

Shadow Measuring

This activity was created by Amaris

The shadows you see outside are caused by objects blocking the light from the sun. The sun reflects off these objects, resulting in a dark figure in the shape of the object on the ground where light did not reach. In this activity, we will see how the position of a light shining on an object (a cutout image of Esiw the robot) affects the size and position of a shadow.

- 1 Let's start by predicting what might happen.

PREDICTIONS

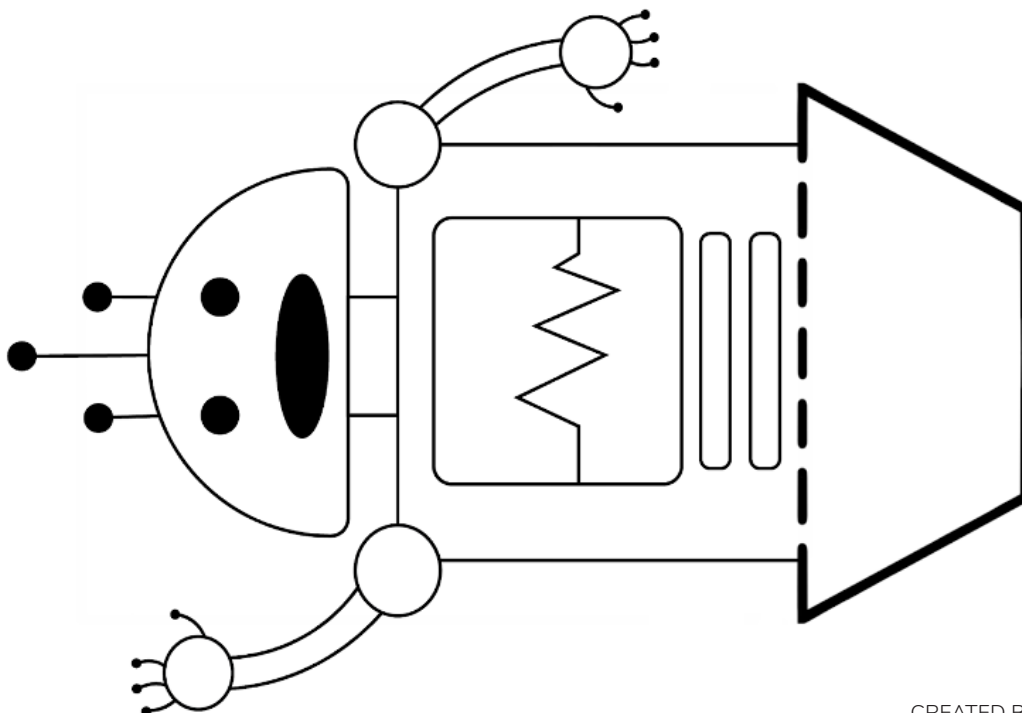
What will happen when you shine a light towards Esiw? Circle your answers in the table below:

POSITION OF LIGHT	DIRECTION OF SHADOW	LENGTH OF SHADOW
In front of Esiw	Towards light / Away from light	long / medium / short
Behind Esiw	Towards light / Away from light	long / medium / short
Above Esiw	Towards light / Away from light	long / medium / short

What will happen to the shadow when you move the light closer to Esiw? Circle your answer:

The shadow will get longer The shadow will get shorter

- 2 Colour the picture of Esiw below, then cut them out along the solid lines. Fold along the dotted lines to make a stand for Esiw then put them in a dark place.



Date: _____

Name: _____

- 3 Grab a flashlight and two rulers. Set one of the rulers down on the floor behind Esiw (for measuring the shadow length). The other ruler will be for measuring the distance between the light and Esiw.
- 4 This step is a bit tricky, so ask for someone's help if you need it! Hold the flashlight a little above and a little in front of Esiw. See the shadow that is produced.

Take a look at the table below. For each of the distances (0 cm, 5 cm, 10 cm, 15 cm, and 20 cm), position the flashlight so that this is the distance between the tip of the flashlight and the top of Esiw. For 0 cm, the tip of the flashlight should be touching Esiw. Try to keep the height of the flashlight the same each time (a little above Esiw).

- 5 For each of the flashlight distances, measure the length of the shadow (using the ruler you placed behind Esiw). Write this down, and also record which direction the shadow goes.

