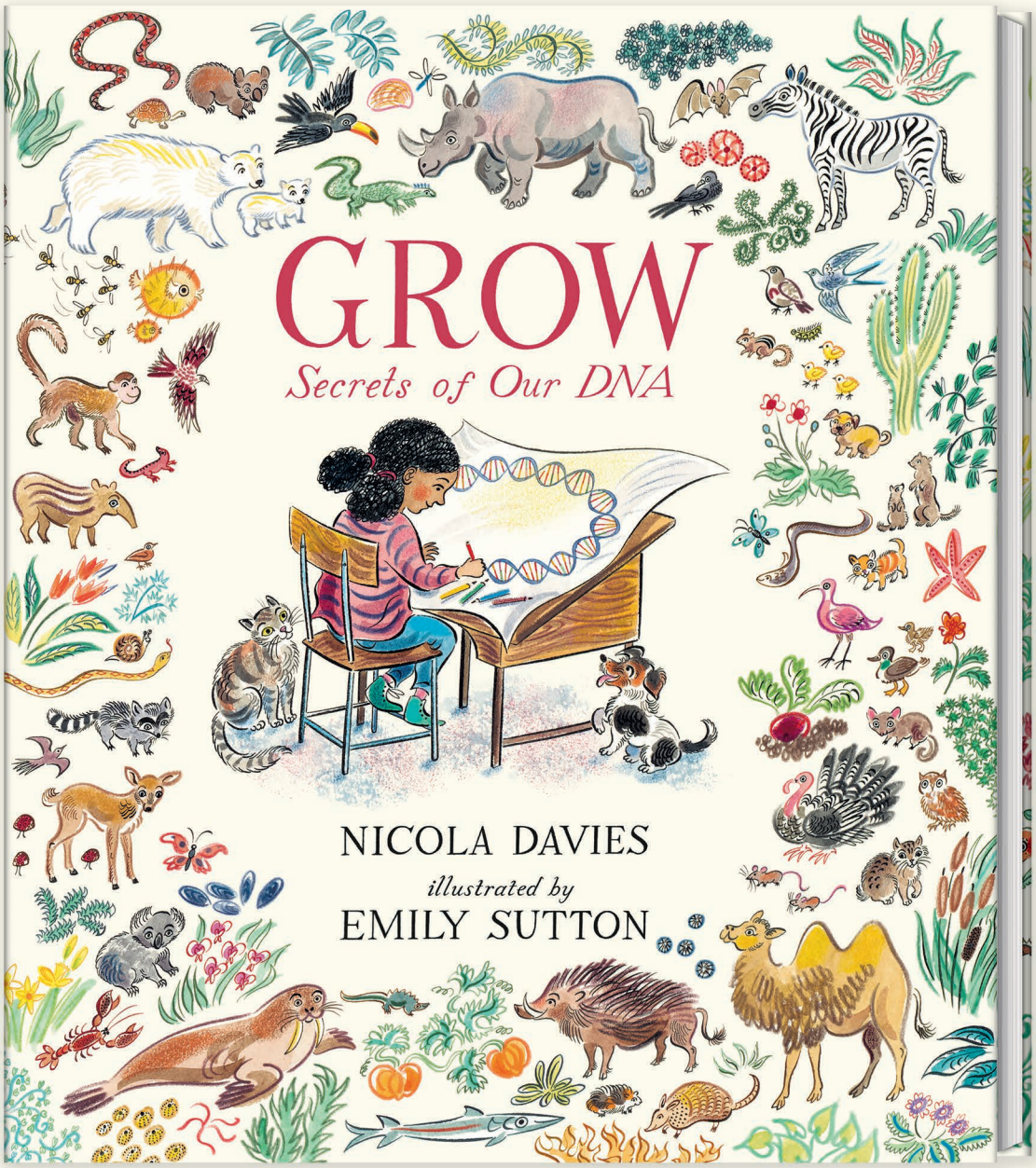
WALKER BOOKS

TEACHERS' NOTES



ISBN 9781406382778 • £12.99 • Hardback • Age 5+

ABOUT THE BOOK

A beautifully illustrated introduction to the concept of DNA for younger readers. All living things grow – every plant and every animal, including human beings. Some things grow fast and others grow slowly; some things grow by tiny degrees, while others grow to be enormous. Yet there's something about the way we grow that links us all together. Ever since you were the size of a dot, your body has been following a set of instructions: a code, which connects you with every creature on the planet... With words from Nicola Davies and exquisite artwork by Emily Sutton, this groundbreaking book is certain to enchant and inspire children.

