I Can See 1 - Light and Shadows

Topic: *I Can See –Light and Shadows*
Time: *15 min*
Age group: *3 - 5*

What you need

- Kia Rapua I Can See Station
- Acrylic panels
- Chalks
- Markers
- Large sheets of paper
- Different shapes (objects or cardboard shapes)

What to do

Set up

- Set up the I Can See Station using the panel module
- Have the Acrylic Panels in place

Activity

Ideally this activity should be done at two separate times during the day; in the morning and afternoon. Tell children that, they will be observing shadows outside to see how they change over the course of the day.

Before you start is important to decide if you'll have children use chalk to draw on the ground or if you'll have them use crayons or markers on large sheets of paper spread on the ground.

- Bring children outside to an open, sunny space around the I Can See Station
- Break children into pairs.
- One children will choose and object or shape to put against the acrylic panel
- The other one will trace the shadow of it.
- It is important to mark the exact point the object or shape was place.
- Return to the spot in the afternoon and have the children switch places and place the object in the exact same position it was.
- Have the child use a different colour to trace the new shadow

The science

- Outside, the shape, size, and position of a shadow change over the course of the day as the sun's position changes, due to the earth movement.

Shadow: A shadow is made when an object blocks light. Shadows change size based on how close they are to the light source.
Transparent: Transparent materials let light pass through them in straight lines, so that you can see clearly through them. Glass is an example of a transparent material.

Translucent: Translucent materials let some light through, but they scatter the light in all directions, so that you cannot see clearly through them. Tissue paper is an example of a translucent material.
Opaque: Opaque materials do not let any light pass through them. They block the light. Wood is an example of an opaque material.

Science talk

Description words

Sun, light, position, rotate, turn, move, direction, high, low, shorter, longer, shortest, and longest.
Introduce the words transparent, translucent and opaque.

Science process words

Observe, notice, compare, same, different, change, predict and record.

Open ended questions

- What's different about the morning and afternoon shadows?
- At what time of day did we see the longest shadow? The shortest shadow?
- Why do you think the shadows changed over the day?

Skills

Observing, predicting, recording, learning vocabulary around light and shadows, learning about the concepts of transparent, translucent and opaque

Stay Safe

- Keep an eye on small object to prevent kids from chocking

Ways to document

- Chart "How a Shadow Changes"

Extending the activity

Other science links

Shape, materials, light, colours.

Cross curricular links

- Literacy (increasing vocabulary)

I Can See 2 – Colours

Topic: *I Can See – Colours*
Time: *10 - 15 min*
Age group: *3 - 5*

What you need

- Kia Rapua I Can See Station (A frame with square frame)
- Clear and coloured panels
- Coloured shapes and toys
- White paper or card cut into shapes

What to do

Set up

- Set up the I Can See Station using the square frame
- Put one clear acrylic panel and other coloured panels, include the silver panel that scatters light.

Activity

This is an exploration of colour using the clear and coloured acrylic frames.

- Bring children outside to an open, sunny space around the I Can See Station
- Ask them what colours the different panels are, if they don't have this vocabulary introduce it to them. Ask them what colours they can see in the translucent/sliver panel. This panel disperses light so you can see all the colours of the rainbow in it.
- Ask them what colours the different shapes are.
- Get a child to stand behind the different panels – can you see them, do they look different in the different colours?
- Ask them to explore in pairs/groups whether the shapes look different behind the different panels by having one child hold the shape behind the panel while the other observes and then switch around.
- Give the groups/pairs some white card. Ask them to predict how it will look behind each panel, note these predictions and then get the children to observe what colour it is behind each different panel.

The science

Colours: White light is made up of a combination of all the different wavelength colours. It can be split by a prism (or by raindrops!) into the colours of the rainbow. All objects reflect or absorb different colours of light, we see the light that is reflected back. For example, most plants absorb light in the red, orange, yellow, blue, indigo and violet wavelengths, but reflect green light. Therefore we perceive them as being green.

Rainbows occur when white light from the sun is dispersed or scattered into its different wavelengths by droplets of rain. When the light hits the raindrop it slows down, because the different wavelengths travel at different speeds they bend at different rates and so get separated out based on their wavelengths, so we see them as distinct colours.

