

Teacher Notes

Themes

- Animal biology
- Cycles in ecosystems
- Careers in science

Key learning outcomes

- Discover the variety of ways animals excrete and manage waste products produced by their bodies
- Understand the roles animal waste and secretions play in their communities and in their ecosystem
- Become familiar with different fields of research readers can enter to study the relationships between animal waste products and their environment

Key curriculum areas

- **Science:** Science Understanding (Biological sciences, Chemical sciences); Science as a Human Endeavour
- **English:** Language; Literature
- **Cross Curriculum Priority:** Sustainability

Publication details

Poo, Spew and Other Gross Things Animals Do!

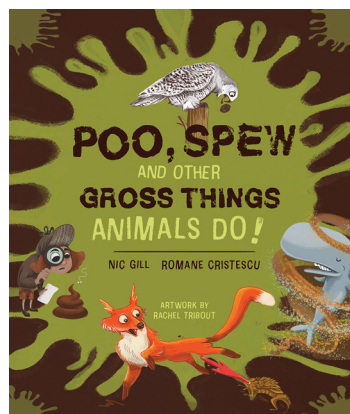
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Poo, Spew and Other Gross Things Animals Do!

Nicole Gill and Romane Cristescu

Artwork by Rachel Tribout

About the book

This book stinks ... we think you'll love it!

Poo, Spew and Other Gross Things Animals Do! will show you how being gross isn't just hilarious – it can be an important survival strategy for animals all over the world.

Take a deep breath and step into the world of not just poo, but also spew, snot and all the other gross things animals do to survive and thrive. From using poo to build a nest, leaving stinky secretions to find a mate, or oozing slime to deter a predator, the animals in this book are amazing ... and revolting.

Discover a whole world of poo, learn how to be a poo detective, and meet some of the great scientists doing gross and yucky work!

You'll laugh. You'll cry. You might even throw up!

Recommended for

Readers aged 9 to 12 (Years 4 to 6)



PUBLISHING

Teacher Notes

About the authors and illustrator

Nic Gill is a Tasmanian author, environmental writer and conservation dog handler. Her dog, Zorro, is a Tasmanian masked owl vomit detection dog, and is also an avid consumer of books, albeit in a more literal sense than Nic would like.

Dr Romane Cristescu trained and worked as a vet in France before relocating to Australia to study koalas. She is also a poo science evangelist, who likes nothing more than discussing the illuminating qualities of animal excrement at otherwise polite parties.

Rachel Tribout is an illustrator and graphic designer from France based in Tasmania. She's the illustrator of *Hold On! Saving the Spotted Handfish*, the author and creator of *The Monsters of Tasmania* and is a member of the Society of Children's Book Writers and Illustrators.

Pre-reading questions or activities

Conversations on bodily functions can evoke different feelings in different people. Some will find them funny, while others might feel awkward ... even though they might still laugh. Hopefully most of the class will feel a deep sense of curiosity!

Make a box for anonymous notes and ask students to use it to communicate their questions, concerns or feelings on the topic of animal waste. They might also share stories, hypotheses and suggested rules for a comfortable discussion. Remind them that they don't need to provide their name on their note.

Use any notes you collect to come up with a list of rules for a respectful and light-hearted conversation on 'poo, spew and other gross things animals do'.

Follow this up with a session for the students to openly share what they know already about different kinds of animal scat. Write a list of diverse classes and families of animal on the board, such as fish, birds, horses, cows, mice, primates and insects. Invite students to draw or describe in words characteristics of the waste each produces. Why are they all different? What do different types of animal waste have in common?