GROW

Secrets of Our DNA

NICOLA DAVIES *illustrated by* EMILY SUTTON

TEACHERS' NOTES BY EVA JOHN



Cover

Talk for thought

- Read the title. What do you think this book might be about?
- Do you think it is fiction, or non-fiction? Give reasons for your opinion.
- Now read the blurb. What do you think you might find out when you read this book?
- Is there anything you want to ask questions about?

Illustration conversation

- Try to name all of the living things you can see on the front and back covers.
- How might you classify these living things into smaller groups?
- What do you think the girl is drawing?
- What might you infer about the girl from the cover illustration?



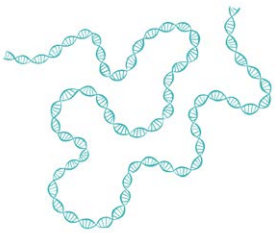
Blurb

Talk for thought

- Why do you think there is use of ellipsis: 'And the way you grow connects you with every creature on the planet …'

Rapid research

- The blurb says that the author and illustrator are *'an award-winning team.'* Find out what other books they have created together.
- Visit their websites:
  www.nicola-davies.com
  www. emilysutton.co/picture-books

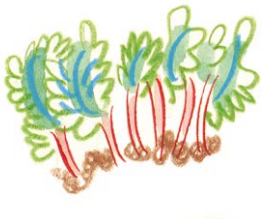


End papers

Illustration conversation

- How would you describe this design?
- How is it different from the diagram the girl is drawing on the front cover?
- What do you think it might represent?

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Title page

Talk for thought

- What would you guess the girl might be interested in?
- Brainstorm what you already know about how to grow plants.

Illustration conversation

- What time of year do you think it is? What clues are there?
- What is the girl doing in the picture, and why do you think she is doing this?
- Why do you think there are red pennants flying in the picture?
- What do you think the buildings are used for?
- What creatures can you spot?
- What art materials do you think Emily Sutton has used to create her illustration?
- What feeling do you get, when you look at this picture?

Investigate and create – In groups:

- Draw up a list of plants that you would like to grow. Think of different reasons you might want to consider when making your choice.
- Find out:
    - When you have to plant them
    - When they mature
    - Ideal growing conditions
    - Where you can plant them: pots, gardens, public spaces
    - How much they cost
- Make plans:
    - Raise funds for seeds, plants and compost, etc..
    - Decide where to grow the plants
    - Decide when to plant them
    - Decide how to care for plants
    - Chart and photograph the progress of your project.



All living things … (First page)

Illustration conversation

- How have these illustrations been organized to reinforce the author's words?



The way they …

Illustration conversation

- What sort of conditions exist in this desert?
- What creatures can you see?

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Talk for thought

- Why do you think the author is using ellipsis here?
- Why do you think it is called the *four o'clock plant*?
- Find out more about this plant, which is known as an *ephemeral plant,* and find out the meaning of the word *ephemeral.*

Investigate

- Other plants that:
    - grow very quickly
    - grow very slowly
    - grow well in hot conditions
    - grow well in cold conditions
    - grow well in wet conditions
    - grow well in dry conditions



Turquoise killifish…

Talk for thought

- What do you think happens to the eggs of the turquoise killifish, once they have been laid?

Illustration conversation

- What do you notice about the puddles in the illustration?
- How does the artist suggest movement?

Create

- A picture of a creature of your choice and try to suggest its movements.

Investigate

- Watch the video about turquoise killifish and jot down any extra information you find out.
  www.youtube.com/watch?v=4sy3R3f_GCY

Create (after watching and discussing the video)

- The puddle of an elephant's footprint holds a secret …
  Continue this piece of writing, making it as informative as possible. You might want to watch the video again to jot down words, phrases and ideas that you could use and develop. Decide whether you want to create an infographic, a comic strip, an information text, an illustrated narrative, a poem or a play.



and others grow…

Number crunch and investigate

- Estimate how many pencils high the bristlecone pine in the illustration is.
- Look at pine cones and find the spiral patterns the scales make. Then find pictures of these on the internet. These show the Fibonacci sequence.
- Find out what you can about the Fibonacci sequence.
  E.g. www.youtube.com/watch?v=CPTmRSYZupA

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A more challenging, very speedy, but highly entertaining film: www.youtube.com/watch?v=ahXIMUkSXX0

- What other forms in nature have the Fibonacci sequence?
- Devise a way to show the number patterns using colours to aid understanding.

