

logic lagoon

Name:

forest
out

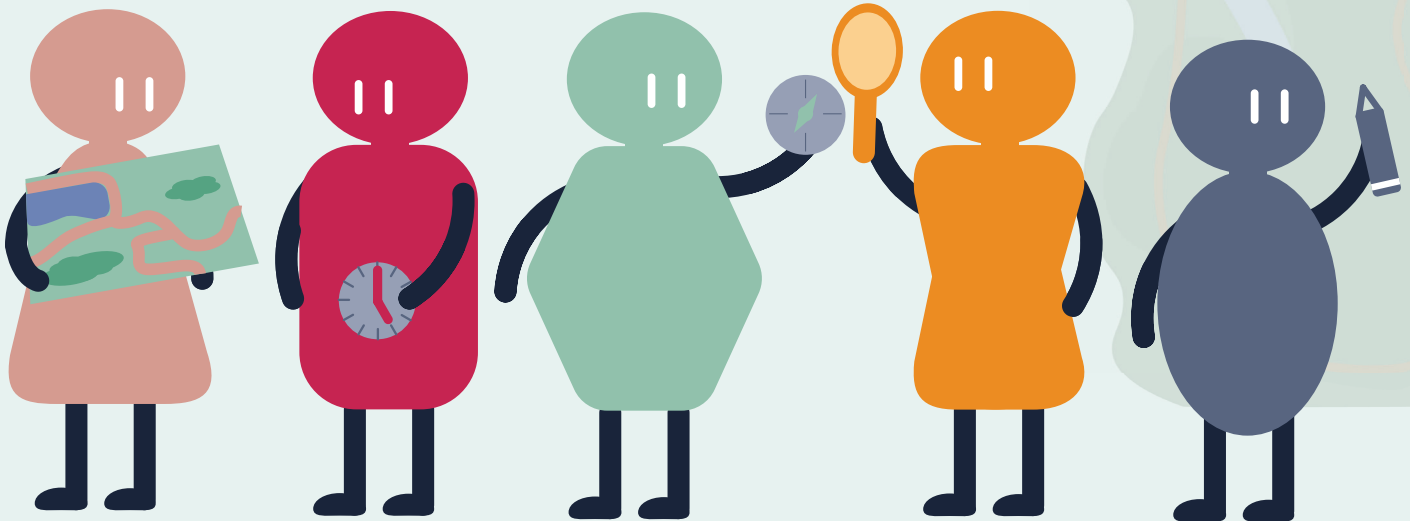
The Wednesday Afternoon Adventure Club

Stories about the applications of spatial skills

"Into the woods"
symmetry lake

riddle river

thinner trail



Exercise book for skilled mathematicians
Grade 3 and 4

Story map and measuring tools included

Introducing: The Wednesday Afternoon Adventure Club

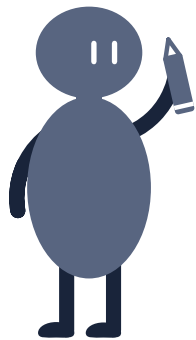
Every Wednesday afternoon, Spencer, Ory, Vicky, Symon and Rosa go on an adventure after school. They ask their parents to pack extra food and have take some accessories for the journey. Like the well prepared group they are, everyone has their own responsibilities.

Let's introduce our travellers:



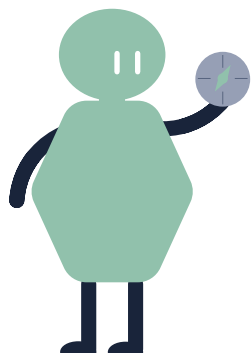
Spencer: the 'leader' of the group. Spencer is good at tracking time. Furthermore, he works well under pressure and stays calm during stressful situations. The others rely on him for tracking time and logical advice. However, in unforeseen circumstances he needs help from the others to think of solutions.

Ory: the 'adventurer'. Ory is always seeking for adventure and usually is the one convincing the others to join him to explore new places. He is courageous and takes the others under his wings if they are scared. Due to his enthusiasm, he can lose track of details on the road. For example, he needs the others to keep track of time.



