



What is a constellation?

Looking at constellations

time

70 minutes

learning outcomes

To:

- know that the stars in a constellation are very far apart
- to know that what you see when you look at a three-dimensional object depends on where you are looking from

end product

- a three-dimensional model of the constellation Orion

materials needed

- 84 wooden skewers
- 48 corks
- 12 pieces of corrugated cardboard measuring 40 x 20 cm
- 12 pieces of corrugated cardboard measuring 20 x 20 cm
- 12 containers
- glow-in-the-dark modelling clay
- rulers
- glue
- scissors
- Stanley knife
- waterproof markers

Preparation

For the activity **Three-dimensional shapes** move all the tables and chairs to the side of the classroom so that the children have plenty of room to act out a geometric shape. You could also use the gym or the playground.

For the activity **Make a constellation** prepare twelve containers each containing glow-in-the-dark modelling clay, corrugated cardboard, seven wooden skewers, 4 corks, a ruler, glue, scissors, and a waterproof marker.



Three-dimensional shapes 15 min.

Move all the tables and chairs to the side of the classroom. Organise the children into four groups of six children. Send each group to a different corner of the room. Each group chooses a three-dimensional shape to act out together. They hold hands and stand in a triangular pyramid, cube, or cuboid. Explain that they are not allowed to choose a circle.

Each group chooses one child to act as coordinator. The other five children make the shape together. The sixth child in each group examines the shape from different sides. Does it look the same from all sides? These children draw the side views of their shapes on paper. Discuss each group's findings. Does the shape change if you look at it from a different side? Why? Ask the children if they think this is also true of the way we look at constellations.



The children investigate what constellations look like when seen from different angles.



Make a constellation 45 min.

Organise the children into pairs. Give each pair a container. The children complete Task 1 on the worksheet. Explain that they must not press too hard on the cardboard when drawing the lines. Provide assistance at step 8 by cutting out the circle in the cardboard.

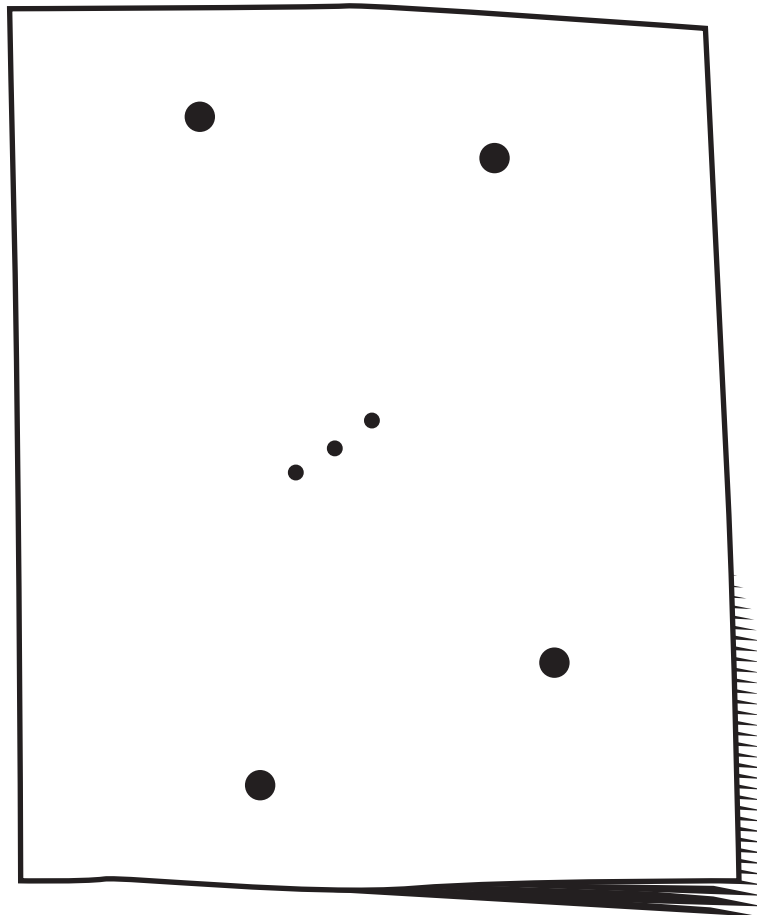


The children look through the eyehole at the three-dimensional Orion. See step 16 of Task 1 on the worksheet for tips for the children if they cannot see their constellation clearly.



