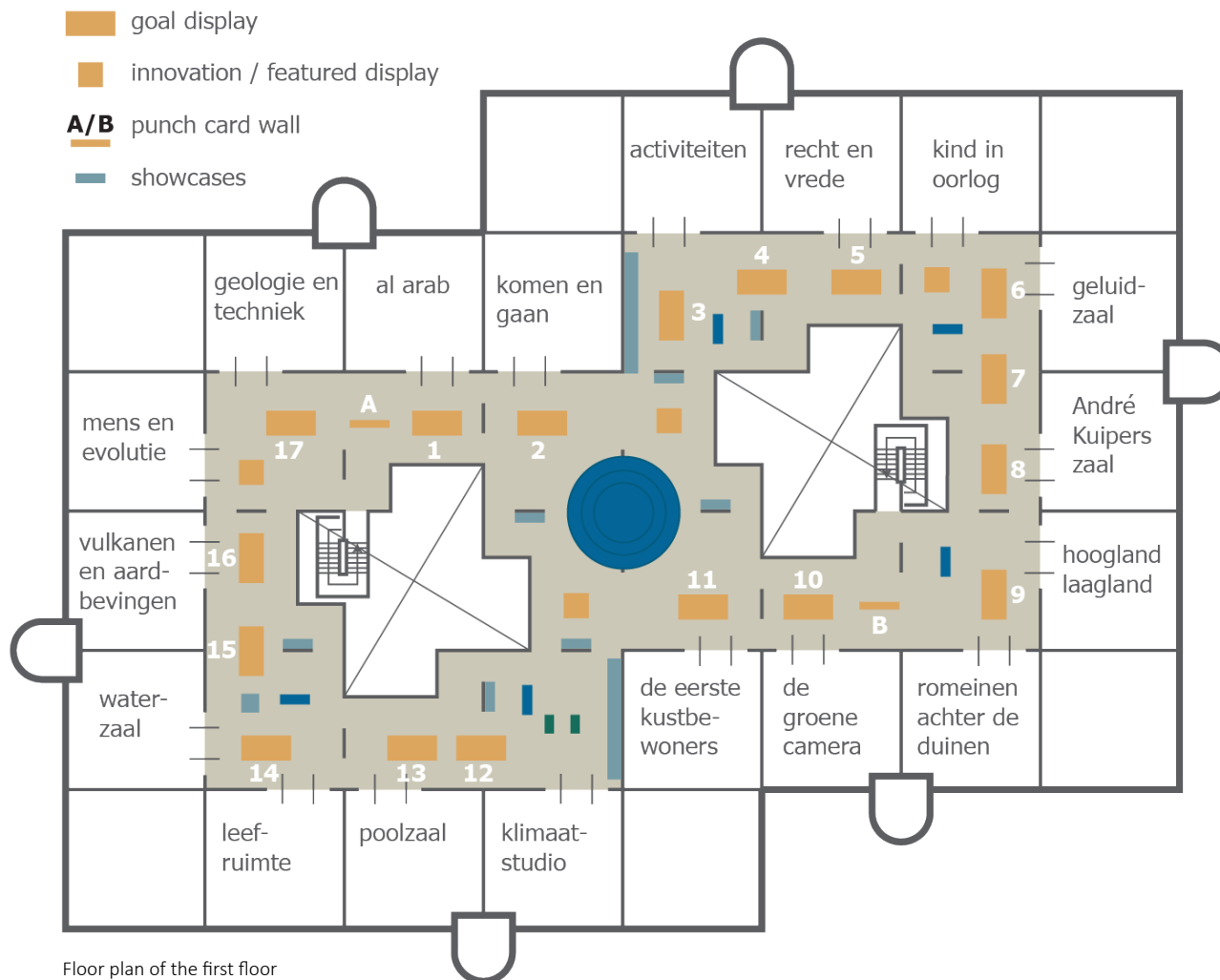


Promotion for the exhibition One Planet.

3.1 EXHIBITION LAYOUT

There are 17 displays, one for each goal. The content is developed by program makers of Museon and the exhibition design is made by design agency Northernlight. All the goal displays in One Planet have the same style, using rectangular shapes, plywood and the colours yellow, white and anthracite. In appendix A an overview of the goals displays can be found. When you take the stairs to the first floor you arrive at one of the One Planet starting points (A and B on the floor plan). These are walls with a big screen on the front side where a video is played continuously to explain what the exhibition is about. It also shows how you can use the punch card.

The seventeen displays are spread over the open area of the first floor, around the two voids. Every goal display has an activity and most of the goals show collection items. The next page shows the general set up of a goal display. There are several smaller displays labelled 'innovative' or 'featured', and there are different showcases with collection items. These displays and showcases have no interactive installations. In the middle there is a lounge area, a round platform with different levels to sit on and surrounded by tv screens displaying various films (LG Vrienden Lounge). Besides watching the films, this area is used to relax (and keep an eye on the children),



for central activities (e.g. tasting insects), or for children to play on. Throughout the exhibition there are small benches, so parents can always take a seat close to where their children are. These benches are situated in front of show-

cases, so that people have the opportunity to take a seat while looking at the artefacts.



The arrangement and appearance of a goal display

3.2 ONE PLANET ACTIVITIES

Museon developed multiple activities around the One Planet Exhibition, keeping in mind the diversity of visitors concerning age and group composition.

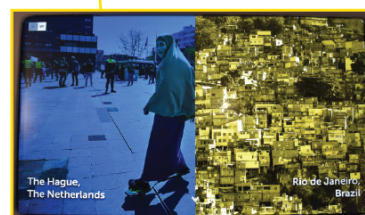
There is a One Planet family quest for parents with small children. Currently it is a small booklet with eight questions about items in the exhibition that have a link with the North Sea. When children show their filled in booklet at the information desk, they receive a small surprise (a shell for example). This quest also leads them to some of the other permanent exhibitions.

There is a One Planet Tour for schoolchildren. It is a booklet with one or two questions about each goal. There are three versions, the easiest one is for children from eight to ten years old and the most advanced one is for children of the first classes of secondary school.

More activities are currently being developed by program managers and educators of the museum: A new quest for families with small children, a 'kijkwijzer' for children up to six, and a tour that leads visitors over the museums green roof and along some displays of One Planet.



Text panel explaining the SDG and the relevance of the related issues. Information is provided in Dutch and English. The black round knob is used for punching the punch card.



Touchscreen with seven scrollable 'pages'. Pages contain infographics, movies, or photographs. There is always information related to the Netherlands as well as about other places in the world.

3.3 PUNCH CARD

One activity that is really integrated in the exhibition is the punch card. This is a card with seventeen questions, one for each goal. As explained above, the exhibition is



always entered in front of one of the punch card walls. Here visitors can get a card if they want to. The questions can be answered at the goal displays, by punching a hole in the card with the favoured answer – yes or no – on top. The ‘yes-side’ is green and the ‘no-side’ is red. At the end of the visit, the visitor can enter their card to let the computer read out their answers. If at least nine answers are provided, the visitor returns feedback in the form of a profile. Based on the answers visitors are assigned to one of these profiles: Nature-protector, optimist, protector, people-helper. They can also see on the screen what percentage of the visitors to date were assigned to each category.

Punchcard wall, placed right in front of the entrance.

3.4 ROUTE

Visitors can enter the exhibition at two different places. Visitors who will go straight to One Planet when they arrive will enter at the punch card wall next to goal 1. Visitors who have visited one of the temporary exhibitions before they go to One Planet are likely to enter at the punch card wall between goal 9 and 10. Both punch card walls form a starting point for the route through One Planet, so visitors can directly start where they enter the exhibition. There is no guidance in what direction they should walk as it is irrelevant in what order visitors explore the goals. (Apart from goal 1 and 17 the goals are randomly ordered by the UN) Also for the exhibition there is no need to see them in a specific order. The signage consists of the numbers and titles of the goal displays, and for the surrounding exhibition the titles on the doors. Subtle visual hints are provided by a darker stroke in the carpet between the goal displays, and a light stroke above.

Used punchcard

YES	
1	Should poor people be given free solar panels?
2	Would you dare to eat insects?
3	Would it be a good idea to make chips and coke more expensive than fruit and vegetables?
4	Would you still go to school if your parents didn't say you had to?
5	Do you agree that more women should be in charge?
6	Do you ever throw litter on the street or in the countryside?
7	Would you like to live next to a wind turbine?
8	Would you like to know exactly what made your telephone?
9	Do you ever eat food that is still fine but is past its 'best before' date?
10	Do you feel comfortable around people who are different?
11	Would you rather live in a big city than a small village?
12	Do you ever eat rare species of fish?
13	Do you think climate change isn't all that bad?
14	Should we campaign to protect natural habitats in other countries?
15	Do you care that some places on the planet are turning into desert?
16	Do you think that The Netherlands could take in more refugees?
17	Do you think it is important to help other countries?

What would you say?

Read the questions on your card. Then find out all about the subject at the right station.

What do you think now?
Turn the card so that YES or NO is facing upwards. Enter the card and press the button.

3.5 THE SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDG's) are established by the UN as the new agenda for sustainable development for 2030. The first and most important goal is to end extreme poverty. The SDG's succeeded the eight Millennium goals that were established in 2000 and ended in 2015. These were the first global development goals. The SDG's are more ambitious, they are not only about development but also about sustainability. The new agenda asks participation of all countries instead of focusing on help from rich countries to poor countries. There is attention for human rights, economic growth, peace and safety and climate. Topics that were not included in the millennium goals. The goals balance the three dimensions of sustainable development: economic, environmental and social (United Nations, 2015). See appendix B for some more information about the goals.



The logo's of the seventeen Sustainable Development Goals

PROJECT OUTLINE

CONCLUSION

This part presented the context of Museon and the exhibition One Planet. The museums objectives and what people can do in the museum are explored, as well as the physical context of One Planet. This knowledge has led to the identification of several boundaries that should be taken into account during the project.

Boundaries

Route

There are two entry and exit points for the exhibition. There is no specific order in which the exhibition should be visited. Visitors might have seen other exhibitions downstairs before they enter One Planet.

Other activities

The design should not interfere with the punch card activity.

Museum vision

Museons strong educational vision and their slogan 'Explore the world' should be reflected by the design.

Content

The design should relate to (part of) the seventeen sustainable development goals of the UN and match with the topic choices that Museon made for One Planet.

Space

The design will be used on the first floor, in a wide and open setting with sight lines to many exhibits, showcases and access to other exhibitions. Big columns on a 10m x 10m grid define the space in the One Planet area.

Ambiance

It is slightly dark in the exhibition. Can be noisy on crowded days because of the open space. Carpet reduces some sound.

Appearance

Exhibits in One Planet have the same visual style: rectangular shapes, plywood, and main colours yellow, white and anthracite.



Children on the stairs that leads to One Planet, looking at the screens displaying the SDG's (source: Museon).

PART 2

RESEARCH

024 The visitor

027 Museum learning

031 Evoking dialogue & reflection

036 Promoting sustainable attitudes

041 The One Planet visitor experience

057 Conclusion

059 Design brief

INTRODUCTION

The goal of this project consists of two elements. Firstly, the aim is to create a design that facilitates dialogue between family members around the content of One Planet. Secondly, the design should create a museum experience that makes families feel inspired to take care of the planet. This part of the report explores the interdependency between these two elements and gathers knowledge on how to facilitate for both of them.

The research part begins with a study to understand the visitors needs and concerns for a museum visit in chapter four. This knowledge is necessary to create a design that provides a enjoyable and meaningful museum experience for families. Chapter five explores how people learn in museums, and how exhibitions can motivate learning. Chapter six aims to find out the importance of dialogue and reflection and studies techniques to facilitate for that. Chapter seven presents a study on promoting sustainable attitudes in informal learning environments. With this theoretical framework, the current context of One Planet is analysed in chapter eight. This analysis is used to understand the events in the current situation and to sharpen the design direction for the project.

4 THE VISITOR

What should the museum offer to satisfy visitor's needs and desires?

The Museon has a collection to show to the people, and exhibitions with a certain content to educate visitors about. To accomplish that, the museum experience should be attractive and meaningful for the visitors. An understanding of families motivations to come to the museum, and their expectations and desires for the visit is essential to match the museums mission with the visitor's needs.

Families have an abundance of leisure activities to choose from but limited time to spend on these activities. Why would they choose to go to the museum in their scarce leisure time? In this chapter I will study what drives people to go to museums and what museums should offer to fulfil visitors' needs and interests. A lot of research has been done on this subject which led to valuable insights considering museum visitors. Therefore, literature will be the starting point of this study. Later, in chapter eight, the current situation in Museon will be explored, to find out how families experience One Planet, and how this experience can be improved.

4.1 REASONS FOR FAMILIES TO VISIT MUSEUMS

Reasons to visit a museum with the family do not necessarily have to be content-related. Visitors may come because of a specific interest on the subjects or objects in an exhibition, but they could also come for other reasons. In fact, content is rarely the primary driver for a museum

visit (J. H. Falk, 2009). The reasons for a museum visit relate to the functions that museums are perceived to serve in people's social and cultural life. They can be assigned to six categories of motivations: place, education, life cycle, entertainment, family event and practical issues (Moussouri, 1997). They are explained on the next page.

Social interaction is essential for a family visit

How people are socialized in museum going as a child effects their museum going habits later in their life. People who were taken to museums when they were young, are more likely to visit museums frequently during their adult life (J. H. Falk & Dierking, 2018; Hood, 1983). They feel comfortable in a museum environment and enjoy exploring and learning new things. People who are used to spend leisure time with activities that require more active participation, and highly value entertainment and social interaction, might assume that museums will not fulfill their needs. Still, they might occasionally visit a museum,

when they expect that the attributes for a successful leisure experience are present in that particular museum. When they are there, they are more interested in family activities, opportunities for social interaction and relaxing in a nice environment, than in the content of exhibitions (Hood, 1983). Also parents who do not have much time to spent with their children due to work, see a museum visit above all as a social family event. The same goes for grandparents who live far away from their (grand)children and only see them once in a while (Moussouri, 1997).

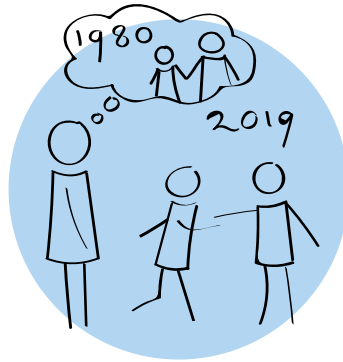
4.2 FAMILY'S NEEDS AND DESIRES

A family visiting a museum consist of a group of people of different ages and various interests and expectations. Each family member has its own role and wishes. To create a successful family experience it is necessary to get insight in the dynamics within a group (Hartog & Remmelink, 2012). Both children's and adults needs and desires will be studied. Consequently the interactions between family members will be investigated.

What children like in museums

- Children like to see real things. It doesn't matter what the object exactly is, being close to an authentic object gives a special feeling.
- Children highly value the story behind an object. They

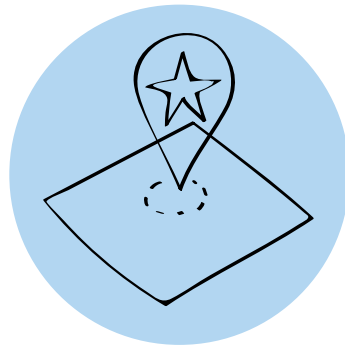
Life cycle: when the museum visit is seen as a repeated activity that is connected with certain phases in someone's life. For example when a parent takes his child to the museum because he went there in his own childhood.



Entertainment: refers to leisure-related reasons for going to a museum. Most visitors find it important to have fun and enjoy themselves, and to see new and interesting things while being in a comfortable and aesthetically pleasing environment.



Place: when people go to the museum because the museum is seen as an important destination for recreation, leisure or culture in the region.



Reasons for families to visit a museum

Education: reasons that relate to the aesthetic, informational, or cultural content of the museum. The majority of museum visitors have this motivation, sometimes to learn something specific but often just to learn in general.



Family event: the museum visit is especially a social experience, a chance to enjoy the time together. For example a day out for the whole family.



Practical issues: Usually not the driving factor for a museum visit, but practical issues do play a role for many visitors in the decision to go to a museum. It considers issues like weather, proximity to the museum, crowd conditions, time availability, and the entrance fee.



visual based on Moussouri, 1997

find the story just as intriguing as the object itself. How is it made? How did people use it? Where does it come from?

- Children like to do or try out things themselves, to feel involved, they want to know how it would feel like to be a scientist, a musician, a politician or archaeologist.
- Children who have been to the site on a school trip like to come back to show their families.

(Black, 2005; Hartog & Rummelink, 2012)

Adults are likely to stay with the younger child, as the older children are able to explore independently. It is often the interests of the oldest child that determines which museum the family will visit. The younger child, with the shorter concentration span, usually decides when the family goes home (Hartog & Rummelink, 2012).

Differences between adults and children

When a family goes to a museum, the children are mainly concerned with their own experience. Most **children have object-centered expectations** and they focus on the hands-on aspects of the visit. **Parents have subject-centered expectations** and prefer exhibits which involve mental activity, but they are often mainly concerned with their child's experience. They want the children to have a good time and to enhance their educational experience.

(Moussouri, 1997p, 238). During a family museum visit they often take on **the role of facilitator**, just like grandparents and other caregivers. Generally, grandparents primarily focus on the enjoyment of the children and the social aspect of the visit and not so much on influencing the educational experience of the children (Hartog & Rummelink, 2012, p.239; Moussouri, 1997).

4.3 SUPPORTING FAMILY INTERACTIONS

Spending time together is important for families who come to museums. Museums can support a social family experience by offering tools to exchange information between family members. Sharing the information in exhibitions with each other does not only make the experience more enjoyable, it also helps both children and adults to make sense of their experience (Moussouri, 1997, p.243).

Social experiences are essential for learning. According to Vygotsky (1978), children learn best when they are presented with a task that is too difficult to complete on their own, but which they can complete through interactions with others.

Exhibit elements that support family interaction

Building on the theories of Vygotsky, the term scaffolding was introduced in the learning context. Scaffolding refers to the verbal and nonverbal guidance provided by adults when assisting children with a task. This kind of guidance

is also valuable in exhibitions, where children continuously explore new things. To support parents in their scaffolding role, the museum should **arrange texts in small sub-headed chunks**. That makes it easier for the parents to make it understandable for their children (Puchner, Rapoport, & Gaskins, 2001). (McManus, 1994). For the design of an exhibit or activity that aims to enhance family learning there are a number of other qualities to keep in mind. Creating **exhibits that are multi-sided and multi-user**, allowing for multiple sets of hands or bodies to interact at the same time, is obviously a requirement. As is the accessibility of the exhibit for both adults and children. **Multi-modal exhibits** appeal to different learning styles and levels of knowledge and **multi-outcome interactions** have the potential to foster group discussion. Lastly, the exhibit or activity should provide **cognitive links to visitors previous knowledge and experience** to make it relevant. (Borun & Dritsas, 1997).

In this chapter the concept of family learning is introduced. The following chapter will dive deeper into the theory of learning and specifically learning experiences in museums.

5 MUSEUM LEARNING

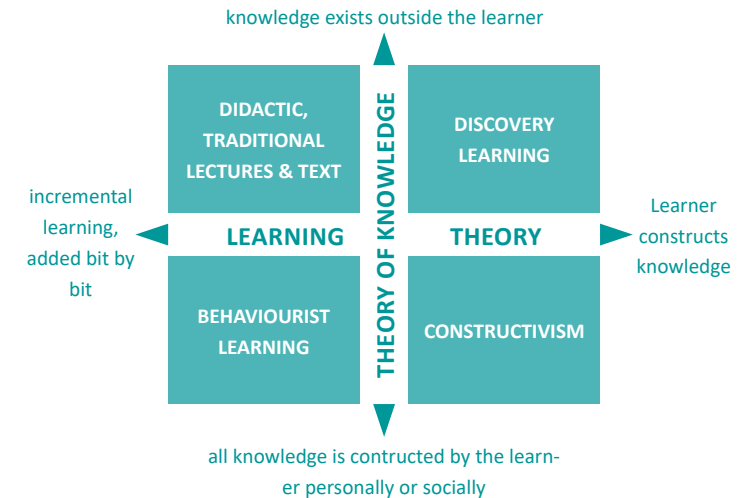
How can exhibition design create an engaging learning experience?

Learning in museums differs from learning in schools in the sense that in museums learning is driven by the needs and interests of a person, and not by the dictates of an authority. In the past the notion of museum learning was very simplistic. The underlying idea for understanding museum learning was: “Visitors come to museums, look at exhibitions or participate in programs, and if the exhibitions or programs are good, the visitors learn what the project team intended.” Research proved that this is not how it works in reality. Learning in museums involves many variables, some relate to the exhibitions and programs, but many do not (J. H. Falk & Dierking, 2018). This chapter shows that learning is a complex, personal and constructive process and provides insight in how an engaging learning experience can be facilitated.

5.1 HOW DO PEOPLE LEARN?

There is no consensus on how people learn. Divergent theoretical perspectives on how the human mind works underlie different theories on learning. These perspectives changed overtime. During the nineteenth century, and for much of the twentieth, the main concept of education was the transmission of information to learners whose task was to absorb as much as possible. Knowledge was considered as objective, truths that exists outside the learner, waiting to be discovered. In museums these ideas about learning and knowledge were translated in didactic displays, with objects and text panels explaining what the visitor ‘needed’ to know. Nowadays, the most supported

learning theories consider **learning as an active and constructive process**. Instead of absolute truths, knowledge is seen as subjective, created inside the learners mind. People are active in constructing their own knowledge based on personal experiences, cultural factors and prior knowledge and skills. This educational approach is called **constructivism**. In museum this approach is for example translated in exhibits build with the idea that visitors draw their own conclusions about the meaning of an exhibition (Hooper-Greenhill, 1999). Hein (1998) created a framework of education in which he distinguishes four types of museums based on their vision on knowledge and learning. He composed this **theory of education** by combining



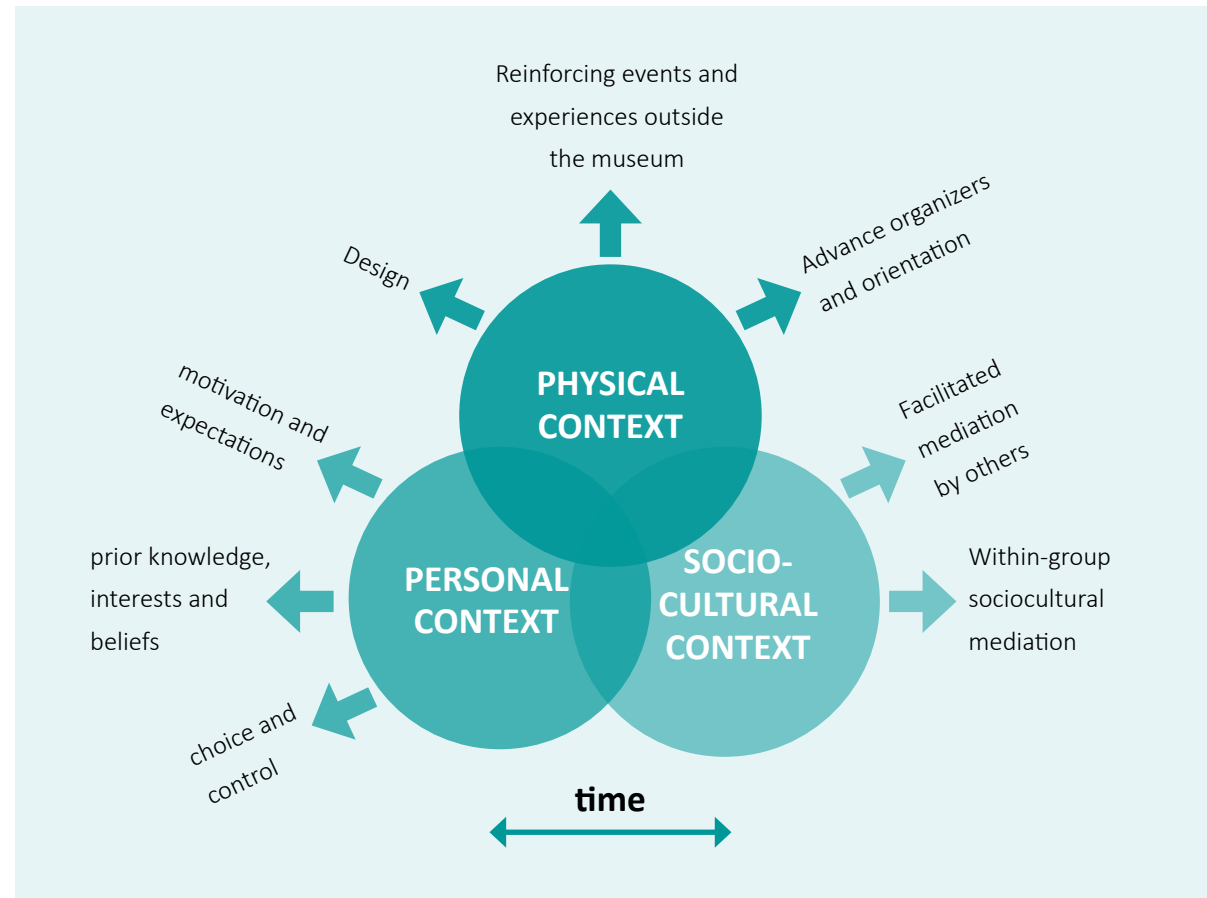
(adapted from Hein, 1998)

a model of knowledge and a model of learning theories. Categorising museums in one of the types is maybe too simplistic, a museum does not necessarily align its content with a single approach to education. Museum for example, has exhibits and activities for each of the four types. However, the model does help to become aware of the different educational approaches and to think about which approach suits best with the purpose of an exhibit or exhibition. A constructivist approach seems to be the most appropriate when the museum wants to evoke dialogue and to let the visitors feel involved in the content because it provides opportunity for visitors to form their own ideas and opinions.

Learning is influenced by different contexts

Constructivism acknowledges that what and how someone learns is very personal. A model that helps to get a grasp of the complexity of this process is the contextual model of learning, conceived by Falk and Dierking. The model is not a definition of learning but more a framework that helps to get a better understanding of the process. Despite its complexity, the process is generalizable, other than the outcomes of learning which vary widely between individuals (Falk & Dierking, 2018). The view on learning that underlies the framework is that “learning can be conceptualized as a contextually driven effort to make meaning in order to survive and prosper within the world” (Falk & Storksdieck, 2005). In other words, it is a dialogue between a person and his or her environment through time. The contextual model of learning suggests that three overlapping contexts influence learning over time: the personal, sociocultural and physical context. These contexts are continuously changing. The framework organises the factors that influence learning, within these three contexts. From the hundreds of factors that probably exists there are eight key factors that are fundamental to museum learning experiences. These are shown in the diagram.

The contexts and factors that influence museum learning



visualisation of the conceptual model of learning
(adapted from Falk & Dierking, 2018)

Insight in these factors is valuable because all of them are essential for a meaningful visitor experience. The absence of one of the factors will make it more difficult for people to make meaning of their experience. Information related to these factors that played an important role in this project is described below.

The visitor in control

Having a choice in what and when to learn and to be in control of one's own learning positively influences learning. Being free in what to explore is precisely the strength and value of museums and they should therefore be careful not to force their learning agendas on the visitors.

Group members help each other learn

Within groups, like families, people help each other to decipher information and reinforce each other's shared beliefs. Parents can support their children in their explorations and children can make their parents see the world from another perspective. Museums create a unique environment for such collaborative learning.

Real objects facilitate meaning making

Whatever the medium is, a website, exhibition, or program, the learning will be influenced by its design. People go to museums to see and interact with real objects,

looking at two-dimensional media and reading texts can also be done elsewhere. Well-designed exhibitions with authentic objects are one of the best mediums for facilitating concrete understanding of the world.

Feeling comfortable and orientated

When designing the environment it is important to keep in mind that people learn better when they feel comfortable in their surroundings and know what is expected of them. When people feel disoriented, it negatively influences their ability to focus on anything else than the overwhelming new environment.

Advance organisers support learning

An advance organiser improves people's abilities to construct meaning from what they experience. It can be everything as long as it can provide visitors intellectual navigation, for instance a sign, text panel, installation or video.

A museum visit is only a small part of a learning process

A museum experience did not fail when a child does not directly understand a phenomenon after learning about it in the museum. The experience in the museum can help him to understand it better when he encounters something similar later in his life. Learning does not take place

in one moment in time. It is an accumulation of understanding build up over time, derived from many sources in many different ways. The knowledge and experiences gained from museums is incomplete and needs reinforcement to become whole. Often these reinforcing events take place in other contexts than the museum, weeks, months or years later (J. H. Falk & Dierking, 2018).

5.2 INTRINSIC REWARDS AS DRIVERS FOR LEARNING

Like the conceptual model of learning states, people have a natural drive to learn. But a learner will not learn about all information he encounters, learning requires motivation. Learning can be motivated by external rewards (most learning in schools) but it is intrinsically motivated learning that can spark long lasting or even lifelong interest. When the visitor is presented with complex information in an enjoyable way the experience promotes further learning. Such an engaging learning experience will not be achieved by extrinsically motivated learning. Hence, a museum learning experience should give the visitor **intrinsic rewards** (Csikszentmihalyi & Hermanson, 1999).