Vicky: the creative one. Vicky is always excited to follow Ory and Rosa on adventures. She is always amazed by her environment and visualises it in her sketchbook, she can spend hours drawing her surroundings. When the others are lost in difficult situations, she is often the one who comes up with creative solutions.

Symon: the loyal and precise one. Symon has a great eye for detail and is usually the one to alert the others if something is missing or incorrect. He is very trustworthy and reliable. Although, he can have a hard time managing sudden changes. That is why he is sometimes scared to go on new adventures.



Rosa: the 'flexible' one. Rosa is the first to join Ory, also seeking for adventures. Where there is friction in the group, Rosa is usually the one who settles the situation. She is a good listener and sees the positive side to each story. She can easily adapt to new situations.

Legend of the map:

1 centimetre on the map = 12 metres in real life

The exercises in this booklet test different spatial skills, as well as design and inquiry based learning. Throughout the booklet, the skill that is tested per exercise is indicated with one of the six icons shown below.



Rotation



Orientation



Visualisation



Spatial relations



Symmetry

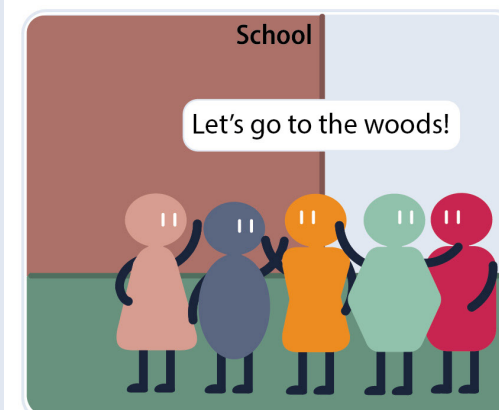


Design and inquiry based learning

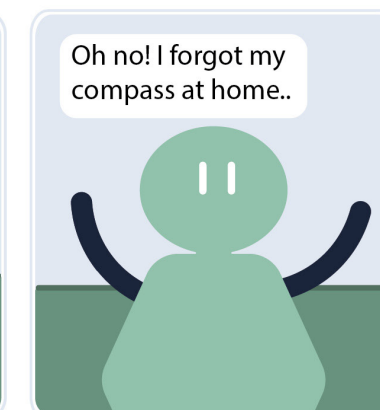
On page 11, you can find a list of tips. If you are struggling to answer one of the exercises, head over there to receive a tip on how to find the right answer.

Destination of the journey:

This week, the group is headed for the woods, just outside of town.



School is out! The group is excited for this week's adventure: they are going to the woods.



Oh no! Rosa forgot her compass. They really need it though, to find their way in the woods, so Rosa decides to go home and grab it.



Rosa runs off quickly and the others cannot follow her. They don't know where she lives exactly but they do remember some details she has told them before about her house.

Exercise 1



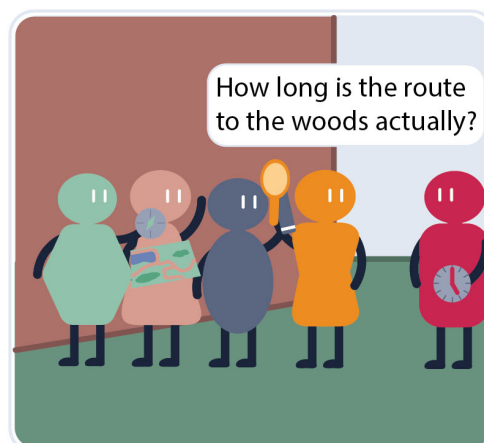
Can you find out where Rosa lives? These are the details the crew remembers:

- She always cycles home from school past the sum square.
- She has one next door neighbour on the left.
- She can see the lake from her front window and the house of the forester from her right side window.

Rosa's address: _____



Everyone made it to Rosa's. She has already packed her compass and is waiting for the rest.



Now that everyone is complete and has their accesoires, it is time to go.

