Teacher: Mª Luisa Casado
Subject: Science
Students: Primary year 3
School: CEIP “Narciso Alonso Cortés” Valladolid
What is light?

We don’t know
Let's investigate
### Light Vocabulary

<table>
<thead>
<tr>
<th>TORCH</th>
<th>TO SHINE</th>
<th>LIGHT</th>
<th>SHADOW</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Torche" /></td>
<td><img src="image" alt="Shine" /></td>
<td><img src="image" alt="Light" /></td>
<td><img src="image" alt="Shadow" /></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>HOLE</th>
<th>TO TRAVEL</th>
<th>STRAIGHT LINE</th>
<th>STRAW</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Hole" /></td>
<td><img src="image" alt="Travel" /></td>
<td><img src="image" alt="Straight Line" /></td>
<td><img src="image" alt="Straw" /></td>
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### Sources of Light

<table>
<thead>
<tr>
<th>STICK</th>
<th>TO BEND</th>
<th>BENT STRAW</th>
<th>THROUGH</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Stick" /></td>
<td><img src="image" alt="Bend" /></td>
<td><img src="image" alt="Bent Straw" /></td>
<td><img src="image" alt="Through" /></td>
</tr>
</tbody>
</table>
What is a source of light?

It is something that gives off light.
How many types of sources of light are there?

Natural sources of light

Artificial sources of light
Sources of light

What is a source of light?

Is it that gives light.

Julio

What is a source of light? It is something that gives light.

There are two types of source of light:

- Natural
- Artificial

Natural source of light
Definition: Sources of light that aren’t manmade

Artificial source of light
Definition: Sources of light that are manmade

There are two types of source of light:

- Sources of light that aren’t manmade
- Sources of light that are manmade

Natural source of light
Definition: Sources of light that aren’t manmade

Artificial source of light
Definition: Sources of light that are manmade

 Verified
Sources of light

What's this?

It's a glow-worm, a natural source of light
Are all objects that shine, sources of light?
Light Sources & Light Rays

Not all things that shine are light sources.
The moon shines because light from the sun bounces off the surface of the moon... and then
And then, the light hits the Earth and we can see the Moon. The Moon doesn’t give off light. It only reflects light.
How does light travel?

Let’s carry out some experiments
Can you still see the spot of light with three cards?
Look! The spot of light is here!
Yes, I can do it, because light travels in a straight line.
How does light travel?

Let's make different experiments!

Experiment n° 1

- I will need
  - A torch
  - Some cards with a hole in the middle

- Instructions

  1. Shine a torch onto one of the cards with a hole in it
  2. Look at the spot of light on the wall
  3. Take another card with a hole in it. Place the new card behind the first card so that there is still a spot of light.
  4. Can you still see the spot of light with three cards?

- Conclusion

  How does light travel? In the straight line.
How does light travel?

Let's make different experiments!

Experiment no. 1

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- Conclusion
  How does light travel? In the straight line.
1. Look at an object through a straw.

Can you see the object?
1. Bend the straw.

2. Look at the object again through the bent straw.

Can you see the object now?
Let’s make our model to explain how light travels
We imagine the stick is the ray of light.
Light, the same as the stick, cannot bend, so it cannot reach our eyes and we can’t see the object.
Experiment n° 2

- **I will need**
  - A straw

- **Instructions**
  1. Look at an object through a straw.
  2. Bend the straw.
  3. Look at the object again through the bent straw.
  4. Can you see the object now? **No**

- **Conclusion**
Instructions

1. Push the stick through the straw.

2. Imagine the stick is light.

3. Can the stick (light) pass through the straw? Yes

4. Now, try to do the same but bend the straw. Can you do it? Why? Because the stick are into the straw.

Complete the conclusion

........................ the same as the stick can /can’t pass through the ..................straw and it reaches our eyes.
LIGHT TRAVELS IN A STRAIGHT LINE
Can light go through all kinds of objects?
Classify the objects depending on the quantity of light that passes through them.
They are **TRANSPARENT** because they let light pass through them
They are **OPAQUE** because they **don’t** let light pass through them.
They are **TRANSLUCENT** because they let a little bit of light pass through them.
Let’s play with shadows
What do we need to make a shadow?