Elements of an engaging learning experience

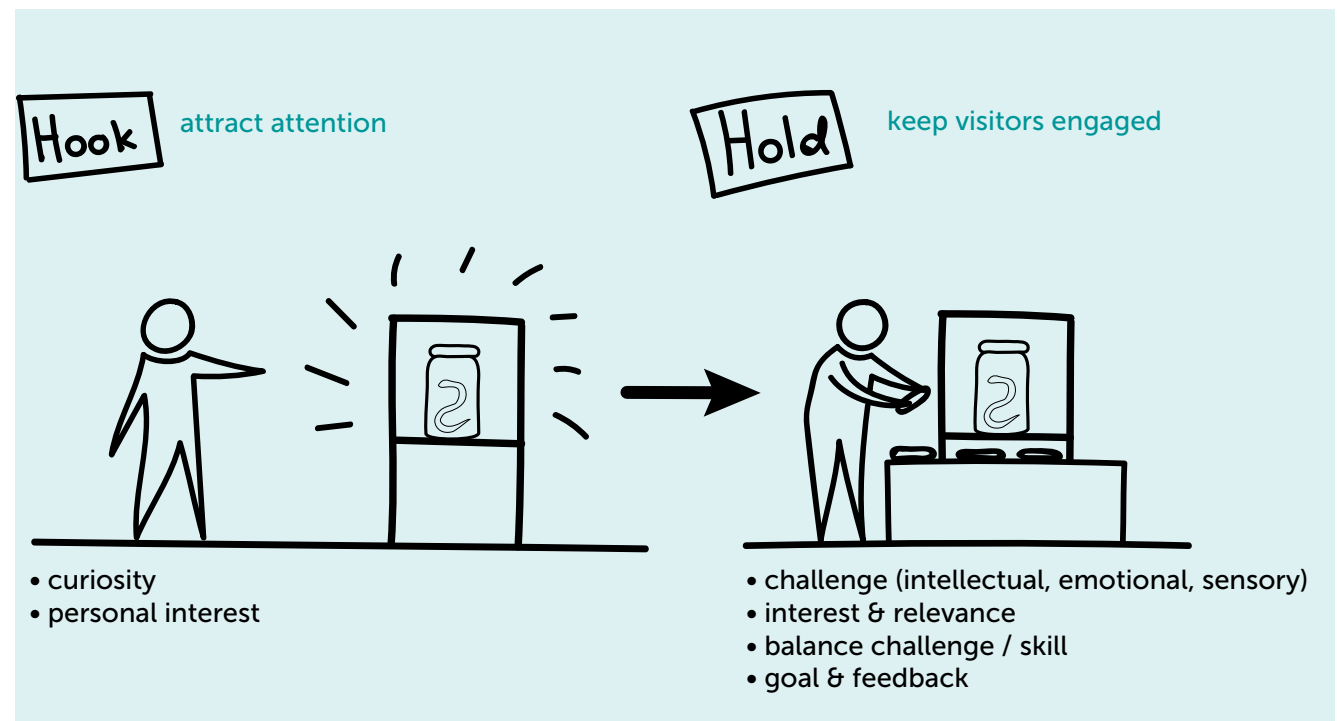
In a museum context an intrinsically rewarding learning experience starts with a **'hook'**, a stimuli in the environ-

ment that attracts the learners attention. This hook should appeal to the learners **curiosity** and can be for example a sound, a huge object or an item with a common cultural interest. For creating a hook, appealing to personal interests is not a requirement. However, the initial attention of the learner only lasts for a moment. In order for learning to take place the exhibit or activity must engage sustained interest. Appealing to **personal interests** is therefore essential. Although personal interests vary among visitors, there are some guidelines. Most important is that a museum experience inspires visitors to see the **link between the exhibits or artefacts and their own lives**. Visitors need to know how knowledge about a subject or object is meaningful to them. Further involvement with a subject or exhibit can be achieved by examining information from new perspectives. Information that is presented as true without showing alternative perspectives discourages further exploration and learning. At all times there should be a **balance between challenge and skill**, so that the learner will not be discouraged by either boredom or frustration. The experiential state, when people keep involved in demanding activities because of the qualities of the experience itself, is what Csikszentmihalyi & Hermanson call the flow experience (1999). To obtain flow, activities need to have **clear goals** so that attention will not be diverted from the tasks. In addition, flow activities

preferably provide immediate **feedback** so that the learner knows whether he should continue the same way or not (Csikszentmihalyi & Hermanson, 1999 ; Perry, 2012).

The next chapter will discuss how an exhibition can incite reflective thoughts and dialogue. It will elaborate on the knowledge required in this chapter, as dialogue and reflection are inherently connected to an intrinsically motivated learning experience.

ELEMENTS FOR AN ENGAGING MUSEUM LEARNING EXPERIENCE



based on the theory of this chapter and the research in One Planet, described in chapter 8.

6 EVOKING DIALOGUE & REFLECTION

How can exhibitions motivate visitors to talk about and reflect on the content?

Chapter four and five showed that social interaction is both a need for an enjoyable museum visit as well as an important part of the museum learning experience. Also reflection is an integral part of a meaningful and lasting learning experience (Sawyer, 2005). The means that will evoke dialogue and reflection will lead to visitor engagement at the same time, as visitor involvement with a subject or exhibit is a prerequisite for both dialogue and reflection (King & Tran, 2017). This chapter builds on the knowledge of the previous chapter and more deeply explores the means that can evoke dialogue and reflection. For effective use of this acquired knowledge during the design phase, a list of design principles is created.

6.1 INVOLVING VISITORS IN CONTEMPORARY ISSUES WITH ISSUE BASED EXHIBITIONS

It has been argued that science museums are at the position to involve visitors in contemporary and controversial issues, rather than just educating scientific knowledge (Pedretti, 2004). Pedretti shows that visitor engagement with these subjects can be achieved by so called critical issue based exhibitions. These exhibitions are made with the intention to stimulate visitors to think critically, make decisions and explore their own thoughts and feelings on complex themes. Issue based exhibitions have the potential to engage visitors with these sensitive subjects and enhance learning, by personalizing the experience, evoking emotions, stimulating dialogue and

promoting reflexivity (Pedretti, 2004).

EcoLogic

An example of an issue based exhibition is EcoLogic. An exhibition at the Powerhouse in Sydney about a worldwide hot topic: climate change. In this exhibition visitors can discover the causes of global warming, and they can find out what they can do to help slow it down. With interactive installations EcoLogic lets visitors experience the effect and difficulties of climate change. For example by let them role play being in charge of Sydney's water management (Museum of Applied Arts & Sciences,



Schoolchildren explore climate change in the critical issue based exhibition EcoLogic at the Powerhouse in Sydney. (source: MAAS.museum)

N.D.). To challenge visitors to think about their own impact on the environment, they have an installation called Bigfoot. Bigfoot allows visitors to determine and compare their footprint by inputting information about their lifestyle (Ballantyne & Packer, 2005). Visitor research on this interactive exhibit proved its ability to stimulate reflection and to change people's perceptions and awareness of their footprint which persisted over time (Falk, Scott, Dierking, Rennie, & Jones, 2004).

6.2 DESIGN PRINCIPLES FOR DIALOGUE AND REFLECTION

Researchers of the Steno Museum in Aarhus identified and evaluated four design principles that facilitate dialogue and reflection in exhibitions about sensitive issues: participation, curiosity, challenge and narratives (Skydsgaard, Møller Andersen & King, 2016). These principles were based on their work experience and the work of other museum professionals (Pedretti, 2004; Perry, 2012; Simon, 2010). I have used these principles as a starting point to explore how dialogue and reflection can be motivated.

Participation

The factor participation consists of both physical and dialogic interactivity. Problem solving and acquiring knowledge cannot only be attributed to activities of the brain. We also use our senses to make meaning of our experiences. Therefore, exhibits that involve **physical interaction** can enhance mental engagement. Besides, interactivity attracts children to engage with an exhibit. Physical interactivity can range from the simple act as touching a screen to exhibit manipulation that involves movement of the whole body. **Dialogic interactivity** involves the sharing of opinions and ideas and has also proven to stimulate visitor engagement. In her book 'The participatory museum'



Nina Simon (2010) shows how stimulating a conversation between visitors, or between visitors and the institution can engage visitors, and even people who normally do not come to a museum. These dialogues are incited by, for instance, involving people in the decision making in what to put on display in the museum, or by giving the visitors the opportunity to make a personal mark or comment. Dialogue between visitors can also be stimulated by prompting personal questions in the exhibition. The communica-

Dialogic interactivity: visitors are prompted by the exhibit 'Straight from the Heart' to write positive (red) or negative (grey) comments about their own body. Exhibition Dear, Difficult Body (2011) at the Steno Museum in Aarhus.

tion of ideas and opinions should have a low threshold, otherwise people will feel uncomfortable to participate or to start talking with each other. Offering alternative ways to participate will involve more people. An exhibit can for instance give the opportunity to create something, but also have the option to let visitors give their opinion or just to view or read other people's creations.

Curiosity

What visitors choose to explore or to engage with is partly explained by curiosity. **Curiosity** can be aroused by fascinating images, intriguing effects, unique objects, and new information that links to previous knowledge of the viewer. Strategies that evoke curiosity are for example presenting people with information contradictory to their own knowledge or presenting incomplete information (Perry, 2012). Open-ended exhibits are much more capable of extending curiosity and motivating inquiry behaviour than close-ended exhibits. By providing an explanation about an observed phenomenon a close-ended exhibit dead-ends curiosity. The explanation stops the visitors own inquiry, and thus serves as a subtle stopping point, motivating the visitor to move on to the next activity (Gutwill, 2008). In short, **to hold attention and keep visitors engaged the exhibit should raise questions rather than present answers.**

Challenge

The principle of challenge is two-fold. An exhibit can engage the visitors by presenting them with **physical or intellectual struggle**, a puzzle for example (Csikszentmihalyi & Hermanson, 1999). Physical challenge goes well with multi-user exhibits that ask for collaboration or competition between visitors. The second type of challenge refers to exhibits that evoke emotional involvement. This can be triggered by **confronting** visitors with dilemmas, inconvenient truths, or by addressing prejudices and taboos (Pedretti, 2004).

Narratives

Narrative and learning go hand in hand. Narratives structure our thinking and help us to recall information, as we remember in narratives. They help us to understand the world and are central to the construction of our identities (Sitzia, 2016). Besides, it is often the story behind an object that makes it interesting in the first place. Skydsgaard et al (2016) distinguish personal and expert narratives. **Personal narratives** can act as a source of inspiration or information by reflecting other people's ideas and experiences. Stories from people who resemble the target group can help to increase the relevance of an exhibition, while stories from people with another background or from another generation, can provide information about

cultural differences and changes over time. **Expert narratives** are views presented by experts. These narratives can make scientific discoveries accessible and memorable for the public by humanising science and creating links with real life. In addition to personal and expert narratives I want to include a less literal, and linear form of storytelling, namely first person narrative. **First person narrative** refers to situations where visitors become part of a narrative structure, and where their actions decide how the story unfolds. This requires the design of a rich context in the physical space (or in virtual reality) to immerse people in the activity (Jenkins, 2004). **Expert and personal narratives, also called discursive narratives, have more potential to stimulate critical reflection as the person can distance him or herself from the presented material.** Immersive first person narratives on the other hand, are easily accepted as the truth, but they are better at stimulating affective involvement. The museum environment should preferably combine both types of narrative, as they complement each other in facilitating meaningful learning experiences (Sitzia, 2016).

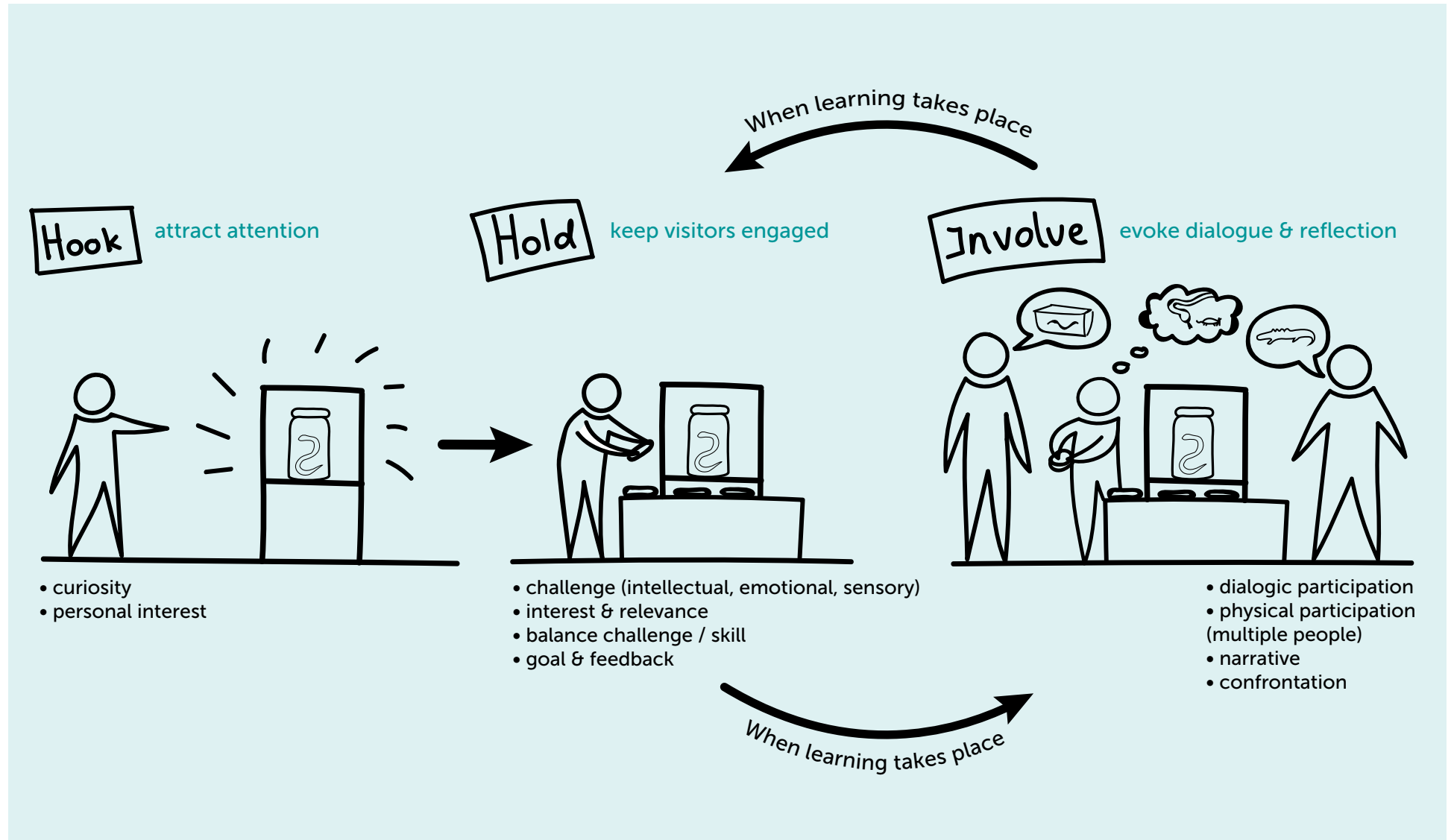
6.3 IMPLEMENTING THE PRINCIPLES

An exhibit will always be a combination of multiple principles. The ultimate way to combine them depends on the type of exhibit, the purpose, the target group and the

content. Reflective thoughts are for example not aroused when the information presented to the visitor is not new (Skydsgaard et al., 2016). Theory cannot define how an exhibit should be designed, it can only provide inspiration and guidelines. To know whether an exhibit or activity will fulfil its purpose, it is necessary to test exhibit prototypes with visitors throughout the design process.

The visualisation on the next page shows the essential elements for evoking dialogue and reflection in an exhibition. The bullet points refer to the design principles that were identified in this and the previous chapter.

EXHIBITION ELEMENTS FOR EVOKING DIALOGUE & REFLECTON



based on the theory of chapter 5 and 6 and the research in One Planet, described in chapter 8.

7 PROMOTING SUSTAINABLE ATTITUDES

How can an exhibition engage visitors in sustainable development?

Learning does not only refer to generating knowledge, it is also about changes in awareness, attitudes, skills, sensitivities and even relationships. This chapter studies the aspects of learning that have the potential to promote sustainable attitudes and behaviour. The research focuses mainly on the environmental aspects of sustainability. Many of the choices made within families daily life have an impact on the environment. For example the food they buy, the way of transport or where they choose to go on holiday. This makes environmental sustainability a more relevant topic when inspiring behavioural change for the target group than the topics of the SDG's that are related to human rights, racism or gender equality.

7.1 INFLUENCING ENVIRONMENTALLY SUSTAINABLE ATTITUDES AND BEHAVIOUR

Museon's mission is comparable to that of many zoos, aquariums, national parks and science centres. These institutions want to raise awareness for environmental issues and to promote conservation practices among their visitors (Ballantyne & Packer, 2005; VanDorn, 2003). In these kind of informal educational settings, people only engage in a learning experience for a short period of time. Still, such experiences have the potential to have impact on the development of environmentally sustainable attitudes and behaviour (Ballantyne & Packer, 2005; National Research Council, 2009). Attitudes are the precursor of behaviour, therefore it is interesting for this project to study how other informal learning institutions managed to have an impact on their visitors attitudes.

An attitude can be described as 'the learned tendency to respond to an object in a consistently favourable or unfavourable way' (Onkvisit & Shaw, 1994 cited in Blythe, 2013) This object can be anything- a product, an institution, policies, the natural environment, animals and so forth. For Museon it would be interesting to know how favourable attitudes towards sustainable actions, like recycling, greening the garden or saving energy can be promoted. When designing for attitude change, it is good to keep in mind that attitudes consist of three components:

- Affective: has to do with our feelings and the emotional responses towards the attitudinal object.
- Cognition: the thinking part, including knowledge, awareness and beliefs regarding the object.
- Conation: this is about what we intend to do regarding

the attitudinal object, it's not the actual behavior but our intention.

Conation does not necessarily lead to behaviour. Factors like effort or difficulty can prevent us from taking the action (Blythe, 2013).

7.2 KEY FACTORS IN ADOPTING ENVIRONMENTAL SUSTAINABLE ATTITUDES

It is complicated to identify the factors within free-choice learning experiences that influence the adoption of environmentally sustainable attitudes. A key difficulty is the diversity between visitors considering their backgrounds, prior knowledge and experiences. Still, research based on qualitative data identified effective factors. These factors shared the following underlying principles: 'arouse learners emotions', 'challenge their beliefs' and 'enhance their environmental conceptions' (Ballantyne & Packer, 2005). An approach that incorporates a combination of these principles addresses the different components of attitude and is therefore most effective. The principles and their potential effects will be described in this section.

Arouse Emotions

Emotions benefit learning in multiple ways. As explained in chapter five and six they are a key factor in motivating

learning. Emotions also help to create vivid memories of experiences, and therefore support later recall of information. For example, people often are able to give detailed descriptions of events that aroused strong emotions.

In relation to environmentally conscious behaviour, studies show that behaviour like reducing energy consumption cannot only be explained by rational decision making. It is also influenced by feelings of guilt, fear or affinity towards

nature. Emotional involvement has the potential to challenge personal attitudes, to let people overthink their current opinions (Ballantyne & Packer, 2005). People's emotions towards specific animals, like love, a sense of connection and amusement strongly relate to the desire to preserve the animals. Also emotions of wonder and respect showed to have an influence on people's desire to preserve the animals (or plants) they saw during a visit to a natural site. (National Research Council,

2009). If during a visit to a natural area the arousal of empathy is facilitated the visitor is more likely to engage in conservation behaviour than when someone is not emotionally engaged (Ballantyne & Packer, 2005).

Challenging beliefs

People's beliefs about their own ability to make an impact on sustainability issues, their self efficacy, influences their attitudes and actions. Often the confidence to make a difference is quite low. For example, people tend to underestimate the concerns of others about climate change which results in feeling powerless (Straver, 2019). These powerless feelings and the idea that others do not care is usually unjust. Letting people experience that others share their concerns, that everyone can contribute, and that small actions are also valuable, helps to promote self efficacy.

Furthermore, it is important to demonstrate how people can apply new developed knowledge. Knowledge should be applicable to actions in their daily lives, and thus be trustworthy, do-able and useful for decision-making. (Ballantyne & Packer, 2005). Giving specific suggestions for behaviour can empower visitors while only communicating that behaviour change is necessary, can make them feel disillusioned (National Research Council, 2009).

Empathy towards nature as a driver for sustainable attitudes

Empathy is defined as the ability to understand and share the feelings of another (Oxford English Dictionary, 2019). Empathy has two components, cognitive and affective. "The cognitive component refers to the understanding of another person's emotion through perspective taking." The affective component refers to sharing the emotion of another person, and one's own feelings in response to that. These two components are interrelated (Lesley University, N.D.).

Having empathy increases the likelihood of helping others and showing compassion, it is been regarded by scientists as the key to altruism. This strong relation between empathy and helping has inspired environmental thinkers to consider the possibility of empathy towards nature. Several studies have found that both induced empathy and dispositional empathy led to stronger concern towards nature (Tam, 2013). Dispositional empathy concerns the natural tendency of an individual to empathise with nature. Induced empathy refers to aroused empathy. This can be realised by showing people images or videos of animals in distress and asking them to perceive themselves in the situation of the animal. People who had taken the perspective of an animal in distress showed increased intentions to protect the natural environment (Shelton & Rogers, 1981).

Enhancing environmental conceptions

People have existing conceptions that might support or interfere with the new information presented in a learning environment. Museums have the potential to challenge people to question their ideas and to search for alternative explanations. A powerful way to challenge people's environmental conceptions is to focus on three different aspects of environmental issues: the evidence of the environmental problem (in relation to human impact), the effects of the problem, and the efforts needed to reduce or solve the problem (Ballantyne & Packer, 2005). An understanding of the human footprint is considered essential to involve people in environmental issues like global warming (VanDorn, 2003).

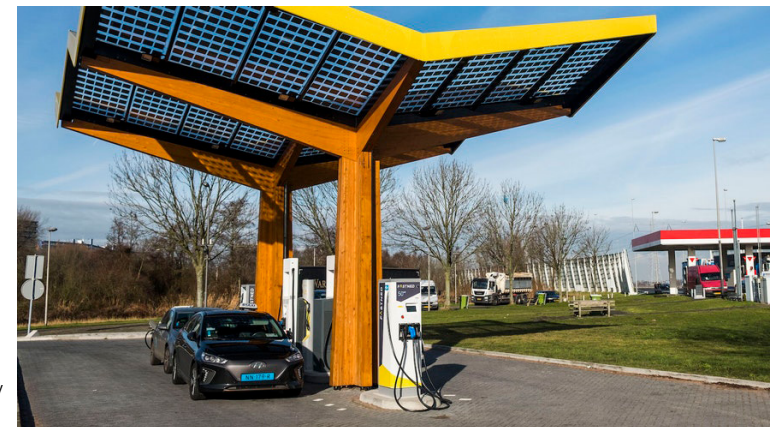
Implementing the principles in an exhibition

These three factors are interrelated, confronting visitors with the effect of an environmental issue can for example arouse someone's emotions, like feelings of empathy. It is good to realise that the means that lead to the enhancement of conceptions often negatively influence self efficacy. A study on the use of imagery for climate change engagement showed that to promote self efficacy the message conveyed by an image should be very different from images that make people feel that climate change is an important issue. Promoting self efficacy asks

for positive images, showing solutions, for example solar panels, electric cars and wind parks. Salience is promoted by showing the climate change impact, which on the other hand made people feel discouraged to do something about it. The images of the impacts distanced them from the issue and made them struggle in understanding how their actions could help (O'Neill, Boykoff, Niemeyer, & Day, 2013). It is likely that this will be the same for other environmental issues like plastic soup or the extinction of endangered species. Demonstrating the negative impact should be balanced with a positive approach. The majority of the people likes to know what they can do to help and pay attention to conservation messages in exhibitions, but they do not want to be overwhelmed with negative messages (Hayward, 2003).



Showing the consequences of climate change, a flooded street in Mumbai. This image is more likely to promote salience regarding climate change. (source: Wired)



A charging station for electric cars. This image is more likely to promote people's self efficacy regarding climate change. (source: autobahn)

7.3 CHILDREN AND SUSTAINABLE DEVELOPMENT

This section presents information that helps to get a better understanding of children's thoughts on sustainable development. In 2013 a report was published on children's attitudes and behaviour towards sustainability (NCDO, 2013). The results in this report are based on a survey among 1.033 children and focus groups with Dutch primary school children from group 6-8. Central themes of the focus groups were water, energy climate and food.

The results show that children do behave in a sustainable way. A large majority thinks about saving water, prefers to go to school by bike and rather puts on warm clothes than turning up the heating.

Understanding cause and effect

For children it is still difficult to understand that an event at a certain place in the world can have an impact at other places. Eleven and twelve year olds already understand the connection between melting ice caps and the Netherlands a bit better than nine and ten year olds. Children express more worries about the rest of the world than about the future situation in the Netherlands. One in six children worry about food and water scarcity in the Netherlands, while one in three children worry about

food and water scarcity worldwide.

Eighty percent of the children want to help to take care of the planet, for future generations. And almost half of the children would like to help to think about the future of the planet. The majority indicated that they feel like they can do something, as an individual, to slow down global warming. However, a vast majority also thinks that dealing with such global issues is especially something that all countries should work on together.

Coming up with solutions for sustainability issues

The group sessions with children showed that children are able to identify a wide range of sustainability issues. Also issues that occur far away from their own context, for example the lack of safe drinking water in Africa or child labour in Asian factories. Considering solutions it appeared to be easier for children to think of impersonal solutions (solutions they cannot contribute to themselves) than personal solutions (things they can do themselves, in their own environment). So concrete actions are difficult for them to identify.

Most of the concrete solutions mentioned by children are related to one of the following categories:

- reducing energy, water, paper and food waste

- recycling household waste
- collect money for poor countries
- buying more ecological and Fairtrade food

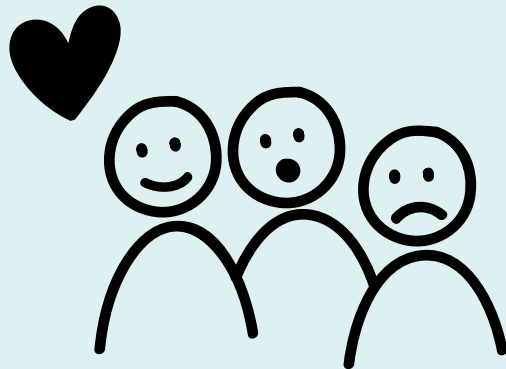
The report shows that children between nine and twelve like to participate in events that support sustainable development. They are able to name many issues related to sustainability, as well as solutions, and they try to behave in a sustainable way at home. However, research on child development suggests that this kind of behaviour can also be driven by extrinsic reasons instead of a genuine interest in the subject. Young children look for appreciation of others in their environment, and try to be a 'good child'. By taking ideological positions and coming up for the good cause they can demonstrate their 'good behaviour'. In puberty children are more likely to take positions to support ideas they truly believe in (Delfos, 1999).

On the next page the findings of this chapter are summarised. The visualisation shows the design principles that are useful for designing exhibits that have the goal to involve people in environmental issues.

PROMOTING SUSTAINABLE ATTITUDES IN AN EXHIBITION

arouse
emotions

for affective involvement



- confrontation
- empathy
- curiosity
- etcetera

challenge
beliefs

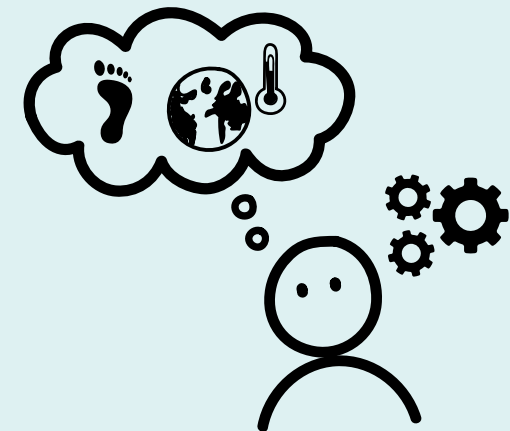
to promote self efficacy



- opportunity to share concerns
- present concrete examples

enhance
conceptions

to promote salience



- show evidence
- show effect
- show effort needed to reduce effect

Visual based on the theory in this chapter.

8 THE ONE PLANET VISITOR EXPERIENCE

How do visitors interact with the exhibits and with each other in One Planet?

The previous chapters presented a theoretical framework that helps to understand how dialogue and reflection can be facilitated in an exhibition and how visitors can be inspired to take care of the planet. This chapter studies the current visitor experience of One Planet. The aim of this research is to find out how visitors currently experience One Planet, and what the possibilities are for improving families learning experiences. Observations and interviews were done, over a period of two months. The theoretical framework is used to analyse the context. Besides for understanding the current situation, the research is also done to identify design elements that can positively contribute to creating an engaging and social exhibition experience. In this chapter the method and findings are discussed.

8.1 ANALYSIS OF THE FAMILY EXPERIENCE

To gain insight in how families behave during their visit to Museon and what needs they hope to fulfil, different methods are used to analyse the current situation. Observations are done to investigate how family members interact with each other and with the exhibits. Interviews with several families are conducted to get a deeper understanding of the interests and concerns of different family members, as well as to get an idea of what people take away from their visit. Reviews on the internet were used to get an impression of both positive and negative aspects of a family visit to Museon. The museum experience does not start and end with exhibition viewing. The experience also includes browsing the website to

search for visitor information, buying entrance tickets, having lunch at the museum café or looking for souvenirs at the museum shop. However, in order to find valuable information for this project it was necessary to focus on a smaller part of their experience, their visit of One Planet.

