

CHAPTER 2: Energy in our Lives

Aim

The aim of this chapter is for children to investigate and test the effect of the sun's energy.

Overview of Chapter

The lessons in this chapter explore further the sun's role as a source of energy. Children are encouraged to investigate the effect of the sun's energy on plants through a fair test investigation and a design and make activity.

Working Scientifically Skills

Through discussing, engaging with and reflecting on the investigations in this chapter the children will be applying and developing the following scientific and designing and making skills:

- Observing
- Predicting
- Investigating and experimenting
- Estimating and measuring
- Analysing (Interpreting)
- Recording and communicating
- Designing and making: exploring, planning, making and evaluating



Lesson 1 – Do plants need sunlight to grow?

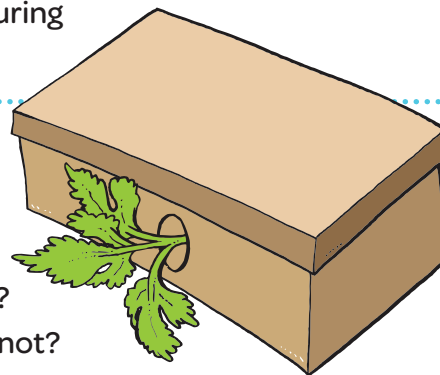
Lesson link

Before starting this chapter teachers are advised to complete Chapter 1 of this programme with their class

Resources

IWB 4 / PowerPoint 4: Do plants need sunlight to grow?

6 quick growing plants (e.g. pea, bean, lettuce or parsley), 5 shoe boxes, scissors, digital camera, measuring jug (for watering the plants).



Activity type: Investigation

Finding out children's ideas

- 1 Do you think plants need light to grow? Why?
- 2 What do you think would happen if a plant got no light?
- 3 Do you think plants grow towards the light? Why/ why not?
- 4 Look at the equipment we have today: how do you think we could use it to find out whether or not a plant grows towards the light?

Investigation question: “Do plants grow towards light?”

Setting up the investigation (see **IWB 4 / PowerPoint 4** for illustrations)

- 1 Show the children the 5 plants. Number each pot and take a photograph of each.
- 2 Place pot 1 under a shoe box with no holes.
- 3 Place pot 2 under a shoe box with a large hole on top.
- 4 Place pot 3 under a shoe box with a large hole on the left hand side.
- 5 Place pot 4 under a shoe box with a large hole on the right hand side.
- 6 Place pot 5 under a shoe box with a large hole at the front.
- 7 Place pot 6 beside the others with no box.

Ask the children to predict what they think will happen to each of the plants. Record their predictions.

Water each plant daily using the same amount of water.

After 10 days children take the boxes off all four pots and carefully observe each plant.

Encourage the children to record their observations by drawing the pots or taking photographs.

Questions to promote discussion

- 1 Describe what happened to the plants in each pot.
- 2 Why do you think this happened?
- 3 What does this tell us about plants?
- 4 Compare what happened to the plants in each box with the plant that was not in a box.

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- 5 Do you think sunlight is important for plants? Why?
- 6 What kind of energy do plants use? (*sun*)
- 7 Is this renewable or non-renewable energy? (*renewable*) Why?
- 8 Encourage the children to do some research about why plants need sunlight.

Lesson 2 – Design and make a greenhouse

Resources

IWB 5 / PowerPoint 5: Different kinds of greenhouses

Some materials that could be used to make the greenhouse: Different coloured plastic bottles, containers (like those for pre-packed salads, fruit etc), cellophane plastic bags (zip-loc) and coloured / white plastic bags, scissors, cellotape, twine, blu-tack, lollipop sticks, dowel.

Activity type: Design and make

Exploring

Show the children the pictures of greenhouses (IWB 5 / PowerPoint 5).

Hold a classroom discussion on the structure and functions of a greenhouse.

