

Teacher Notes

Themes

- Dung beetles
- Animal recyclers
- Habitats

Key learning outcomes

- Learn about dung beetles and what they do to survive.
- Discover how dung beetles recycle waste of other animals to nourish the soil and keep our Earth clean.
- Learn how dung beetles make their homes.

Key curriculum areas

- **Science:** Science Understanding (Biological sciences, Physical sciences); Science Inquiry (Planning and conducting)
- **English:** Language; Literacy
- **Mathematics:** Measurement
- **Technologies:** Design and Technologies
- **Cross-curriculum Priority:** Sustainability

Publication details

Dung Beetle on a Roll

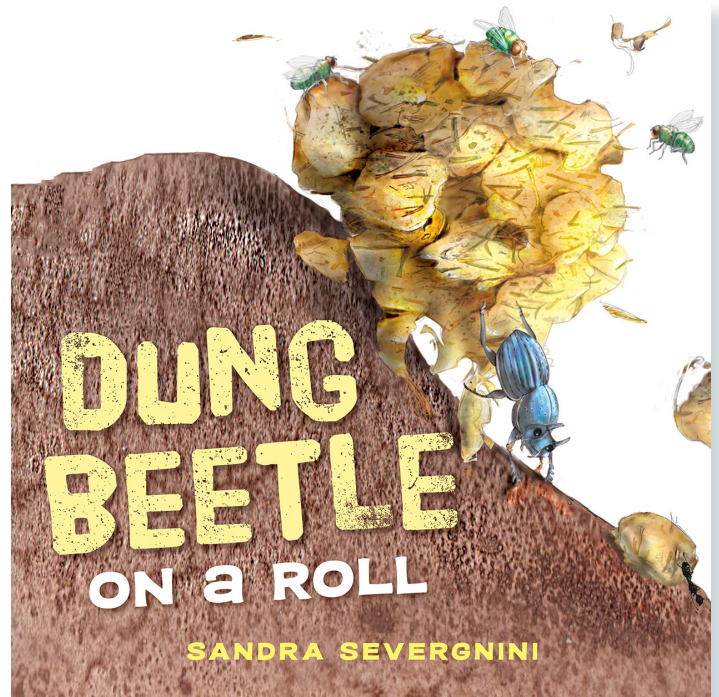
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Dung Beetle on a Roll

Sandra Severgnini

About the book

Bigger is not always better. Sometimes the smallest of creatures can have the biggest impact ... even with dung!

Explore the fascinating and incredibly important role that tiny dung beetles play in our environment. From pushing dung balls that can weigh up to 50 times more than they do, to recycling nutrients in our soil, these beetles are really quite exceptional!

Written and illustrated by the award-winning Sandra Severgnini, *Dung Beetle on a Roll* is a delightful encounter with these small but important beetles.

Recommended for

Readers aged 5 to 9 (Years 1 to 4)



PUBLISHING

Teacher Notes

About the author/illustrator

Sandra Severgnini is an author and illustrator of numerous award-winning books. Her fascination for the amazing world around her inspires her words and brings sensitivity and humour to her illustrations.

Pre-reading questions or activities

What does the word ‘waste’ mean to you, and what are some things that you have or produce that are considered to be waste? Brainstorm with the students and write down what they say as a mind map. *Waste is something that living things do not require any more or do not have use for. However, just because one living thing does not need it any more does not mean that no one can use it. All living things including humans have or produce waste. Examples are rubbish, packaging, clothes you have grown out of, poo, wee and carbon dioxide (animals breathe out carbon dioxide as they cannot use it). Poo is just the part of food that an animal cannot use and must get rid of.*

What happens to this waste, and can you think of something or someone that might like your waste? *Rubbish is picked up by the garbage truck.*

Packaging can be recycled into new packaging.

Clothes you have grown out of can be passed on to a younger sibling or friend.

Poo/wee goes in the toilet, and another animal, plant or other living thing can use it as food.

Carbon dioxide is used by plants to make food through photosynthesis.

We are now going to read a book about a dung beetle and what it can do with poo. Another word for poo is ‘dung’.