Exercise 2



Estimate the distance from Rosa's house to the border of the woods (where the road gets thinner) if you can only travel by road, and thus not through the grass. You can use the tiles of 3cm and 5cm. Remember: 1 centimetre on the map equals 12 metres in real life.

Distance from Rosa's house to the woods, traveling by road:

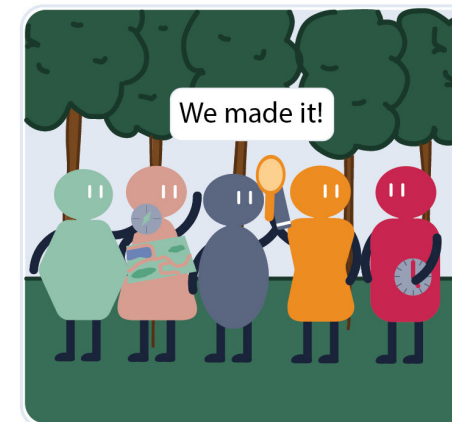
_____ cm on the map

_____ metres

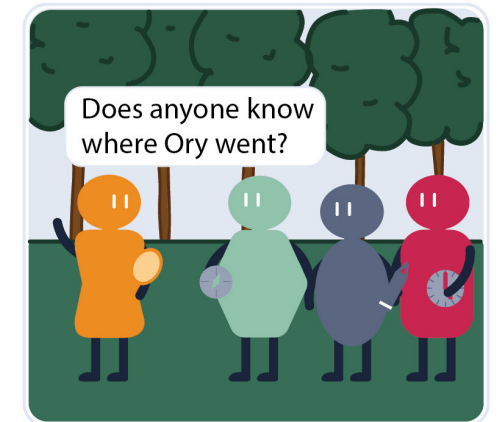
Distance from Rosa's house to the woods, traveling through grass:

_____ cm on the map

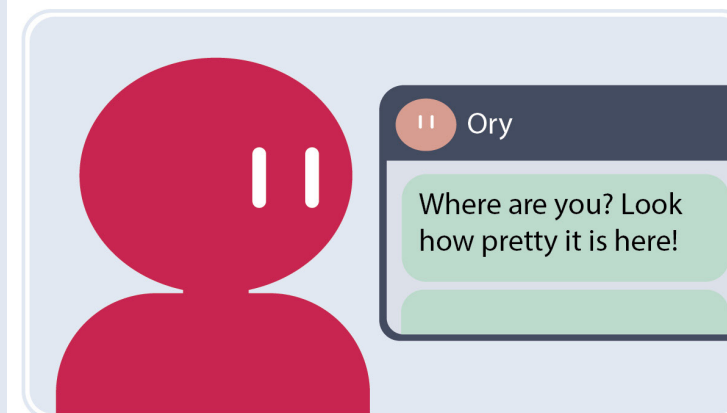
_____ metres



We've made it into the woods! The road is already changing to be less straight and when we enter the woods it also narrows down a bit



While the others are still looking around, Symon realises that Ory is missing! He must have ran of when everyone was too distracted.



The group is walking around for a while when Spenser receives a message from Ory.



Attached to the message is a picture.

Exercise 3



Can you find out where Ory went? If you look at the picture attached to the message he sent to Spener, you can locate his exact location.

Ory's location:

- ☐ A
☐ B
☐ C
☐ D

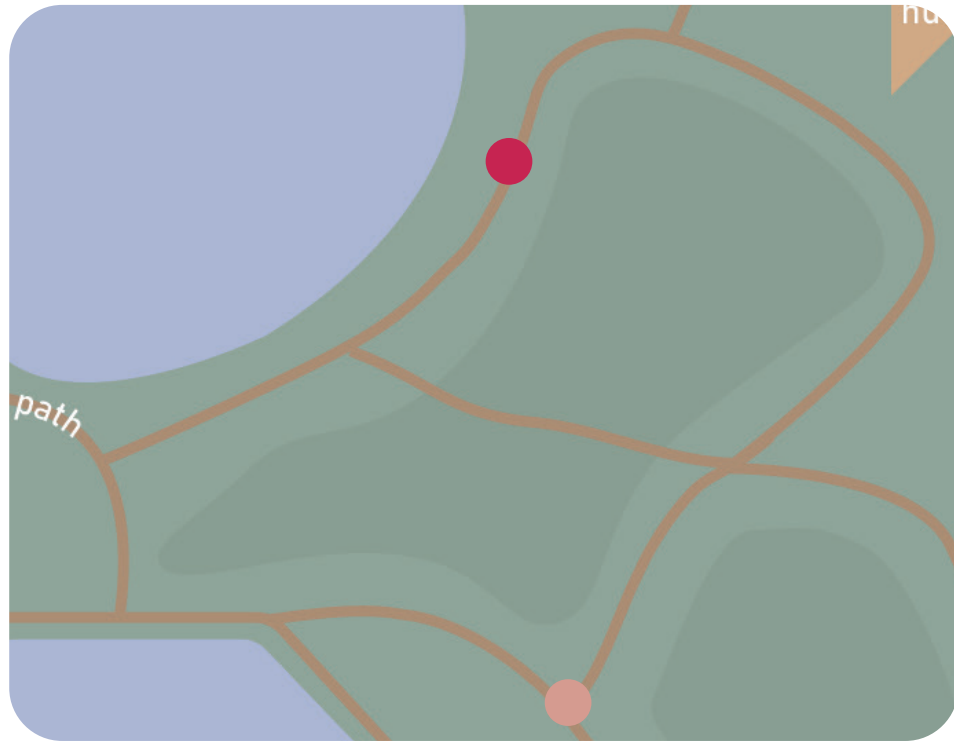


Exercise 4



What is the quickest route to reach Ory? And what is the distance of this route? (You can use the measuring tiles of 3cm and 5cm). The starting point of the crew is at the dark pink dot and Ory is located at the light pink dot.

Draw the shortest route below. Afterwards, measure the distance of the shortest route on the physical map. The scale on the picture below is not correct.



The distance of this route is:

_____ cm on the map

_____ metres



The crew is back together. Symon notices a path: the thinker trail.



Ory sees on the map that the thinker trail goes around the hill. They wonder how long it takes to walk it.

Exercise 5a



Can you calculate the distance of the thinker trail around the hill? (the start and end point are the same).

Distance of the thinker trail:

_____ cm on the map

_____ metres

Exercise 5b



The crew travels with a speed of 40 metres per minute. How long does it take them to walk along the thinker trail?

The equation to calculate time is : $\text{time} = \text{distance} : \text{speed}$.

Calculation: _____

Time = _____ minutes

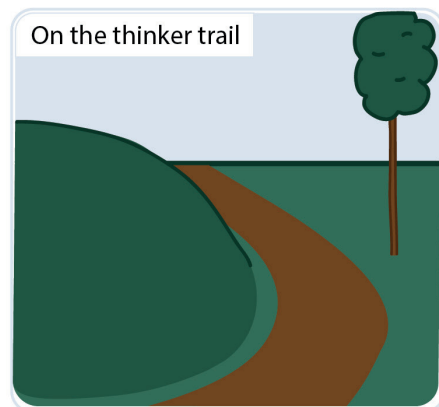
Exercise 5c



Can you convert the speed of the crew to kilometres per hour? Use the table below for guidance.

distance	40 m	40 m	 m	 m	 km
time	1 minute	 s	360 s	3600 s	1 hour

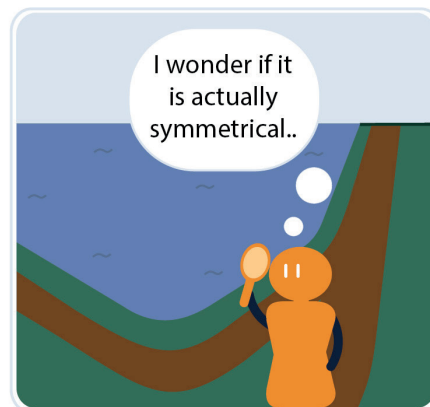
X
 X
 X
 X
 how many seconds is that?
 X
 X



The crew decides that they have enough time to walk across the hill. They enjoy the views along the way and make it back to the T-crosspoint.