Questions to promote discussion

- 1 What do you see in the pictures?
- 2 Do you know what they are?
- 3 What are they used for?
- 4 Why do you think gardeners plant things in greenhouses?
- 5 How do you think greenhouses help plants to grow?
- 6 What are they made from?
- 7 How do you think the sun gets into the greenhouse?

Tell the children that they are going to design and make their own small, table top greenhouses. Show the children the materials that are available to them and discuss the criteria that their designs must meet.

Some suggestions for criteria:

- It must be made from recyclable materials.
- It must be at least 30cm in height.
- It must be able to stand by itself.



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Planning and making

After the whole class discussion on materials and criteria, the children work in small groups. They discuss their designs and make detailed drawings of them. They then make their greenhouses.

Evaluating

Each group evaluates their designs.

Questions to promote discussion

- 1 How did you make your greenhouse?
- 2 Did you stick to your original design?
- 3 How did you change it?
- 4 If you were to make this again is there anything you would do differently?
- 5 What aspect of your design do you like most?

Lesson 3 – How can we be sure energy is coming from the sun?

Lesson link

Junior and Senior Infants Programme Chapter 4: All lessons
1st and 2nd Class Programme Chapter 4 : All lessons

Resources

Thermometers (1 per group), Piece of A4 paper (1 per group)
PCM 10: Planning your investigation
PCM 11: Recording your investigation

Teacher note: This activity needs to be conducted on a sunny day or an overcast day (not intermittent cloud).

Safety note: Remind the children of the dangers of looking directly at the sun.

Activity type: Discussion

Questions to promote discussion

- 1 How do we know that the sun is a source of energy?
- 2 Could this energy be coming from somewhere else?
- 3 What do we observe about the sun? What can we see? (*day/night*) What can we feel? (*we observe that the sun gives us heat and light because we can see light and we can feel heat*).

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- 4 How could we test and confirm our observation that heat comes from the sun? How will we make sure this test is fair?
- 5 What equipment would you use to measure heat energy?

Activity type: Investigation

Investigation question: “How do we know that the sun gives off heat energy?”

In groups the children discuss how they could measure the heat energy from the sun using thermometers and a white sheet of paper. They discuss and record their plans on their planning sheets (PCM 10) and carry out their investigations. Emphasise the importance of ensuring a fair test and of knowing how they are going to record their results. They can record their results on recording sheets (PCM 11).

One possible way to carry out the investigation is the following:

- 1 Place a thermometer in the sunlight. Discuss the placement of the thermometer in terms of ensuring the test is fair: e.g. standalone spot if possible, not directly touching the ground or a building (*this might give off heat and give an inaccurate reading*), in direct sunlight.
- 2 Leave the thermometer until the temperature stabilises. Record the temperature.
- 3 Think about how they could change the conditions to see if the sun gives out heat. What factors should stay the same to make the test fair, what could they change? For example: place a piece of paper over the thermometer.
- 4 Leave the thermometer until the temperature stabilises. Record the temperature.
- 5 Remove the piece of paper.
- 6 Leave the thermometer until the temperature stabilises. Record the temperature.

Discuss how the class will record their results. Here is one option for a table:

Initial temperature	Covered temperature	Uncovered temperature

Discuss the investigation and the results.

Questions to promote discussion

- 1 What did we observe throughout the investigation?
The process started with an observation that we feel heat and suspect it comes from the sun but as scientists we question this – and test what we observe.
- 2 How did we test our starting observation?
We used a thermometer as a tool to measure heat. We devised a test that kept the thermometer in the same place and the same conditions but changed how much sunlight shone on the thermometer. We blocked the light and heat from the sun by covering the thermometer with the paper. We recorded that the temperature on the thermometer changed before and after taking the paper off; this gives us evidence that the sun produces heat energy.

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- 3 How does the sun affect us?
- 4 Why is the sun useful?
- 5 Can the sun be harmful?
- 6 In what way is the sun's energy harmful?
- 7 List two ways to protect yourself from the sun (*wear sunscreen and sunglasses*).