Interview method

In the museum, and especially on the second floor there is a lot to see. To make it easier for visitors to tell something about their experience after their visit, I made cards they could take with them during the visit. These cards show a floorplan of One Planet and the seventeen goal displays, and also the exhibition rooms surrounding One Planet. With stickers in four colours participants could indicate when they encountered something fun, interesting/

surprising, boring, or stupid/annoying. This idea is inspired by emotion maps that are sometimes used for user experience studies (Gabb, 2010). A semi-structured interview was used to give visitors the chance to share their experiences. Interviewing people both before and after their visit is very time consuming, therefore some families were only asked to participate after their visit (without using the card). The procedure is described in more detail in appendix C.

Observing interactions in One Planet

To explore how people interact with each other and with the exhibits at One Planet, I observed in the exhibition for several afternoons. On two Sundays, three holidays during the Christmas break, and a few hours on Wednesday afternoons. The goal was to find out whether families do things separately or together, what their conversations are about, and how this differs between displays. Furthermore, I studied which displays seem engaging or less engaging and if there are differences between what children and what parents like. To gain insight in the family interactions it is necessary to see the same family interact with more than one exhibit. Therefore six families were unobtrusively followed and observed during their visit of at least four displays / exhibitions. These results were used to find out how the family interactions influence

the visit. I also observed at most of the displays, to learn about the differences of interaction level, conversation level, and engagement level. Where people stop and look at the exhibits, whether they seem enjoyed or interested, for how long, if any conversations arise and if visitors interact with each other. Finally, the results were analysed to find out why some exhibits evoke more interaction, conversation or enjoyment than others.

8. 2 FINDINGS

Results from the observations and interviews were combined during the analysis. On the following pages the findings are discussed per subject: *visitor motivations and expectations, routing and orientation, communication of One Planet's theme, family interactions and exhibit engagement, dialogue and reflection* and *inspiration for sustainability*. *

Visitors motivations and expectations

During interviews, prior to their visit of One Planet, families were asked about their reasons to visit Museon. The results show that many families came to Museon because they looked for a nice activity to do together. Going to a place where the children would enjoy themselves was one of the main requirements. The reputation of Museon as a 'nice museum for children' where 'there

are a lot of things to do' convinced them that a visit to Museon would meet their expectations. A few families were specifically looking for a museum, but most of them looked for activities in general. Some would even prefer an outside activity if the weather would allow for it.

Grandparents and three boys:

"Het is slecht weer, we konden niet naar het bos." (Grandad)

Mother and daughter:

"We hebben vandaag meidenweekend. We zijn op zoek gegaan naar een museum en deze hebben we gekozen omdat we er nog nooit zijn geweest." (Mother)

Parents and three children:

"Het is een fijne plek om te ontspannen en nieuwe dingen te ontdekken" (Father)

Families come with the intention to have a nice day together, to relax, to be entertained and to explore new things. Some parents chose to visit Museon to let their children have a good time in a responsible environment, where they have the opportunity to learn something.

Others do not mention the educational aspect and see the visit especially as a social and enjoyable event. Children are sometimes more eager to do the activities, like the family workshops or the science show, than to visit the exhibitions. For the vast majority of the children the hands-on aspect is very important. A girl was even worried about whether the exhibitions she planned to see would be interactive enough:

Mother and 10 year old daughter:

"Het was op de site niet duidelijk wat je nu eigenlijk kan doen in de tentoonstellingen." (daughter)

"Ze maakte zich zorgen of het wel interactief genoeg was. Ik zelf dacht: het komt wel goed." (mother)

Although the entertainment and social aspect is very important, both children and parents really enjoy it when they learn something new. When I asked what they had experienced as most fun or interesting, it was often something that added to their prior knowledge. So the opportunity to explore and discover things is something visitors really appreciate. What they learn is not so important to them, they do not come to the museum with the objective to learn something specific. (Except families who visit

***Translations of the quotes can be found in appendix D**

the museum because the child is doing a school project on a subject related to one of the exhibitions.)

Comment on TripAdvisor Oktober 2017

“Kleinzoon en een vriendje hebben vanmiddag genoten van het grote educatieve aanbod, dus weten nu net weer iets meer. Zijn inmiddels vaardige ‘Ridders te paard’. Maar ook ik heb puzzels opgelost en dingen bijgeleerd, over waterverbruik bijvoorbeeld!”

A twelve year old girl liked the exhibition ‘Romeinen achter de duinen’:

“Daar waren lekkere recepten te vinden. Daardoor heb ik nieuwe ideeën voor recepten gekregen.”

Families certainly do not have the objective or the need to learn about how they can contribute to a more sustainable planet. They just like to learn about any theme they perceive as relevant to their life. Findings based on the post-visit interviews showed that families can have a great time in the exhibitions on the first floor and One Planet, without paying attention to the theme of One Planet. So from the families point of view, learning about sustainable

development during the museum visit is absolutely not required for a successful day out with the family.

Persona's

The text above describes the overall impression of families who visit One Planet. Of course there are quite some differences between the families. To be able to create a design that takes into account this diversity in families, and their motivations and needs, I have created family persona's. They represent the characteristics of families (within the target group) that I encountered most during the observations and interviews. The persona's are shown on page 44 and 45.



Enjoyable & Educational Afternoon

- The family visits Museon for the first time.
- Mother appreciates a safe environment where the children can explore independently.
- The family is interested in the topics of One Planet and talks about them during the visit.
- Children also have school projects related to sustainable development and at home they try to make environmentally sustainable choices.
- Learning new things is important for a satisfying experience.



Combining Omniversum & Museon

- The family has visited Museon a few years ago, they use to combine it with watching a movie at Omniversum.
- Children have a low concentration level during the visit, they look around and approach exhibits that seem interesting, which are mostly the hands-on installations.
- The family stays less than 1,5 hour in the museum.
- They like animals and nature but thinking about sustainability is not part of their daily life.
- Stay close to each other but do their own thing.



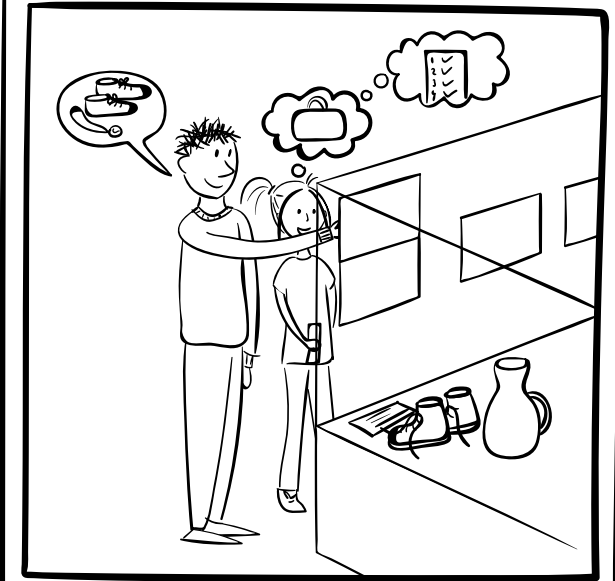
Frequent Visitors

- The family lives nearby and visits Museon several times a year, often on a schoolday afternoon.
- Stay close together but don't interact much with each other during the visit.
- Mother feels uncomfortable to interact with hands-on exhibits.
- Child enjoys exhibits on various themes on the first floor, like evolution and space.



Family Day Out

- The family visits Museon for the first time.
- Chose Museon because the children are interested in science. They are especially interested in the activities.
- Visit all exhibitions and stay in the museon for more than four hours.
- Sometimes split up in pairs or view exhibits on their own.
- Children like the interactive exhibits, parents prefer to read and view collection items or videos. They use the punch card.
- Are familiar with quite some themes in the exhibitions as they live in an energy neutral district.



Daddy Day

- Visit Museon for the first time, they informed themselves about the exhibitions on the website.
- Use a punch card, child is primarily motivated to collect all the stamps on the punch card.
- Father tries to slow her down and explains things about the content.
- First visit One Planet and then some of the other exhibition rooms.

Routing and Orientation

For this project it is especially interesting to look at how people visit the first floor. Since One Planet is a different exhibition than the seventeen rooms on the first floor it is likely to expect that people visit One Planet separately from the other exhibitions. In reality this is not the case. Instead of going from room to room or goal display to goal display they combine them which leads to a crisscross route. Sometimes skipping rooms or exhibits. When you look at the architecture of the space and the positioning of displays in combination how visitors behave in museums it could explain why this happens. The entrances to the exhibition rooms are big so even from a distance people see what is in there. If it seems interesting they enter the room, even though it is not part of the exhibition they are currently visiting. If you would visit the exhibitions separately you have to go through the whole first floor twice, which might feel unnatural. It also means that you cannot respond directly to your curiosity.

Communication of One Planet's theme

The way of visiting is also not surprising when you realise that some people do not see One Planet as one exhibition, and the rooms as different ones. The interviews showed that the distinction was not very clear. Also in online reviews visitors expressed confusion.

Family with two children, interviewed after their One Planet visit

“De indeling van het museum was eerst onduidelijk, wat hoort erbij de tentoonstelling en wat niet. Later wordt het wel duidelijk.”

(Mother) *“Horen de zalen er ook bij?”* (Father)

Comment on Trip Advisor February 2017

“Het kost even moeite om het centrale thema van de tentoonstelling boven te doorgronden, maar als je dat eenmaal gedaan hebt, is het een mooi concept dat kinderen goed bezighoudt.”

That visitors go through the exhibitions crisscross is in itself not problematic. It allows them to explore freely what they want and when they want. On the other hand, it is important that it is clear what the exhibition One Planet is about. Especially for the visitors for whom sustainable development is not something they think about in their daily life, it is necessary to clearly communicate the overall theme. The theme explains the overarching narrative and when this is missing it makes it more difficult for people to make meaning of the content. I did some additional in-

terviews to find out more about the clarity of the theme. I asked four families how they would describe the overall theme of One Planet. It was interesting to see how within one family everyone had his or her own explanation:

“Van oud naar nieuw” (Mother)

“Over mensen.” (12 year old girl)

“Over de planeet.” (Father)

None of the interviewees mentioned the SDG's. This is not surprising, because **most people in the Netherlands do not know what the SDG's are**. In a research conducted in 2017 seven out of ten people reported that they never heard of the SDG's. Only 9 % reported they know what the SDG's are (Boonstoppel, 2017). Since so many people are unfamiliar with the term, it is unlikely that visitors can easily identify it as the overall theme of the exhibition. It is explained in a video at the start of the exhibition, but **few people watch the introduction video**. Nonetheless, some people identified an overarching theme and described One Planet's theme quite sharp in their own words during the interview:

A father:

“De toekomst. De toekomst van de aarde en hoe we daarvoor moeten zorgen.”

All interviewees needed quite some time to answer, which shows that even though they had a clue of the theme, it was not easy to describe. Apparently the exhibition does not clearly communicate that the theme is sustainable development.

The experience in general

An interesting finding is that many **families spend a long time in the museum**. Much longer than the average family visit which takes between one and two hours (Dierking, N.D.). Families who stayed in Museon for over three hours were no exception. That already says something about how people enjoy the visit. The exhibition fulfilled the need to learn something as well as to have fun for most visitors. There were some occasions where visitors who visited One Planet before were bored or did not even want to go upstairs again, because they assumed that One Planet and the rest of the first floor would not offer them something new and interesting.

Family interactions & Exhibit Engagement

The results related to family interactions and exhibit engagement were analysed by categorising the observations (interactions, conversations, engagement) into three different levels. See Appendix E for an example of how observations were coded during the analysis. The findings

are summarized in an overview of the displays, which describes how they score on interaction, conversation and engagement level. This overview can be found on the pages 50-55. For the overview the goal displays are classified by what kind of interaction they evoke between the exhibits and the visitors (Play, Look, Listen and Quizzes & Puzzles). Note that all displays are included but not all are observed. Their score is an impression based on conversations with museum staff (mainly the guards, the people who spend most of the time in the exhibition), the interviews with visitors, and what I have observed unintentionally when I was in the exhibition. In the overview these displays are marked with a question mark.

By comparing the results it becomes possible to explain why some displays evoke more interaction and conversation than others. This resulted in the identification of a number of key elements for creating engaging exhibits that stimulate family members to interact and talk with each other. Those that are relevant for this project are summarised on page 56.

Dialogue & reflection

In general there are quite some displays that are successful in evoking conversations. Although the conversations are sometimes limited to how an installation works, there

are many cases where people really talk about the information on the exhibit. People see things they find interesting or discover something new and like to share that with family members. However, longer conversations, that include a form of reflectivity are rarely observed. And, it is exactly this type of conversation that supports long lasting learning experiences. In order to feel involved, and feel like you could also participate in helping to make the world more sustainable, it is necessary to make the link between yourself and the content in the exhibition. Involvement requires forming a personal opinion and reflection on your own role in the issue, as an individual or family. That is not something you could expect the visitors to do, if they are not handed the tools for this. As described in the previous chapter, the way that a museum tries to educate visitors, strongly influences how people participate during the visit. And as a result, what they take away from the experience. For a more active attitude, and to evoke dialogue, it is necessary to challenge people, to raise questions and arouse emotions. Currently the displays show a lot of information but even though it is relevant and interesting for visitors, they are not invited to form their own ideas. Just a knowledge transfer from display to visitor makes it difficult to evoke reflection and feelings of involvement. Exhibits that mainly intent to

transfer knowledge to the visitor will make them passively absorb knowledge instead of actively participate and learn (Franse, 2012; Hein, 2002).

The punch card is a medium that attempts to evoke active dialogic participation. This is partially successful. The effect of the card varies from just collecting stamps, reading the question and responding directly, to thinking or discussing about the answers. Some adults even got in a heated discussion.

Some conversations triggered by the punch card:

Girl reads question 6 out loud:

"Gooi jij weleens afval op straat."

Other girl responds: ***"Nee".***

Boy joins the conversation: ***"Ja dat zegt iedereen die het invult. Ik moet eerlijk zeggen dat ik wel eens iets op straat heb gegooit."***

Girl: ***"Ja een kauwgompje ofzo."***

Conversation triggered by question 13: 'Do you think climate change isn't all that bad?'

Man: ***"Eigenlijk zorgen mensen niet voor klimaatverandering. Dat gebeurt sowieso."***

Woman: ***"Jawel mensen zorgen dat het nu sneller opwarmt."***

Man: ***"Opwarming gebeurde altijd al, in bepaalde periodes, daar hebben we geen invloed op."***

Woman (clearly irritated): ***"Doe normaal."***

Some children said they learned more because of the card, or that it was more interesting because of the card. But it was also mentioned that questions did not relate to the content on the displays.

There are some aspects of the card that hinder dialogue or reflection. In its current state most questions are easy and fast to answer because they ask about the visitors preference. That does not challenge people to look at a subject from different perspectives and to consider the pros and cons of the answers. Furthermore, many questions are impersonal, in the sense that they ask about something that you as an individual cannot directly influence. For example: "Should poor people be given free solar panels?" Personal questions might be more challenging to answer. At the same time, this is also the strength of the card. It is accessible for different age groups, from young children to adults, because the use does not require much effort. A card that you bring along seventeen displays, raising complex questions or dilemmas for each SDG would probably be tiresome. This shows that involving people in an experience

that can evoke dialogue and reflection requires a longer focus on a specific subject.

Inspiring sustainable development

Research showed that in order to inspire sustainable attitudes and behavior people should be presented with concrete ideas that benefit the environment. To find out whether people gain new ideas for more sustainable behaviour in One Planet, I asked both schoolchildren and families about this, at the end of their visit. A visit for schoolchildren is different from a family visit. Schoolchildren often use the punch card and fill in a booklet with small assignments about each goal. Therefore it is likely that they have paid more attention to the content of the exhibits than other visitors. For both families and schoolchildren it was quite difficult to mention something they could apply to their own behaviour. Actually most people could not mention anything at all. Sometimes they saw ideas for sustainable behaviour but immediately said it was not something they could or would do themselves:

"Ehhhhh, ja zonnepanelen, maar daar gaan mijn ouders over. Dat kan ik niet zomaar zelf doen. Later zou ik het wel zelf doen." (girl, 1VWO)

"Nee ik heb niet echt dat ik nieuwe ideeën"

gekregen heb. Ja nieuwe eiwitten, maar ik denk niet dat dat zo gauw in de supermarkt ligt.” (father)

One girl gained insight in reducing food waste because of a question on the punch card:

“Dat je eten niet weg moet gooien als het over de datum is. Dat je het gewoon nog kan eten want het is tenminste goed tot dan, maar het kan langer.” (girl, 1VWO)

A particular finding is that several people mentioned it would be interesting to show the impact of human actions on the planet. Examples they gave related to visualizing the waste of resources (e.g. water) or the negative effect of plastic waste. It were only adults who mentioned this, and in two cases they referred to the ‘bad’ behaviour of their children. Similar to the findings in the literature apparently also some visitors see confrontation and awareness as an essential element in motivating sustainable attitudes and behaviour.

“Een zielig dood zeehondje met rietjes die uit de buik steken komt wel binnen.” (mother)
“Je zou het effect kunnen laten zien van ver-

spillen en zuiniger zijn. Op mondiaal niveau. Bijvoorbeeld bij papiergebruik en het kappen van regenwoud.” (mother of three children)

The findings from the interviews suggest that the exhibition barely communicates to its visitors how they can contribute to sustainable development. But do people actually want that? Are museum visitors interested in learning in Museon about how they can contribute? I have asked only a few interviewees what they think about this, but all of them responded positively. Children (secondary school) care about sustainability as they link it to their own future. Consequently, they would like to contribute. Concrete, simple ideas that everyone could implement in their daily life is something they would be interested in. What is also important is that tips about sustainable behaviour do not just tell what is bad, or what you should not do. It should give you alternatives.

Family with grandad, grandma and two children:

“Ideeën moeten niet alleen zijn van ‘minder plastic gebruiken’, maar ook alternatieven geven.” (Grandad)

Schoolchildren:




“Ja het is belangrijk, anders zijn we over 30 jaar allemaal weg” [about sustainable development] (Boy, 1 VWO)

“Het gaat wel over je toekomst, als je oud bent maakt het niet zoveel uit maar voor ons wel.” (Girl, 1 VWO)




“Ja het zou leuk zijn om meer van die simpele dingen te weten” (Girl, 1 VWO).

These findings are in line with the literature study, which showed that children do like to help, but find it difficult to come up with ideas they can implement in their own life. Offering the opportunity to obtain concrete examples would thus be valuable.




Engagement with exhibit (parent / child)

-  Joy or interest
-  Some joy or interest
-  No joy or interest

Interaction between family members

-  participating together
-  participating next to each other
-  no interaction

Conversation between family members

-  conversation about content
-  conversation
-  no conversation

? this display is not observed during the research, score based on interviews, conversation with guards and spontaneous observations.

Displays with play element



13. Animal planet



The displays 3, 7, 14 and 17 evoke a physical form of play, where you manipulate the exhibit with the whole body. Goal 4, 6, 12 and 13 require action but only in the sense of touching a screen or an object. All four displays with physical interactivity attract young visitors attention and are capable of holding that attention for a while. You see groups gather to look at each other and to wait for their turn to play the game. The play activities can take some time and sometimes cause impatience among (adult) family members. When children are playing at goal 4 and 13 you can often see parents lose their interest and hear them say they want to move on. A logical explanation for this, is that parents do not really have a role in these games. Apart from telling their children what to do.



14. Save the oceans



The displays with elements of play that are most successful on interaction level are 7, 12, 14 and 17. All these displays have in common that they ask for collaboration or competition between people. The opportunity to work as a team or do a competition contributes to a positive experience, as you see people together get absorbed in a game or enjoy their victory.

This high level of interaction is apparently no guarantee for evoking conversation. Some of these exhibits do evoke conversation but only limited to how the installation works or the expression of enthusiasm or disappointment.



3. XXXXL



4. Game on!



7. Alternative energy





6. Stop water pollution



17. Goal!



12. Good catch!



◀ Only one display in the play category really evokes conversation about the content: goal 12. What makes this display different from the others is that information on the display is necessary to play the game successfully. Besides, in this game every family member can take on a different role which allows for a high level of interaction. Mostly it is the youngest child who tries to catch a fish, older children or parents read the text that pops up when a fish is caught and explain the meaning of it. Then they can decide together whether they should throw the fish back or put it on the plate. This is also one of the few displays with a seat. That could also partly explain why families stay here much longer compared to most other displays.

Displays with a puzzle or quiz



11. Urban jungle
(source: Museon)



15. Regreening
(source: Museon)



◀ Even though puzzles or quizzes are somewhat similar to the displays with play elements, I made a separate section because they have aspects that distinguishes them from the play displays. The quizzes and puzzles combine both hands-on activity with information about the topic of the exhibit. To play the game or do the puzzle you need to look at this information. People might like it because it is challenging. In interviews it is also mentioned that the questions and answers helped to learn something about the topic.

When interacting with these exhibits you receive immediate feedback, something that especially children really appreciate. For goal 11, children would even like more feedback. Only the line connecting the cube and the photograph lights up, which some children perceived as disappointing. For these exhibits to be successful the difficulty of the questions must match with the children's knowledge and they should give parents the ability to help. At goal 15 for example, the questions are too difficult for young children, but during the quiz their is no time for explanation. In such a situation learning is not facilitated by the exhibit.

Displays with listening element



Goal 8 Wake-up call



The interactivity at goal 8 only consists of listening to audio fragments. In general the exhibit receives less attention. When visitors pass this exhibit they often interact with it shortly by listening to the headphones. Family members don not do this together, they listen to their own headphone. After listening to the fragments no thoughts are shared about what they heard. It is probably the listening aspect that makes it difficult to evoke interaction at this exhibit. Here listening is an individual activity and apparently the fragments are not interesting enough to share with group members.

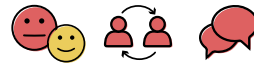
Displays with focus on looking



Goal 15 Regreening



Goal 1 Solar power



Goal 2 Protein a-plenty



Goal 3 XXXL



Goal 10 Colourful



Although people do not spend as much time at these displays compared to the play displays, you can still see many people enjoying them. They also evoke interaction and conversation. However, some displays do this more successfully than others. Goal 2 and 3 make adults and children share their thoughts on what they see. Both are also mentioned as exhibits that visitors really liked during the interviews. The animals and insects in pans make display 2 exciting. Children like to show their parents what they discovered in a pan. Display 3 shows unfamiliar types of candy. People are curious about what it is and children ask their parents for explanation.

Display 1 is less successful. Partly because visitors do not find it very interesting what they see. Interaction is difficult because most people look through the windows alone. Through one window you can see a cartoon film, which children really like while most adults do not find it interesting. They hardly respond when children say something about it.

At goal 15 you can see the effect of wind on sand by controlling the direction of the wind with a turning knob. Visitors' attention and concentration, and the time spent at this exhibit clearly indicate that both children and adults find it interesting to look at. Comparable exhibits - where you can also trigger action and observe the effect - were popular



Goal 9 Food miles



Goal 5 Girl power (source: Museon)



Goal 13 Animal planet



Showcases (Stones, animals, clothing) (source: Museon)

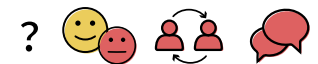


too. For example the volcano you can let erupt, or the rocket you can launch at goal display 7. During interviews people mentioned they liked these installations.

The showcases do evoke conversation between family members. Children and adults point at items and ask or say what it is and what they think of it. Conversation about the items arise when they arouse emotions (like amusement, or respect), when family members share an interest about the object, or when one of the family members tells a story or facts about the object. However, the latter sometimes leads to a one way conversation. Interactions at goal 13 are similar to showcases, but generally conversations are limited to pointing at the animals and saying the names or how cute the animals are.



Goal 16 On the run



Elements for exhibit engagement, interaction and conversation, based on research in One Planet

- Scary or nasty things work well to engage children (they arouse emotions).
- People like to learn and discover new things, some children appreciate elements that help to learn (asking questions, feedback).
- Children can get highly engaged with an exhibit for something completely different than the exhibition makers intended (playing volleyball with the cubes at SDG 11, a quiz that becomes a reaction game, the punch card run).
- Not everyone likes hands-on exhibits. The hands-on aspect might prevent people (especially adults) from interacting with it.
- Children like to show their parents what they discovered
- When something is new but still a bit familiar children get curious and want explanation.
- Individual activities (like listening, looking through a small opening) make interaction difficult, unless it makes the visitor so enthusiastic that others get curious.
- When an activity provides a role for children of different ages and for adults, they are stimulated to do it together.
- When only the child or the (grand)parent can participate in the storytelling or sharing of facts it might become a one way conversation (Showcases)
- Combining mental effort with physical participation in one exhibit is engaging and stimulates visitors to talk about the content. Especially when there is opportunity for collaboration.
- People like to share when they see something beautiful, cute or funny. (The showcases)
- Raising questions evokes conversation (the punch card), easy answers quickly stop the conversation.

RESEARCH CONCLUSION

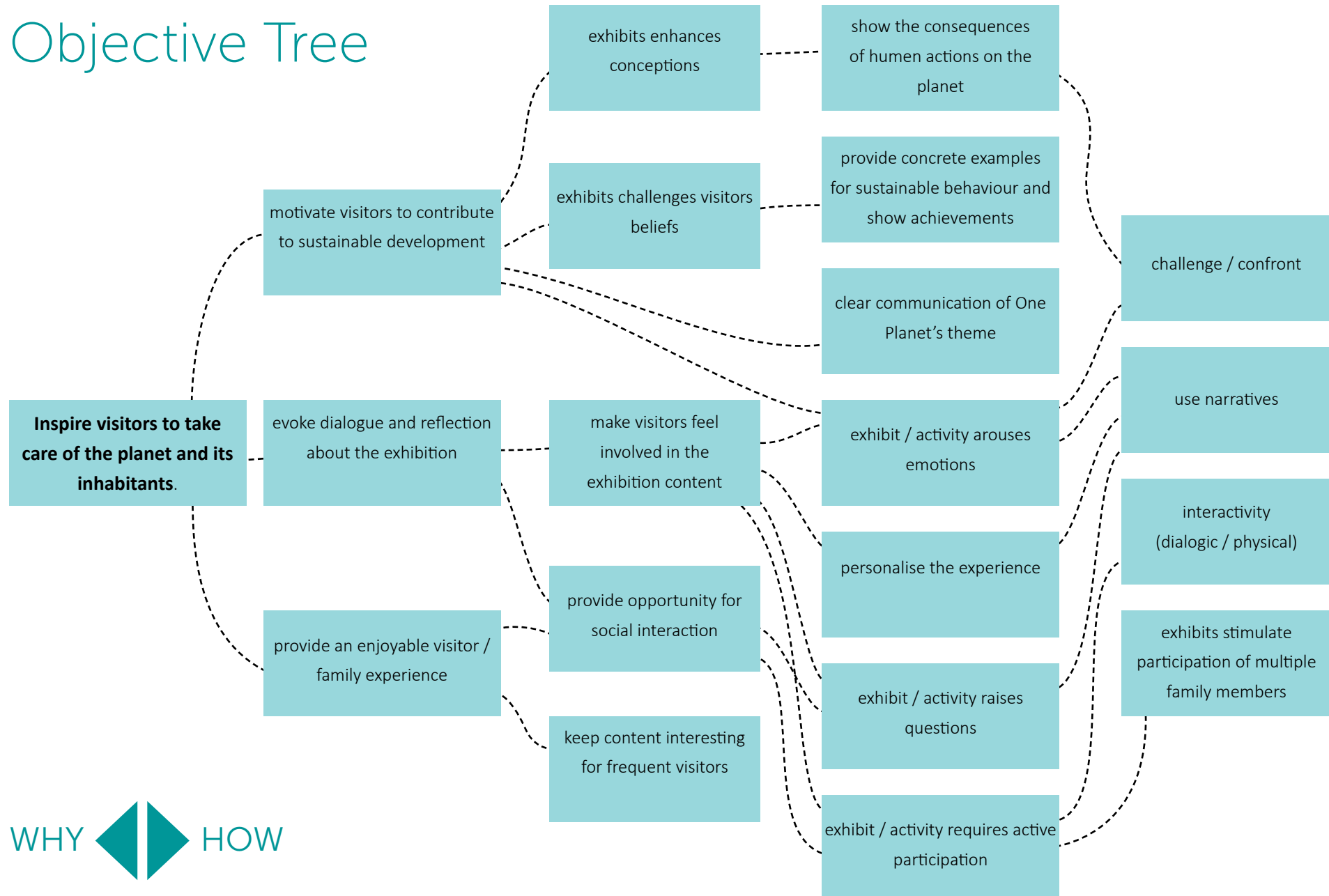
The literature study presented knowledge on how to create an engaging museum experience that provides opportunity for reflection and dialogue. It also showed how an informal learning environment can inspire sustainable attitudes and behaviour. This resulted in a selection of design principles that will provide guidance during the ideation stage. Although some principles benefit both elements of the design goal, like arousing emotions, others might oppose. Dialogue and reflection ask for a constructivist approach where the visitor is expected to make his or her own meaning from the experience. This requires open-ended exhibits that do not give clear explanations and the presentation of multiple views. Inspiring sustainable attitudes and behaviour on the other hand, requires the enhancement of visitors' conceptions and the presentation of concrete examples. This seems to ask for a more didactic approach.