When they walk a bit further down the road, they arrive at the symmetry lake.



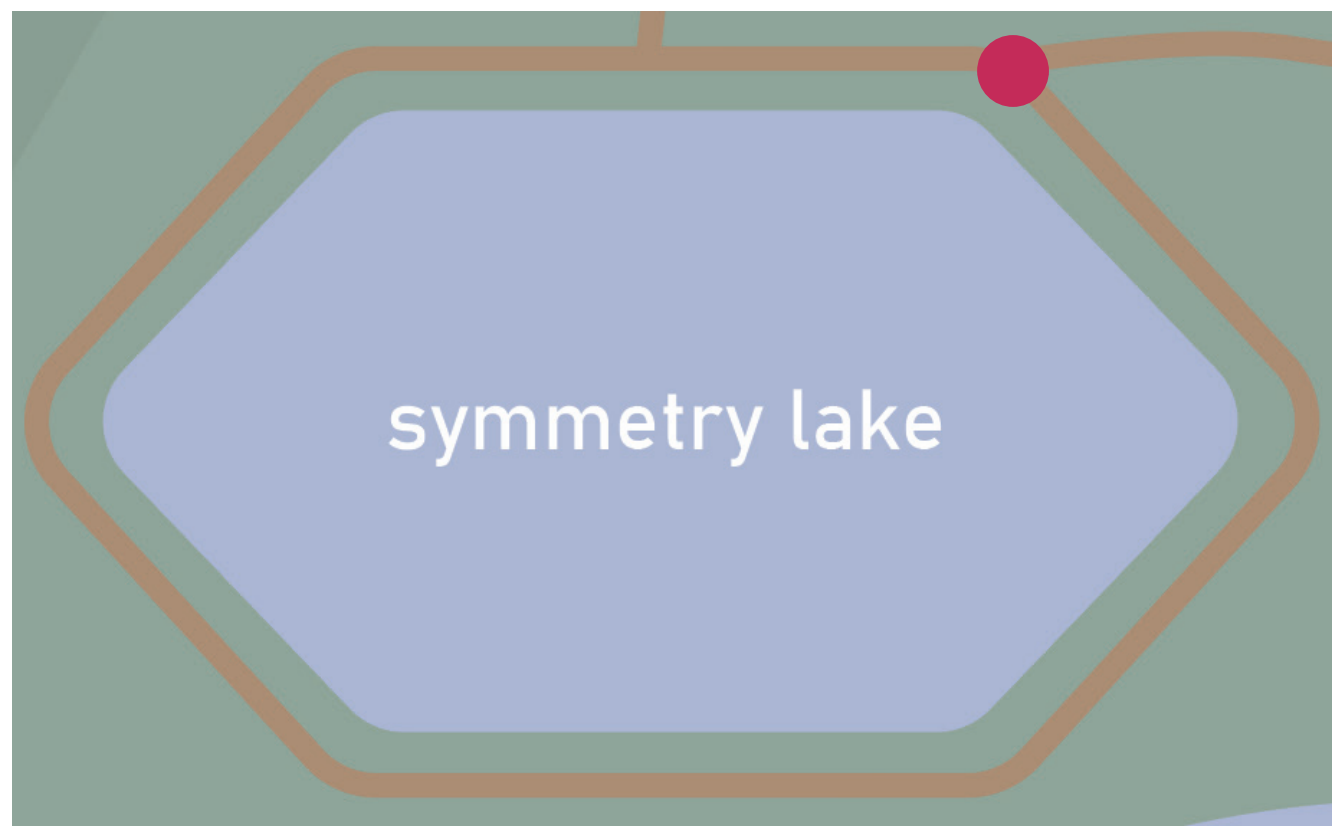
Symon acknowledges its beauty and perfect looking shape. He wonders if it is in fact, symmetrical.