Discussion questions

Science

1. Animal guts are full of different kinds of microbes. Read pages 8–9 in *Poo, Spew and Other Gross Things Animals Do!* and discuss with the class how our own faeces are made up of large amounts of bacteria, viruses and fungi. Ask them why they think having microscopic living things in our guts might be so important. Discuss whether they think there is a difference between these ‘good’ germs and ‘bad’ germs.
2. Read page 12 in the book. Discuss how all animals take roughly the same time to poo, but the characteristics of that waste – such as colour, moisture, contents and volume – can vary depending on what they eat. Ask them to describe how the poo of an herbivore (such as a cow or elephant) differs to that of a carnivore (such as a dog or cat).
3. Owl pellets are the hard remains of meals regurgitated before they can slide down the digestive tract (and risk causing problems). Ask students how they might use these pellets to learn about the owls that make them. Read pages 14–16 in the book and discuss how owls form these pellets, and how they differ to vomit. Guide students to a conversation on vomiting, and ask them why our own bodies might lose precious nutrients and water this way, rather than letting them pass through the body.
4. Everybody knows farts (and poos) are stinky. But why? Read pages 30, 31, 34 and 37 in the book and ask students to discuss whether all animals find poos as smelly as we do. What kinds of reactions do smells emitted from animal waste produce in different animals?
5. Discuss with students how so many of our medical tests – to see if we’re healthy and strong – rely on analysing our urine and other waste material. Read pages 36–37 in the book and ask students why a number of animals use their waste to attract a mate. Encourage them to make a connection between the strength and health of a mate and the characteristics of their urine or faeces.
6. A common strategy animals use to evade predators is to look like a feature of the environment, be it a stick, a leaf or a bit of poo. Read pages 42–43 in the book and ask students to think of other examples in nature of an animal camouflaging itself to look like something boring (or gross).
7. Discuss with the class different ways studying animal scat found in a particular area could be used to learn more about the wildlife. Make a list of their thoughts, and then read pages 52–55 in the book to add to their ideas.

Teacher Notes

8. Washing our hands after using the bathroom is immensely important. But why? Other animals don't do it, right? Read page 76 in the book and ask students to consider why penguins might be fine pooing on themselves, but we need to clean ourselves up. Discuss how animals might have different behaviours, bodies and habitats that tolerate poor hygiene, while we need to ensure our hands stay clean.

English

1. Read page 10 in *Poo, Spew and Other Gross Things Animals Do!* and emphasise the term egestion, describing the removal of solid waste from the body. Ask students to consider why scientists might use more technical terms rather than simpler (or even crude sounding) words like poo.
2. Choose 5–10 words in the 'grossary' at the back of the book and search for their etymology (word origins) on the internet. Share these details with the students, particularly any information on which language the word originated in. Discuss with them why they think so many technical and scientific terms might have their roots in languages such as Greek and Latin.

Sustainability

1. Dung beetles (also known as scarabs) were imported into Australia to deal with the copious amounts of herbivore manure being produced by livestock. Read pages 20–21 in *Poo, Spew and Other Gross Things Animals Do!* and ask students to imagine what kinds of problems would arise in a landscape where animal waste piled up. What kinds of pests, diseases and environmental consequences might we expect?
2. Read the 'gross fact' on page 48 of the book and ask students to share their thoughts on birds using cigarette butts in their nests to keep parasites from getting out of hand. Does this surprise them? Ask them to discuss whether this benefit means we should be discarding our cigarettes on the ground for birds to use.

Activities

Science

Tabletop digestion

Safety: This activity uses sharp instruments to cut up food items. Remind students to take care with slicing and cutting.

Food in this activity is not to be eaten. Throw out food after the activity is done in a responsible manner, adding it to compost if possible.

You will need

- Samples of soft but solid processed food items (keep it simple – bread, tinned spaghetti, doughnuts)
- Samples of fresh fruit and vegetables (banana, lettuce, corn, tomato)
- Small cup of water
- Detergent (add some green food colouring for a better effect)
- Lemon juice
- Cornflour (or similar material to represent microbes)
- Knives or scissors
- Chopping board
- Extra-large plastic sandwich bag
- Kitchen sieve
- Stockings or large cotton socks
- Plastic buckets or containers

What to do

1. Divide the class into two groups. One will break down just the processed foods. The other will break down processed foods with some fresh fruit and vegetables.
2. Divide each group into four smaller groups – mouth, stomach, small intestine, large intestine.
3. Explain how the activity will simulate digestion in humans, from food to poo.
4. Mouth: People in this group will use scissors or knives to break the food items down into the smallest pieces possible. Instruct them to add some drops of water to make it a bit mushy. This forms a wet ball of slop called a bolus. One person, nominated as the esophagus, is to put the bolus into a plastic sandwich bag, as an example of how the bolus is ‘swallowed’.

Teacher Notes

5. Stomach: People in this group will take turns lightly squishing and rolling the bag around. One person can add a small squirt of lemon juice to represent stomach acid. Another can add a sprinkle of cornflour to represent stomach microbes.
6. Small intestine: After a few minutes of squishing the 'bolus', one student can empty the stomach contents into a kitchen sieve held over a container or bucket. Tell the students this water mixture is now called chyme (rhymes with 'time'). Explain how the body absorbs nutrients from chyme. People in this group will add a few drops of detergent to the material in the sieve. Explain this represents bile, a substance produced by the liver to help the body digest fats. One student is to pour the material left in the sieve into a sock.
7. Large intestine: Instruct this group to lightly squeeze the sock to extract liquid from the material. Tell them the large intestine takes water from the material, leaving faeces. Taking too much water makes you constipated; too little leaves you with diarrhoea.

