STEM Activity 1:
Mirror images

Background information and Science information

These activities look at the properties of mirrors. To consolidate learning it is useful to take photos of the learners work during key points of the activity. You can use these later for activities such as sequencing, recalling and improving vocabulary.

Reflection

ACTIVITY 1

Method

Introduction

Talk to the learners about mirrors.

- Where can we usually find them?
- What do we use them for?

Development

1. Give the learners a mirror each. Ask them to look at themselves in the mirror and take photos of their reflection.
2. Now look at the alphabet or some letters of the alphabet (perhaps the learners' names) in the mirror. Can the learners record what they see by taking photos? How is this different from the original image?
3. Can they tell if this is the same with photos and pictures? Can they point to a person in the photo while looking at the mirror image? Why is it so difficult?
4. Put two mirrors opposite each other. What do the learners notice about how many of their own images they now see?
5. Repeat these activities using Lego figures. Can the mirrors be arranged to see the back and front of the figures at the same time?

Scientific Inquiry

What do we see in a mirror?

Learning Intention

To understand that mirrors reflect.

Equipment

- A set of identical mirrors
- A variety of mirrors
- Paper and markers
- Alphabet figures
- A collection of pictures/photos of people and things
- Lego figures

Safety

Ask the learners to be careful if they are using glass mirrors as they are easily broken and produce sharp edges.

Reflection

ACTIVITY 1

Discussion

Discuss with the learners what the mirrors show when we look in them.

- Can we see ourselves in the mirror?
- What changes in the mirror? (Remember how letters look in the mirror.)
- How can we use mirrors to see many reflections at once?

Extension

Look at reflections in different surfaces, such as tinfoil and shiny dark Formica. Talk about what makes a clear reflection.

If possible, arrange a visit to a hall of mirrors at a fairground.

You could link this to a topic on personal hygiene and taking care of personal appearance, for example, checking hair is tidy after combing.

STEM Activity 2:
Curved reflections

Background information and Science information

Concave mirrors (such as the inside of a spoon) make images look larger. Convex mirrors (such as the outside of a spoon) make things look farther away.

Take photos at key points during the activity to use later for activities such as sequencing, recalling and improving vocabulary.

Reflection

ACTIVITY 2

Method

Introduction

Remind learners that mirrors reflect. Discuss which other surfaces can reflect images, for example, still water or glass.

Development

1. Allow the learners to freely explore the selection of spoons and look at their reflections.
2. Investigate whether a spoon gives the same reflection in the back as in the front.
3. Investigate whether all spoons give the same results.
4. Investigate reflections in different sizes of spoons.

Discussion

Discuss the results of the investigations with the learners.

- Were the spoon reflections the same as mirror reflections?
  - What was different?
  - What was the same?
  - Why might this be?
- Were the reflections the same in both sides of the spoon?
  - What was different?
  - What was the same?
  - Why might this be?
- Were the reflections the same in all sizes of spoons?
  - What was different?
  - What was the same?
  - Why might this be?

Scientific Inquiry

What type of a surface will increase the size of an image?

Learning Intention

To know that a curved surface will change the size of my reflection.

Equipment

A selection of metal spoons such as desert spoon, tea spoon, serving spoon and so on.

Extension

Investigate other metal objects with curved surfaces, for example saucepans, teapots, sugar bowls, mixing bowls and so on.

- Are the reflections affected by the curve?
- Can the learners work out if the curve is concave or convex by the size of the image produced?
- Can you think of any times where it would be useful to have a mirror to make things bigger? Examples could include: dentists to look at your teeth, doctors during surgery, or drivers at difficult road bends to see more clearly.

STEM Activity 3:
Prisms

Background information and Science information

The water and mirror create a prism effect, splitting the light into the colours of the spectrum refraction.

Refraction is when light passes from one medium to another, for example water to air resulting in a change in speed and direction. The different colours of light are affected differently. Violet light bends the most followed by blue, green, yellow, and orange. Red light bends the least. This results in the different colours of light being spread out and separated, so we can see the spectrum as a rainbow in the refracted light.

Take photos at key points during the activity. These can be used later for activities such as sequencing, recalling and improving vocabulary.

Reflection

ACTIVITY 3

Method

Introduction

Talk about rainbows. Search the internet for a variety of rainbow pictures.

Discuss the best weather in which to get a rainbow (rain and sun).

Development

Making our own rainbow

1. Place the mirror in the waterproof container you have selected. Ensure it sits at an angle. It may be useful to use adhesive putty to secure the mirror in place.
2. Fill the container with water so that the mirror is covered.
3. Shine a white light through the water into the mirror.
4. Hold the white card over the top of the mirror to catch the array of colours in the reflection.