In appendix F an overview of the design principles is presented and they are illustrated by inspirational examples from practice.

The research of the context showed that currently there is a lack of opportunity for dialogue and reflection, because the exhibition does not sufficiently support visitors to focus on a subject. Also, the one-directional knowledge transfer, from display to visitor, does not encourage dialogic participation and reflexivity. Moreover, the exhibition could give visitors more ideas on how they can contribute to sustainable development.

This chapter ends with the design brief which combines the insights from the previous chapters and the initial assignment. An objective tree is created as part of the design brief. The tree shows the objectives in more detail and visualises the relations between the different design objectives. Reading the tree from left to right gives insight in HOW the objectives can be achieved. Reading from right to left explains WHY an objective is included.

Objective Tree



WHY  HOW

9.0 DESIGN BRIEF

This project aims to design an activity that gives people the tools to reflect on and discuss subjects related to One Planet. Families should also have the chance to find out what they can do to help to take care of the planet and its inhabitants. A precondition for this, is that all family members enjoy the experience. Social interaction and participation are key in achieving the objectives. For dialogue and reflection it is required to create an open-ended activity, and to emphasise that visitors will construct their own ideas and knowledge based on what they experience.

Promoting sustainable attitudes and behaviour is a more univocal message. This does not necessarily have to interfere with being a place for dialogue. But, the exhibition should in the first place give visitors the opportunity to find out which issues they find important and care about and why, and what role they want to play in it. When they come to the conclusion that they would like to contribute to a more sustainable planet they should be able to find inspiration for how to do that. However, we should not assume, and not want, that all visitors leave the exhibition with similar ideas. Therefore, telling them what they can do to contribute should not be central to the visit of One Planet. Instead encouragement for sustainable actions should be presented in a free and open manner.

The design goal summarises the design objectives in one sentence. The interaction vision describes how the activity should be experienced by the visitors.

Design Goal

“Design an activity that evokes dialogue about the content of One Planet between family members and that gives them the opportunity to explore their own ability to contribute to sustainable development.”

Interaction Vision

Participating in the activity should be enjoyable, social, explorative, inspiring, and slightly confronting.

PART 2

DESIGN

062 Ideation

072 Conceptualisation

INTRODUCTION

Part three describes the design stage of the project. The aim of this stage is to create a design that answers the design brief as presented in part two. Several brainstorm sessions were done, in groups as well as individually. These sessions served to explore a broad range of solutions. Also children were involved in the creation of the concepts, six children participated in a co-creation session. A Research through Design approach was used to gain knowledge throughout the design process on how the desired outcomes of the design can be facilitated in One Planet. First three divergent prototypes were created and tested, implementing different design principles from part two. Based on the test results, the co-creation session and additional ideation, a concept direction was chosen. This concept is further developed by doing several iterations.

10 IDEATION

Two brainstorm sessions were held at the beginning of the design process. One with five people within the MuseumFutures Lab and one with three people from my family. These group sessions were done to broaden my personal view on the subjects and to get a wider range of solutions than I would come up with on my own. In both sessions How To's were created to explore ideas on how to implement different design principles that were identified in the research phase. Results of these session can be found in appendix G.

A selection of questions for the How To's:

- How to make an installation where children and adults can play with together?
- How to raise questions in an exhibition?
- How to arouse emotions in an exhibition?
- How to show different perspectives on the same subject?
- How to give concrete examples for sustainable behaviour, without giving answers directly?

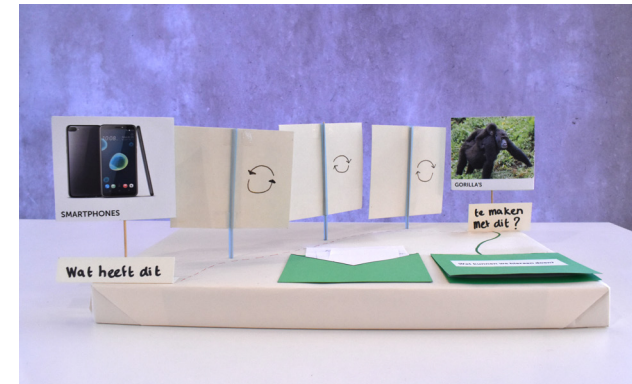
In following brainstorms that I did on my own, ideas created in these sessions were combined, altered and more ideas were added. This eventually resulted in the

first concept. For this project a Research through Design (RtD) approach whereby prototypes are being tested in the context is desired. Knowledge gained during tests can add to the design principles from the theoretical framework and the visitors' feedback from the test helps to create a concept that fits the context of One Planet and the target group. The RtD process started by doing several design sprints, whereby divergent ideas were tested. Later it focuses on iterating one concept. The concepts and tests from the ideation phase are described in the next paragraph. I also did a co-creation session at the beginning of the ideation phase, which is described in paragraph 10.4.

10.1 CONCEPT 1 'MISSING LINK'

What

The concept places two seemingly unrelated items- which can be images, sounds, smells, objects etc. - next to each other. However, there is a story that connects them, which is related to a sustainability issue. The idea is that the design should show multiple sets, so that people can choose what to explore. The prototype only shows one set because creating the content is time consuming. Both positive as well as negative examples could be part of the design. This concept presents a negative



Prototype of 'Missing Link' concept before people interact with it, the connecting story between the phone and the gorilla is hidden.



Prototype when all images are revealed. The prototype tells the story of deforestation caused by the mining of minerals that are used in phones. In the end it gives examples on how everyone can help to reduce the waste of the minerals.

issue, but it gives some examples on how everyone can do something to help. People can also write down their own solution.

Why

The intention is to arouse curiosity by presenting incomplete information and to gradually present a story that holds people's interests. The gradual reveal of information is also a part of the design to give people the opportunity to think about it for themselves. The concept addresses the principles of showing evidence and effect of human actions on the planet.

Test

The prototype was tested by three groups, two adults with their son (c. 14), two boys (both 10), and one boy (9) who was later joined by his grandma. The first family was asked to test the prototypes, the other ones interacted with it on their own initiative. During the test I observed the participants and I interviewed them afterwards to find out how they experienced it.

Findings

The first family, did not like it at all. They disliked both the interactions and the content. They perceived it as a too negative message and would appreciate it more when it

showed clear solutions for the problem. When interacting with it the mother and father referred to goal display 8 and after that quickly completed the 'linking story'. It definitely did not make them feel involved in the subject.

“Well, yeah that’s what happens with the gorillas...”

(Original quote: “Ja zo zit het met de gorilla’s maarja.”)

The two boys were more positive, they liked the interaction because it was presented like a riddle. When turning around the first image they also referred to what they had seen at display 8, but they continued exploring the link with more enthusiasm. Testing the prototype invited them talk about the subject, but it seemed like they were more telling their thoughts to me than to each other. So it is not clear whether the prototype on its own would also evoke a similar conversation. Also the nine year old boy liked it. He liked it because of the subject as he told me that he wanted to become a biologist. After turning the images and explaining how they were connected he wrote a comment about how to help the gorillas. This indicates his interest for the subject and prototype.

Conclusion

My presence during the test influenced the visitors be-

haviour because they directed their explanations to me. What they would do when interacting with it in a natural setting (talk to each other, reflect in their own mind or quickly stop thinking about it) cannot be concluded from this test with certainty. What did become clear, is that it arouses curiosity by showing something incomplete. A weakness is that some people perceive it as negative or irrelevant. Presenting multiple sets about different issues could make it relevant for more visitors, as they can choose themselves what they find interesting to explore. The negative aspect could be reduced by presenting solutions more clearly or by presenting other sets that show positive relations.

10.2 CONCEPT 2 WHO AM I? ANIMAL GAME

For the second concept a more specific theme was chosen to design for, namely animals of the exhibition. I set a direction at this stage because conceptualisation goes hand in hand with the content that is going to be presented. The topic of animals was chosen for two reasons, 1. the theme of animals can be linked to many of the SDG's. 2. animals can be the link between children's experience and the topic of sustainable development, since most children have an interest for animals.



Set up for the testing of concept 1 and 2.



Animal passports, and cards with hints about the animal.

What

The concept is a family game, that needs to be played with at least two people. There are different roles, the animal, the biologist and the animal protector. Multiple people can have a similar role. One person plays the animal. The other roles can start to ask questions to find out which animal it is. The 'animal' has an animal passport and cards to answer the questions by using prior knowledge or by showing the card or reading the card aloud. The biologist and animal protector can make up their own questions

or use the question deck of the game. The question deck questions are chosen in such a way that topics like the animals characteristics, habitat, behaviour, threats and solutions to help the animal, can be discussed during the game.

Why

The goal of this concept is to engage the family in a fun and social activity that at the same time enhances their conceptions about animals and the environment. The el-

ements of the game should invite families to talk about sustainability issues related to both the animals and their own lives.

Test

The concept was placed on a table in the middle of the exhibition. It was tested with eight families. Most of them were asked to participate. Some approached the table on their own initiative and were then asked to participate. The game was introduced with a short oral explanation.

During the test I observed the families, and I interviewed them afterwards to find out how they experienced it.

Findings

- The game was successful in engaging families, which was shown by the fact that they wanted to keep playing. Often until the animal cards were all used.
- Children were eager to ‘play’ the animal.
- Both children and adults liked it because they learned new things about the animals and because it was an activity they could do together.
- The game succeeded in evoking conversation about animals but not about sustainability issues. Both the questions and the answers related to these topics gained less attention. For the next iteration it should be considered how this topic can be brought up in a more appealing way.
- The answers related to sustainability made children sometimes confused instead of helping them to identify the animal. Probably the link between the problem and the animal was too abstract.
- Some animals, coral and the red panda were difficult to guess. This was by most people seen as something positive. Sometimes an adult joined their child in the role of the animal to help.
- Reading pieces of text is no problem even when it

is quite a lot together. Cutting it up in small pieces keeps it attractive. It should not be more than two to three sentences at once.

- Most of the families used the question deck for asking questions. Only two families did not use them at all.
- Two boys made the suggestion to use keywords instead of complete questions so that you have to think more about what to ask. On the other hand, when people adjusted the question a little bit, children became often confused and did not know how to answer because they could not find the card with the corresponding answer.

10.3 CONCEPT 3 ‘CHALLENGE TREE’

Whereas the previous two ideas were more about enhancing environmental conceptions, this concept addresses visitor’s beliefs on what they can do to contribute to sustainable development.

What

The prototype is a 80 cm height wooden tree, with paper circles and leaves. The circles can be used to write a personal challenge regarding sustainability. The leaves can be used to respond to another person’s challenge. White indicates: ‘I want to try this too!’ and coloured indicates ‘I

am already doing this!’. There is also a stamp which says “I can!”.

Why

The idea is that when visitors see each other’s ideas they feel encouraged. Different ways of participating are provided so that not only people who want to write down a personal challenge can interact with it. The stamp is a gesture of commitment. The test should show **how visitors in One Planet interact with an exhibit that asks for dialogic participation.**

Test

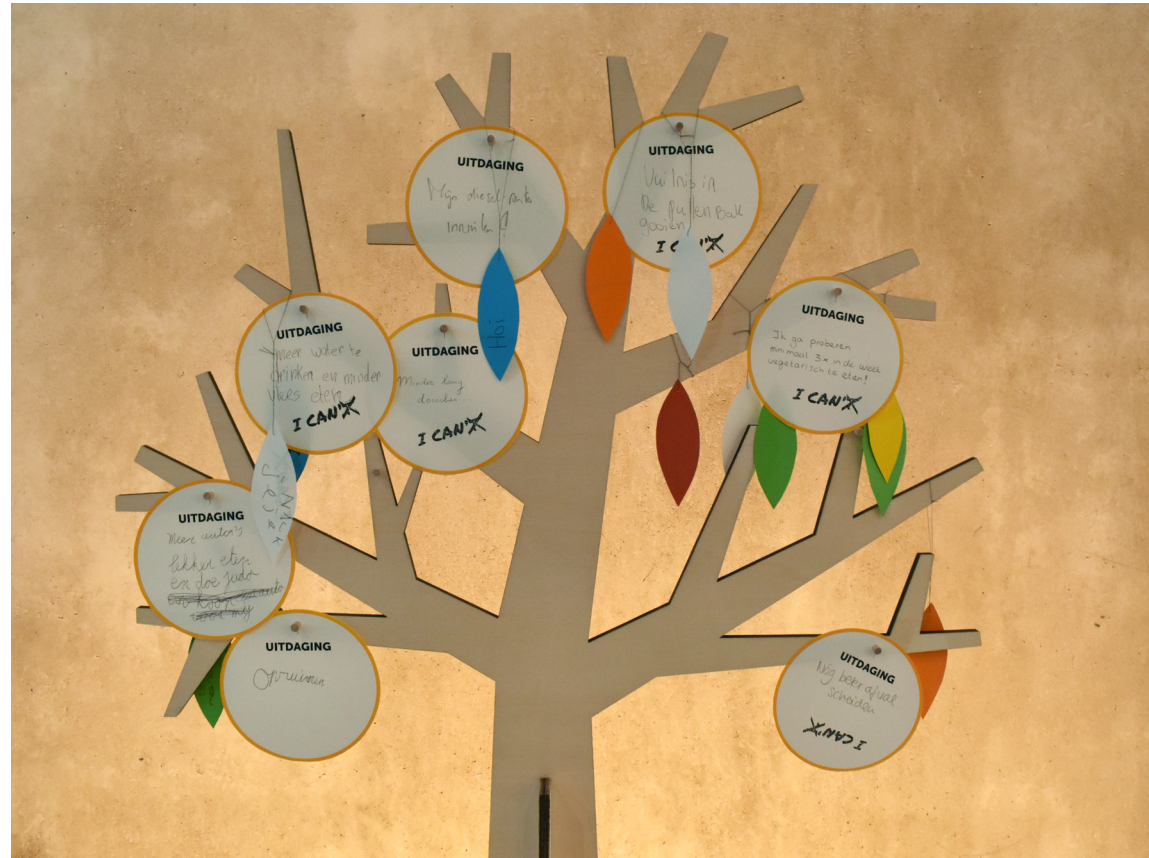
The prototype was placed on a table in the middle of the exhibition. Visitors were not asked to participate because the goal of the test was to see whether visitors interact with it on their own initiative. I did not observe because that would be too time consuming. I passed by occasionally and interviewed two families that I saw interacting with the prototype.

Findings

Quite some comments were written on the prototype in only three hours that the prototype was tested (see photos) while there were not many visitors in One Planet. This shows that the visitors like to share their ideas



with others, and are willing to make the effort of thinking about and writing down a personal challenge. Within families, children and parents made their own comment. The observed and interviewed participants first read the comments of other people and then wrote their own. Most comments were serious, only one boy thought it was more fun to oppose and write down his personal wishes. The leaves were also used, but often visitors wrote something on them too. Apparently more people wanted to write down their own challenge than just respond to others. Visitors' contributions show that this form of dialogic



participation stimulates people to make the link between sustainable development and their own lives, and to reflect on their own behaviour. From the interviews I could not tell whether visitors felt more encouraged. The people I interviewed seemed already confident about their ability to help, and were aware of the importance. Still, they did like to read other people's comments.

The table on the next page compares the strengths and weaknesses of the three concepts, in relation to the desired qualities of the design.

COMPARING THE STRENGTHS AND WEAKNESSES OF THE THREE CONCEPTS

	Missing Link	Who am I, Animal Game	Challenge Tree
Enjoyment	+ Arouses curiosity by showing incomplete information (reported by visitors)	+ Engaging, motivates to continue playing, because of the factor challenge, the topic and the social interaction. (observed and reported by visitors)	+ People like to leave a message and to read other peoples messages. (observed)
Educational	+ Requires participation and leaves the visitor in control on what to explore	+ Perceived as educational by children and parents (reported by visitors) - Subjects related to sustainability issues receive hardly attention. (observed)	+ This form of dialogic participation has the potential to provide visitors with new ideas for sustainable behaviour, without the necessity of the museum to dictate visitors.
Dialogue	- you can do it alone, decreasing the chance that it evokes conversation	+ - Visitors talk about the content for the whole duration of the game. Reflexivity however will be hard to achieve, as the focus is solely on guessing the animal. (observed)	+ Evokes conversations when group-members are around (observed) - you can do it alone, decreasing the chance that it evokes conversation
Reflexivity	+ aroused reflectivity		+ Motivates people to reflect on their own behaviour (observed)
Relation One Planet	- Presents an issue too much out of the blue (designers opinion)	- A strong connection with the exhibition is missing (opinion of stakeholder and designer)	- Is only used during a very short moment of the visit (opinion of stakeholder and designer)
Additional remarks	- Is considered too negative (reported by visitors)	- The way information about sustainability is incorporated is too cumbersome and therefore confusing. (designers opinion / observed)	Maybe it's only inviting to people that already think about sustainability in their daily life.

10.4 CO-CREATION SESSION WITH CHILDREN

During the ideation stage I did a co-creation session with six children from group 7 (10-11 years old). Conversations with Fenne van Doorn and Thomas Latcham, both experienced with co-creation sessions with young children, pointed out that having a specific subject and clear tasks for the children is important. Therefore I did not use sustainability but the more specific topic 'endangered animals' as the theme of the sessions. Reasons to choose this topic are similar as why it was the focus for my second concepts (the co-creation session was around the same time). The session served to find out why children care about animals and how they would convince others to help the animals.

The children received a sensitizing booklet four days prior to the session. This booklet included short writing and drawing activities about animals in general. See Appendix H for an example of a filled in sensitizing booklet.

The session started by discussing a few questions of the booklet. After that there were two activities. The first was making a collage about an endangered animal they care about. The second activity was creating a game that would motivate others to help the animal. The first activity was individual, the last activity was done in groups of two. The



session took one and a half hours, the exact set up of the session can be found in appendix I.

Insights Co-Creation session

The session gave me insight in children's thoughts regarding (endangered) animals, but also in their way of thinking and behaviour in general. The insights that are relevant for this project are summarised below.

children working on their own games
during the co-creation session

About children and animals

What they like and about animals: they are beautiful, they take care of nature (like bees), they are stubborn (which is not always nice), they are unique, sometimes they look or act like human beings.

What they do not like and about animals: They are stubborn, and they do not understand people's intentions.

What they think is sad: What humans do to animals (how humans treat animals), chihuahua's in purses or coats, that people are hunting animals, that they are being slaughtered, that they are being caged (the zoo). Many of the kids were vegetarian.

Why it is terrible that animals are endangered: That few of them are alive, they are so beautiful, sometimes the endangered animal is their favourite animal.

How they think they can help: Even though the children want to help, they find it difficult to come up with things they can do themselves. Donating money, supporting animal protection, eating vegetarian, using every part of a slaughtered animal are solutions they come up with. They all chose animals that live far away which also makes it more difficult to come up with ideas to help.

Mentioned subjects about endangered animals: Plastic soup, elephants and rhinoceros that are being hunted for the healing power of their horns/fangs; polar bears and their declined habitat thanks to climate change; panda bears that are losing their habitat thanks to deforestation.

About the children

Creating: The children expressed themselves more easily by writing and tinkering than through drawing. They hesitated to draw because they said they could not draw

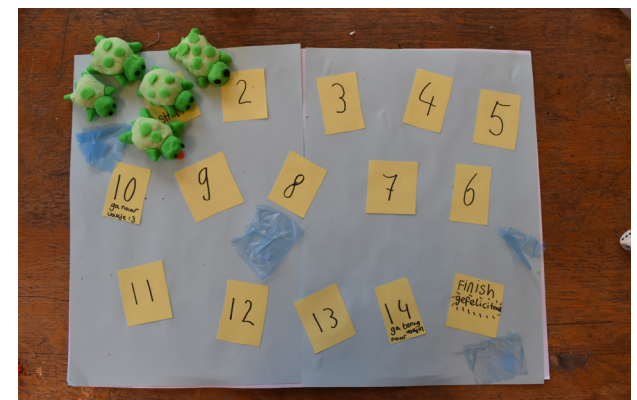
Results from the second activity, from top till bottom:
1: A game to protect elephants. Players use real money that will later be donated to an elephant protection program. 2: Soccer for brown bears. 3: Plastic soup game.

what they had in mind. Claying made them really enthusiastic and creative. The children were not so creative when it came to the form of the game (2x game of goose and 1x soccer), but they had interesting ideas for the content. They thought about how it would be played, and how to make it interesting for the players. For instance they considered the tasks for the different squares of the board game.

Authenticity: They want to create their own idea and want to emphasize it is their idea. They pay attention to what others say and do. If someone does or writes something similar, the children immediately say their idea is being copied. They are quickly satisfied with their work. If they come up with an idea, they continue with it. They do not think of alternatives.

Knowledge: They know quite a bit about animals and have a strong opinion about these matters. For example how people treat animals. Sometimes these things are (partly) incorrect. They often correct one another spontaneously, for instance about what an animal eats or where he lives. They also ask each other things to find out more about their chosen animal or to get confirmation.

Insights from this co-creation will be used for further steps in the design process. Children feel bad about endangered animals because there are not many left of



them, or because it are beautiful creatures. However, they only come up with a few species, and all of them live far away. A design that shows both the beauty of other species and shows how fast the population is decreasing, has the potential to make children care about wildlife. If those species live in the Netherlands, they might even feel more empowered to take action themselves.

10.5 CONCLUSION FROM PROTOTYPE TESTS AND CO-CREATION SESSION

The tested prototypes had some strengths, but cannot yet define a concept direction. The 'Challenge Tree' has the potential to evoke reflection and gives opportunity for dialogic participation, which is obviously something that the visitors appreciate. On the other hand, this concept does not enhance visitors' conceptions and is less likely to engage visitors who do not pay attention to the sustainability message of One Planet. The first two concepts do enhance conceptions but miss a strong link with the exhibition. Also they bring up sustainability issues in a somewhat forced way, which decreases interest, attention or causes confusion. More ideas were created, keeping in mind these strengths and weaknesses and the insights from the co-creation session. This resulted in a new concept. The process for the development of that concept will be described in the next chapter.

making collages about endangered
animals



11 CONCEPTUALISATION

11.1 CONCEPT 'EXPEDITIONS'

Whereas the previous concepts were designed for an activity at one location in the exhibition, the new concept is completely connected to the visit of One Planet. The idea is that visitors can choose to do an exploratory journey through the exhibition. These 'expeditions' should support visitors with focusing on one theme, so that it becomes possible to facilitate reflection and dialogue. When they arrive in the exhibition, the expeditions are introduced and families can choose a theme of their interest.

A too much content based approach for designing the expeditions

For the development of the expeditions I first took an approach that turned out to be too much focused on the content and not enough on the interactions. The difficulty of this approach was to design it in such a way that it would evoke dialogue. Besides, putting specific content and collection items central to a whole expedition becomes problematic when Museon decides to change the showcases.

Framework used for the first iteration

The framework on the next page was created for the development of the expeditions. It is based on the design

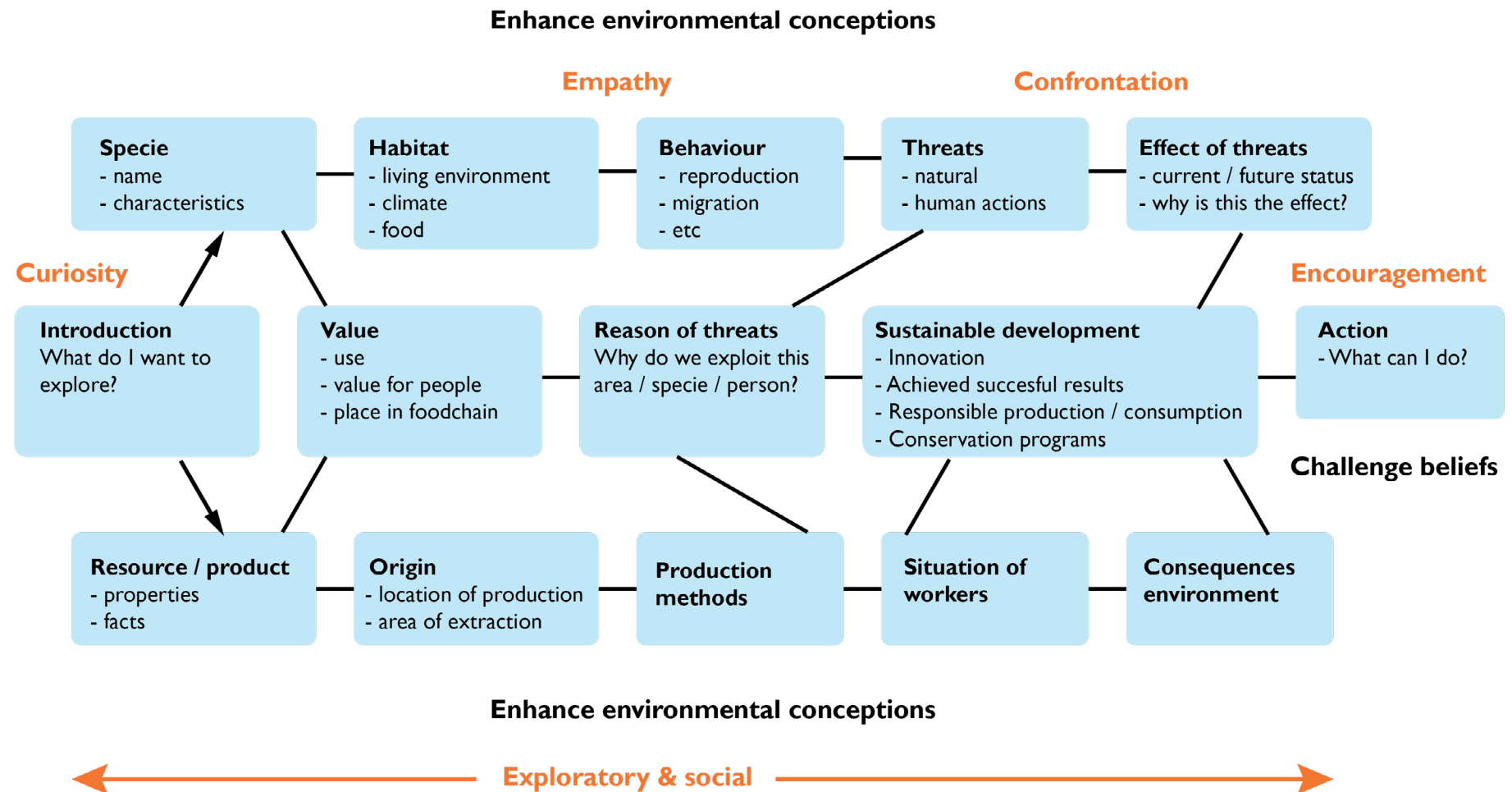
principles for promoting sustainable attitudes and the insights gained during the ideation phase. Aspects that children find interesting about animals are its characteristics, behaviour, habitat and value for the planet or for people. Having the opportunity to learn about these aspects also enhances conceptions about the subject and helps to link environmental issues to the animals. Confronting people with the evidence and effect of human actions is required to stimulate positive attitudes towards conservation practices. Lastly, the expedition is not complete without encouraging visitors to take action themselves. Therefore positive messages, like solutions, concrete examples for sustainable behaviour and achievements, should be presented as well. In short: the expedition should present a rich context, the (environmental) issue and possible solutions. This can be applied to living species, but also to products (e.g. clothing). Moreover, when the expedition is able to arouse visitors emotions it will be more meaningful and effective.

The framework helped to determine the content for the expedition but did not give guidance in designing the interactions between the design and the visitors. Although I did of course take the interactions into account while designing, this approach did not lead to a satisfying design. The design became rather complicated as well,

with a lot of additions required in the exhibition, which is undesirable for the stakeholder. Page 74 briefly describes some aspects of the first iteration.

After realising that it was not the direction to go I took a fresh perspective on the design of the expeditions. This time with the design principles for evoking dialogue and reflection as a starting point. I did not completely forget about the framework for the content, but it was now more on the background. I also used a new interaction vision that more specifically describes the desired interaction qualities for this concept than the one in the design brief.

FRAMEWORK FOR DEVELOPING THE CONTENT OF AN EXPEDITION



The framework above shows the kind of content that an expedition should include in order to inspire sustainable attitudes, but it does not say much about how to engage the visitors in the activity and how to evoke conversations.

SOME ASPECTS FROM THE FIRST ITERATION OF THE EXPEDITIONS

The design intends to immerse the family in the subject matter by letting them step into the shoes of a researcher. As a group of researchers the family can decide on what kind of expedition they want to go and what specie or subject they would like to observe. After choosing the subject (e.g. coral or sea turtles) a world map appears, presenting the destinations of the expedition. Consequently the world map disappears and the One Planet map emerges, with the same red dots. The dots show where these real places can be 'visited' in One Planet. After copying these stops in their log book the family can start the expedition by following the stops. Stops are existing displays in the exhibition, but also some additional stops will be created.

