NATURE'S RECYCLERS - TEACHER'S NOTES

KEY MESSAGES

Composting organic waste is an important way of contributing to a more sustainable pattern of living. Composting and worm farming is working with nature. In nature, nothing is wasted

CURRICULUM LINKS- NSW

- **This program explicitly teaches SCIENCE Stage 2**

  A student:

  ST2-2VA demonstrates a willingness to engage responsibly with local, national and global issues relevant to their lives, and to shaping sustainable futures.

  ST2-4WS investigates their questions and predictions by analysing collected data, suggesting explanations for their findings, and communicating and reflecting on the processes undertaken

  ST2-10LW describes that living things have life cycles, can be distinguished from non-living things and grouped, based on their observable features

  ST2-11LW describes ways that science knowledge helps people understand the effect of their actions on the environment and on the survival of living things.

- **This program supports parts of the GEOGRAPHY Stage 2**

  A student:

  GE2-2 describes the ways people, places and environments interact.
  Students investigate sustainable practices that protect environments e.g. discussion of ways waste can be managed sustainably.

CROSS CURRICULUM PRIORITIES

1) Sustainability
2) Civics and Citizenship

BACKGROUND INFORMATION

Organic matter and food scraps make up about half of the garbage put out by many households. This represents a significant amount of waste that could be returned safely to the earth, increasing soil fertility and reducing greenhouse gas emissions (mostly methane). Composting is the natural process of breaking down food scraps and garden waste into humus, a rich living soil that can be used in the garden to grow healthy plants.

People can compost using compost bins or compost heaps.

Composting organic matter allows the materials to complete their natural process by decomposing and regenerating the soil. The dead plant and animal tissues are broken down by living organisms in the soil.

Under a microscope, soil is full of tiny organisms including bacteria, fungi, nematodes, mites and springtails. Larger helpers in the compost heap include earthworms, ground beetles, wolf spiders, centipedes and slaters. Invertebrates are a vital part of ecosystems because of their number, variety and their influence on larger animals and plants and even entire ecosystems.

A handful of healthy soil or compost is full of life – in fact there are more micro-organisms in a handful of soil than there are humans on the earth (that is more than 7 billion!!).

When organic matter such as food scraps or plant material is buried in a landfill, instead or breaking down into rich humus, it ferments and produces a gas called methane (this is what makes landfill sites smelly). Methane is a really powerful greenhouse gas and therefore very harmful to our environment. We need to avoid making methane as much as we can.

LEARNING ACTIVITIES

Today students will be examining the creatures that live in the compost and discover their role in nature's system of returning nutrients to the environment. They will also be learning why composting, or recycling organic material, is a sustainable living practice.

1) Compost Creatures poster.

Students are invited to examine the Gould League Compost Creatures poster. Student's prior knowledge is sought.

Focus questions:

i) **Does anyone have compost at home?**

ii) **Is there a compost heap or bin at your school?**

iii) **What things can go in the compost?**

iv) **What things shouldn't go into a compost heap? (bread, meat & dairy)**

v) **Can you predict what kinds of invertebrates you will find in compost?**

vi) **What invertebrates do you think should not be in compost?**

vii) **The invertebrates and other animals found in compost are called decomposers. What does this mean and what function do they have in compost?**

Look at page 13 in the Wise about Waste booklet to see some of the creatures we might find in the compost today.

2) Compost Creature Investigation

Students will be conducting an investigation to see what they can find in the compost. Trays of compost, hand magnifying lenses, labelled cubes and utensils are provided. Students will need their booklet and a pencil to make a tally of the creatures they find. "We will be using hand tools and magnifying lens' to investigate the creatures in the compost. Most compost creatures are harmless to humans. One dangerous spider that likes black compost bins and worm farms is red back spiders - do not touch these. (An adult may safely remove or squash red back spiders as a bite to a child may require hospitalisation – after first aid treatment of applying ice)

If you would like to handle an earthworm this perfectly safe for you but to be kinder to the earthworms, you need to wet your hands. This is because our hands naturally have

acid on them – which we can't feel but the worm can. At the end it is important that everyone washes their hands."

Code for Caring for Compost Creatures [to be displayed]

1) Leave all dangerous small animals alone eg red back spiders.
2) Wet your hands if you want to handle an earthworm
3) Use utensils carefully to avoid crushing small animals.
4) When observing compost creatures, you may put them in a labelled container and after a short time return the animal to where it was found.

Note: *If students handle snails, slugs or their slime, ensure they keep their hands away from their mouths and wash their hands with soap afterwards*

In your Wise about Waste Booklet:

- Do a tally next to each creature to show how many you found
- Which were the most common? Which were the least common?
- How many different types of creatures were found?

3) The Mechanics of Organics and Worm menus

Read Kellie Bollard's book The Mechanics of Organics.
What things do worms eat? What things don't they eat?
Look at Worm Food poster and plan to make a worm menu to display at school.

TO SIMPLIFY

1) Look at Compost Creatures poster and discuss

GOING FURTHER

- Using the information on the back of the Compost Creatures Poster, create a food web.
  Who eats who?
- Lifecycle of an earth worm – draw the stages of an earthworm life – from egg sac to young worm (pre-breeding age), to mature worm (with visible clitellum/saddle).
- Discuss with students some examples of structural features and adaptations that may help animals to survive in a compost bin.
  - Eg. An earthworm has a long, thin and flexible body which helps the earthworm to burrow between the soil particles to reach food and to escape from predators. Can students think of any other examples?
- Discuss with students some examples of adaptations (inherited physical features and behaviours that might help animals survive in a particular environment) of creatures in a compost bin.
  - Eg. Springtails are tiny little creatures which are blind, almost colourless and have short legs. They scurry around in the compost in search of food. Their physical features help them to move around easily between the soil particles and to avoid predators. If uncovered, they quickly move under the soil particles. This behaviour would help them to survive by reducing their chances of drying out or being seen by predators. Can students think of any other examples?

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SOURCES

1) Down to Earth : An Earth Works learners guide / NSW EPA, Environment Protection Authority
2) Earthworks Course Participants Notes (NSW EPA)
3) Compost Creatures Poster (Gould League)

RESOURCES

1) Worm Farm cross section model
2) Gould League Compost Creatures poster
3) Bucket of living compost
4) ID charts
5) Plastic sheeting to spread on table or ground
6) Magnifying lens'
7) Plastic utensils for gently moving soil and creatures
8) Hand-washing bucket and soap
9) Dustpan and brush for clean up
10) Book: The Mechanics of Organics by Kellie Bollard
11) Poster: Worm Food by Kellie Bollard