Not on one line 20 min.

In Task 2 on the worksheet the children compare their constellation with the constellation as we see it on a clear winter night. Do the children see Orion as shown in the drawing below? Encourage the children to look at their constellation from different sides. Ask them why it is that the constellation looks different when seen from different sides. Explain that this is because the stars are not located on one line.





What is a constellation?



You are going to answer the following research question:

What does a constellation look like when seen from different sides?

1 *Make a constellation*

1 Collect a container with the things you need from your teacher.

2 Examine the items in the container. Take out the long piece of cardboard.

3 Draw a straight line two centimetres from the short edge of the cardboard.

Write a 1 under this line. You are going to divide the rest of the cardboard into six equal parts as shown in the drawing below.

4 Measure the length of the cardboard from line 1.

The length of the cardboard is _____ centimetres.

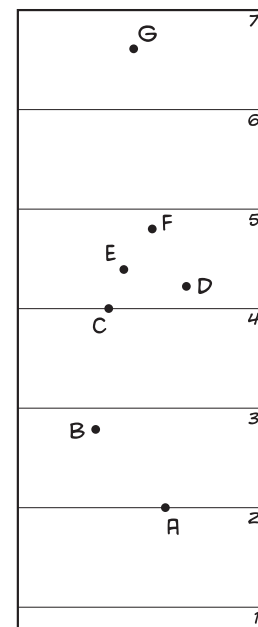
5 Divide this figure by six. Write your answer here:

_____ ÷ 6 = _____ centimetres.

6 Starting at line 1, measure the number of centimetres you calculated in step 5. Draw a straight line here. Write a 2 under this line.

7 Repeat step 6 until you have drawn six lines in total.

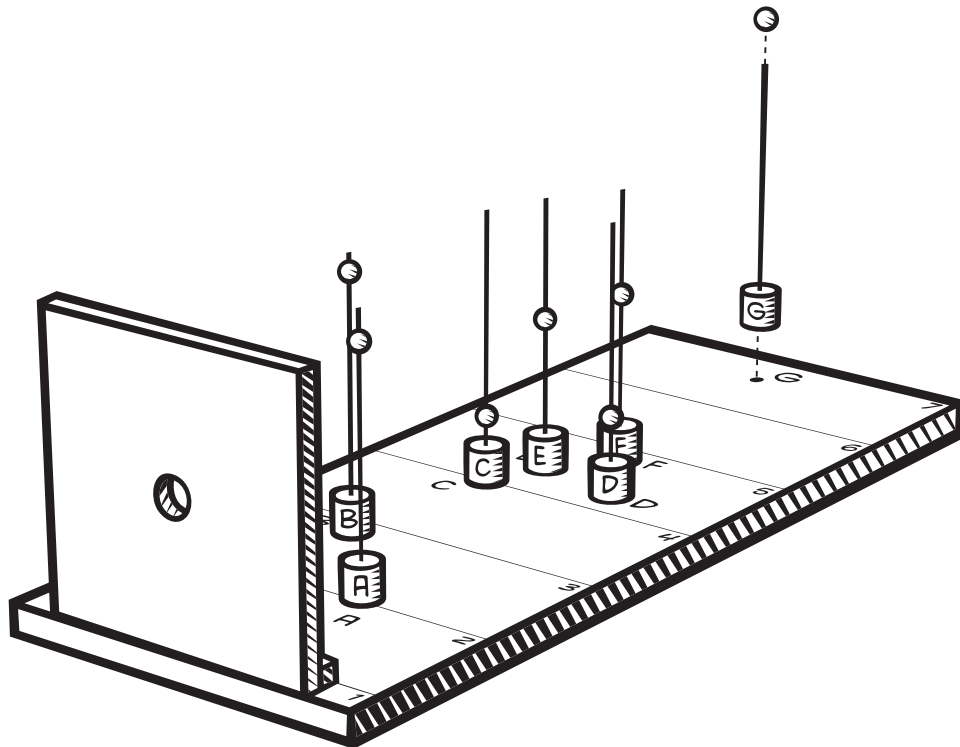
The seventh line is the top of the cardboard.