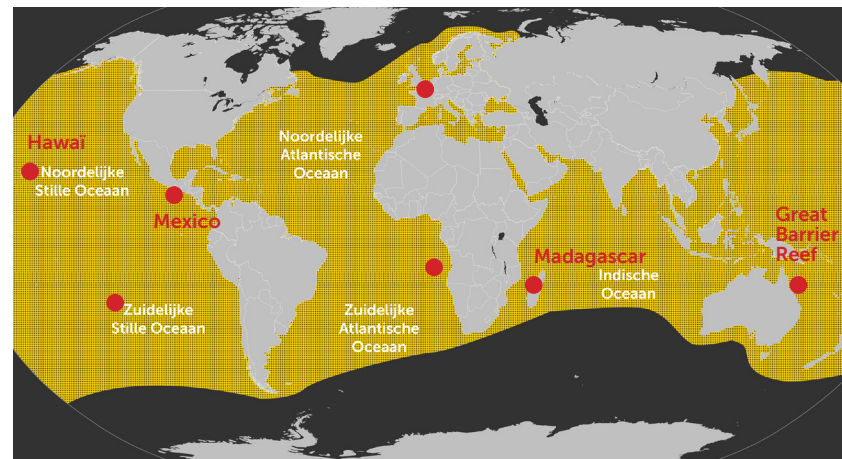
Virtual reality

An example of an additional stop is an 'expedition outpost' where the family can observe their subject in virtual reality (VR). This could be for instance a 360 degree VR film of the underwater world. There are films like this which also show the human impact on the natural environment. Letting visitors experience this in VR has the potential to make them aware of the consequences as well as to emotionally involve them. A weakness of using glasses is that the visitor will be closed off from his surroundings, which makes it less likely that visitors will talk to each other during the activity.

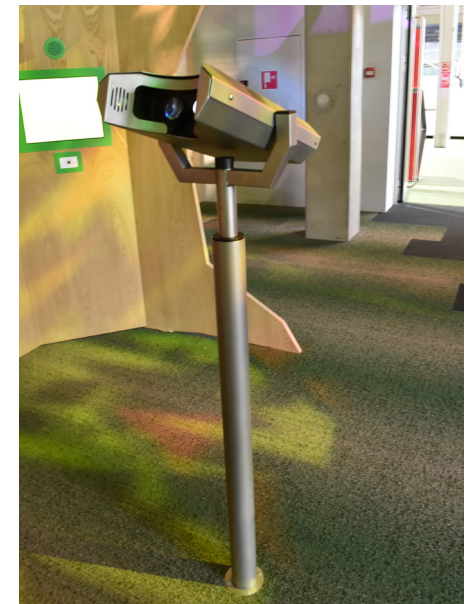
In contrast to this idea for the expeditions, the final concept does not intend to immerse the visitors. For reflection and dialogue it seemed to be more effective to let the visitors experience One Planet from their own personal perspective. Which makes asking about their opinions or behaviour more straightforward. In some parts of One Planet immersion can certainly enhance a meaningful learning experience related to sustainability, because of its strength to arouse emotional involvement. But for my project it did not lead to the desired interactions.



Visitors can choose a theme and a subject to investigate. Having so much choice made the concept too complicated. The development of the content would take an immense effort for Museum.



One Planet presents different geographical perspectives. During the first iteration this idea was used for the design of the expedition.



The idea of the VR binoculars was inspired by a visit to Technopolis in Mechelen. There you could spot birds and other animals with the binoculars.

11.2 INTERACTION QUALITIES

For the further development of this concept a metaphor is used to illustrate the desired interaction qualities.

“It should feel like receiving tips from locals on what you may like to explore at your holiday destination.”

The interactions qualities that are present in this interaction vision are:

Mutual interest: Visitors have interest in the place, that is why they are there. The museum should show interest in the visitor, ask questions and care about the answers.

Guidance: Based on their interest visitors receive guidance during different moments of the activity. Having a goal and an idea about what they can expect should help visitors to focus and motivates exploration.

In control: Although they receive guidance visitors should still feel free in what to explore. Besides, they are invited to give their input at several moments of the activity.

Inside information: The design should give visitors the opportunity to explore more than they would do without.

11.3 CONCEPT DEVELOPMENT

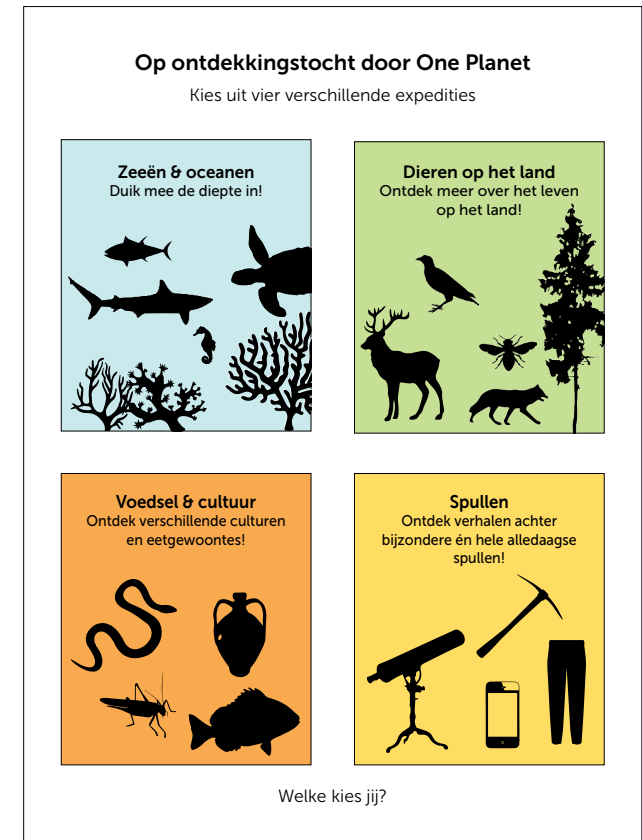
In consultation with several employees from Museon, four themes were chosen for the expeditions: *seas and oceans*, *life on land*, *food and culture*, and *things*. A test with 24 visitors (seven families) was done to (1) find out what they think about doing an ‘expedition’ instead of finding their own way through One Planet, and (2) see if the chosen themes were perceived as interesting.

Eighteen visitors said they would like to do an expedition, the other six preferred to visit One Planet on their own. Reasons why people want to do an expedition were:

- to find out more about a specific subject of personal interest (the ocean, animal and food expedition)
- to find out something new (things expedition)
- to get some guidance while visiting One Planet

All four expeditions were chosen by some people as their first choice, however the *things* expedition was only chosen twice, and most people chose it as their least favourite. The theme for this expedition should be adjusted so that it appeals to more people.

This new approach resulted in design interventions that require less additional content and that can be made with relatively simple additions. An outline was created



Poster to test what visitors think about the concept

for the expeditions. Especially the design principle of dialogic participation was leading. At various moments during an expedition visitors will have the chance to make choices, give their opinion, or to leave a message behind for other visitors. The following pages present the draft outline for the expeditions concept. Later in the process, every element on itself was designed in more detail.

11.4 DRAFT OUTLINE CONCEPT EXPEDITIONS

Just as during the previous iteration one theme, the Seas & Oceans expedition, is chosen to elaborate the concept.



When you enter One Planet the expeditions are introduced



Zeeën & Oceanen Expeditie

Deze gele stippen op de kaart geven de plekken aan die horen bij de Zeeën & Oceanen Expeditie.

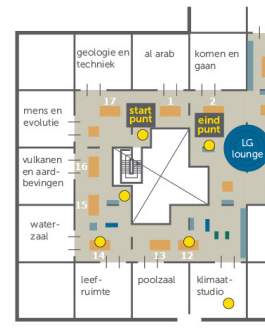
Tijdens je tocht kom je deze borden tegen:

Deze helpen je om nog meer te ontdekken over het leven in zeeën en oceanen.

Wat vind jij? Bij deze borden kun je je mening achterlaten.

Veel plezier!

Plattegrond One Planet

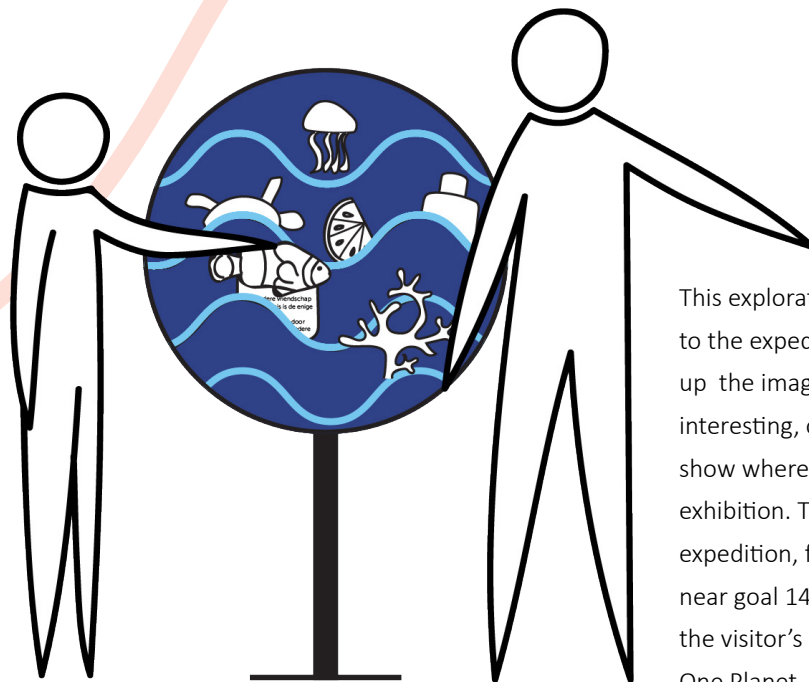


The first step is choosing an expedition and getting a log book. The log book shows where the stops are.

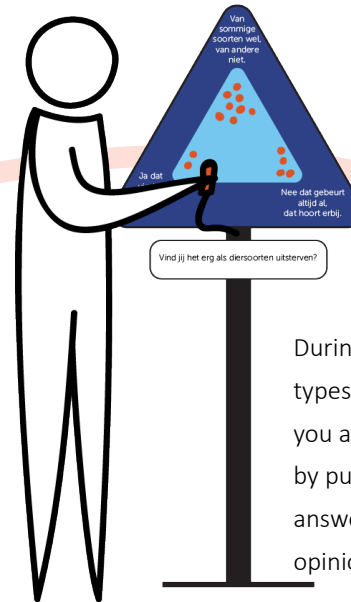


For the Ocean and Life on Land expedition the first stop is a puzzle to learn about the food chain of the ocean or for the animals on land. There are also items to touch or smell, which are linked to the food chain. For example a piece of coral, sepia or seaweed.

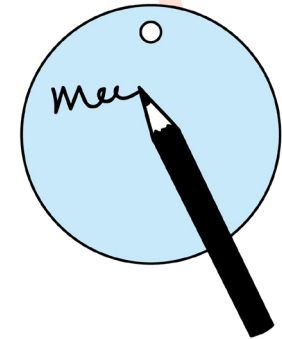
During the ocean expedition you will visit the parts of One Planet that are related to the underwater world, which are goal display 12 and 14 and several showcases. Also the Climate Studio is part of the expedition.



This exploration board introduces topics related to the expedition in an appealing way. By lifting up the image cards the visitors can find out fun, interesting, or confronting facts. The cards also show where to find more about that topic in the exhibition. There are two of these boards for an expedition, for ocean one near goal 12 and one near goal 14. The board creates the link between the visitor's prior knowledge and interests, and One Planet.



During the expedition you will find two types of boards. This question board asks you about your opinion. You can answer by putting a stamp near your preferred answer. You can also see other people's opinions.



At the end of the expedition you have the opportunity to leave a message, or to read other people's messages.

PART 4

EMBODIMENT

080 The Final Design

091 Evaluation

098 Revision

101 Recommendations

INTRODUCTION

This part describes the details of the final concept. One of the expeditions is elaborated to illustrate the desired interactions. Physical prototypes are made for a part of the expedition to test with visitors at the Museon. Eight families were invited to test the concept. The results of the test will be described in chapter 13. Based on the test results suggestions are made for the redesign of the concept in chapter 14. Chapter 15 describes further recommendations for the Museon, to take into account when implementing the concept.

12 THE FINAL DESIGN

This chapter shows the different parts that make up the expedition in more detail. One of the themes is elaborated as an example. For all themes a route is mapped out, giving an indication of which exhibits and exhibition rooms can be included in each theme. For this project I designed the layout and content of the seas & ocean expedition.

Each expedition starts at one of the two starting points, near the One Planet entrances. The floorplan on the next page shows the parts that are included in the ocean expedition. A floorplan with the other routes can be found on page 99.

Themes

life on land expedition

seas & ocean expedition

inventions & science expedition

food & culture expedition



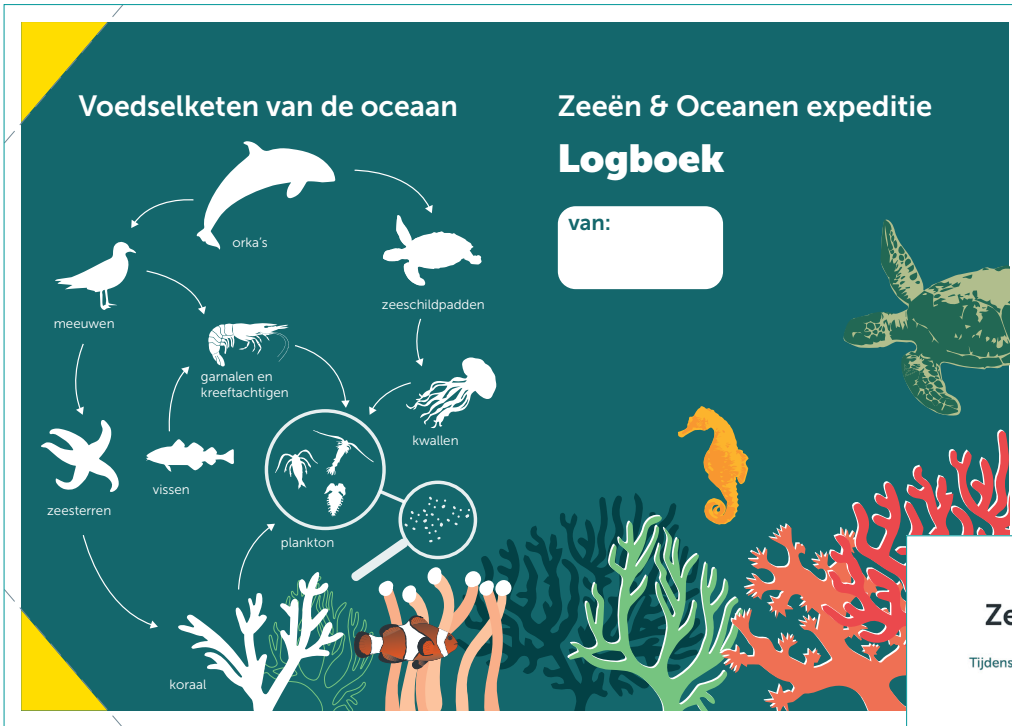
When entering One Planet, the expeditions are shortly introduced. The introduction board is placed close to the introduction display for the punch card, but this should not be problematic. The activities are clearly distinct and the simplicity of the expedition introduction makes it for visitors easy to understand what the purpose is. They can then choose to see everything with the punch card or to focus on a specific theme. After choosing an expedition visitors can take a log book. The log book contains further instructions for the expedition.

The stops for the seas & ocean expedition

- starting points and end point are the same for each expedition
- exploration board
- question bord
- ★ start activity



The exploration boards are linked to nearby exhibits that are part of the expedition.



Log book

The log book shows where the stops for the expedition are. It has the same colour as the boards of the expedition, so that people are certain that they found the right board. The booklet can also be used during the first activity. The yellow corners can be ripped off to answer the questions at the question boards. After the visit children can take the booklet home as a souvenir.

The booklet is A4 format.

Zeeën & Oceanen Expeditie

Tijdens deze tocht door One Planet kun je van alles ontdekken over de onderwereld.

- Over de voedselketen in de oceaan
- Hoe mensen het leven onderwater beïnvloeden.
- Hoe we met z'n allen het leven in zeeën en oceanen kunnen beschermen.
- En je komt allerlei voorwerpen en activiteiten tegen die te maken hebben met zeeën en oceanen!

Tijdens de tocht kom je deze borden tegen:

2x

Deze ronde borden helpen je om meer te ontdekken over het leven in zeeën en oceanen.

De icoontjes op het bord geven een tip over de tentoonstelling.

2x

Bij deze borden wordt een vraag gesteld en kun je je mening achterlaten.

Plattegrond One Planet

Deze gele randen op de kaart geven de plekken aan die horen bij de Zeeën & Oceanen Expeditie.

Veel plezier!

ontdek de wereld
MUSEON

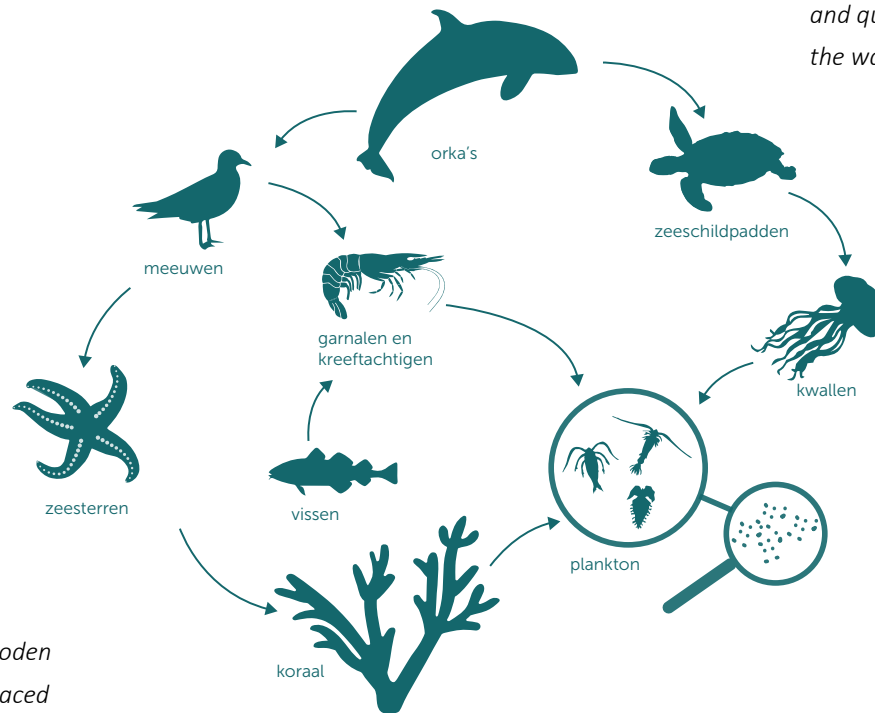
SUSTAINABLE
DEVELOPMENT GOALS

gebruik deze hoekjes om je mening te geven

gebruik deze hoekjes om je mening te geven

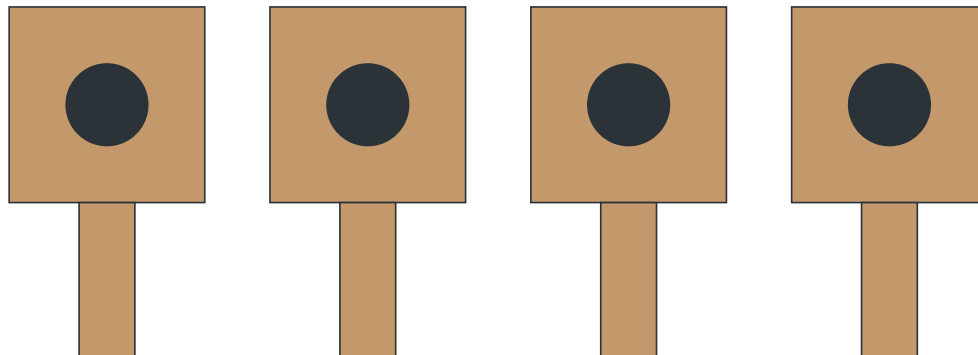
Wie eet wie?

*Foodchain image
and question on
the wall*



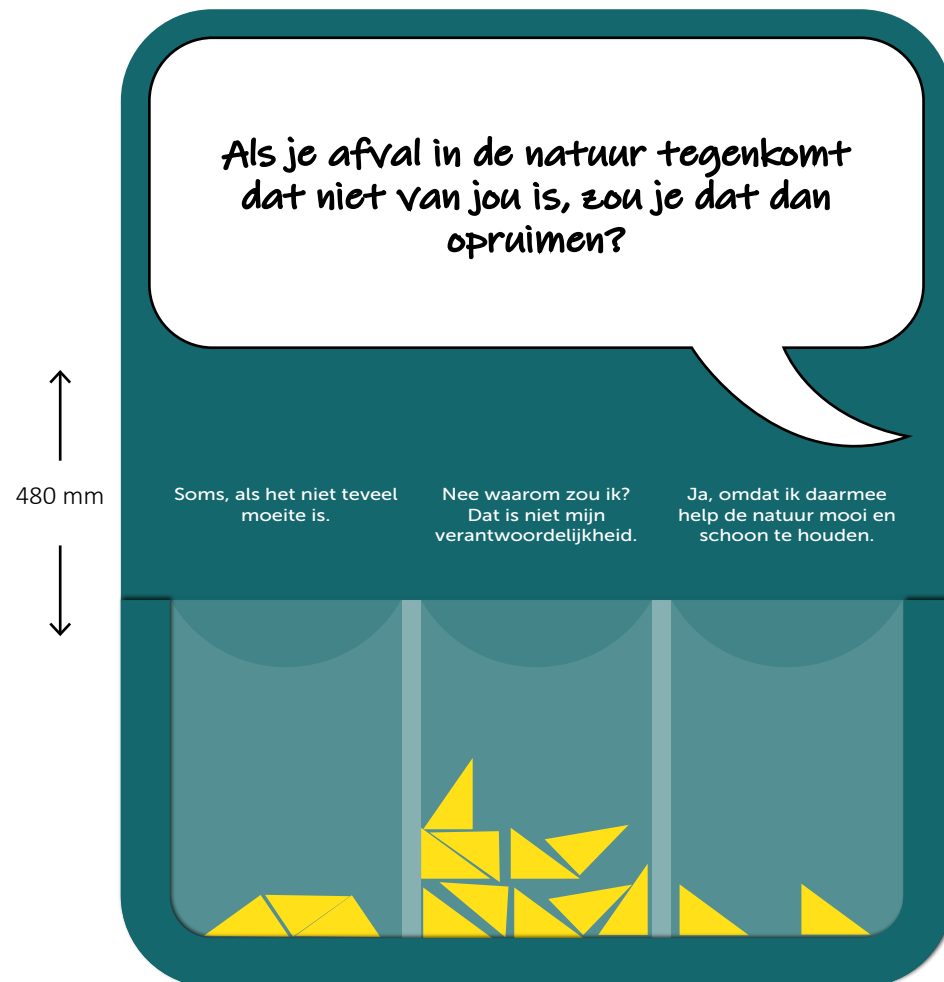
*standing wooden
feelboxes, placed
in front of a wall*

Van welk dier voel je het eten?



Start activity

The first stop is meant to let families dive into the theme by using multiple senses. It should invite collaboration between family members. For the ocean expedition it are feel boxes with food for ocean animals. What is inside should be exciting to feel. This can be realised by choosing objects with an interesting shape, or objects you do not see every day. One of the boxes contains plastic bags, to evoke conversation about animals eating plastic.

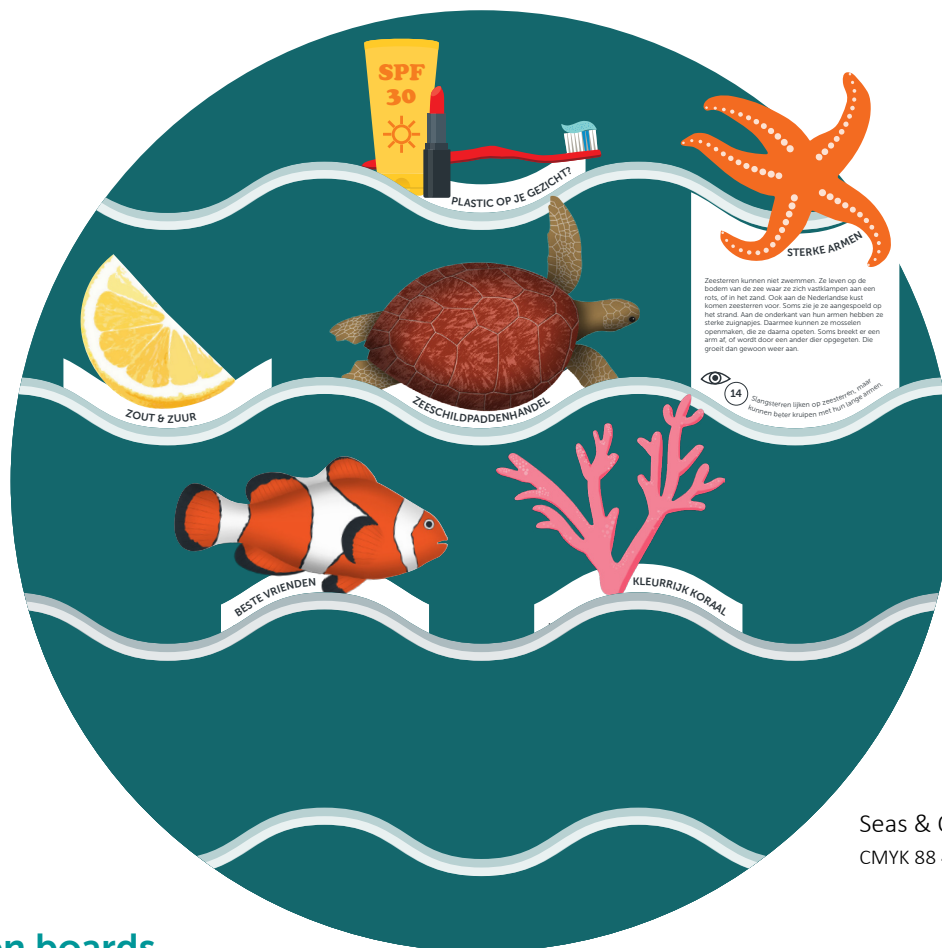


Question board

For each expedition there are two question boards with multiple choice questions. Families can answer by using the log book. The questions should be related to the theme of the expedition and at least one of them should address an (environmental) issue. The purpose of these boards is to incite reflection and conversations, therefore the question should be personal (what would *you* do, what do *you* think). That is also why it shows the answers of other people. Seeing other people's answers and leaving behind your own makes it a more interesting activity.

The boards are made of a wooden panel and will be placed on the wall or on a column. The container for the pieces of paper can be removed so that it can be emptied when necessary.

↑
660 mm
↓



Seas & Oceans
CMYK 88 44 51 19

Food & Culture
CMYK 0 33 92 0

Life on Land
CMYK 68 31 99 15

Inventions
&
Science
CMYK 88 99 30 20

Exploration boards

Families will find two exploration boards during their expedition. These boards will show them what there is to explore about their theme, and where. Every board is placed near the exhibition rooms or goal displays that are linked to the board. This board for example is placed near goal display 12, a showcase with sea turtles, and a screen on the floor displaying an underwater film.

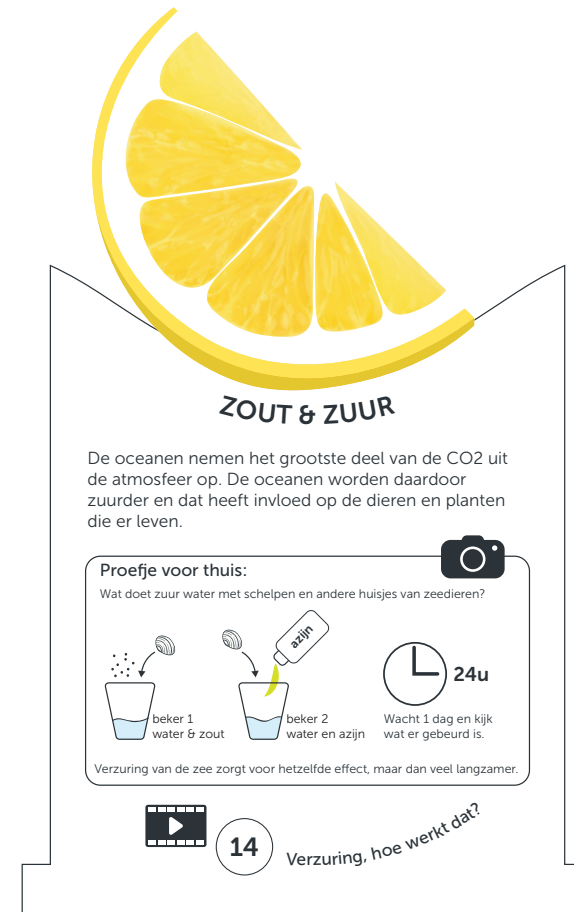
The boards and cards are made out of plywood with a print. The board is build up in seven layers and is 26mm thick. It will be placed with the bottom at a height of 78 cm, so that children within the target group can reach all the cards. It is demountable to make it possible to change the content.

Both the colours and pattern of the boards differ per expedition so that families know when they found the right one. Colours are chosen that harmonise with each other and with One Planet's yellow colour. The colours also have a link with the theme.



Cards

The cards on the board can be pulled up and give some information about a topic in the exhibition. That information is linked to a tip. This tip highlights for example a collection item or a movie. The purpose of these tips is that children feel more motivated to explore the collection items and other forms of content in One Planet and the surrounding rooms. Some tips are formulated as a question, motivating the families to discuss what they see. The cards should present different kinds of information, some may include interesting or funny facts, others confronting information (e.g. the amount of plastic that



ends up in the Mediterranean Sea everyday). For every expedition there should be a card with an activity that children can do at home (e.g. an experiment), this can expand the learning experience beyond the visit. Important is that the information on the cards is comprehensible and relevant for the children of the target group. As the board is placed near the exhibits that are linked to the cards, families can come back several times to explore more tips.