What's happening?

The process of digestion involves two types of action. One, called mechanical digestion, includes any physical movement, such as chopping, squeezing and squishing actions. The second is chemical. Saliva, stomach acid, bile and microbial enzymes all help break food down further.

Having plenty of fibre will help keep the process moving, binding the material together from mouth to bum for a nice, clean digestion process.

Interview with a scientist

Poo, Spew and Other Gross Things Animals Do! includes six scientist profiles with ecologists who study different environments.

Break the class into pairs and provide each pair with the name of one of the six scientists. One in each pair is to pretend to be a researcher who works with that scientist in their field, studying the same things in the same environment. The other person is to come up with a list of interview questions based on the scientist profiles in the book, asking them details on their work.

Invite the students to perform this interview in front of the class.

Teacher Notes

English

Dung ball

You will need

- 3 × waste-paper buckets or baskets
- 3 × A3 sheets of paper
- Pad of sticky notes
- Masking tape

What to do

1. Arrange the three baskets in a row, separated by at least half a metre.
2. Estimate a distance of at least 2 metres from the baskets (or approximate a distance most students will accurately throw a small ball of paper). Use the masking tape to mark this distance along the ground.
3. Write the words 'formal', 'common' and 'slang' on individual sheets of A3 sized paper. Place each sheet in front of one of the baskets.
4. Write words from the following list on sticky notes: Poop, Urine, Wee, Vomit, Barf, Emesis, Diarrhoea, Flatulence, Fart, Wind, Faeces, Booger, Mucus, Scat, Stool, Pellets, Waste, Spit, Dung, Saliva (feel free to add your own, or take from *Poo, Spew and Other Gross Things Animals Do!*).
5. Invite students to randomly take a word from the sticky notes and roll it into a ball. They can then step up to the line, and choose the basket that best matches what type of word their sticky note represents (formal, common or slang). They then openly declare this is the basket they will aim to throw the ball into, before throwing.
6. Once the list has been depleted, or if all students have thrown at least once, hold a discussion on why they chose the basket they did.

What's happening?

Word use changes over time, depending on who uses the word and their reasons for using it. Some words become euphemisms – polite ways of referring to something considered unappealing, offensive or just plain gross. Others are used because they have very specific, formal meanings that are understood by a particular group of people. Saliva, for example, refers to a very specific material produced by the body. Spit could refer to saliva, or any other watery material expelled from the mouth that might include saliva. Scientists might need to know the difference if they're studying an animal's function.

Teacher Notes

Undead languages

Words like coprophage and regurgitate have their origins in Latin and Greek, which were the main languages used by scholars and academics for centuries. While a version of Greek is spoken today, Latin is mostly a 'dead language' ... or is it?

These undead bits of words are called 'root words' and can help you understand unfamiliar words in modern English.

Use the English meanings to Greek and Latin roots from the table in the 'Undead languages' worksheet provided on the next page to fill in the definitions below, which match some of the English examples:

Definitions

1. _____ adj. Focused on self.
2. _____ n. A medicine or substance causing someone to vomit.
3. _____ adj. Having more than one type of lens.
4. _____ v. To look at something again.
5. _____ adj. Something done or given after a person's death.
6. _____ v. To form an idea of something before actual knowledge or experience etc.

Today, people use Greek and Latin roots to create their own words. Can you create a word to mean:

Many poos? _____

Against farting? _____

Before spewing? _____

Create your own gross words with an undead Greek or Latin root, and write the definitions here:

Teacher Notes

Worksheet: Undead languages

English meaning	Latin root	English example	Greek root	English example
poo	faeces	faecal	copro	coprolite
wee	urin	urinary	–	–
spew	vomitus	vomit	emeo	emetic
fart	flatus	flatulent	–	–
eating	edi	edible	phage	bacteriophage
self	ego-	egotistic	auto	automobile
again	re-	revise	–	–
after	post-	posthumous	–	–
before	pre-/ante-	preconceive	pro-	procrastinate
with	multi-	multifocal	poly-	polygon
under	sub-	subterranean	hypo-	hypodermic
with	co-/con-	coincidence	sym-/symp-	sympathetic
inside	intra	intramural	endo	endothermic
without	dis-	disjointed	a-/an-	anaerobic
all	omni-	omnipresent	pan-	panorama
above	super-/ultra-	superior	hyper-	hyperventilate

Teacher Notes

Sustainability

Whose poo is this?