8 You will be attaching your stars to the board you have just drawn. Next you will make the eyehole. Take the square piece of card. Draw a cross exactly in the middle of the card. Use the compass to draw a circle with a diameter of 1 centimetre on this cross. Ask your teacher to cut out this circle for you.

9 Glue the eyehole to the long piece of cardboard in front of the first line. The drawing below shows you how to do this.

10 Now you are going to make a three-dimensional model of the constellation Orion on your board. The drawing below shows exactly where you need to put each star. Each of the stars has been given a letter. Some stars, such as A and C are positioned exactly on a line. The others are located in between the lines. Use the pencil to mark the letters A to G in the places where the stars need to go. Look at the drawing to see how to do this.



11 Cut four corks in half. Use the waterproof marker to write the letters A to G on the corks.

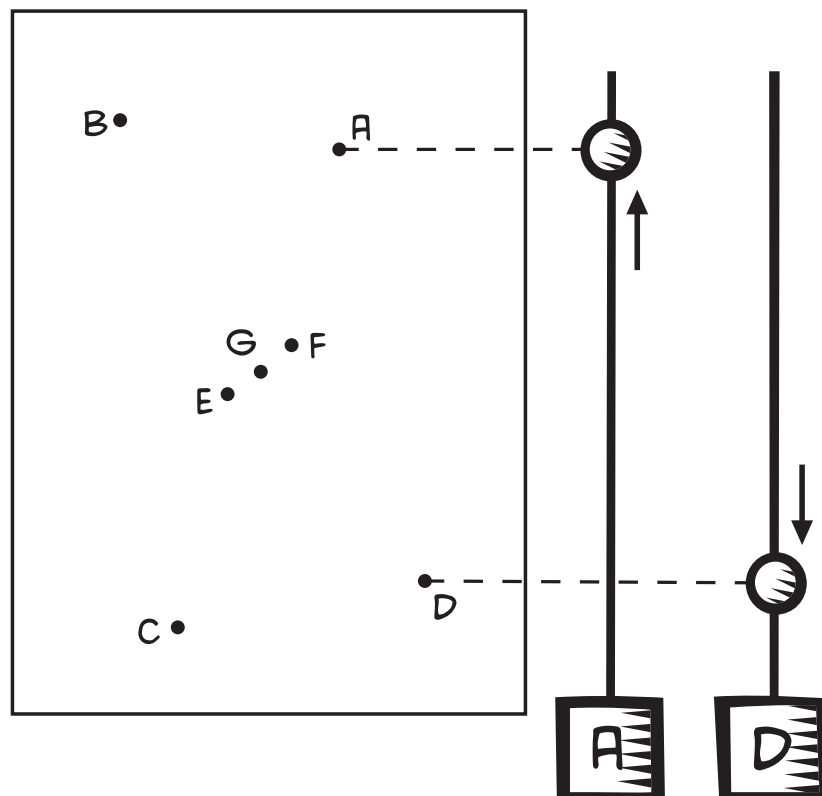
12 Take the 7 wooden skewers and stick one in each of the lettered corks.

13 Take the glow-in-the-dark modelling clay and roll seven small balls about the size of a pea. Slide one ball onto each skewer. Each ball represents a star.

14 Put the stars on the correct letters. The drawing below shows how high each star needs to be. Star A should be very near the top of the skewer. The other star near this line (Star B) is also high. Stars C and D should be near the bottom of the skewer. Stars E, F, and G should be almost halfway down the skewer.



15 Look through the eyehole in your cardboard square to see if the stars are in the correct place. The constellation should look the same as in the drawing.



16 Does your constellation look the same? If not, go through steps 10 to 14 again. Other reasons why your constellation doesn't look the same may be:

- the balls representing the stars are too large
- the balls are not at the correct height on the skewers
- the hole you are looking for is too small, so you cannot see the whole constellation

2 *Not in one line*



You have now made a three-dimensional model of the constellation Orion. Look through the eyehole. In the box below, draw what your constellation looks like.

draw what you see **HERE**