The other four cards can be found in appendix J. Only one board was created, because creating the content is time consuming and not the main purpose of this project.

85
CENT

BEDREIGDE DIEREN

85
CENT

POST
★



FIRST
★



Alles over het planten- en dierenrijk
HET GROTE BOEK
VAN DE

Natuur

alles over het planten- en dierenrijk



Peter Goes

Rivieren

Een reis langs zeeën, meren en rivieren

de & de grondel garnaal

Geert-Jan Roelofs
Margot Westermann

en andere vreemde vriendschappen
in het dierenrijk

Picture books
were a source of
inspiration for
making the cards



The tree will be placed in front of a column at the center of One Planet.

The last stop is where all the expeditions come together. Here the families will find the 'Challenge Tree', which is similar to the tested concept. The tree asks for participation of the visitors because it asks people to come up with their own ideas. It can also be used as a source of inspiration for ideas to take care of each other and the planet.

UITDAGINGENBOOM

Kleine acties hebben ook een positieve bijdrage aan de leefbaarheid van de planeet.

Weet jij een duurzame uitdaging, voor jezelf of andere bezoekers? Of heb je een goed idee om de aarde duurzamer te maken?

Schrijf het op een kaartje en hang hem aan de boom.

○
IDEE

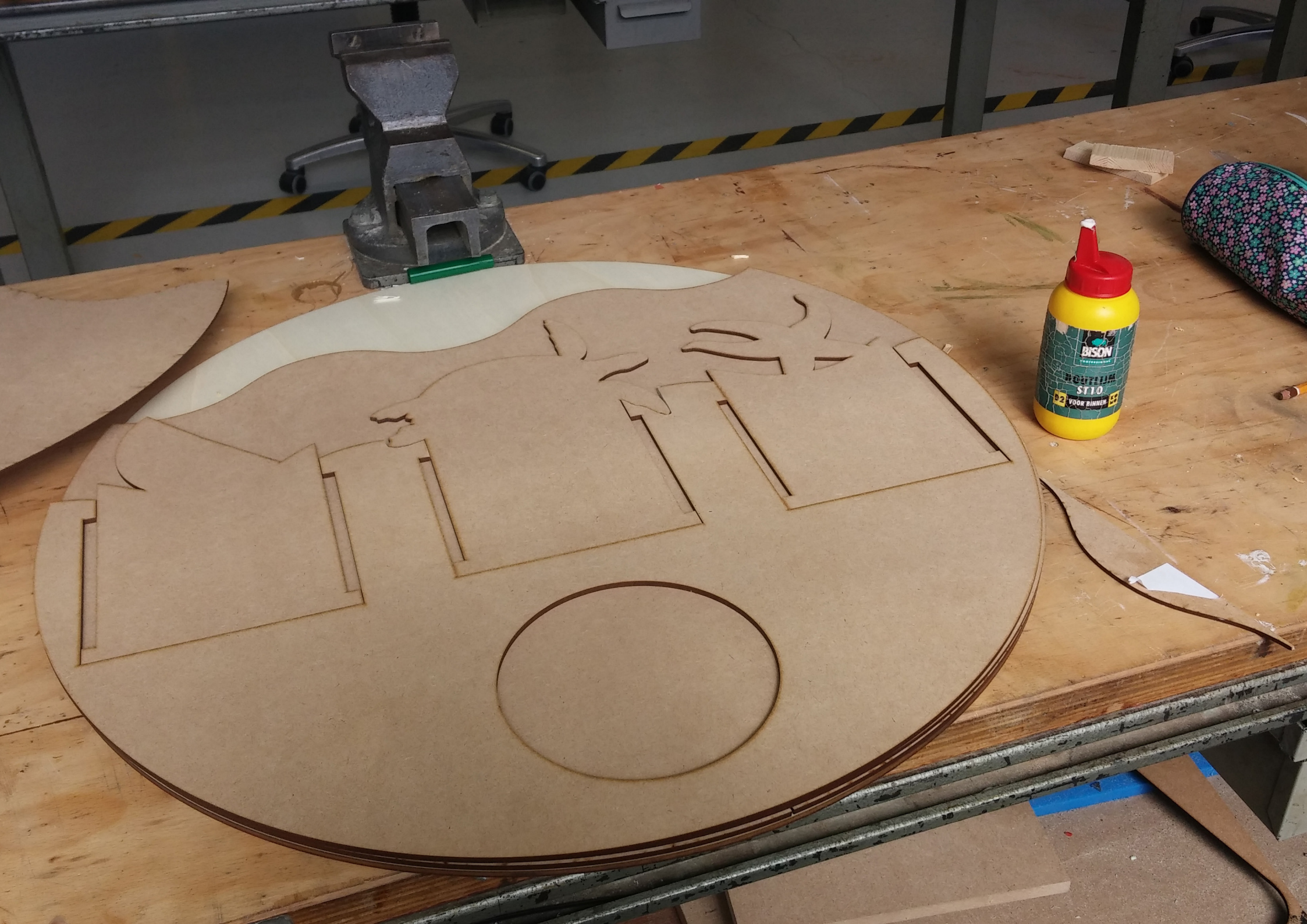
○
UITDAGING

Revised explanation, in the real design it can be written on the tree.

Compared to the previously tested version, the explanation is simplified and the idea with the coloured and white leaves is removed because visitors did not use it as intended. Instead they used them too for writing messages. In the final design the leaves can still be used for writing, as they make the tree look nicer.



An exploration board in the context



13 EVALUATION

12.1 THE TEST

The expectation for the design is that it motivates exploration of the exhibition and that it triggers conversations and reflective thoughts related to the content of One Planet. A test was set up to evaluate to what extent the design is successful in achieving this.

Participants

Eight families were invited to the museum to test the concept. The children who participated in the research ranged from eight to thirteen years old. Six families participated in a group of four (two children, two parents). One family in a group of five (two adults, three children) and one family consisted of one child and a parent. Most of the families visited Museon before, but they did not visit One Planet recently. A detailed list of the participants can be found in Appendix J.

Setup and prototypes

Due to time limitations it was not possible to make all the elements of the expedition. Important was to give participants a good impression of how it would feel to do an expedition. For the starting activity a simple version of the food chain 'feel game' was made. I used four of Museon's feel boxes and placed them on a table, filled with coral, plastic shrimps, a real seastar and a plastic bag. One ex-

ploration board was made and one question board. Both were placed on an easel on the same spot as in the design. For the end point the tree was used that I had made for a previous test. The tree is much bigger in the design compared to the prototype, after the test an image was presented to the participants to give them an impression of how it would look. The introduction board, where visitors can choose their expedition was not included in the setup. Also for this an image was used to show the idea. The log book in the test was the same as the design for the first three families. The others used a different version because I made alterations after the first test day. See Appendix K for the new version.

Procedure

Before the test the families received a short explanation of the procedure in a quiet room on the ground floor. Here they also received a log book. After that they were taken upstairs to the place where, in the design, visitors would choose their expedition. I showed them where the introduction board would be placed, so that participants could orientate. From there on they could start the expedition. Parts of the test were recorded on camera and my assistant observed and took notes. Participants could take as much time as they wanted for the expedition. The time they needed varied from 45- 60 minutes. When the

Setup evaluation



participants indicated they were finished, we went downstairs for the evaluation. The evaluation consisted of a survey and an interview, this took around 20 minutes. The survey can be found in appendix L.

12.2 FINDINGS

The insights from the observations, survey and interviews were used to evaluate the concept on the design goal and interaction vision. The study shows that the concept is promising in evoking conversations, reflection and in inspiring sustainable attitudes. Improvements on various part of the expedition are necessary but the overall concept was received positively by the participants. The survey scores give an impression of how people experienced the activity, but the interviews and observations give more valuable insights. This section first summarises the quantitative results. Thereafter, the use of the design is discussed per topic. These topics refer to my design goal or interaction qualities.

Quantitative evaluation

Eleven adults and thirteen children filled in the survey. There were no significant differences between adults and children so the results are presented as an average of both groups. Scores are based on a 1-5 scale.

Enjoyable

Based on the average of three questions:

Did you like it?

Would you do another expedition?

Would you recommend other families to do an expedition?

4,3

Exploratory

Do you think the expedition helped you to explore the topics in the exhibition?

4,3

Social

Have you talked to each other about the topics you encountered?

3,6

Visitors were also asked which descriptions matched the activity. The diagram shows how many families marked each description.



Other words that were marked indicated some critical remarks on the design.

Firstly, there was **too much text**. Secondly, there were aspects that were **unclear**. And lastly, most families experienced a form of **distraction**.



Family 3 stops at goal display 16 because they think it is the starting point of the expedition.

Qualitative evaluation

These insights are based on what people said during the interview, and their behaviour during the test. During the interview questions were asked about the participants answers on the survey as well as some additional questions.

Guidance & Exploration

Seven families said that they felt guided by the expedition. Having a theme and a booklet with indications of where to stop made parents feel supported in helping their children to learn. Some parents said that having a goal for the visit and a thematic focus motivated them to explain more about the topics to their children. Another important positive effect of the guidance is that it motivates family members to stay together, as they share the same goal. On the survey many of the children indicated that they felt motivated to explore. During the interview some said



Family 5 is feeling and guessing what is inside the boxes.

they would feel the same without a theme, a booklet and the board, especially the younger children. Except from being able to choose a theme they like, younger children do not seem to perceive guidance as an advantage. However, they still liked it to have a booklet. Some older children (10+) did mention advantages of the guidance by the booklet and the board. For example a boy said the board made exploring collection items more active. Several children said they were motivated to explore because the expedition introduces a kind of search element.

Family 7

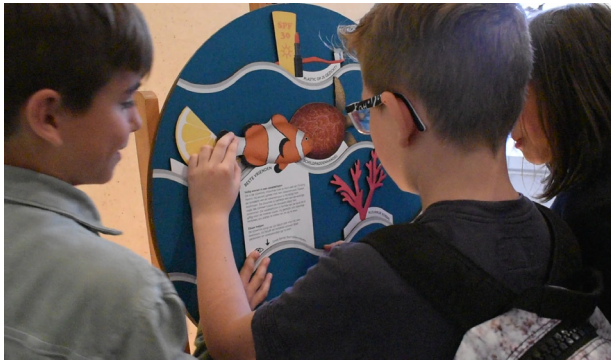
Father: *“Now you have a mission to go to those points. Normally during a visit, they [the children] run around. Last time [a year ago] everyone had suddenly disappeared, everyone followed his own interest.”* **Mother:** *“Because*



Family 4, the father takes a picture because the girl wants to do the experiment on the card at home.

there was no structure.”

Considering guidance there is also a lot to improve. This could be concluded from the participants behaviour during the test. After the first three test the log book was adapted because people missed the boards. The participants went to the exhibits that were highlighted for the ocean expedition and did not notice the part about the exploration boards. Some visitors did see the board in the exhibition but did not recognise it as the one in the booklet, because in the booklet it was depicted without images. Furthermore, many participants missed the hints at the bottom of the cards. Several participants made the suggestion to put them on top. Also, there was **too much**



Family 5, three boys reading the clownfish card. The board is too small to stand around it and look at the cards with a bigger group.



Family 5, after reading the hint on the card the family looks at the Great Barrier Reef movie. They talk about the animals they see.



Family 8, a boy is answering the question. He did not talk much about it with his mother, but he told me later during the interview that he liked to see what other people answered.

text on the cards which discouraged some children too look at it. The other extreme were children that read all the texts on all the cards, which made them spend much more time next to the board than intended with the design. It was also mentioned by many participants that the floorplan in the log book showed too many details which made it **confusing**.

The factor **distraction** is important to mention. Within every family the children (or parents) were distracted at some point during the expedition. With distracted I mean, they went to another exhibit or showcase that was not part of the expedition. Mostly it were the children that were distracted and parents called them back, telling them that they would finish the expedition first. Three families experienced this as something negative. They

still liked doing the tour and having a specific theme but recommended to keep the stops close together without exhibits on the way that are unrelated. The distraction mainly occurred when participants walked from one stop to the other. During the test all families continued the expedition after having a short moment of distraction. I asked the families if they would continue if they were not testing the activity. All children and adults said they would. For example because they wanted to know what comes next, or because it would be about a topic they choose and thus like to explore.

Interactions & Conversation

Six out of eight participants said that the activity evoked conversations about the topics of the exhibition. Especially the question board was experienced as a conversation

trigger and in line with my previous research, they also experienced the fish game as a social activity. The exploration board evoked some conversations as well. One father for example explained his ten year old daughter what co2 is, after she saw the text and said: "Co2 that dirty stuff." Other cards initiated conversations too, especially the card about coral. Two families read the card, went to the coral showcases and talked about it for a while. The 'feel boxes' stimulated a lot of interaction between family members. For all families both children and parents participated. Children wanted their parents to feel what they felt, or a parent had to go first because it was a bit scary. In general people shared quite some thoughts throughout the whole activity, also during the parts that did not include one of the designed elements, like in the climate studio. An explanation could be that the whole expedition is a



Family 6, an eight year old boy is trying to peek at his big brother's paper. Later he comes up with his own idea.

group activity and thus stimulates people to stay together and do things together which makes it of course easier to have a conversation. Another reason is that the focus on one theme stimulated the parents to explain more, or to ask the children more questions.

Family 2

Father: "It's not too big. You have a specific purpose, and you can explain the children a bit more about that."

In the conversations triggered by the question board and the challenge tree I noticed that most parents ask their children what they think or what they are going to write down and why, but they did not say much about their own opinion. Questions that make children curious about

their parents answers may even stimulate more social interaction.

Reflection & Inspiration

Some children experienced the activity as supporting their learning because it helped them to focus. Six children indicated they got new ideas during the activity. These ideas were diverse, in some cases initiated by the existing exhibits and in other cases by the designed elements. A twelve year old boy said he got an idea about how he could help the planet when he was writing a message for the tree. Many parents and children also liked to read other people's messages, and during the interview they even gave examples of messages they liked. Some adults said the idea of the tree is nice because it works in two ways: it makes you think when you write your own message and you can get inspired by other people's messages. A mother suggested to highlight the best ideas, so that it is easier to get inspired. Seven families indicated that the expedition made them think. The question board was often given as an example for that. It made them reflect on their behaviour because it placed them in a situation and asked what they would do. A thirteen year old boy even thought he would clean up the trash next time, while he would not do it before. Even though answering the question is not a game, not hands-on, but rather serious, the

children liked it and wanted more of them. They also liked that the answers of other visitors were visible.

Family 5

11 year old boy: "now we have a booklet and just one subject. Otherwise you start to think about a lot of things. Then you think about this and that and you do not have enough space in your mind."

Confrontation

Children did not mark the word confrontation. The word was difficult for them to understand, also after the parents explained it. Three parents said that some parts of the expedition were confronting. A mother said it was confronting as it makes you think about your own behaviour. Two other parents found the parts about microplastics, overfishing and acidification of the ocean confronting. This confrontation was perceived as a positive aspect. They said it is good to be confronted with these things sometimes.

Conclusion

The observations and interviews showed that during the test of the expedition the participants were thinking and

talking about the subjects and reflecting on their own behaviour. In this case especially related to plastic soup and a bit about co2 emission. But what is most important is that all children and adults still enjoyed doing the expedition. The variety in activities balances seriousness and playfulness. The dialogic participation was perceived as enjoyable and interesting while at the same time children and parents experienced they learned something from it.

Integrating dialogic participation in the exhibition the way it was done with the design proved to be promising for providing a meaningful family experience for the exhibition One Planet.

Points of improvement

Exploration board

- the size of the tips board, it should be bigger so that more people can use it at the same time
- Increase font size to make texts more legible, also for parents standing behind their child.
- less text
- make it easier to pull up the cards
- indicate that you can lift the cards
- the tip should be at the top instead of the bottom
- refer to the corresponding displays and rooms on the outside of the board.

Question board

- a bit more space between the plastic sheets so that it is easier to insert your paper.
- indicate on the board that you can use the corners of the booklet to vote
- different kind of plastic which is not static, too make it possible to remove the pieces of paper.
- questions that make children more curious about their parents answer.

Challenge tree

- bigger
- no loose stamp, it can be connected to the writing stand with a string.
- more spots to place your message
- a special branch for the most interesting or original ideas, to inspire other visitors

Log book

- present as less elements as possible on the map
- highlight only the boards, not the places in the exhibition that are included in the route, visitors will see that on the boards.
- show an exploration board with images instead of an empty one, so that visitors can recognise it more easily.

Food chain game

It is not necessary to include this element. It is fun for the family and triggers conversation but these qualities are also found in other parts of the expedition. Without this activity the route will be clearer and Museon does not have to add additional exhibits in the One Planet area.

12.3 LIMITATIONS

My presence during the test may have influenced the participants during the test. The participants may for example have felt more urge to follow the stops of the expedition because they were testing it. It is possible that during a regular visit they would deviate from the route for a longer time. Sometimes children went to interesting things they saw which were not part of the expedition and parents called them back. However, during the interview parents said they would also call back the children when they would do the tour in a natural setting. Moreover, due to unclarity of the use of the tips board it cannot be said with certainty that this part of the expedition works as desired. After explanation of how it works most participants said they liked the idea, but only for three out of eight families it could be observed from behaviour that it worked. All families came to Museon for the purpose of participating in the test and received free entrance. When doing the

questionnaire and interview most were aware that it was my graduation project they were testing. It is possible that they were less critical because of this. Nonetheless, they still named quite some points of improvement and children mentioned honestly things they did not like.



Participants from the test interacting with the prototype of the exploration board.

14 REVISION

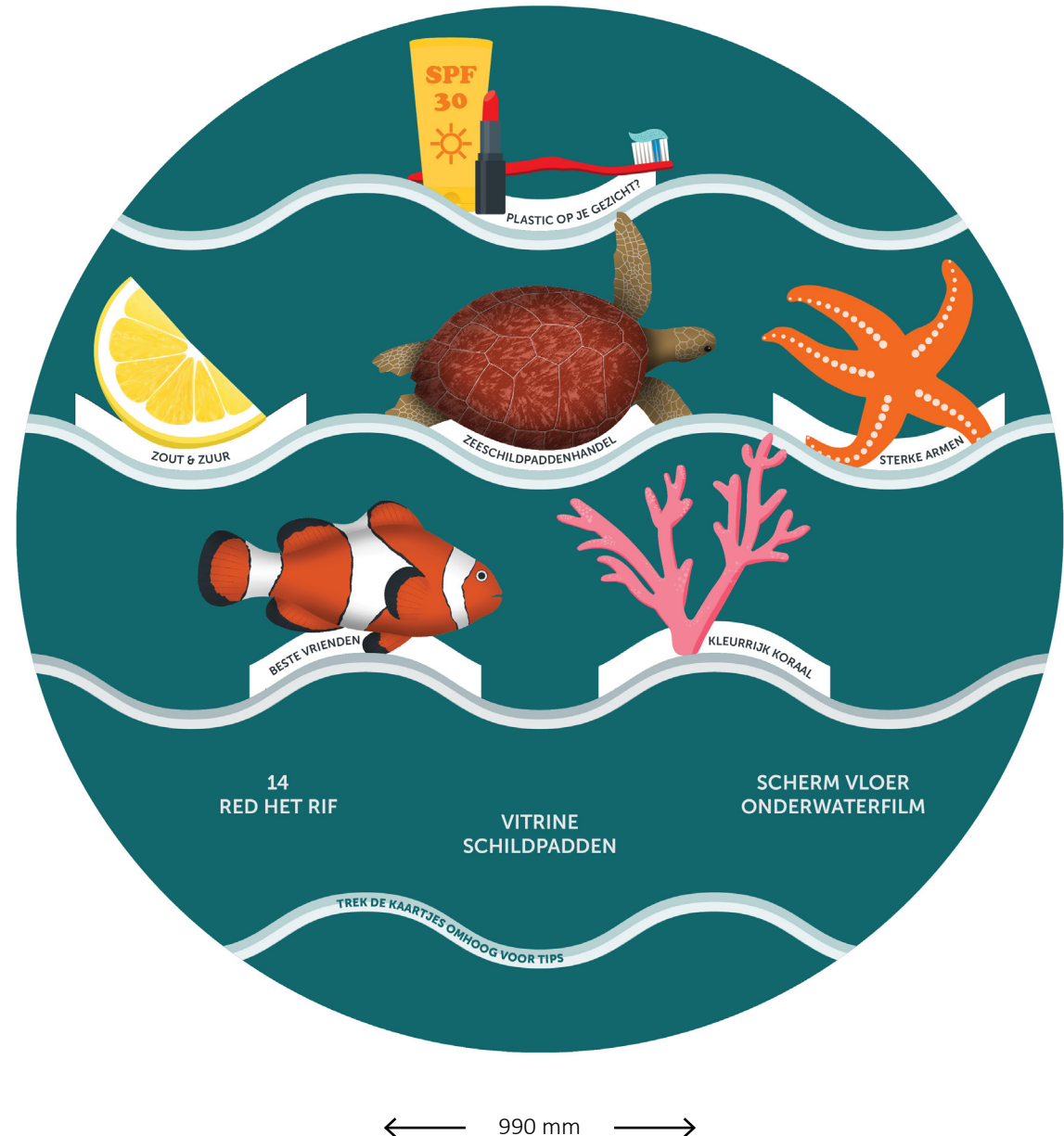
Based on the findings from the evaluation some suggestions will be made for the revision of the design. The revisions consider a small change to the challenge tree, and the layout of the exploration board and log book. For the latter two, the use was not clear to the families. Instead of showing both the stops and the boards on the floorplan, it should only show the boards (see revised booklet). When visitors find the exploration boards, the boards will show them which places belong to their expedition. This simplifies the routing and prevents people from missing the boards.

The size of the board and cards need to be increased so that bigger groups can interact with it at the same time (at least two groups of two). However, the diameter should not become too big, because that will make it impossible for children to reach the upper cards. A size of 990 mm will be suitable.

The font size of the texts on the cards was 12 pt, but it is recommended to make it 16 pt so that parents can read it more easily when they are standing behind their child.

The amount of text should be reduced for the card about microplastics, sea turtles and clownfish.

A hint on the board is added to clarify that people can lift up the cards.





A branch on the tree can be used to highlight the most interesting or original ideas. This supports people in getting inspiration from other visitors. Possibly, it also motivates people to come up with better ideas. The ideas can be selected by staff members, or by

other visitors. For example like this: visitors can hang a coloured leave next to an idea they like and at the end of the week a staff member rearranges the messages, based on what the visitors selected.

Zeeën & Oceanen Expeditie

ontdek over de onderwaterwereld

- 1 Voor deze expeditie volg je de **zeegroene** borden! ★
De volgorde bepaal je zelf.

- 2 Rond bord gevonden?



2x

Deze borden leiden je naar de plekken die gaan over zeeën en oceanen.



Deze icoontjes **onderaan de kaartjes op het bord** geven tips over wat er te ontdekken is!

Vragenbord gevonden?



2x

Bij deze borden wordt een vraag gesteld en kun je je mening achterlaten.

- 3 Ga naar **eind punt**

Je kunt een berichtje achterlaten aan de uitdagingenboom.

Plattegrond



★ Bij elke ster hangt een bord aan de wand.

Veel plezier!

geef je mening met deze hoekjes

geef je mening met deze hoekjes

The text explaining the topics included in the expedition was skipped by the participants, and the booklet contained too much information. Therefore, this text is removed. The numbers are added to help people understand what is expected of them. The amount of detail on the floorplan is reduced.

There are more aspects of the concept that need improvement, but that is not realisable within the time available. In the next chapter recommendations are given that need to be taken in to account by Museon, when they want to realise (parts of) the concept.

15 RECOMMENDATIONS

The concept is feasible and the evaluation showed that it is promising. During the final stages of my project I was told that Museon has interest in the implementation of thematic expeditions on the first floor. This chapter presents the most important aspects to take into account for the further development of the expeditions.

First of all, when Museon reconsiders the themes and the stops, it is important to keep the amount of goal displays and exhibition rooms included limited. An expedition cannot include everything that could be related to a theme. That would make it too lengthy. For illustration: the oceans expedition, which only contains two goal displays and one room, took almost an hour for most participating families. Related to this is the issue of distraction. Most participants indicated that it is not really a problem as they are motivated to go back to the theme, but it is still recommended not to spread the stops over the whole first floor. Children's attention is diverted at the moments when they are walking to the next stop. When these distances are long, with a lot of unrelated things in between it will require too much efforts of the parents to keep the family together.

When considering the stops I would also recommend to take into account the kind of interaction included exhibits

evoke. This, to make sure that there is a good balance between hands-on participation, dialogic participation, and exploring collection items and information.

Participants liked the question board and challenge tree, the use was clear and they also evoked the desired behaviour, so these elements do not need much adjustments. The questions can be made up in a brainstorm, preferably with visitors, both adults and children, involved. On the challenge tree the most inspiring messages can be highlighted (e.g. by hanging them on a special branch).

For the exploration boards more adjustments are necessary, an extra design iteration is recommended. In the chapter 13 the required improvements are described. Highlights in One Planet and the exhibition rooms need to be selected for creating the content of the boards.

Additional recommendations

A nice result of the tree is that Museon can get to know their visitors a little bit. The information of the messages can be used to find out what visitors would like to do for the planet. Related to that, the museums could organise activities. For example, when a lot of visitors say they would like to make their garden greener, Museon could organise a workshop about plants and insects.

Confrontation and affective involvement received less attention with my design. Both aspects can help to realise Museon's mission of inspiring sustainable behaviour. This can be taken into account when redesigning exhibition rooms. A room can for example be designed to immerse visitors in an environmental issue like climate change (e.g. with visual effects, augmented reality or virtual reality). I would recommend to do something immersive and confronting for only one or two exhibition rooms, otherwise visitors may feel discouraged and become disinterested.

-
- The floor plan of the Science Museum of Amsterdam is divided into several rooms and a central exhibition area. The rooms are labeled as follows:
- Top Row:** de groene camera, VN zaal, kind in oorlog
 - Second Row:** geologie en techniek, al arab, leszaal, geluidzaal
 - Third Row:** mens en evolutie, (central area with numbers 1, 2, 3, 4, 5, 6, 7, 8), André Kuipers zaal
 - Fourth Row:** vulkanen en aardbevingen, (central area with numbers 9, 10, 11, 12, 13, 14, 15, 16, 17), hoogland laagland
 - Fifth Row:** water-zaal, de eerste kustbewoners, caribbeaan ties, romeinen achter de duinen
 - Bottom Row:** leef-ruimte, poolzaal, klimaat-studio
- The central exhibition area features a large blue circle labeled "LG lounge" and a white area labeled "vogelvlucht" with bird illustrations. There are also several numbered boxes (1-17) and colored dots (red, orange, green, blue) scattered throughout the central area, indicating specific points of interest or exhibits.

The stops as shown on the floor plan are chosen with the insights from the evaluation in mind. These rooms and goal displays fit in the themes and are clustered together which supports families to stay focused on their chosen theme. That is why for example the *Waterzaal* is not included in the food & culture expedition.

- life on land expedition
- seas & ocean expedition
- inventions & science expedition
- food & culture expedition

16 REFLECTION

This chapter described my personal reflection on the process of this project. Six months ago I started this project and stated personal goals that I hoped to achieve while working on my final deliverable of my master program. This reflection refers to these personal goals.

Research trough design and working with non-designers

I enjoyed most parts of the project but it was the creation of concepts and prototypes and testing it with the visitors that brought me the most satisfaction. Creating physical models helps me to find out how I want something to be. Seeing people interact with your creations and hear their comments is an amazing source of inspiration and knowledge. I was positively surprised by the creativity of the visitors and their enthusiasm to think along with me. When testing, one of the questions I used to ask was: 'how would you make it better', which often resulted in useful ideas. This project showed me once more how valuable it is to involve the people you design for. By doing that several times during this project I got more confidence in that way of working.

Looking back on my process there were some aspects that I could have done better. An important one is that I should better structure my insights so that I use them more effectively while designing. When working on the first iteration for the expedition concept I have spend quite some time on a design that was not leading in the right direction. Paying more attention to my own research insights would have prevented me from doing that.

Working for a museum

Not only doing my project for Museon but also working three days a week at the museum enriched the past six months. I learned much more than I would have hoped

before starting the project. Not only aspects related to my own project but also beyond the outlines of the graduation project. Thanks to my mentors at Museon, Hub and Judith, I learned a lot about how museums work as I had the opportunity to be involved in all kinds of activities. Like a workshop about creating exhibition for blind people, or sessions that discussed the marketing strategy for Museon. Before I got this project within the MuseumFuturesLab at IDE I did not even think about the possibility to work for a museum or a company that designs exhibitions. Now it is certainly a direction I would like to explore further. What makes museums (especially the ones for families) interesting to me is the combination of playfulness and education.

The end result

Seeing the participants interacting with my prototypes the way I intended made me feel proud of what I have made. I also had the opportunity to present my project for all the staff members of Museon and it is likely that part of my research and design will be used for future adaptations on the first floor. That is a great reward for the time and effort I have put in the project.

GLOSSARY

Attitude = A settled way of thinking or feeling about something, also described as ‘the learned tendency to respond to an object in a consistently favourable or unfavourable way’ (Onkvisit & Shaw, 1994 cited in Blythe, 2013)

Collection = The items on display in the museum (or in the archive). Most of the time in showcases and only possible to look at. In a few occasions also possible to touch.

