

Danger! Acid Rain

key message: plants are very important,
acid rain can damage plants.



seai curriculum link:

Content Strand – Environmental Awareness

Strand Units – Environmental Awareness and Science and the Environment

skill development:

Observing, investigating, predicting, experimenting and recording.

integration opportunities:

SESE: Geography - Weather, climate and atmosphere

SPHE: Myself and the Wider World - Environmental Care

Mathematics: Measures – Capacity, litres and millilitres

Danger! Acid Rain

Key Message: Acid rain is caused when oil, coal, petrol, gas and turf (all sources of energy) are burned and the gases that are emitted dissolve in the rain to form an acid. Acid rain can damage plants, plants are very important to us as they absorb CO₂ and are a food source.

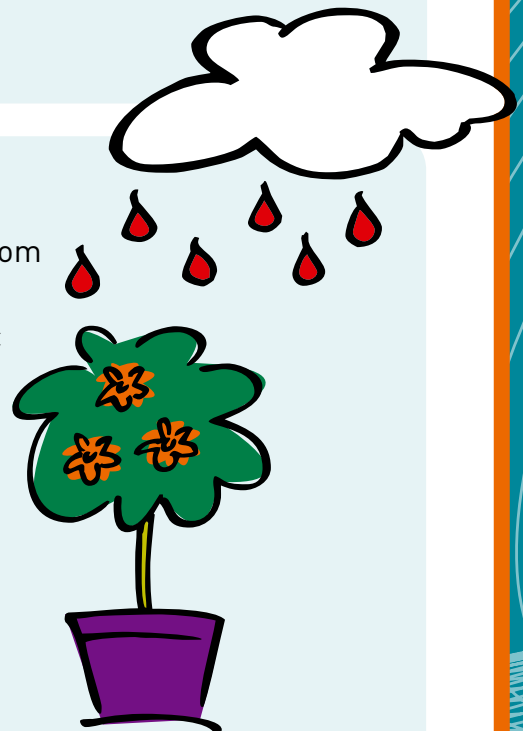
Before you start

Share the key message with the children so that they can see the purpose of the activity. Tell them that the class is going to look at plants and what they need to grow. Ask some questions to the children:

- 👉 What do plants need to grow? *Water and heat*
- 👉 Where do most plants get their water from?
- 👉 Where does the rain come from?
Good opportunity to revise/discuss the water cycle
- 👉 Is rain pure water? If not, why not? Would it vary from place to place, depending on what is in the neighbourhood?
- 👉 How do we know the air is not clean?
Dirty washing, dust on cars, smells in the air etc.
- 👉 Where would you go to breathe clean air?
- 👉 How could the air quality affect the growth of plants?
- 👉 What do plants grow from?
Seeds, bulbs or cuttings

Background

Acid rain occurs when the sulphur dioxide gas from burning fossil fuels mixes with the rainwater in clouds. This mixture produces an acid (sulphuric acid). This acid rain damages plants, buildings, forests and fish. Acid rain interferes with the process of photosynthesis and with the nutrition of plants and trees, it corrodes metal and stone work, and fish cannot survive in water which is too acidic.



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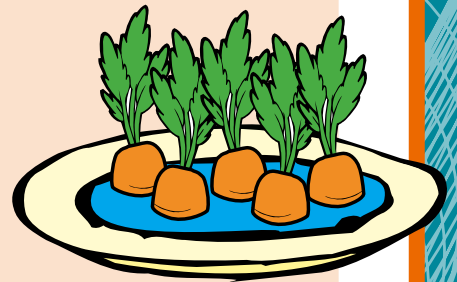
How does acid affect carrots?

You will need

- | | | |
|----------------|--------------------|--------------|
| 3 carrots | 3 saucers | 4 tbsp water |
| 4 tbsp vinegar | 4 tbsp lemon juice | |

Steps

1. With the children working in groups, they cut the tops off the carrots (care with knives).
2. Pour water in one saucer, vinegar in another and lemon juice in a third.
3. Place the carrot tops in the middle of the saucers and leave them in a warm, bright place for 2 or 3 weeks. Don't let the liquid dry up, top up if necessary.
4. Children use the recording sheet to record changes. What do you notice? Any difference in growth, colour?



How does acid affect the growth of cress seeds?

You will need

- | | |
|--|-----------------------|
| 3 jam jar lids | Packet of cress seeds |
| Cotton wool | Water |
| Diluted vinegar (4 tbsp water plus 1 tbsp vinegar) | |
| Diluted lemon juice (4 tbsp water plus 1 tbsp lemon juice) | |

Steps

1. Label the three lids: water only, vinegar and water, lemon juice and water.
2. Place the cotton wool on the jam jar lids.
3. Dampen the 3 cotton wool pads with a few teaspoons of the 3 liquids, e.g. water, diluted vinegar and diluted lemon juice. The quantity should be the same for each cotton wool pad.
4. Sprinkle some cress seeds onto each lid and place in a warm place.
5. Water the seeds (daily, if necessary, seeds need to be kept damp and warm to germinate) on the lids with the liquids: water, diluted vinegar and diluted lemon juice.
6. Children use the recording sheet to record changes.



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Safety

Care with cutting tops off carrots.

Discussion

- What did you notice about three saucers in the first investigation? Did the acids have any effect on the growth of the carrot tops?
- Was there any difference between the cress which had only water put on it and the cress which had the vinegar/lemon juice on it? If so, what was the difference?
- What do our experiments tell us about acid rain? How can humans help to keep acid rain to a minimum? What can we do in our own homes and lives eg. avoid putting tyres on bonfires, burning waste in the garden etc.
- Display the recording sheets and record the class findings on a chart or make a class PowerPoint presentation to show to another class or use on a science open day.

Did you know?

Doctors did a survey and found that about 360 lives have been saved every year since the ban on burning smokey coal in Dublin in 1990.

The average raindrop falls at ten km per hour – about three times faster than the average person walks!

These 'black stones' (which we now call coal) later came to be mined in England and in Ireland and used as fuel. Gradually so many people were burning it that the air in big cities like London became heavily polluted, and in 1952 it was estimated that 4,000 people died in London from the effects of air pollution.

"In China people burn black stones for fuel"! This is what the explorer Marco Polo told people at home after his adventures in China about 700 years ago.

In Eastern Europe acid rain has destroyed whole forests.

All the fish in 140 lakes in Minnesota in the USA have been killed because the water became too acidic.

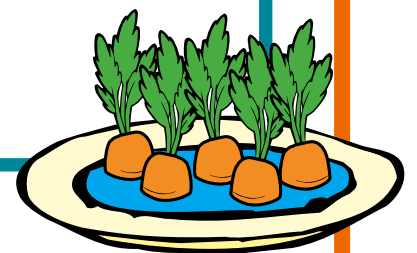
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recording sheet - photocopy and use

Carrot Tops

Draw and/or write what happens to each saucer

	Saucer 1 water only	Saucer 2 water + vinegar	Saucer 3 water + lemon juice
After one week			
After two weeks			
After three weeks			



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recording sheet - photocopy and use

Cress Seeds

Draw and/or write what happens to each lid

	Lid 1 water only	Lid 2 water + vinegar	Lid 3 water + lemon juice
After one week			
After two weeks			
After three weeks			