Discussion questions

Science

1. What living things are in this book? *Dung beetles, cows, grass, trees, ants, flies and elephants.*
2. Why is the dung beetle important to its habitat/home? *It removes the waste of other animals so they have a clean place to live, and provides nutrients for the soil that help new plants to grow.*

Teacher Notes

English

1. What is the genre of this text? Give an example from the book that makes you think this.
Non-fiction (Years 1 and 2); Narrative non-fiction (Years 3 and 4)

Technologies

1. In the book, why did the dung ball collapse? *The dung beetle built it too quickly and too big.*

Activities

Science

Classifications

Scientists give unique names to everything so that they can talk to each other about what they have learnt about the world. In science you will hear many new words, and one part of science is learning these words and what they mean.

Biologists study living things, so the first words we are going to look at are 'living', 'non-living' and 'once-living'. For something to be living it has to have these seven features:

- movement
- respiration
- sensitivity
- growth
- reproduction
- excretion
- nutrition.

If something has all seven of these properties, it is living (such as animals, plants, bacteria, fungi). If it does not, it is non-living (some examples include rocks, metals, air, water). Anything that used to have the seven features but does not any more is called once-living (such as wood, paper, anything that has died).

Teacher Notes

For more on living things click on the link below:

<https://www.sciencelearn.org.nz/resources/14-characteristics-of-living-things>

Get the students to create a table of living, non-living and once-living things.

Living	Non-living	Once-living

Extension activity for Years 3 and 4:

To discuss different living things, they are put into categories, and this is called taxonomy.

Some examples of the categories used to name living things include: Kingdom, Class, Order and Family. Dung beetles are in the Kingdom Animalia, Class Insecta, Order Coleoptera (beetles) and several species are in the Family Scarabaeidae (scarab beetles).

Using the link below, have a go at sorting the pictures into living things and then decide if they are an animal or not:

<https://www.sciencelearn.org.nz/resources/27-living-or-non-living>

English

Writing a procedure – how to make a dung beetle home

Discuss with the students how the same information can be presented in different ways. This book is narrative non-fiction because it gives you facts about dung beetles by telling a story. Another way to present this information is as a procedure. Get the students to pretend they are a wise, old dung beetle writing a procedure on how to make a dung beetle home. (*Extension activity: write about the jobs of all three types of dung beetle.*)

Think about the materials the dung beetle needs and brainstorm some of the different steps that dung beetles must do to create their home.

Younger students can instead complete the worksheet on page 7, 'Retell the dung beetle's story', where they will cut and paste images from the story in the correct order.

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Mathematics

Sand ball experiment

In the book the dung beetle had a problem – the ball of poo fell apart. Let's see if you are better at making a ball than the dung beetle. For this experiment we are going to use sand and water to make a ball and then roll it down a ramp. The question you are testing is: Which sand ball will roll the furthest before it falls apart?

In the book the dung beetle makes his ball too big; however, the ball might also fall apart because there is too much or too little water. This means there are two variables. You have three options depending on your students:

1. Give each student the same amount of water and sand so that they are just looking at size (Years 1 and 2).
2. Each student must make the same size ball but can vary the amount of water they use.
3. Let the students make different size balls with different amounts of water.

Use the worksheet provided on page 8 to help with this experiment.

Sustainability

Making a compost

Our waste can be used again. This is called recycling. One way to recycle plant scraps and poo is to compost them. Composting is a process where living things (beetles, earthworms, fungi and bacteria) break down once-living things (food scraps, leaves, other plant material and poo) and turn them into soil. This soil is now full of nutrients that plants need to grow.

In this activity, you will make a compost.

Things you will need:

- Container/compost bin (with a lid)
- Leaf litter or grass
- Animal poo (optional)
- Food scraps (see Note below)

Teacher Notes

Steps:

1. Fill 1/3 of the container with leaf litter or grass.
2. Fill the next 1/3 of the container with animal poo. If animal poo is not available, use more leaf litter or grass.
3. Top the remaining third of the container with food scraps, leaving some space at the top for air and to make it easier to mix later. Over the next two weeks, fill up the container with more food scraps. The compost should be moist, so let in the rain or water it if it is getting dry. The lid can be placed on top of the container, but make sure that air can still get in so the living things that are inside can breathe.
4. Once the container is full, let rest for 2–3 months so that all the material inside can break down.
5. During this time, mix the compost to allow it to aerate and make sure it is still moist. To mix: if it is a small container, place the lid on firmly and shake the container, then reopen the lid to let air come back in. If it is a large container or compost bin, you can use a compost mixer, or empty the compost and shovel it back in.