Content = Content contains the collection but also the information or stories the museum wants to communicate. The content can also be incorporated in interactive exhibits, games, quests or guided tours for example. Therefore the content can be dependent on the interactions between the medium and the visitor.

Dialogue = In this report dialogue is defined by a two-way conversation between two or more persons whereby the purpose of the conversation is the exploration of a subject, the exchange of opinions, or problem solving. This dialogue can exist in real time but can also take place with a delay between the responses. For example when a person leaves a message and another person responds to it.

Families = In this project a group consisting of at least one adult (parent, grandparent, caregiver) accompanied by at least one child is considered a family.

Goal display = An display in One Planet that is dedicated to one of the seventeen SDG’s. There is one goal display for every SDG. A display consists of multiple exhibits.

Meaningful museum learning experience = When both the visitor and the museum are satisfied. When the visitor was satisfied with the experience and the museum is satisfied that the visitor learned (broadly defined) something of merit (Perry, 2012).

Reflection = The act of thinking about, correcting and internally reviewing new information ((Duschl, Schweingruber, & Shouse, 2007) In reflecting individuals are becoming conscious of what interests them, and what is motivating them to engage further.

Sustainable development = Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987).

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APPENDICES

110 Appendices Part 1 Project Outline

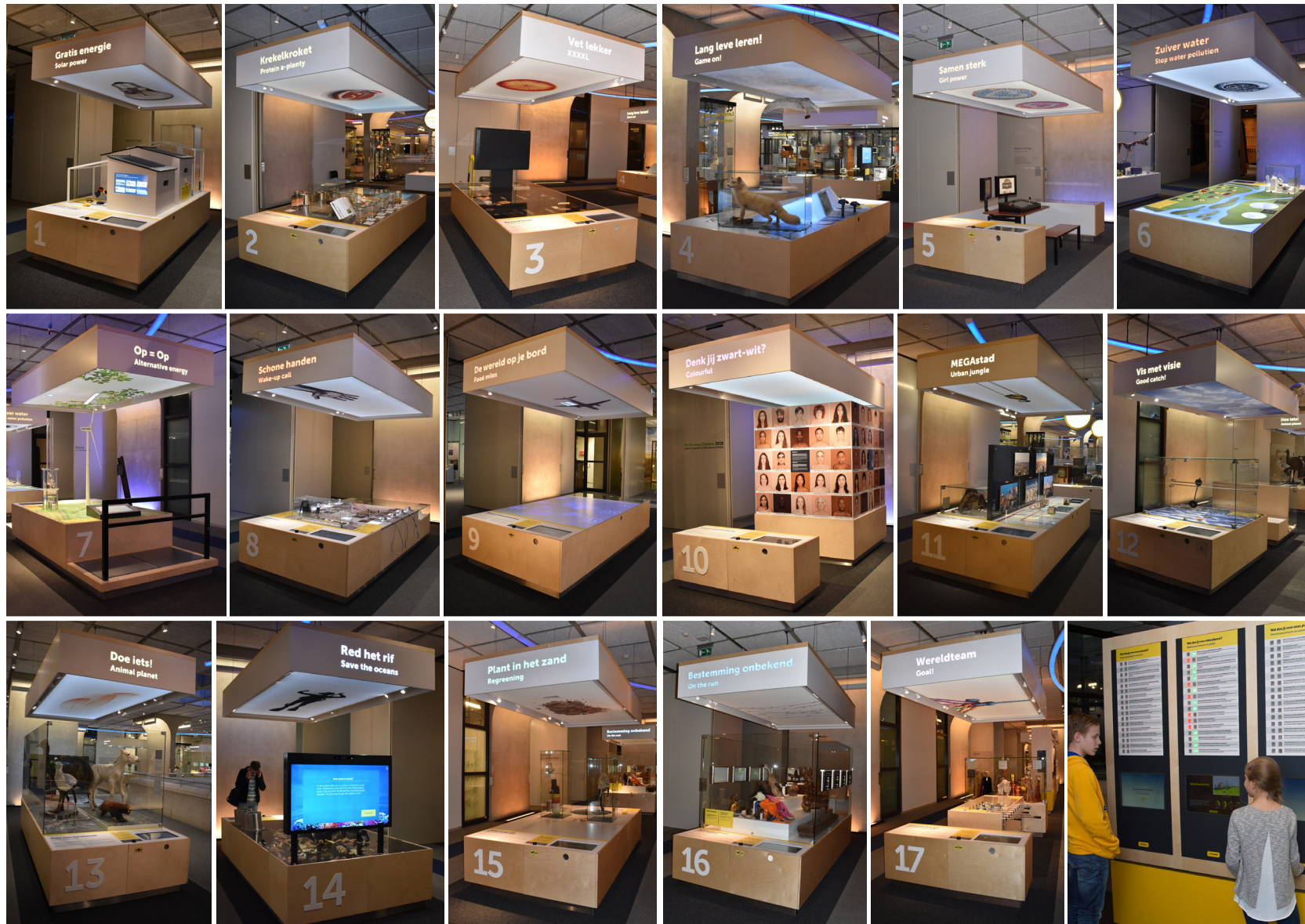
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A Overview One Planet exhibits



Floor plan Museon



B The Sustainable Development Goals

3.5 The Sustainable Development Goals

The Sustainable Development Goals (SDG's) are established by the UN as the new agenda for sustainable development for 2030. The first and most important goal is to end extreme poverty. The SDG's succeeded the eight Millenium goals that were established in 2000 and ended in 2015. These were the first global development goals. The SDG's are more ambitious, they are not only about development but also about sustainability. The new agenda asks participation of all countries instead of focusing on help from rich countries to poor countries. There is attention for human rights, economic growth, peace and safety and climate. Topics that were not included in the millennium goals. The goals balance the three dimensions of sustainable development: economic, environmental and social (United Nations, 2015).

These new goals were not created within the walls of the UN. They are created by the people for the people, through one of the widest participation processes in history. During the design phase of the goals civil society played an important role: over 500,000 people participated through debates and consultations and 7,8 million people worldwide voted online for the themes they considered most important (SDG Nederland, N.D.)

The 17 goals have 169 associated targets, which help to explain the goals as well as focussing efforts. A target is an action which contributes directly to the goal. To monitor progress made towards these goals the UN drafted a list of indicators for each country. All countries translate the targets into national policy. Evaluation reports are written using these indicators to measure progress made towards the achievement of the goals.

C Visitor interviews

Interview procedure

I approached the families when they entered the exhibition and asked if they would like to participate in a research on how to improve the exhibition One Planet. I asked them some questions and explained how they could use the card. They were also told that I would like to speak to them again at the end of their visit. Cards were given to both parents and children. If they preferred to share a card it was also possible. The idea of the cards is also that the families are not unexpectedly asked to participate in an interview when they are already in the mindset of going home. Nine families have used the cards. Seven of these families participated in an interview.

A semi-structured interview was used to give visitors the chance to share their experiences. Not all questions were asked to all families. This depended on the time they wanted or could take for the interview and also on the way a family visited the exhibition. Interviewing people both before and after their visit is very time consuming, therefore some families were only asked to participate after their visit (without using the card). Notes were taken during the interviews and visitors' comments were written down more elaborately directly after the interview. The interviews are not audio recorded.

Interview Questions before entering the exhibition

- Komen jullie vaker in het Museon?
- Hoe zijn jullie op het idee gekomen om Museon te bezoeken?
- Wat is je leeftijd? (kinderen)

Interview Questions after visiting the exhibition

- Hoe vonden jullie het bezoek?
- Welk onderdeel sprak je vooral aan?
- Hebben jullie de strippenkaart gebruikt? Waarom wel/niet?
- Ik zie dat je dit deel interessant/leuk/stom/saai vond, weet je nog waarom?
- Wat zijn jullie tegengekomen dat beter kan?
- Heb je het idee dat je iets nieuws geleerd hebt? Wat?
- In hoeverre vonden jullie de tentoonstelling goed aansluiten op jullie interesses?
- Wat vonden jullie van het onderwerp van de tentoonstelling?
- Zijn jullie thuis ook wel eens bezig met duurzaamheid? Op wat voor manier?
- In hoeverre heeft de tentoonstelling jullie nieuwe ideeën geleerd over wat je zelf kan doen om bij te dragen aan duurzame ontwikkeling?
- Hebben jullie ook andere tentoonstellingen in het museum bezocht vandaag?
- Zijn jullie van plan om nog een keer terug te komen naar het museum? Voor welke tentoonstelling / activiteit?
- Hebben jullie zelf nog vragen of opmerkingen?



D Translation of quotes from research One Planet

Page 42

"The weather is bad, we couldn't go to the forest.

"We have a girlsweekend today. We were looking for a museum and chose this one because we have never been there before."

"It's a nice place to relax and discover new things"

"The website wasn't clear about what you can do in the exhibitions"

"They were worried if it was interactive enough. I thought: It is gonna be alright."

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"Grandson and friend had enjoyed the educational inventory, so they know just a bit more. They are skilled "Ridders te paard". But I had also solved puzzles and learned new things, about waterconsumption for example"

"You could find delicious recipes there. Because of that I have new ideas for recipes."

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"The layout of the museum was unclear at first, what belongs to the exhibition and what does not. Later on it became more clear". "Are the rooms also part of the exhibition?"

"It took some time to determine the central theme, but once you have, it is a good concept to amuse the kids."

"From old to new"

"About people"

"About the planet"

"The future. The future of the earth and how to take care of it."

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"Do you sometimes throw litter on the streets?"

"No"

"Yeah everybody who answers it says that. Frankly, I've thrown something on the streets once."

"Sure, a piece of gum or something."

"Actually, people aren't causing climate change. It happens anyway."

"Yes they do, they cause stronger global warming."

"Global warming was already happening, in certain periods, we have no influence."

"Get bent."

"Ehh, yes solarpanels, but that's my parents' decision. That isn't something I can do myself. In the future I will do it myself."

Page 49

"No, I don't think I have got new ideas. Yes new proteins, but I don't think supermarkets will sell it anytime soon."

"That you shouldn't throw away expired food. That it's still edible because the date only shows 'at least' fresh until then, but it can be longer."

"A poor, dead seal with drinking straws sticking out it's belly is confronting."

"You could show the effect of wasting and saving. On a global scale. For example the use of paper and the deforestation of the rainforest."

"The ideas shouldn't be only like 'using less plastic', but also giving alternatives."

"Yes it's important, otherwise we'll all be gone in thirty years."

"It's about your future, when you're old it isn't really relevant anymore, but it is for us."

"Yes it should be nice to know more of these simple things."

E Coding example observations

Exhibit	Doen1 Hands-on	Doen2 Spelen/leren	Plezier / Aandacht	Interactie	Gesprek	Flexibel	Overige	Familie
3 XXXL (rustig, 2 groepjes)	Lezen en kijken	Leren over onbekende soorten snoep.	Zowel de 2 moeders als de 2 meisjes kijken aandachtig naar de snoep en ook naar de barbies. (1 gewone en 1 met realistische lichaamsverhoudingen) 1 meisje blijft nog een tijdje naar de barbie kijken. Bij sommige snoepsoorten zijn ze enthousiast: Moeder: "Goed idee!" [kijkt naar de portugese snoepjes met vijgen en noten]	Ze staan met z'n vieren rond het display en bekijken wat er te zien is. De meisjes stellen vragen en de moeders leggen uit over wat het is.	Gesprek over wat er allemaal te zien is. "Mama is dit gezond." "Ik weet niet of het gezond is, het is meer bijzonder." [over de visstaafjes]. Meisje vraagt bij alle snoep of het gezond is. Meisje: "Dat is poep." Moeder: "Nee, dat is zoiets als knijpyoghurt maar dan met heel veel voedingstoffen. Meisje heeft het erover dat je het woord rot niet mag gebruiken omdat het een lelijk woord is. De moeder legt uit dat het ook wordt gebruikt voor fruit dat niet meer goed is.	Iedereen kan het goed zien. De meisjes kunnen het nog niet zo goed lezen/begrijpen, maar de moeders leggen het uit.		2 moeders en 2 meisjes van ongeveer 7 jaar oud. 2 jongetjes van 8/9 zijn bij goal 4 aan het gamen
4 Lang leve leren!	Video Gamen	Eerst 2 jongetjes samen, daarna blijft 1 alleen spelen.	Het jongetje wil niet stoppen met spelen. Geconcentreerd en soms enthousiaste geluiden. Moeder is niet geïnteresseerd in het spel.	2 jongetjes spelen samen en zijn gefocust op het gamen. Als het jongetje door zijn moeder wordt geroepen om verder te gaan wil hij niet. Maar zijn moeder haalt hem weg bij de game.	Jongetje naar zijn moeder: "Nog één keertje!"	Voor 1 of 2 personen.		2 moeders en 2 meisjes van ongeveer 7 jaar oud. 2 jongetjes van 8/9 zijn bij goal 4 aan het gamen
13 Doe iets!	kleuren op een touch screen, daarna een selfie maken	Vooraf 1 meisje is aan het kleuren. Andere kinderen kijken. Een klein jongetje probeert zich ermee te bemoeien maar dat lukt niet goed. Andere mensen kijken. Meisje gaat nog een keer kleuren nadat ze een foto hebben genomen.	Het meisje vindt het leuk. Activiteit duurt lang. Ander jongetje die ook bij het groepje hoort wordt ongeduldig. Tijdens het maken van de foto wordt de rest iets enthousiaster.	Moeder vraagt: "ben je klaar?" "Dan gaan we een foto maken." Moeder helpt om de foto te kunnen maken.	Gesprek over hoe het werkt, en of het klaar is.	Samen foto nemen gaat wel goed maar het tekenen niet zo.	Als het druk is staan er veel mensen om heen.	

Engagement with exhibit (parent / child)



Joy or interest



Some joy or interest



No joy or interest

Interaction between family members



participating together



participating next to each other



no interaction

Conversation between family members



conversation about content



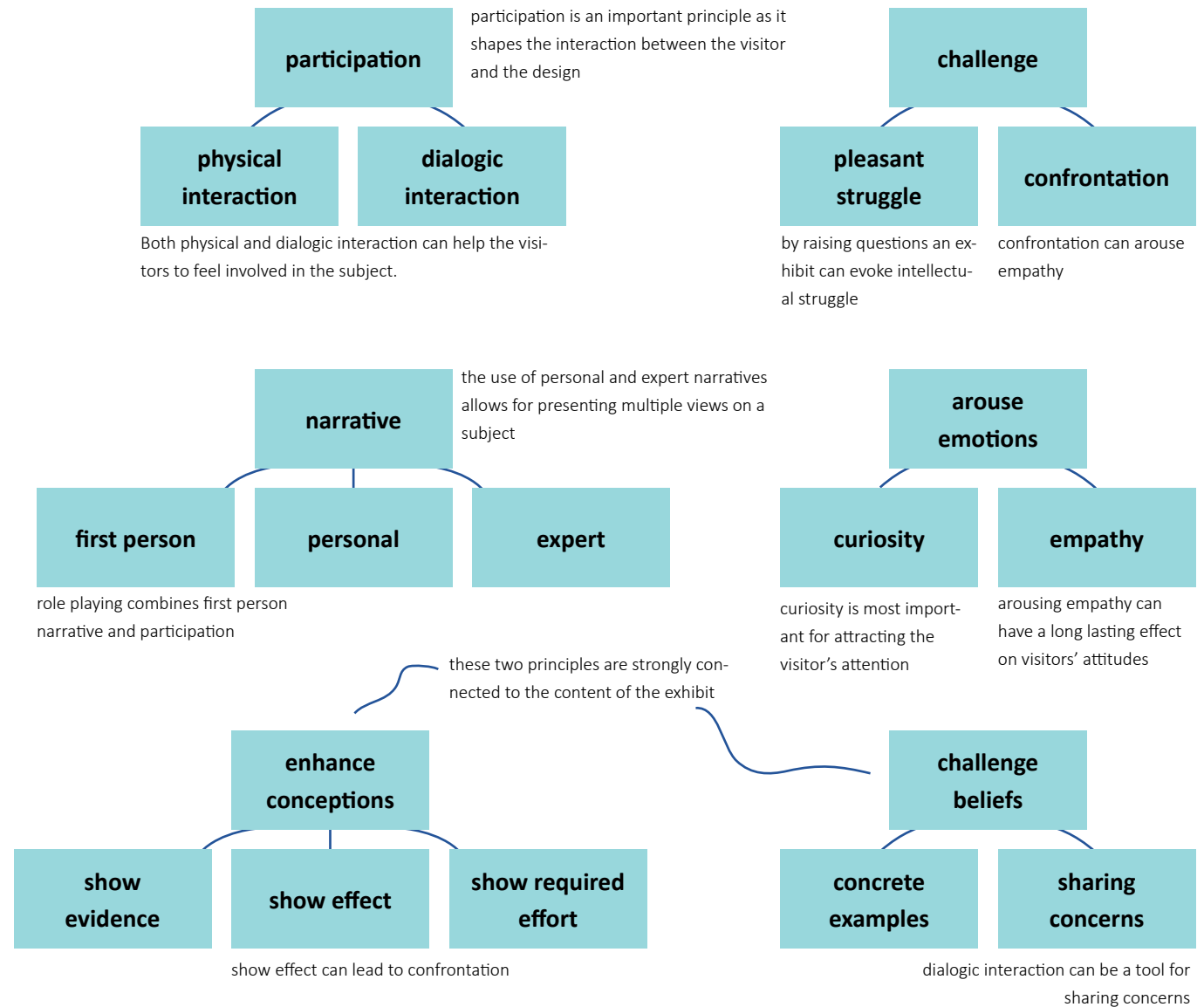
conversation



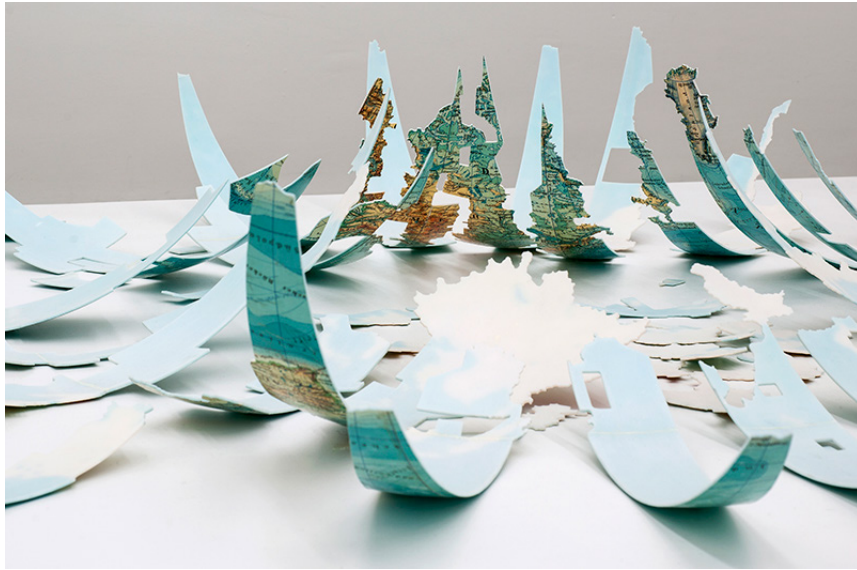
no conversation

F Design principles

In chapter five and six a number of design principles were identified that evoke dialogue and reflection in an exhibition and in chapter seven design principles were found that have the potential to promote sustainable attitudes. Although these are two different goals some of the principles are similar, like the arousal of emotions. However, there are also principles that contradict each other. A design will always incorporate multiple principles as they complement each other. Some can have a causal connection. It is not necessary to include all of them. The principles cannot define the design, they just form a guideline and a source of inspiration. This section gives an overview of the principles and shows inspirational examples from practice in which I recognise some of them. The most prevalent design principles of the examples are written above the images.



Art - Enhance conceptions, confrontation, narrative



Artworks created by Belgian artist Maarten vanden Eynde. I came across the work of this artist when I went to Mechelen, where he presented work at the Contour Biennale. His artworks immediately attracted my attention because of his choice for contemporary issues and the way he translates these issues in appealing and comprehensible images or installations. His work combines the principles of showing evidence and effect and confrontation.

Top: The Overview Effect, 2019

A polyester globe cut in the 38 different time zones that currently exists. The installation visualises the complexity and artificiality of the division of time. "The title is inspired by Frank White's book of 1987 *The Overview Effect – Space Exploration and Human Evolution* in which he describes the cognitive shift in awareness experienced by astronauts when they see Earth from outer space (Vanden Eynde, 2019)."



Bottom: Ils ont partagé le monde, made in collaboration with Congolese painter Musasa, 2017.

The work consists of nine paintings depicting the most important raw materials that provide the foundations of the world we know, by introducing a universal visual language. For each pivotal material, various drawings form a visual rebus, or a summary of the origin, use and influence of the materials. The composition of the nine panels refers to the wheel of fortune, the wheel of progress and the distribution of economic and natural riches (Vanden Eynde, 2017).

School projects - Participation, challenge, enhancing conceptions, narrative, and challenging beliefs



Activities organised by Cross Your Borders.

At the NOT (an annual national education exhibition) there were several organisations that offer programs and activities to promote citizenship and sustainable attitudes among schoolchildren. Cross Your Borders educate children about diverse global issues. For example about the clothing industry by let them role play different people who are a link in the production and distribution chain. In another lesson children learn about the issues related to soy production in Brazil by building a soy plantation with Lego. Someone who works at the company told me that it was the active participation that made it appealing to the children, especially to involve the children who do not care about the topics already. Cross Your Borders only organises activities for secondary schools (Cross Your Borders, 2019).

The Missing Chapter Foundation presented school programs related to sustainable development for primary schoolchildren. These programs are part of the **'KidsK-racht' project**, a collaboration between many companies, e.g. Unilever, AH, UNICEF and WNF. All programs are set up with the same underlying principle: "Children are, by nature, agents for change and instigators of positive behavioural changes." An example is **'Waterspaarders'** (water savers), a project that challenges children to save water and teaches them about the effect of human behaviour and the consequences of global warming. It combines offline material (booklet with exercises and activities) with a online platform where you can participate in challenges for example. The content is created in collaboration with Young Crowds (Missing Chapter Foundation, N.D).

At the Dutch Design Week I also saw some inspiring designs. An example is **Terra Nova Minimaatschap-pij** (ASN Wereldprijs winner 2016), designed by social designer **Lisa Hu** for primary school children. Terra Nova is a game that invites children (and adults) to think and talk about societal questions by building a society on an uninhabited island. Questions are for example: "Do you have more rights than the newcomers who just stranded here?" and "Would you take care of an ill person who is unable to work?" (Hu, 2016).

All these activities are designed to engage children and educate them about global issues. They have in common that they require active participation, both physical and dialogic. The activities of Cross Your Borders and the Terra Nova game make use of a narrative structure.

Museums - Emotions, participation, narrative



Humanity house - Journey of discovery - visited in February 2019

This temporary exhibition in the Humanity House in The Hague let's you experience what it feels like to flee from an area effected by conflict or disaster. This example primarily involves physical participation and empathy, as it places you literally in the position of a refugee. I believe that for people who do not know or care about subjects like the refugee crisis, such an experiential journey has the potential to change attitudes towards refugees as it can make it easier to empathize with them in the future. For me it personally evoked reflective thoughts in the sense that you start thinking about how it would be when your hometown becomes a conflict area. After the discovery journey you have the chance to meet refugees who migrated to the Netherlands. Every person has his own exhibit where you as a visitor can get know him or her by asking interview questions (you can choose between about eight different questions). The questions were answered by video fragments. I like this way of receiving information, because the interaction of asking questions tells me what I can expect from the video. I was therefore more willing to watch the whole video fragment, and the questions made me curious about the answers on the other questions.

< The mirror doesn't show your reflection, which let's you experience the dehumanisation of migrants.



Dolhuys - Exhibit where you can do psychological tests - visited in January 2019

One of the most fun parts of the Dolhuys were the different tests, developed by psychiatrists in different time periods. You could test yourself e.g. on mental illnesses, how the left and right part of your brain function, or personality traits. Also other people interacting with the exhibit seemed to enjoy it, and it evoked quite some conversations. What made it interesting was that you get to know something about yourself and the people you are with. It was fun because some tests resulted in weird and confronting conclusions, providing material to tease each other. Knowing who and when the tests were developed helped to put the results in perspective.

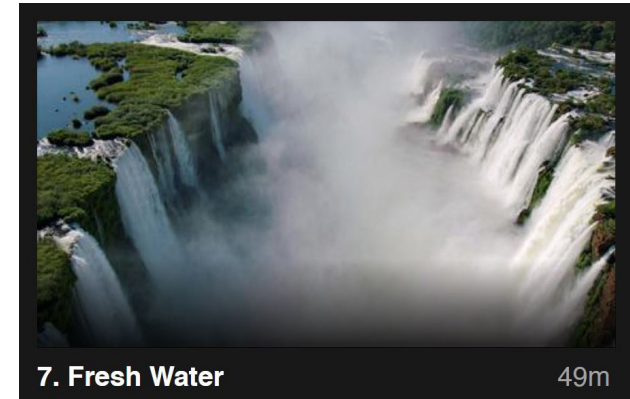
(Social)Media - Enhance conceptions, arouse emotions, confrontation, challenge beliefs



Climate March Amsterdam (Elsevier, 2019)

Messages in the media are powerful when it comes to evoking dialogue about environmental issues, and they have the potential to challenge peoples' beliefs. The media brings you in contact with other people who have similar concerns and stimulates reflection as it also presents other views. The climate protests in Amsterdam and The Hague show that many people think that action is needed to save the planet.

Nature and wildlife documentaries raise awareness about the human impact on the planet. They present confronting information and emphasise the need for change in order to conserve the planet. These documentaries usually start by showing the beauty of the planet and wildlife. Images and messages in newspapers and on internet show confronting information in a more direct way, like the example on the right.



Netflix documentary 'Our Planet' (Netflix, 2019)




Dead seal with a frisbee around his neck (Omroep Zeeland, 2018)

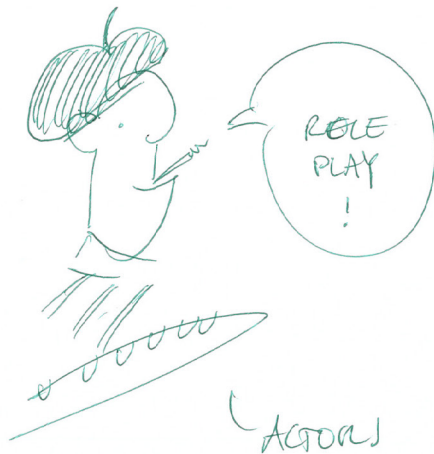
The sight of the seal choked by a plastic toy will be confronting for most of us, and is likely to evoke feelings of distress. Besides challenge and empathy it also addresses the principle of showing effect, as it clearly shows how human actions influence wildlife.

G Ideas from brainstorm MuseumsFuturesLab

music!
swell
play in to
their memories
↳ from childhood




unexpected visions



What kind of emotions?
Think of negative emotions
as well to achieve a
positive experience in the
end?

MEOWS!
TICKLE THEIR
"AAAAAH"
FACTOR




Immerse in emotional
situations.

How to arouse
emotion in an
exhibition?

idea integrating emotional ~~analysis~~
what triggers emotions


Stories
First
Person
Recollection



Show People/Animals etc.
in Emotional situations


*storytelling
↳ sound effect.
Animate/mic.
Lighting.
Music. ~~story~~ effects.
storytelling. syncing the zones.

SHOW THEM WHAT
THEY LOVE



SHOW
AB
CONTROVERCY

BOOM
SHOCK THEM



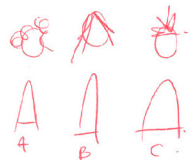
ASK PEOPLE
TO IMAGINE
HOW THEY
WOULD DO
"IT" IF
THEY
WERE
SOMEONE
ELSE

IF I WERE
A -----

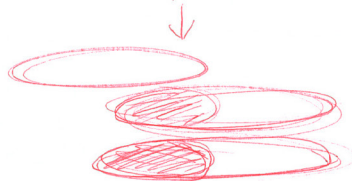
Role-play



LET PEOPLE
TALK IN MULTI-CULTURAL
GROUPS - OTHER STORIES



Different characters sharing
stories from their perspective.



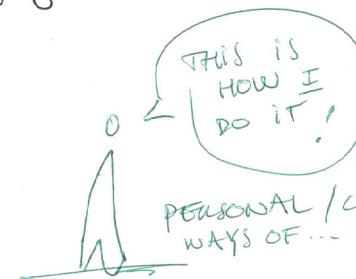
Use filters: what happens
if you add something or
take an aspect out?

How to offer different
perspectives on the same
subject?

ask all visitors
to leave their
opinions behind
to be shown

Show an Internet
discussion on the
topic

Share.
↓
Information Board.
to show different ideas
from different visitors.



Leave stories from visitors in a
sort of pool of stories to be
presented to later visitors, who
in turn can add/connect their
stories.

~~the~~
you can turn around
the sign/board to
show a different side /
information / backside



or you can walk
around it yourself

↳ maybe with mirrors.

↳ put your own face on it.

Show counterintuitive sustainable behavior...

OF DIFFERENT CULTURES?

INDIAN "VS" SWEDEN

Show/Resent several contradictory examples of sustainable solutions/behavior.

showing blank spaces
↳ something is missing

make a mistake, let something be broken!

something shows up every time but you don't know why until the end, like in a poem

try to show something explain in broken vocabulary

ASK THE GUIDE TO SPEAK IN SIGN LANGUAGE

Show statements People believe to be untrue

Show questionable solutions

→ interest (trigger)?

