



Young children naturally build knowledge by being curious about the world around them.

When you do science with your children, you can share their sense of wonder about the natural world. They'll develop self confidence when they ask and answer their own questions.

Exploring My Shadow

Light can pass through some objects and is blocked by others. Where the light is blocked we see shadows. Our bodies are opaque; light cannot travel through them.

Explore the placement of your shadow on the ground at different times on a sunny day. Because the earth is rotating (once every 24 hours) the sun shines on us from different directions over the course of a day. Our shadows appear in different places. When the sun is directly overhead our shadows are shorter; when it is rising or setting our shadows are longer.



Questions to Ask

- What is creating our shadow?
- Are all your shadows the same size and shape?
- Do all your shadows point the same way?
- How are they different? What is different about them?
- At what time of day was your shadow the biggest? At what time of day was your shadow the smallest? Why do you think that is?

What You Need

- Sidewalk chalk in a variety of colours
- A sunny day

Hands-on

1. Go outside on a sunny day with sidewalk chalk.
2. Stand on a line and have a friend draw the outline of your shadow on the pavement. Draw the outline of your feet as well so you know exactly where you were standing.

How to get the most out of your explorations:

- **Dress for the mess**
Science explorations can be messy.
- **Take your time**
Play for as long as the activity holds your child's interest. Don't rush towards the 'right' answer.
- **Be curious**
Ask "What would happen if..." and then find out. Let your child's questions guide you.

3. Name your shadow or mark it with your initials and note the time you went outside.
4. Come back later in the day. Stand on the same spot and re-draw your shadow on the pavement, using a different colour chalk.
5. Come back again (if possible) and re-draw your shadow again with a third colour.
6. Compare your two (or three) shadows.
7. Repeat as many times as is fun.

What Next?

- Go outside on a cloudy day. Where is your shadow? How come?
- Find other shadows outside e.g. birds flying overhead, shadows of trees, playground equipment, etc.
- Put toys or furniture in the sunlight and trace the shadows. How do the shadows change if you turn the object? How do they change over the course of the day?
- Can you find a way to make your shadow disappear?
- Explore making different sized shadows indoors by changing the angle at which the light from a flashlight hits an object.
- Play shadow tag: try and step on your friends shadows, without them stepping on yours.



Shadow Puppets

Shadows are created when the pathway of light is blocked by an opaque object.

What You Need

- Translucent paper or fabric for use as a screen
- Cardstock or light cardboard to make cut-outs (e.g. cereal boxes)
- Straws or sticks
- Projector, strong flashlight or desk lamp

Hands-on

1. Cut cardboard in to various shapes to make puppets (e.g. people, animals, etc.).
2. Attach the puppets to a straw or stick.
3. Make a screen using an old sheet or tissue paper, hung from the ceiling or clothesline.
4. Shine the light behind the sheet and put the puppets into the light beam between the light and the screen. Have the “audience” sit on the other side of the screen.

What Next?

- Experiment with adding transparent and translucent materials to your shadow puppet. Feathers, cellophane (coloured or clear), and recycled plastic containers are good things to start with.
- Investigate shadow puppets around the world. Shadow puppetry is a complex art form particularly in various parts of Asia. This might be a good place to start: http://en.wikipedia.org/wiki/Shadow_play



Questions to Ask

How are you making the shadows?

What happens when you move the puppet closer to the light? Further away?

What happens when you turn the thin side of your puppet to the light?

Can you make the shadows of items from around the room look like something else? Perhaps a rabbit or a dog?

Make a bigger screen using an old white sheet and let the children explore their own shadows.

Can you make shadows of different shapes using just your hands?

Hint: check these websites for some hand shadow suggestions:

<http://www.gutenberg.org/files/12962/12962-h/12962-h.htm>

<http://video.about.com/familycrafts/How-to-Make-Shadow-Puppets.htm>



Looking for more?

More science activities for young children can be found at scienceworld.ca/preschool.html

This website has short videos, games and activities for 3–5 year olds

peepandthebigwideworld.com

Our favourite books:

Science in Seconds for Kids by Jean Potter ISBN 0-471-04456-3

I See Myself by Vicki Cobb ISBN 0-688-17836-7

How to Catch a Star by Oliver Jeffers ISBN 978-0-00-715034-2