

## II. Graphing light

Key Question: How does light change over time?



Student name:

Class:

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## Activity 1 – Graphing light

In this activity you will make a graph with light and see how light intensity changes in time. You will use a lamp as your light source.

- On the computer screen you see the light intensity diagram. Along the horizontal axis you see the time in seconds and along the vertical axis you see the light intensity in lux.
- Locate the red cross on the vertical axis of the graph.

Point the light sensor at the light source.

What happened to the light intensity? What happened to the cross?

When the light intensity goes \_\_\_\_\_, the red cross goes \_\_\_\_\_.

Point the light sensor towards the ground.

What happened to the light intensity? What happened to the cross?

When the light intensity goes \_\_\_\_\_, the red cross goes \_\_\_\_\_.

Now you will use the light sensor to perform a measurement. After starting your measurement you will:

**A.** Point the light sensor to a the light source again.

Do not place €Sense too close to the light source, you want to measure within the light sensor range, so the cross have to stay below 15171 lux.

**B.** Keep pointing at the same direction for a few seconds.

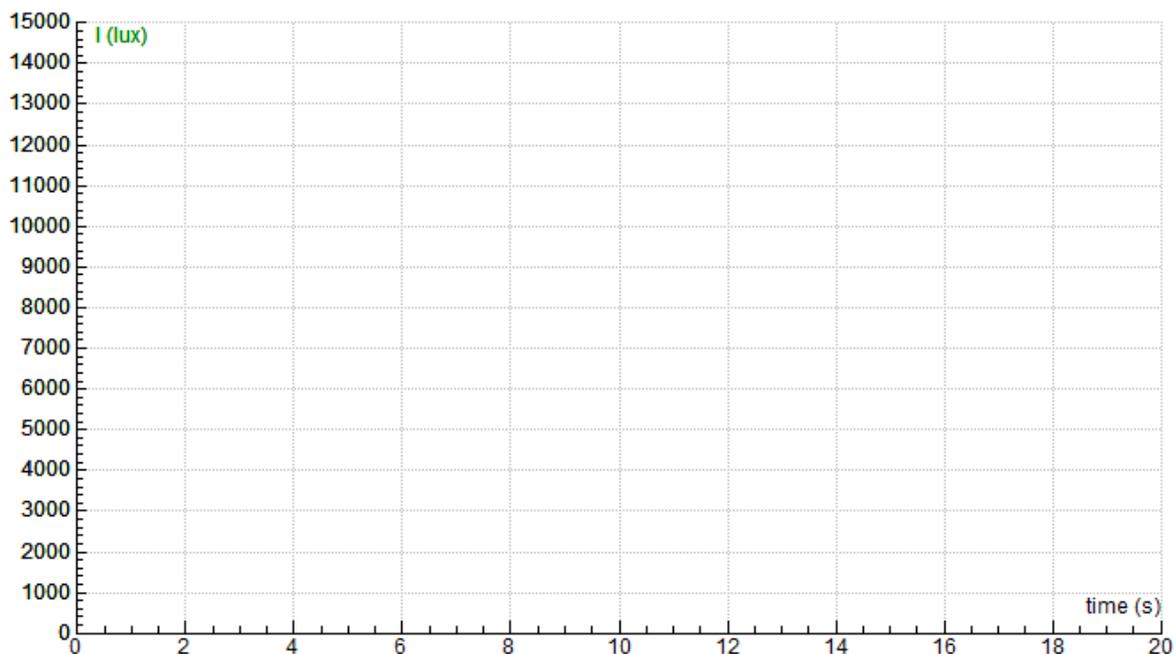
**C.** Slowly move the sensor away from the light source.

**D.** Then slowly move the sensor towards the light source.

**E.** Stop for a few seconds in front of the lamp.

**F.** Cover the “eye” of the sensor with your hand.

- Start your measurement by pressing the green Start button.
- Perform steps A to F.
- Draw the resulting measurement graph in the diagram on the next page.



- In the graph, label the moments when the sensor:
  - was moved away from the lamp,
  - was moved towards the lamp,
  - was kept in front of the lamp, and
  - was covered with your hand.

What was the light intensity measured in front of the lamp?

During how many seconds the sensor was moved away from the lamp?

What was the light intensity at the furthest distance from the lamp?