Interest can be a trigger for visitors to raise a question. ↓ How to make the visitors interested in the certain object?

how to make them wonder?

How To Raise questions in an exhibition?

Show something mysterious

"How does that work?"

Formulate statements that don't make sense directly.

SHOCK THEM!

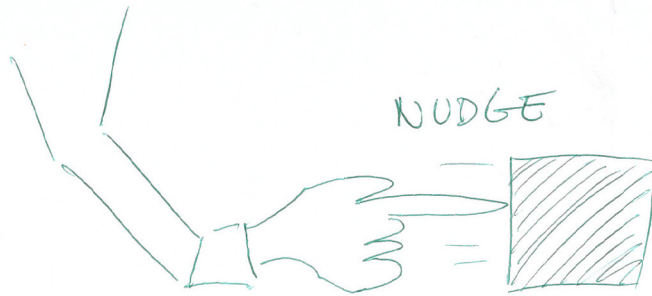
"You will live underneath the surface of the ocean."

Why?

How?

STATE THE OBVIOUSLY WRONG

Cut off explanations before they end



Role-play
in a situation
that asks implicitly
for a certain
behaviour, or that
allows and does not
allow certain behavior.

Guided fantasy (CF technique)
↳ Imagine that

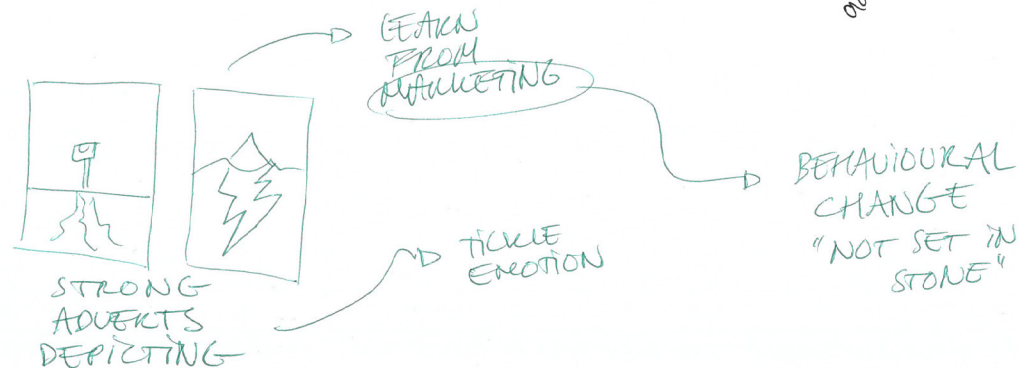
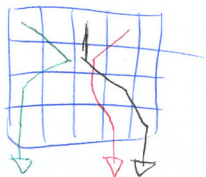
How to give
concrete examples
for sustainable
behaviour, without
giving answers
directly?

"Diaries" of
different people
showing their
goals & actions
but not yet if
they achieved it

→ Analogies / metaphors.
"Climate change is like"
→ So what does that mean?

→ Visual cues:
↓ trigger behavior
↓ achieve the goal

giving them elements of
the behaviour that they
can mix together.
Like a morphological chart



G Ideas from brainstorm family

overbuising



Bedreigde diersoorten



gezond eten

Biodiversiteit

VOOR



ouders & kinderen 8-12

Quiz, laat de kinderen de dieren beschrijven aan de hand van 3D-video/VR
→ de ouders raden het diersoort

→ de ouders worden een dier

natuur bescherming



Draai de rollen om. Laat het kind leiden.

Samen eten maken van minder bekende groente

Hoe maak je een installatie waar ouders en kinderen tegelijk mee kunnen spelen?

In de eigen tuin

Samen Fruit plukken / roemen wat is het?

3D-film door de natuur



fotopuzzel ⇒ gezond eten
foto's combineren met juist bij behorende feiten en cijfers over nutriënten, voedingswaarde, energiegebruik, watergebruik etc van desbetreffende voedingsmiddel.
Bij goede match kleurt foto groen.



voelkast, formaat voor kinderen en volwassenen
Daarbij moeten ze samen raden wat voor producten zij voelen, omtrent het onderwerp

kleur



puzzel van twee kanten
zichtbaar, één kant met informatieve tekst
andere kant met beeld.

Hoe kun je kinderen betrekken bij een saai onderwerp?

kinderen zijn dol op dieren

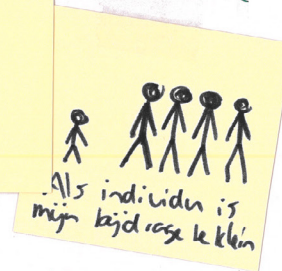
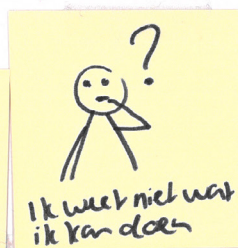
kinderen zijn niet dom meer worden wel graag serieus genomen.
Geef ze verantwoordelijkheid

Laat ze iets maken!
Dat geeft zelfvertrouwen en trots

kinderen in het onderwerp meenemen en laten zien hoe het bij hun wereld aansluit

Maak het tastbaar
Laat ze zien, het liefst in het echt.

Laat ze ontdekken met proefjes en activiteiten



hoe kun je van dit naar dit gaan →



→ Stimulans vanuit overheid/andere instantie om veranderingen toe te passen.
Geef op een website aan wat ze kunnen doen, en geef een waarde aan elke actie.

Pub max 5 minuten douchen max 2 x per week = 10 punten
max 2 keer per week vlees (portie 70 gram) een = 15 punten

Op website kan iedereen aangeven wat ze doen, zo weten andere dat ze niet de enige zijn. De totale besparing van iedereen kan ook op website getoond worden. Met 200 punten kan een bon ontvangen worden, voor gratis stuk fruit of groente.

puzzel met punten die belangrijk zijn voor de mens. Er kunnen groene en rode belangrijke punten zijn.

Groen = beter voor milieu Rood = slecht voor het milieu

Vervolgers is er een lijst met het gevolgen van de acties die de mensen graag doen.

Bezoekers kunnen in een museum hun eigen belangen ranken op een scherm. Zij krijgen dan te zien hoe goed/slecht hun acties zijn voor het milieu. Vervolgers zien zij hoeveel voorgaande bezoekers ook die actie gehoord hebben als belangrijk. Door te swipen kan je zien hoe je deze acties kan veranderen voor een betere bijdrage aan het milieu. Ook wordt er met copiers getoond hoeveel er gespaard wordt als de bezoekers hun gedrag aanpassen.

Vb belangrijk voor mens:

Fit zijn

op vakantie kunnen

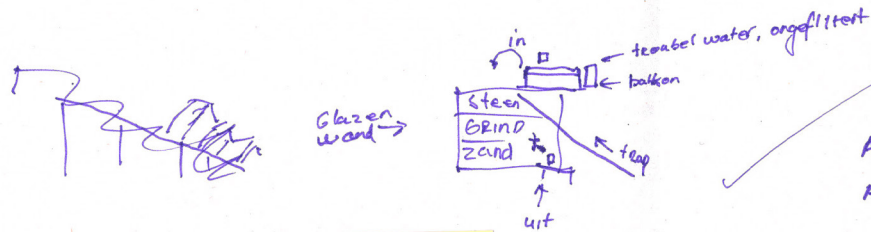
met auto naar werk kunnen

acties
→ fietsen naar werk

→ niet te ver weg

→ auto delen

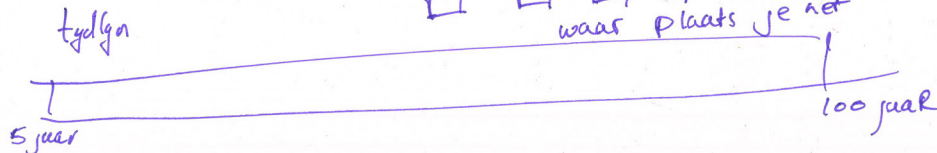
Waterfiltering laten zien door doorzichtige glazen wand
 by door wal met steen, grind zandlaag te laten
 zien hoe vies water naar buiten komt als schoon water



Hoe kun je kinderen motiveren om duurzame activiteiten te doen?

en wat impact heeft voor flora

Laat kinderen met ouders sorteren wat het langst blijft liggen na doorspoelingen gaat of eruit



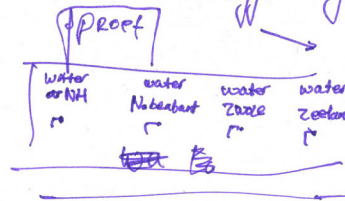
eventueel 2 tydlijnen naast elkaar, wie heeft het het beste ingeschat?

Hoe is water per land in de wereld beschikbaar of gem. consumptie per persoon per land
 verschillende landen/continenten gebruik en beschikbaarheid fysiek zichtbaar



Alternatieve laten zien als koken, chemicaliën

en hoe krijgen wy in NL ons water?



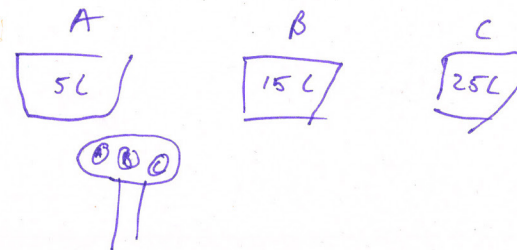
en waar komt het vandaan?

verschillende gemeente pils naast elkaar laten proeven

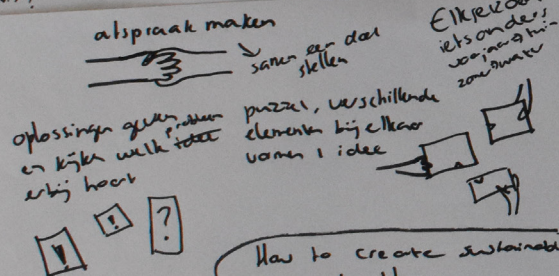
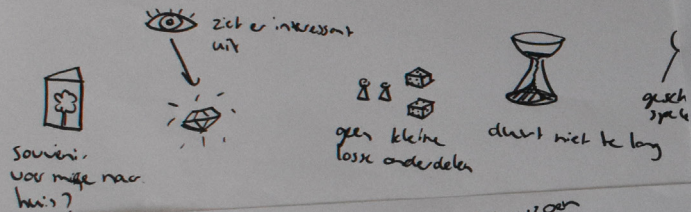
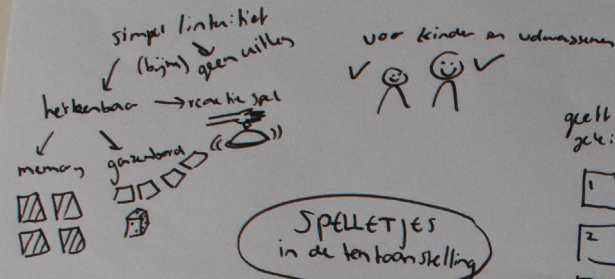
laten zien wat gemiddelde verspilling is per activiteit of gewoon wat het kost door het als een bak te laten zien

Maak keuze wat kost de gemiddelde douche beet

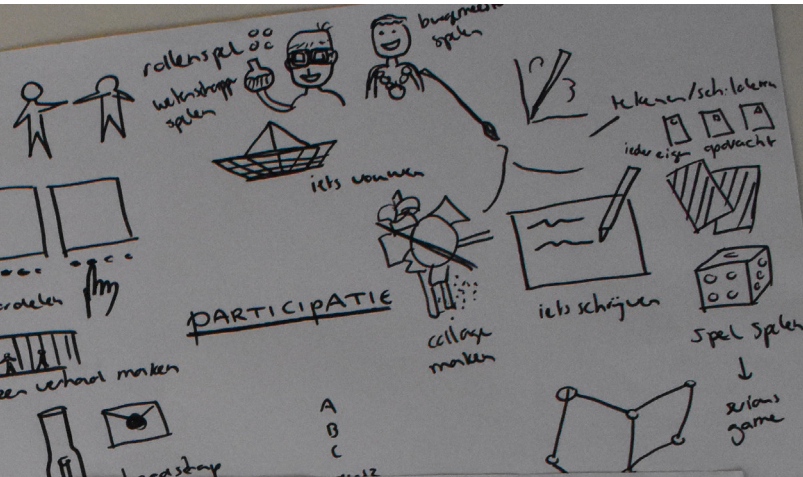
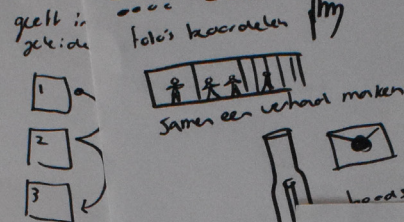
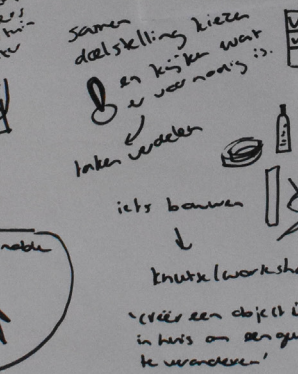
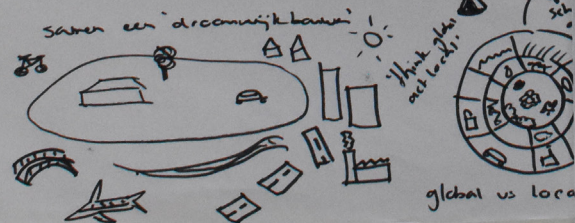
die bakken water



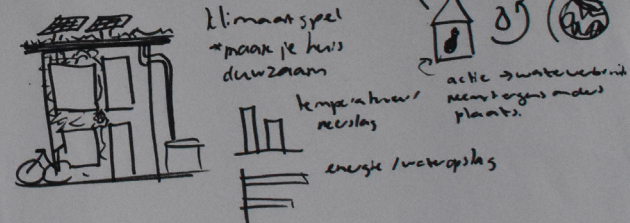
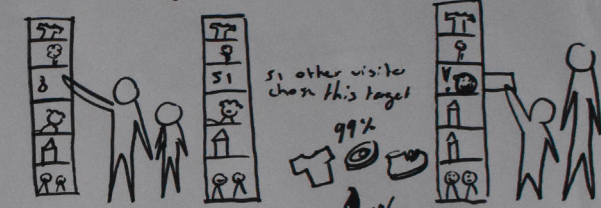
G Individual brainstorm



- ideeën of problemen bespreken
- korte denken en
 - kijken naar
 - bloemen zaden
 - geen idee eten
- ↓
- Wat zijn jij doen?
Wat doe je al?



Set a target



H Sensitizing booklet

Maandag

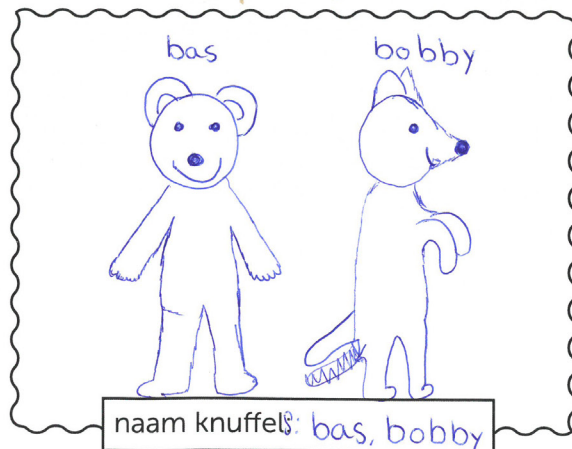
Hier woon ik

Teken je huis en met wie je hier woont. Vergeet je huisdieren niet!



Knuffels

Hoe ziet je lievelingsknuffel eruit?



Dinsdag

Dieren

Wat is je lievelingsdier?

panda, hond, kat, apen

Wat vind je leuk aan dieren?

dat ze een eigen manier van leven hebben en dat ze veel op mens. en lijken

Wat vind je niet leuk aan dieren?

NIETS

Bedreigde dieren

Ken je een dier waar het niet zo goed mee gaat?

Teken of beschrijf het dier: panda



Zou jij je willen inzetten om dieren te beschermen? Waarom wel / niet?

De mens heeft ervoor gezorgd dat het dier bedreigd en daarom moeten wij ons ervoor inzetten

Woensdag

Dieren en ik

Als je met dieren kon praten, met welk dier zou je dan willen praten?

met vissen

Wat zou je dan willen vragen of zeggen?

is het klein als je in een vissen kom zit? zo ja vind je dit dieren mishandeling?

Wat zou je doen als je de baas van een dierentuin zou zijn?

De dieren die in het wild moeten leven vrij laten en dieren met een te kleine leefwimte vrij laten

Wil je verder nog iets zeggen?

nee



I Setup co-creation session

Introductie 15 min

- Voorstellen
- Ijsbreker
- Korte uitleg over de dag
- Boekje bespreken

Collage maken 30 min

Materialen: A3 vel, kurk, gras, foto's, emoticons, plastic, leer, karton, gekleurd papier, stofjes, stiften, lijm, scharen, post its.

- Opdracht uitleggen 3 min
- Naar boekje, welk dier hebben jullie hier gekozen? => Dier kiezen voor collage 3 min
- Knutselen 15 min
- Tussendoor rondlopen en vragen stellen
- Collages aan elkaar presenteren / bespreken met de groep 9 min (video's maken!)

UITLEG

Maak een collage van een dier dat jij leuk en interessant vindt en waar het niet zo goed mee gaat.

- Een dier dat bedreigd is.
- Een dier dat in de nabije toekomst niet goed meer op aarde kan leven.

Je gebruikt een A3 vel en zet het dier in het midden. Laat op de collage iets over het dier zien. Laat ook zien wat jij denkt dat niet goed gaat met het dier en hoe je denkt dat het komt.

Collages met de groep bespreken.

Wie wil iets laten zien wat hij heeft gemaakt? Wat betekent dit? Waarom denk je dat dat zo is?

Spel maken 30 min

Materialen: klei, plastic, sate prikkers, rietjes, kurk, crepe papier, karton, plexiglas, plastic mes/vork, lijm, stiften, schaar, stofjes, touw, elastiekjes, schuim, mos, plakband, post its, dobbelstenen.

- Opdracht uitleggen 3 min
- knutselen 20 min
- ondertussen rondlopen en vragen stellen
- Na bespreken / ideeën aan elkaar presenteren 7 min (video's maken!)

UITLEG



Bedenk een spel waarbij de spelers gemotiveerd worden om het dier of de dieren uit jullie collages te helpen.

- Hoe zorg je dat de spelers het dier willen helpen?
- Hoe zorg je dat de spelers weten hoe ze kunnen helpen?


AFSLUTEN 15 min

- elkaars spel spelen
- evt kijken bij andere groep

I Materials collage making



groot	bijzonder	klein
spannend	mooi	lelijk
gek	wonderlijk	grijselijk
sterk	zwak	inspirerend
slim	nuttig	speciaal
trots	nieuw	sierlijk
uniek	zief	heerlijk
schattig	lief	prachtig
vriendelijk	gevaarlijk	kwetsbaar
gaaf	grappig	harg
zacht	glibberig	snel
	giftig	sloom



131

J Cards of the exploration boards



PLASTIC OP JE GEZICHT?

Microplastics

Microplastics zijn stukjes plastic die kleiner zijn dan een halve centimeter. Ze komen in zee terecht doordat grote stukken plastic afval uit elkaar vallen. Maar ook door hele kleine plastic deeltjes die in make-up en verzorgingsproducten worden gebruikt.

De deeltjes vergaan niet, eenmaal in het water zullen ze daar blijven. Vissen nemen die deeltjes op, zo komt het plastic in de voedselketen terecht en uiteindelijk op ons bord.

Wat kunnen we eraan doen?

Om de verspreiding van microplastics tegen te gaan kun je bij de producten die je koopt kijken naar de ingrediënten.



Plastic Soup Foundation houdt een lijst bij van producten die 100% microplastic vrij zijn.



BESTE VRIENDEN

Veilige wonen in een zeeanemoon

Dit is de clownvis, misschien ken je hem wel van Finding Nemo. Hij woont samen met een zeeanemoon. Tussen de tentakels van de zeeanemoon is hij veilig voor roofvissen. De clownvis is namelijk een van de weinige visjes die zomaar tussen de tentakels door kan zwemmen. De zeeanemoon is familie van de kwal en is giftig voor de meeste vissen. Hij gebruikt zijn stekelige tentakels om dieren te steken en ze op te eten.

Elkaar helpen

De clownvis zorgt op zijn beurt ook voor de zeeanemoon. Hij houdt de tentakels schoon door parasieten en voedselresten op te eten.



Great Barrier Reef onderwaterfilm



KLEURRIJK KORAAL

Kleine huisjes

Koraal bestaat in allerlei vormen en kleuren. Als je in de vitrine het koraal van heel dichtbij bekijkt zie je allemaal kleine putjes. Dat waren de huisjes van hele kleine diertjes. De diertjes hebben samen het koraal gebouwd.

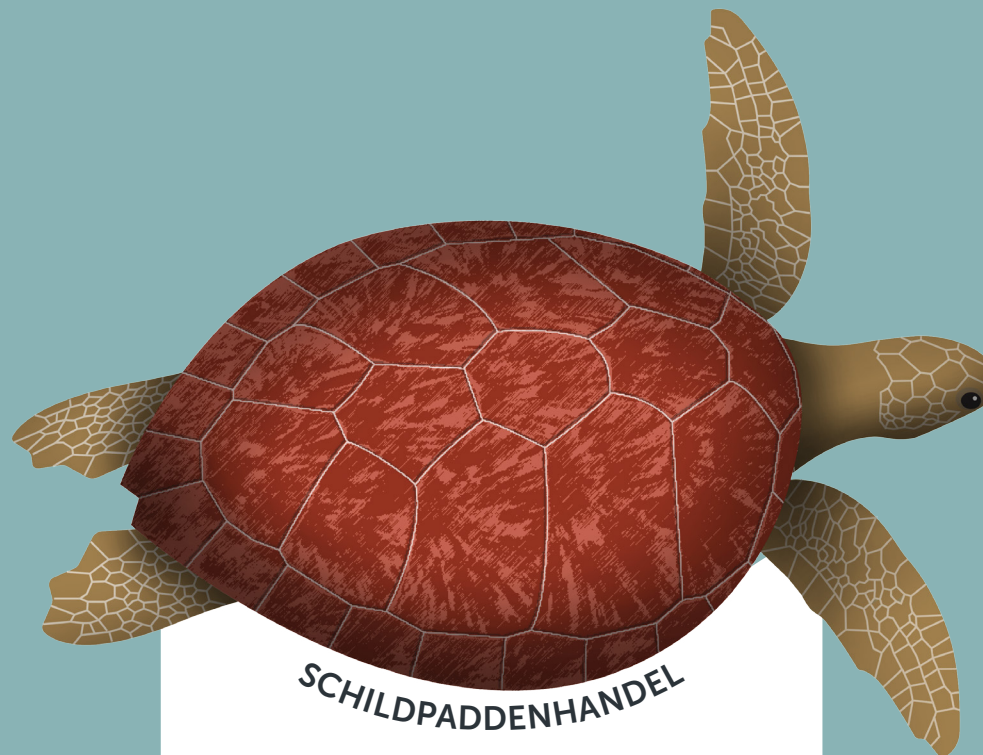
Koraaldiertjes en algen

Die diertjes leven samen met algen. Eigenlijk groeien de algen zelfs in het diertje. En dat is waar koraal zijn mooie kleuren door krijgt. In het koraal dat je hier ziet leven de diertjes niet meer. Wat er dan over blijft is een kalkskelet. De algen verdwijnen en daardoor ook de kleur.



14

In de vitrine zie je allerlei soorten koraal
Wat voor vormen zie jij erin?



SCHILDPADDENHANDEL

Schildpad in de pan

De Groene zeeschildpad wordt soms door mensen gevangen om opgegeten te worden. Als je zijn bijnaam bekijkt dan zie je in welk gerecht hij soms terecht komt.

Waardevol schild

De Karetschildpad wordt gevangen omdat zijn schild veel geld waard is. Zijn schild wordt gebruikt om bijvoorbeeld sieraden of tassen van te maken. Wat vind jij van zijn schild?

Omdat er steeds minder zeeschildpadden zijn is het nu op veel plekken verboden om ze te vangen.



Vitrine

Groene zeeschildpad & Karetschildpad

K List of participants

Eight families participated in the test, divided over four days.

This scheme shows the configurations of the families

Thursday 31 May

Family 1

Mother
Father
Daughter (3)
Son (8)

Family 2

Mother
Father
Son (8)
Son (11)

Family 3

Mother
Mother
Daughter (11)
Daughter (9)

Friday 31 May

Family 4

Mother
Father
Daughter (10)
Son (13)
Daughter (15) did not participate in the test
Daughter (18) did not participate in the test

Family 5

Mother
Father
Son (10)
A friend (boy, 10)
A friend (boy, 11)

Family 6

Mother
Father
Son (8)
Son (10)

Sunday 1 June

Family 7

Mother
Father
Daughter (8)
Son (13)

Wednesday 5 June

Family 8



Mother
Son (12)

L New version of the log book


The original log book was adapted after the first test day. This version was used by family 4, 5, 6 and 7 during the test. Family 8 used the revised booklet as shown in chapter X.X Revision

Zeeën & Oceanen Expeditie

Tijdens deze tocht door One Planet kun je van alles ontdekken over de onderwereld.


- 1 Ga naar**  *Gebruik de achterkant van je logboek voor de activiteit bij dit punt.*
- 2 Vind de borden en ontdek de tentoonstelling**  *Je komt twee soorten borden tegen.*


Rond bord met tips



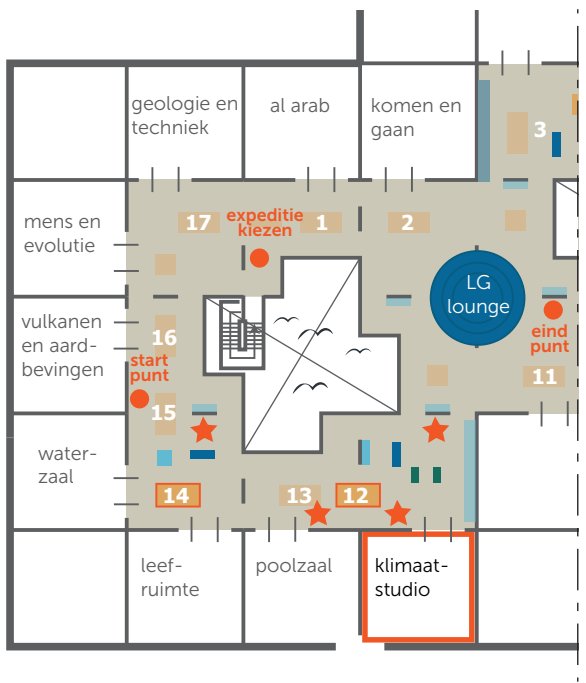
2x

Vragenbord



2x
- 3 Ga naar**  *Je kunt een berichtje achterlaten aan de uitdagingenboom.*

Plattegrond One Planet



Deze oranje randen op de kaart geven de plekken aan die horen bij de Zeeën & Oceanen Expeditie.

Veel plezier!

ontdek de wereld
MUSEON

SUSTAINABLE DEVELOPMENT GOALS

M Evaluation documents

Interview questions

- Wat vonden jullie ervan?
- Hoe vonden jullie het eerste punt?
- Wat vonden jullie van het vragenbord?
- Wat vonden jullie van het bord met de tips?
- Denken jullie dat de ontdekkingstocht helpt om meer te ontdekken over de tentoonstelling?
- Wat vonden jullie van de boom waar je een berichtje aan kon hangen?
- Hebben jullie gepraat over de onderwerpen die je tegenkwam? Waarover?
- Zorgde de ontdekkingstocht ervoor dat jullie na gingen denken over hoe mensen omgaan met de planeet?
- Kun je een voorbeeld geven?
- Hebben jullie door de ontdekkingstocht zelf ideeën gekregen over hoe je kan bijdragen aan een leefbare aarde?
- Kun je een voorbeeld geven?
- Wat zou er beter kunnen aan de ontdekkingstocht?

For asking questions I referred to the answers people gave on the survey. All participants received their own colour to fill it in, so within a family everyone could make his own judgement.

Enquete test ontdekkingstocht

Vonden jullie het leuk?

helemaal niet leuk ☐ ☐ ☐ ☐ ☐ heel leuk

Zouden jullie weer een ontdekkingstocht doen (met een ander thema) als je Museon nog een keer bezoekt?

nee zeker niet ☐ ☐ ☐ ☐ ☐ jazerker

Zouden jullie andere families aanraden om een ontdekkingstocht te doen door de tentoonstelling?

nee zeker niet ☐ ☐ ☐ ☐ ☐ jazerker

Hebben jullie het idee dat je met de ontdekkingstocht meer kan ontdekken over een onderwerp in de tentoonstelling dan zonder?

helemaal niet ☐ ☐ ☐ ☐ ☐ heel erg

Hebben jullie met elkaar gepraat over de onderwerpen die je tegenkwam?

helemaal niet ☐ ☐ ☐ ☐ ☐ heel veel

Welke woorden vinden jullie passen bij de activiteit? Omcirkel er max 5.

onduidelijk	veel van hetzelfde	teveel tekst
lokt gesprekjes uit	motiveert om te ontdekken	zet aan tot nadenken
niet actief genoeg	geeft richting aan het bezoek van de tentoonstelling
confronterend		geeft nieuwe ideeën