You will need

- ‘Whose poo is this?’ worksheets on the next page (enough copies so each student can have one of the animals on it)
- Strips of paper 10 cm wide × 40 cm long (enough for the class)
- Scissors
- Stapler
- Sticky tape

What to do

1. Cut out the animal cards from the worksheets – one per student. Choose one animal to be endangered, making sure there is just one of them.
2. Staple each card to the centre of a strip of paper, with the name facing out.
3. Ask each student to close their eyes so they can’t see the animal on the card.
4. Wrap the paper around their head, with the animal card positioned over their forehead. Use sticky tape to secure the band in place firmly.
5. When you’re sure the student can’t see their animal, let them open their eyes.
6. Students are to all find members of their own group. Instruct them to one by one ask another student questions about their animal based on their poo. They can use the flow chart on pages 58–59 in the book for inspiration.
7. After the activity, discuss with the class how scientists might learn how a species is endangered even if they can’t find any individuals left in an environment.

Worksheet: Whose poo is this?

CAT

SEAL

WHALE

NATIVE HEN

TASMANIAN
DEVIL

QUOLL

DOG

PENGUIN

EURASIAN
HOOPOE

COW

SHEEP

DEER

RABBIT

BROAD
TOOTHED RAT

WOMBAT

KOALA

SEBA'S SHORT-
TAILED BAT

BLACK BEAR

Teacher Notes

Australian curriculum links

Year level	Learning area: Science	Other learning areas
Year 4	<p>Science Understanding: Biological sciences</p> <ul style="list-style-type: none">Living things have life cycles (ACSSU072) <p>Science Understanding: Chemical sciences</p> <ul style="list-style-type: none">Natural and processed materials have a range of physical properties that can influence their use (ACSSU074) <p>Science as a Human Endeavour</p> <ul style="list-style-type: none">Science involves making predictions and describing patterns and relationships (ACSHE061)	<p>English</p> <ul style="list-style-type: none">Understand that social interactions influence the way people engage with ideas and respond to others for example when exploring and clarifying the ideas of others, summarising their own views and reporting them to a larger group (ACELA1488)Incorporate new vocabulary from a range of sources into students' own texts including vocabulary encountered in research (ACELA1498)
Year 5	<p>Science Understanding: Biological sciences</p> <ul style="list-style-type: none">Living things have structural features and adaptations that help them to survive in their environment (ACSSU043) <p>Science as a Human Endeavour</p> <ul style="list-style-type: none">Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE081)	<p>English</p> <ul style="list-style-type: none">Understand that patterns of language interaction vary across social contexts and types of texts and that they help to signal social roles and relationships (ACELA1501)Understand the use of vocabulary to express greater precision of meaning, and know that words can have different meanings in different contexts (ACELA1512)
Year 6	<p>Science Understanding: Biological sciences</p> <ul style="list-style-type: none">The growth and survival of living things are affected by physical conditions of their environment (ACSSU094) <p>Science as a Human Endeavour</p> <ul style="list-style-type: none">Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE098)	<p>English</p> <ul style="list-style-type: none">Understand how to use knowledge of known words, word origins including some Latin and Greek roots, base words, prefixes, suffixes, letter patterns and spelling generalisations to spell new words including technical words (ACELA1526)Understand that strategies for interaction become more complex and demanding as levels of formality and social distance increase (ACELA1516)
All	<p>Cross Curriculum Priority: Sustainability</p> <p>OI.1 The biosphere is a dynamic system providing conditions that sustain life on Earth.</p> <p>OI.2 All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival.</p>	

Related books from CSIRO Publishing

AmAZed! CSIRO's A to Z of Biodiversity (<https://www.publish.csiro.au/book/7984>)

Animal Eco-Warriors: Humans and Animals Working Together to Protect Our Planet (<https://www.publish.csiro.au/book/7570>)

Plantastic! A to Z of Australian Plants (<https://www.publish.csiro.au/book/7956>)

The Encyclopedia of STEM Words: An Illustrated A to Z of 100 Terms for Kids to Know (<https://www.publish.csiro.au/book/8084/>)

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>