OBSERVATIONS ←

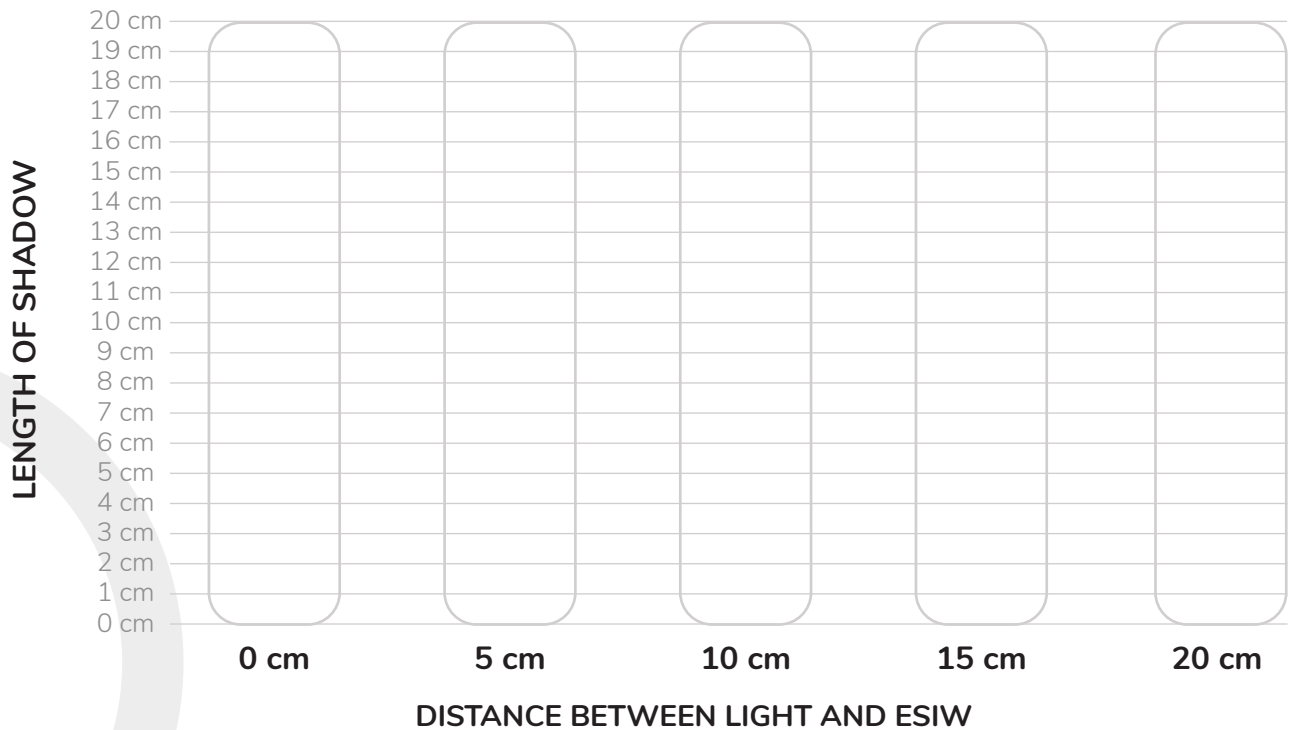
DISTANCE BETWEEN LIGHT AND ESIW (cm)	DIRECTION OF SHADOW	LENGTH OF SHADOW (cm)
0	Towards light / Away from light	
5	Towards light / Away from light	
10	Towards light / Away from light	
15	Towards light / Away from light	
20	Towards light / Away from light	

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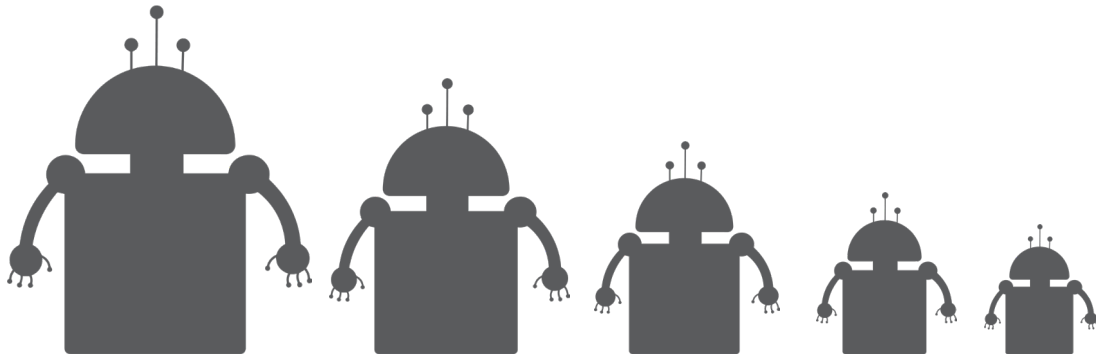
Date: _____

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- 6 Now, we're going to try graphing! A graph is like a way to see all the things you just observed in one place. Below, colour each bar up to the mark that matches the shadow length you measured.



- 7 Alternately, if measuring and graphing the shadow length is difficult (or you want to try a different method), you could hold up a piece of paper behind Esiw, and trace the shadow on each one. Try tracing the shadows lined up, side-by-side, like this:



- 8 Look at your drawings or graph, and think about the following questions:

When was the shadow the longest?

When was the shadow the shortest?

Did this match up with your predictions, or were you surprised?