



How we see

SEQUENCE 1

Age group	6-9 y. o.
Prior knowledge	None
Material needed	How we see box, mirror, glass of water, paper, pencil.
Subjects	Light
Skills involved	Understanding the basic principle of sight. Observation and logical reasoning.
Time to carry out the sequence	1 hour

Step 1: Introduction

Start the lesson by talking to your students about the 5 basic human senses. After they have named them all, ask them to define how each of them works. Start with the two easiest ones to perceive. Touch is related to us physically touching an object, we can taste stuff when something touches our tongue. What about the others? We hear things because sound reaches our ears, and we can smell something when the odour comes to our nose. But what about sight? What is it that allows us to see?

Let the students hypothesise, and when they are done, if they don't have the answer, tell them to imagine a situation when they can't see. One way or the other, they will describe a situation where it is dark, so ask them what is missing in that scenario.

Then describe to them that we can see because light reaches our eyes. It comes from the source (the sun, a lamp...) travels to the object, bounces off it and comes to our eyes, and that is how we can see. To make sure that the students understand, let



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them choose an object in the room, and demonstrate the route the light takes, from the source to that object and then to their eyes.

Step 2: How do mirrors work?

Note: If you have an option, use a large mirror so that the whole group can see the reflection of the person standing in front of it.

Now talk to your students about mirrors, and how they work. They might have a guess now that they know how sight works. If they don't get it, tell them that it is the same as with any other object, but in this case the light bounces twice. It travels from the source to our face, then to the mirror, and it then reflects from the mirror to our eyes. This is why we can see ourselves in the mirror.

Step 3: Be my mirror

Now, analyse the image shown in the mirror. Is it the same as us? The younger students who don't know left and right yet probably won't be able to understand the difference, and maybe not even the older ones will figure it out.

To help them, divide them into pairs, standing opposite to one another, and have one person imitate the mirror. Have the students raise their left hand, and the "mirrors" imitate them. Then, without lowering their hands, rotate the "mirrors" 180 degrees, so that their backs are turned to the "original". What do they notice? Are they raising the same hand?

The students will realise that are using opposite hands, so discuss it with them, and have them try to figure out why.

While the physics of it might be too complicated for this age group, the general principle can be explained simply. The mirror works exactly like there is another person that is directly imitating what we do, like they did in their game.



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Note: If you students are advanced enough, and you want to go in depth on this subject, you can use this video: <https://www.youtube.com/watch?v=1t4dOPxKgrY>

Step 4: Turn it around

Prepare the material and do the “Inverted arrow” experiment, as described in the “Cration of elements”.

After you have discussed it with your students, and they understand what happened, you can have them make their own drawings and flip them. For the older students, you can have them try to write their inverted names, so that when they look at them through the glass of water, the names are spelled right. It will be challenging because they not only have to write the letters in reverse, but also reverse the order of the letters.

Step 5: Storytelling

Read the story “The words in the dark” to your class. To get them to get into the role, at the moment when Louis becomes blind, you can ask them to close their eyes and keep them closed for the rest of the story. After you have read it, talk to the students about what happened. How do they think it would impact their lives if they suddenly lost sight. You can use the storytelling resources to create your Braille alphabet.

Notice: When opening such a topic, be sure to properly close it, not leaving the students feeling bad. Also, when discussing blindness with your students, be sure to mention that it doesn’t always mean complete darkness. Some people that are legally blind can perceive light, shadows, blurry shapes, some colours.



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SEQUENCE 2

Age group	10 -12 y. o.
Prior knowledge	None
Material needed	How we see box, playdough, cardboard, paper, pen
Subjects	Optics
Skills involved	Understanding the basic principle of sight Coding
Time to carry out the sequence	1 hour

Note: The first step is the same as in the previous sequence

Step 2: Storytelling

Read “The words in the dark” story to your students. Talk to them about what happened and how did Louis cope with it. Can they imagine themselves in such a situation. Discuss the Braille with them. Do they understand how it works? Do they think they would be able to communicate like that? You can use the storytelling resources to create your Braille alphabet. Additionally, you can tell your students that not all blind people can use Braille, because it takes a quite a lot of work to develop touch sensibility. Also, because of modern technology like audio books and voice technology, less and less children learn braille.

Step 3: Discovering the content of the box

Give the students enough time to see what the box holds. After hearing the story, can they guess what they will be doing next?

Step 4: Code and decode the messages

First, talk to your students about the story and that Braille is not a language, but a tactile writing system, or a code. This means that the Braille letters are almost



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universally the same all over the world, with slight variations depending on the specific characters of a language.

Divide them into groups of four, and each group is then divided into two pairs. Have each pair write a message in Braille, using playdough and a piece of cardboard. After they have done so, let them decide amongst themselves, who will be the “reader” and who will be the “decoder”. The reader then closes their eyes and is handed the message in Braille by the other pair in their group.

Note: The decoder shouldn't be able to see the message

The reader uses his finger to “read” letter by letter and describes it to the decoder who uses the printout from the box to decode the message. After they are done, they check the results with the other pair in their group. Then they repeat the process but change the roles.



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