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Science talk

Description words

Light, rainbow, colours, dark, light, vocabulary around labelling all the different colours!

Science process words

Observe, notice, predict and record.

Open ended questions

- Does looking through the coloured panels change the colour of the object?
- Why do you think this is?
- Do you know how rainbows are made?

Skills

Observing, predicting, recording, learning about the concepts of transparent, translucent and opaque

Stay Safe

- Keep an eye on small objects to prevent kids from choking
- Make sure square panel is fitted correctly to A-frame

Ways to document

- Note predications and observations about colour change of shapes behind the different coloured panels.

Extending the activity

Use different coloured card (e.g. red, green, blue) behind the acrylic panels and ask the children to predict and then observe what colour it will appear (will get colour mixing!).

Other science links

Shapes, materials, shadows, light, our senses (how our eyes and brain perceive light and colour)

Cross curricular links

Literacy (increasing vocabulary)

I Can See 3 – Seeing through things

Topic: *I Can See – Light and Sight*
Time: *10 - 15 min*
Age group: *4 - 7*

What you need

- Kia Rapua I Can See Station (A frame with square frame)
- Translucent, Transparent and Opaque Acrylic panels
- Different shapes or toys (wooden playground shapes or others)
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What to do

Set up

- Set up the I Can See Station using the square frame
- Put one clear acrylic panel, one partially see through panel (silver translucent one) and one cannot be seen through (opaque glass or solid coloured) panel on the frame.

Activity

This is an exploration of things that are see through (transparent), partially see through (translucent) or block light (opaque).

- Bring children outside to an open, sunny space around the I Can See Station
- Ask them if they can see through the different panels.
- Get one child to hold a shape up behind each of the three panels – transparent, translucent, opaque. Ask the other children if they can see it properly each time.
- Explain the three terms and what they mean for being able to see through objects. The clear acrylic is transparent, we can see through it perfectly. The light passes through it and into our eyes. The silvery acrylic is translucent, we can see through it but not very well. It scatters a lot of the light so we can't see as well. The solid panel is opaque, it absorbs (blocks/sucks up) all the light so we cannot see through it.
- What would happen if we painted the clear panel? What would happen if we scratched the clear panel?
- Ask the children if they can think of other things that are transparent/translucent/opaque? How do we use see through and non-see through materials in our house (glass = windows, curtains to block out light). Make a list.
- Do a craft activity to make transparent/translucent/opaque examples for the classroom – cut out the inside of paper plates and replace them with clear plastic (copy covers), tissue and black paper and use these to try to look at different objects.

The science

Shadow: A shadow is made when an object blocks light. Shadows change size based on how close they are to the light source.
Transparent: Transparent materials let light pass through them in straight lines, so that you can see clearly through them. Glass is an example of a transparent material.

Translucent: Translucent materials let some light through, but they scatter the light in all directions, so that you cannot see clearly through them. Tissue paper is an example of a translucent material.
Opaque: Opaque materials do not let any light pass through them. They absorb all the light. Wood is an example of an opaque material.

Science talk

Description words

Light, scatter, block, transparent, translucent, opaque, absorb.

Science process words

Observe, notice, compare, same, different, change, predict and record.

Open ended questions

- How do these panels look different?
- How does the toy look when you try to see it behind this panel? How is it different to the clear one?
- What do you think happens to the light going through the panels?

Skills

Observing, predicting, recording, learning about the concepts of transparent, translucent and opaque

Stay Safe

- Keep an eye on small objects to prevent kids from choking
- Make sure square panel is fitted correctly to A-frame

Ways to document

- Make a list of transparent, translucent, opaque objects in classroom and at home.

Extending the activity

Use paper plate looking glasses with transparent, translucent, opaque windows to investigate concept further in the classroom. Investigate further using mirrors. Are opaque but we can see our reflection because all of the light is not absorbed but bounced back into our eyes.

Other science links

Shape, materials, light, colours, shadows.

Cross curricular links

Literacy (increasing vocabulary)