Exercise 6



Symon was right, the lake is symmetrical. But how many symmetry lines does the lake have? Can you draw all the symmetry lines you see in the picture below?

Tip: A symmetry line is a line that divides a shape in two shapes that are exactly the same, but mirrored, like looking into a mirror.



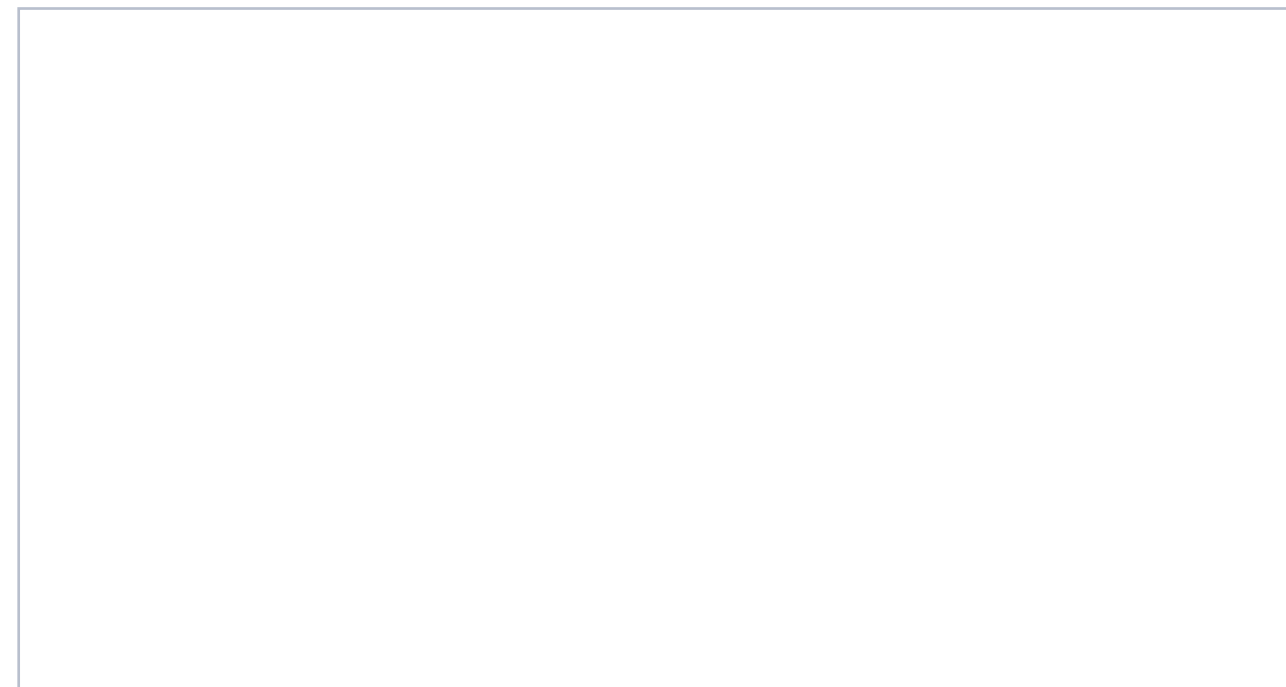
I can count: _____ symmetry lines.

Vikcy is also admiring the lake, she wants to draw a picture to show her parents later.