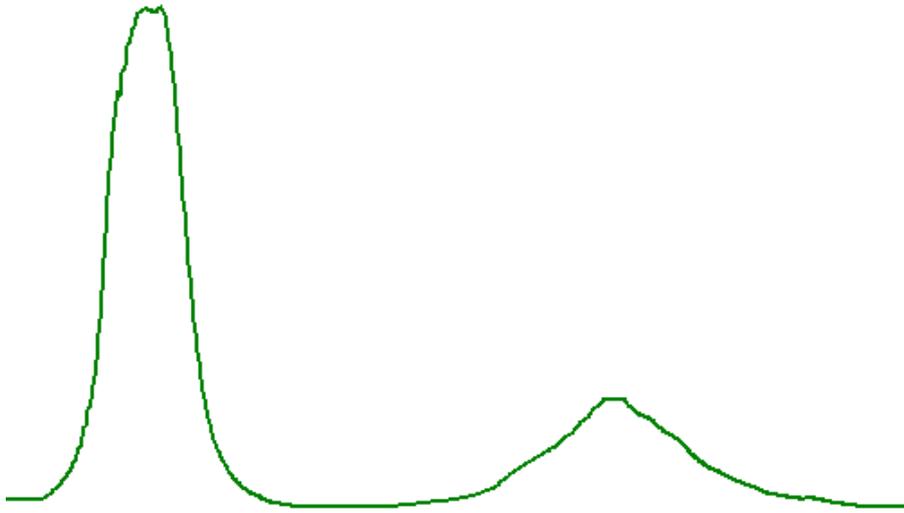
During how many seconds the sensor was moved towards to the lamp?

After how many seconds you covered the sensor with your hand?

What was the light intensity when the sensor was covered by your hand?

## Activity 2 – Match the graph

Now you are going to use the light sensor and make a light graph, which matches the shape shown below.



- First look at the shape and write down how do you think this graph has to be made?

- Start the measurement and try to match the given shape.

Did you succeed? Congratulations!

- Do you think you can make a graph that looks like the letter M. Write down the steps you would take to make an 'M'. Then make it!

### Activity 3 – “Clouds” game

In this activity you are going to play a game.

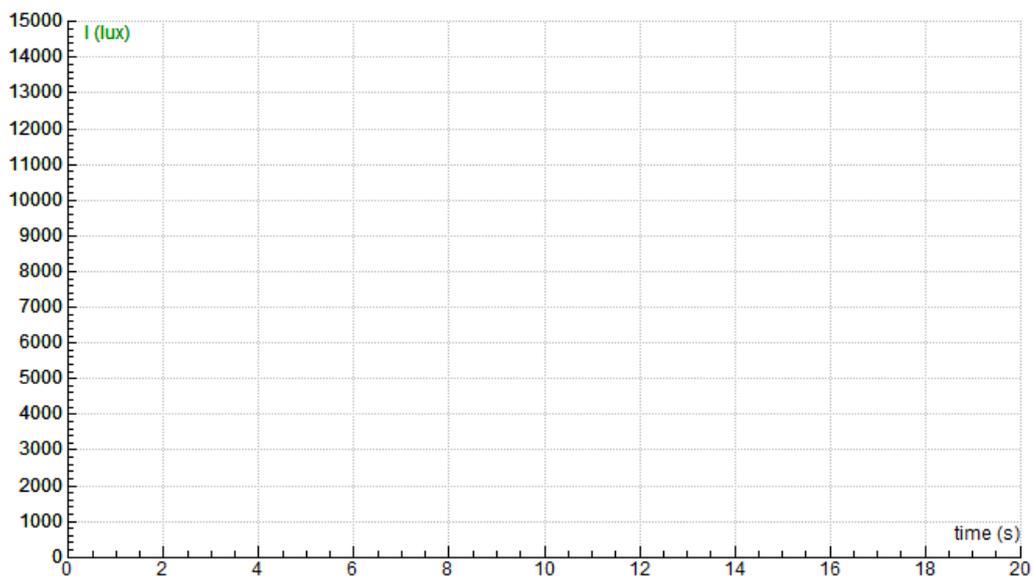
- Make two identical cloud shapes: one from white paper, and one from black paper.
- Point the light sensor to the light source. Write down the light intensity measured at this moment.
- Place the white cloud in front of the light sensor (at circa 1.5 cm distance). Write down the light intensity measured at this moment. Do the same for the black clouds. Always place the clouds exactly in the same place.

The light intensity measured with no cloud is \_\_\_\_\_.

The light intensity measured for the white cloud is \_\_\_\_\_.

The light intensity measured for the black cloud is \_\_\_\_\_.

- Now play a game with your classmate. Hidden from your view, the classmate will pass the white or the black in front of the light sensor. You will look at the graph on the screen and guess which of the clouds your classmate uses.
- Let your classmate record his graph.
- Draw his graph in the diagram.



- Tell which of the clouds was placed in front of the light sensor and when. Label your graph to reflect this.

## Questions:

- G.** By using the light sensor make other letter graphs e.g. 'W' or 'N'. Write down the steps you would need to create your graph.