Discussion

Discuss the results of the experiment.

- Which colours were on the card?
- Did the colours look like a rainbow?
  - What was the same?
  - What was different?

Extension

Repeat the experiment using different colour filters on the torch. Ask the learners: 'Does a rainbow still appear? Are there any differences?'

Can the learners find anywhere outside that this refraction effect occurs naturally? (Puddles).

Scientific Inquiry

Can we make our own rainbow with a mirror and some water?

Learning Intention

To observe that when you reflect white light through water, it appears as different colours.

Equipment

- A set of identical mirrors
- White card
- Waterproof clear container that a mirror can sit inside at a tilted angle
- Water
- Light source (torch)
- Adhesive putty (to secure mirror in container)
- Variety of coloured cellophane (extension activity)

Safety

Make sure that the learners are careful when using glass mirrors/ glass containers as they are easily broken and produce sharp edges. Learners should be supervised by an adult during these activities.

STEM Activity 4:
Periscopes

Background information and Science information

Light reflects away from a mirror at the same angle that it enters the mirror. The periscope uses this fact to direct light to its final destination around a corner. The light enters at a 45 degree angle.

Take photos at key points during the activity to use later for activities such as sequencing, recalling and improving vocabulary.

Method

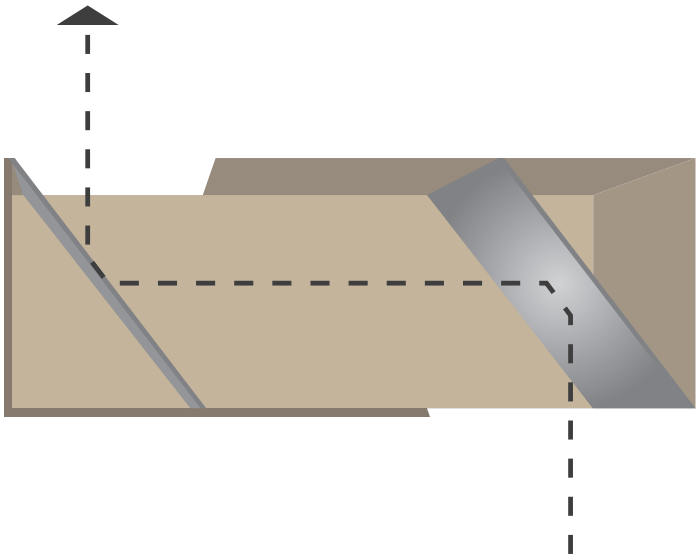
Introduction

Look at pictures of submarines and discuss their telescopes.

Are there times when it might be fun or useful to look around a corner or over a tall wall with a telescope?

Development

1. Take the shoebox base without the lid.
2. On the inside, place one mirror on the side of the shoebox near the bottom edge of the shoebox and trace around it.
3. Cut out three sides of the traced mirror so the flap door can open inwards towards the closest side of the box.
4. Stick or tape the mirror to the exterior side of the flap.
5. Slant the flap at a 45 degree angle from the side of the shoebox it was cut from. Use tape to hold it in place.
6. Take the second mirror and do the same thing at the other end of the shoebox on the opposite side.
7. Only fix the second mirror in place when you have aligned/adjusted it on the flap (the flap should be fixed at a 45 degree angle) to see out the first opening through the second opening on the side of the shoe box.
8. Place the lid back on the shoebox.



Scientific Inquiry

Is it possible to use mirrors to see around a corner?

Learning Intention

To understand that it is possible to use mirrors to see around a corner.

Equipment

For one periscope you will need:

- Shoebox
- Two small mirrors
- A pencil
- Scissors
- Tape PVA glue

Safety

Make sure that the learners are supervised by an adult when using scissors.

Reflection

ACTIVITY 4

Discussion

Try out the periscope. Does it work?

Set up tests for the periscope: one person should be out of sight around a corner and they can hold up different objects. The second person can use the periscope to look around the corner and name the object being held up.

Extension

Find different uses for the periscopes. As part of this activity, ask the learners to discuss rights to privacy. Key questions:

- Where is it ok to look at other people? (Classroom, street).
- Which places are private? (Bathroom, bedroom).
- Should we look at someone for a long or short time? Why?
- When do you like to be looked at?
- When do you not like to be looked at?

Ask the class to agree rules for using the periscope, based on this discussion.

Investigate spy stories. Use the periscope as part of a spy drama.