Exercise 7



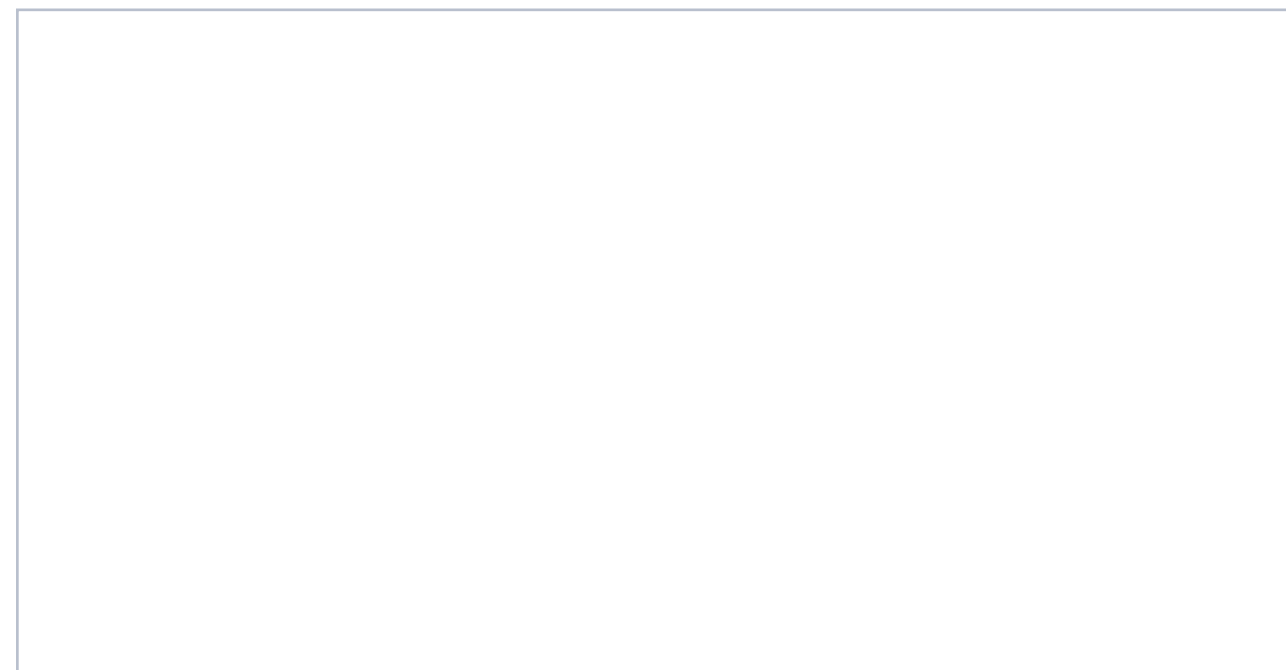
Can you draw a picture Vicky would draw for her parents? Imagine you are standing on the dark pink dot on the picture in the previous exercise. You can choose which point you are facing. What would you see? Draw it in the space below.