A source of light and an object
Any kind of object?

No, only opaque and translucent objects.

When can you see a shadow?

When an object blocks the light.
Let’s make predictions: where is the shadow going to cast?

Draw it with a red crayon

Shine the torch.

Draw the silhouette of the shadow with a blue crayon
DRAW the SHADOWS -

1. Draw the shadows

The shadow is going to be bigger

smaller
LIGHT REFLECTION
We are going to split a ray of light
Make the ray hit the mirror
What's the matter with the ray of light?
The ray of light bounces off the mirror
Now let’s try with a curved mirror or spoon
What's the matter with the light now?
I don't Know.
It isn't very clear.
Let’s make a model to understand what is happening.

With flat mirrors the angle of reflection and the angle of incidence ARE the same.

With curved mirrors the angle of reflection and the angle of incidence AREN’T the same.
Thanks to light reflection our periscopes work.
Oh! This is the other way round!

Oh no, I built it like this on purpose. This is a present for our teacher, to spy on us when she is writing on the blackboard.
1. Light from the Sun hits the nest and then it bounces off ...

2. And the light hits the top mirror...

3. ...And it bounces off again and

4. And hits the bottom mirror...
How fast does light travel?
300.000 km/s
Does light travel at the same speed through air, water, or glass?
Let’s see

What does the straw look like?

It’s bent!

Experiment nº 1
Is it magic?

It's straight!
Experiment nº 2

**Instructions:**

1. Put the container on a table and place the coin in the bottom.

2. Keep looking at the coin and move yourself backwards slowly until the coin disappears from view.

3. Stay still and stand in the same place and ask a friend to pour water into the container. You will find you can see the coin again!
I can see the coin again

This is magic!
This is Science!

This is called:

LIGHT REFRACTION
Light travels at different speeds through different substances. It travels more slowly through water or glass than it travels through air. As light slows down, it also changes direction a little.

**THIS IS CALLED LIGHT REFRACTION**
A BIT OF HISTORY
One day as we were working very hard, like real scientists, we were surprised.
Newton came to see us! He told us about his life. He doesn't look so old.
I was born in 1642.

In the XVII century!
Where were you born?

I was born in England.
I studied in Cambridge University.
In my times very few people were interested in Science. They believed in magic and witchcraft.
I’m a very famous scientist. I made great discoveries about optics, physics and mathematics.
One day I bought a prism and I decided to carry out some experiments with it.
I closed the curtains of my room. I left one window with the curtains open, then I covered the window with a piece of card and I cut a very small slit to make a single ray.
I made this ray hit the prism.
The light was white, of course, but when I made the ray go through the prism I could see the white light split into different colours.
INCREDIBLE.
SEVEN
COLOURS LIKE THE RAINBOW!
Do you want me to show you how to carry out this experiment?
I don’t think Newton knows how to use a torch properly. Very good with the torch.
00000000h!
Do you want to try something similar?
Following Newton’s path
Instructions:
1. Pour water in the container.
2. Put a mirror on the water and stick it with plasticine to one side of the container.
3. Shine the torch on the part of the mirror which is under the water.
4. Hold a sheet of white paper over the torch.
5. Move the torch until you see the spectrum on the paper.
Following Newton's path

Make a light spectrum

I will need:
- A container
- water
- A ball of plasticine
- A mirror
- A torch
- Some white paper

Instructions: (draw them)
1. Pour water in the container.
2. Put a mirror on the water and stick it with plasticine to one side of the container.
3. Shine the torch on the part of the mirror which is under the water.
4. Hold a sheet of white paper over the torch.
5. Move the torch until you see the spectrum on the paper.
Good bye Newton! We are going to continue with our investigations.