This activity will demonstrate to your students how composting works, and you can then use the soil to plant flowers, vegetables or other plants.

Note: Food scraps to avoid are meat and dairy as they can smell and attract unwanted animals such as flies and rats. Also, a lot of citrus fruit can cause the compost to become very acidic and kill the living things inside the compost, so either avoid adding citrus scraps or add them only sparingly.

Teacher Notes

Name: _____

Retell the dung beetle's story

Cut out the picture with the sentence below it and paste the events in order.

1

2

3

4

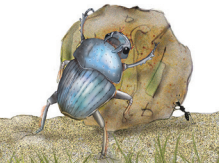
5


6



Then he rolls the poo into the biggest ball ever.


First, he finds some poo.


The poo ball falls apart.


He builds a new dung ball.


He rolls the ball to the top of the hill.


He shows his dung ball to his mate.

Illustrations © Sandra Severgnini

Teacher Notes

Name: _____

Sand ball experiment

Aim: To see how far a sand ball will roll without stopping or collapsing.

Hypothesis (prediction): _____

Things you will need:

- Sand
- Water
- Measuring cups
- Piece of wood
- Measuring tape (or with Years 1 and 2 mark with masking tape where each group's ball lands so they can try to get further each time)

Steps:

1. Measure the amount of water and sand you will use and record it.
2. Mix the sand and water together.
3. Shape it into a ball.
4. Measure the size of the ball and record it.
5. Rest the piece of wood on something to make a ramp, then place the ball on top.
6. Let go of the ball.
7. Measure how far the ball rolled.
8. Repeat all steps with different sizes and/or wetness of sand ball.

Attempt	Wetness	Size	Distance
1			
2			
3			
4			

Conclusion (what did you notice about this experiment?):

Australian Curriculum Links (Version 9.0)

Year level	Learning area: science	Other learning areas
Year 1	<p>Science Understanding: Biological sciences</p> <ul style="list-style-type: none"> Identify the basic needs of plants and animals, including air, water, food or shelter, and describe how the places they live meet those needs (AC9S1U01) <p>Science Understanding: Physical sciences</p> <ul style="list-style-type: none"> Describe pushes and pulls in terms of strength and direction and predict the effect of these forces on objects' motion and shape (AC9S1U03) <p>Science Inquiry: Planning and conducting</p> <ul style="list-style-type: none"> Suggest and follow safe procedures to investigate questions and test predictions (AC9S1I02) 	<p>English: Language</p> <ul style="list-style-type: none"> Explore how texts are organised according to their purpose, such as to recount, narrate, express opinion, inform, report and explain (AC9E1LA03) <p>English: Literacy</p> <ul style="list-style-type: none"> Use comprehension strategies such as visualising, predicting, connecting, summarising and questioning when listening, viewing and reading to build literal and inferred meaning by drawing on vocabulary and growing knowledge of context and text structures (AC9E1LY05) <p>Mathematics: Measurement</p> <ul style="list-style-type: none"> Compare directly and indirectly and order objects and events using attributes of length, mass, capacity and duration, communicating reasoning (AC9M1M01) <p>Technologies: Design and Technologies</p> <ul style="list-style-type: none"> Evaluate the success of design ideas and solutions based on personal preferences and including sustainability (AC9TDE2P03)
Year 2	<p>Science Inquiry: Planning and conducting</p> <ul style="list-style-type: none"> Suggest and follow safe procedures to investigate questions and test predictions (AC9S2I02) Make and record observations, including informal measurements, using digital tools as appropriate (AC9S2I03) 	<p>English: Language</p> <ul style="list-style-type: none"> Identify how texts across the curriculum are organised differently and use language features depending on purposes (AC9E2LA03) <p>English: Literacy</p> <ul style="list-style-type: none"> Identify the purpose and audience of imaginative, informative and persuasive texts (AC9E2LY03) <p>Mathematics: Measurement</p> <ul style="list-style-type: none"> Measure and compare objects based on length, capacity and mass using appropriate uniform informal units and smaller units for accuracy when necessary (AC9M2M01) <p>Technologies: Design and Technologies</p> <ul style="list-style-type: none"> Evaluate the success of design ideas and solutions based on personal preferences and including sustainability (AC9TDE2P03)
Year 3	<p>Science Understanding: Biological sciences</p> <ul style="list-style-type: none"> Compare characteristics of living and non-living things and examine the differences between the life cycles of plants and animals (AC9S3U01) <p>Science Inquiry: Planning and conducting</p> <ul style="list-style-type: none"> Use provided scaffolds to plan and conduct investigations to answer questions or test predictions, including identifying the elements of fair tests, and considering the safe use of materials and equipment (AC9S3I02) Follow procedures to make and record observations, including making formal measurements using familiar scaled instruments and using digital tools as appropriate (AC9S3I03) 	<p>English: Language</p> <ul style="list-style-type: none"> Describe how texts across the curriculum use different language features and structures relevant to their purpose (AC9E3LA03) <p>English: Literacy</p> <ul style="list-style-type: none"> Recognise how texts can be created for similar purposes but different audiences (AC9E3LY01) <p>Mathematics: Measurement</p> <ul style="list-style-type: none"> Measure and compare objects using familiar metric units of length, mass and capacity, and instruments with labelled markings (AC9M3M02) <p>Technologies: Design and Technologies</p> <ul style="list-style-type: none"> Generate and communicate design ideas and decisions using appropriate attributions, technical terms and graphical representation techniques, including using digital tools (AC9TDE4P02)