Exercise 8



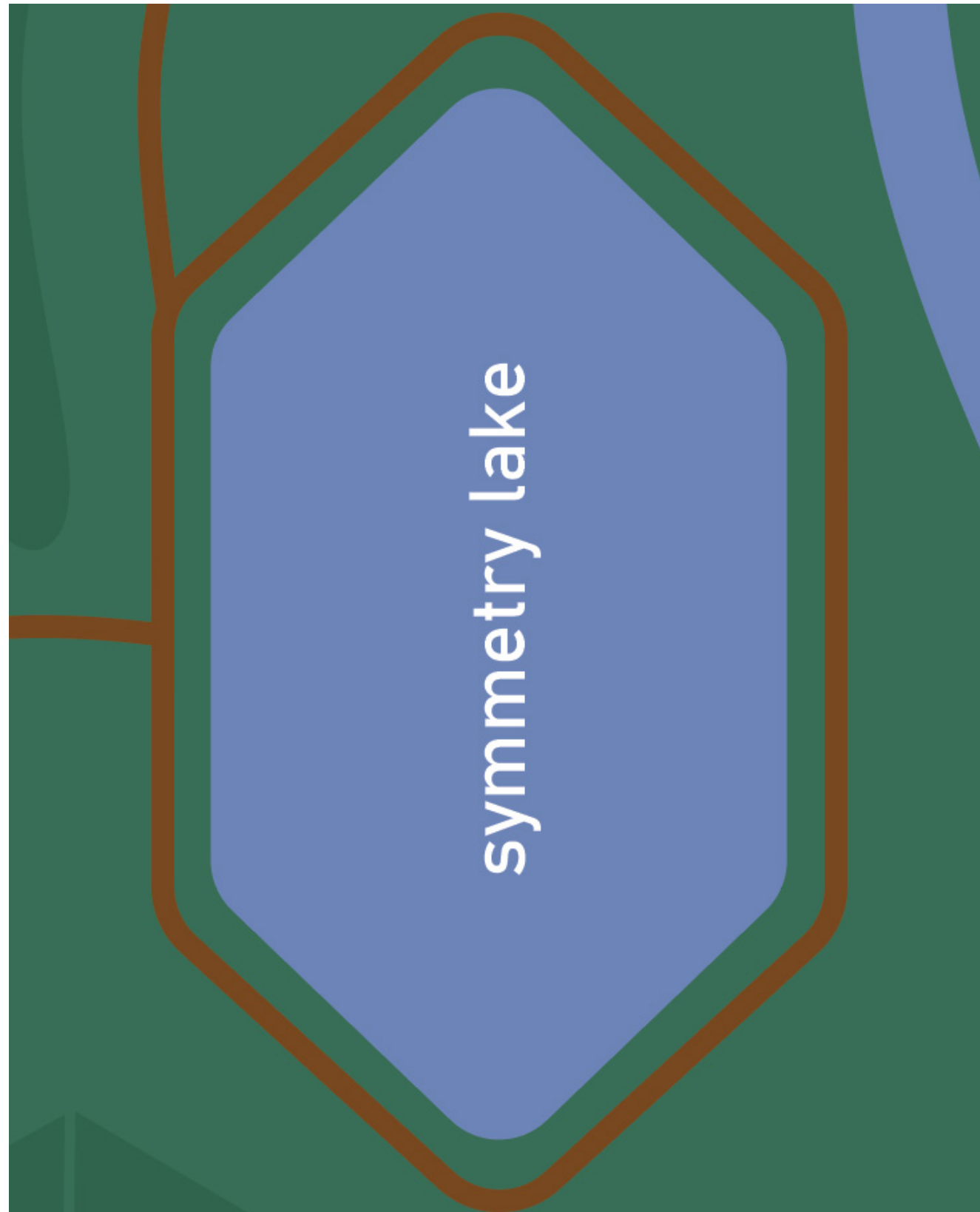
The crew wants to cross the lake, however they did not take their swimming clothes and they don't want to make their normal clothes wet. Can you think of a way for the crew to cross the lake without getting wet? You can draw or write down your ideas below.



Exercise 9



Can you build the best idea you had for the previous exercise? Use the lake below as an underground and build something with which the group can cross it.



Hints

Exercise 1

Read the details one by one. If you keep in mind what the options are that are left after each detail, only one house remains.

Exercise 2

Before you start measuring, can you point out the route that you should take from Rosa's house. If you can travel over grass, what is the route you can take?

Exercise 3

Look at the four options in the book and find out where these places are on the physical map. Which two options are not possible? And what is the difference between the remaining two?

Exercise 4

Which route do you think will be the shortest? How can you check if that one is the shortest?

Exercise 5a

Can you point out which route you will measure? Which tiles do you think would be best to use? Make sure that each tile starts at the end point of the last, so that you do not miss anything.

Exercise 5b

Write the formula of the question and fill in each number that you already know.

Exercise 5c

Look at the table and which units are written down. First write down each step that is taken to get from one number to the next and then fill in the table.

Exercise 6

You can use the mirror from the box. Place the mirror vertically on the map and turn it around. When is the view in the mirror exactly the same as on the paper?

Exercise 7

Look at the comic story above exercise 6. On the third picture, you can see the lake in front of Symon. Use this picture as inspiration for your own drawing. Carefully watch the shape that the lake has on this picture. Also take a look at the physical map, if you stand on Rosa's location, what can you see in front of you?

Exercise 8

Think of objects that you know that can float. Can you think of something using these objects?

Exercise 9

Take a look at the materials in front of you. Can you recreate one of your ideas with these objects?