Teacher Notes

Year level	Learning area: science	Other learning areas
Year 4	<p>Science Understanding: Biological sciences</p> <ul style="list-style-type: none">Explain the roles and interactions of consumers, producers and decomposers within a habitat and how food chains represent feeding relationships (AC9S4U01) <p>Science Understanding: Physical sciences</p> <ul style="list-style-type: none">Identify how forces can be exerted by one object on another and investigate the effect of frictional, gravitational and magnetic forces on the motion of objects (AC9S4U03) <p>Science Inquiry: Planning and conducting</p> <ul style="list-style-type: none">Use provided scaffolds to plan and conduct investigations to answer questions or test predictions, including identifying the elements of fair tests, and considering the safe use of materials and equipment (AC9S4I02)Follow procedures to make and record observations, including making formal measurements using familiar scaled instruments and using digital tools as appropriate (AC9S4I03)	<p>English: Language</p> <ul style="list-style-type: none">Identify how texts across the curriculum have different language features and are typically organised into characteristic stages depending on purposes (AC9E4LA03) <p>English: Literacy</p> <ul style="list-style-type: none">Use comprehension strategies such as visualising, predicting, connecting, summarising, monitoring and questioning to build literal and inferred meaning, to expand topic knowledge and ideas, and evaluate texts (AC9E4LY05) <p>Mathematics: Measurement</p> <ul style="list-style-type: none">Interpret unmarked and partial units when measuring and comparing attributes of length, mass, capacity, duration and temperature, using scaled and digital instruments and appropriate units (AC9M4M01) <p>Technologies: Design and Technologies</p> <ul style="list-style-type: none">Generate and communicate design ideas and decisions using appropriate attributions, technical terms and graphical representation techniques, including using digital tools (AC9TDE4P02)
All	<p>Cross-curriculum Priority: Sustainability</p> <ul style="list-style-type: none">All life forms, including human life, are connected through Earth's systems (geosphere, biosphere, hydrosphere and atmosphere) on which they depend for their wellbeing and survival (SS1)Sustainable patterns of living require the responsible use of resources, maintenance of clean air, water and soils, and preservation or restoration of healthy environments (SS2)	

Related books from CSIRO Publishing

For younger readers:

- *Where Are All the Christmas Beetles?* (<https://www.publish.csiro.au/book/8140>)

For older readers:

- *Poo, Spew and Other Gross Things Animals Do!* (<https://www.publish.csiro.au/book/8021>)
- *Sensational Australian Animals* (<https://www.publish.csiro.au/book/8094>)

For adults:

- *Introduced Dung Beetles in Australia: A Pocket Field Guide* (<https://www.publish.csiro.au/book/7207>)

Teacher Notes

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Packed with fun, exciting and quality articles, Double Helix magazine is created to inspire young readers. It covers a range of topics across science, technology, engineering and maths.

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Other CSIRO resources

CSIRO has developed and delivered a broad range of high-quality STEM education programs and initiatives for nearly 40 years. Our programs aim to inspire the pursuit of further STEM education among students and the community, to equip the emerging workforce with tomorrow's skill sets, and to strengthen collaboration between industry and classrooms across Australia. For more information visit: <https://www.csiro.au/en/Education>