Talk for thought

- What do you think the author means by *'when times are tough'*?



'In the deep ...'

Talk for thought

- What do you think it is like in the Arctic Ocean?
- Find it on a map or globe.
- Why do you think quahog clams take such a long time to grow in the Arctic?

Illustration conversation

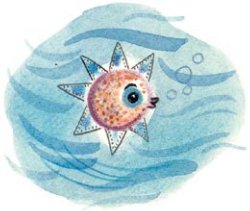
- What is happening in this picture?
- Why do you think there are so many seagulls?
- If clams take so long to grow, do you think we should eat them?

Word wizard

- Find synonyms for ***fast*** and ***slowly***.
- Create a chant, using the words you have found. You might like to make up some percussion or electronic music to go with them.
- Perform for each other and think if there are any ways of polishing your performance.

Investigate

- Find out about the ten longest living creatures on earth. Guess what they might be, before watching the film: www.youtube.com/watch?v=IDaPH_ZGiVw



How much things ...

Talk for thought

- Do you think all things start off at the same size?

Illustration conversation

- Describe how a sunfish changes, using the illustrations to help you.
- How does the illustrator convey the sense of the size of the fully grown sunfish?
- Guess how long the sunfish is in metres.

Investigate

- Find out just how big sunfish can grow.
- What comparison or image can you think of to suggest the size of a sunfish?

Author technique

- Re-read from the beginning of the text to this point, picking out all the images that Nicola Davies uses to suggest the size of different living things.

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Create

- Make a list of the smallest and largest creatures you can think of
    - Fish
    - Amphibian
    - Reptile
    - Bird
    - Insect
    - Mammal
- Thing of an image that would accurately convey the size of each one, which will enable other people to visualize it accurately. This is a very tricky thing to do!



And growing isn't …

Talk for thought

- When you hear the word 'change,' what do you think of?
- Think of plants which grow from the following:
    - Seeds
    - Bulbs
    - Suckers
- Look at a variety of seed packets to find out what sort of information is given.
- Why do you think some seeds are packaged in a smaller sealed foil packet inside the paper packet?

Create

- Carefully unfold a seed packet to find out the shape of the net used to make it.
- Create your own net and design a seed packet for a plant of your own creation. Is it a vegetable, a flowering plant, or something else entirely?
- Make a drawing of a plant or animal of your choice, showing how it changes.

Investigate and create

- Find out about the magical life cycle of the butterfly.
- Design a way to show this. It could be a picture, a diagram, an infographic, a collage, a three-dimensional model, a mobile, an electronic presentation.
- Find out which plants are useful to butterflies at different stages in their life cycle.

Illustration conversation

- What are the tripods in the illustration being used for?
- Why do you think there is netting over some of the frames?



You grew from …

Illustration conversation

- What are the greyscale illustrations on the left of the illustration showing?
- Look at some baby scans on the internet, or maybe you have one of yourself as a

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baby. What features can you identify on the scan?

- How has the girl in the coloured illustrations changed?

Create

- Create a timeline of your growth, with five illustrations or photos, from birth to the present day. Think about how you will present your information: a concertina book, a poster, an electronic presentation, or some other way?
- Write about how you have changed at each point. What can you do now, that you couldn't do when you were first born?
- Create a poem to go with your timeline:
    - E.g. complete the following, choosing your words carefully, thinking about rhythm and alliteration, and possibly rhyme too, if it doesn't make your words sound clunky!

When I was first born ….

When I was one ….

When I was three ….

When I first went to school ….

And now, I ….



You will go …

Talk for thought

- What can you find out about the girl's life from the pictures?
- What sort of *'instructions'* do you think the author means?
- What is a code? Think of examples of when we use codes.
- Do you think we can influence the way we grow and develop? If so, how?

Create

- Fast forward on your own life: draw pictures of what you think might happen to you.



If you could …

Talk for thought

- Why do you think the author uses the words: *'If you could see DNA …'* ?

Illustration conversation

- What do you notice about the colours in the DNA spirals?

Investigate and create

- Using four colours, yellow, red, green and purple, find out how many different paired combinations you can make. Combine with a friend to try arranging these coloured steps in different orders, going up a ladder. What do you notice?
- Look at the following to decide which gives the clearest instructions, and see if you can make a DNA helix (spiral ladder).

  www.wikihow.com/Make-a-Model-of-DNA-Using-Common-Materials

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www.youtube.com/watch?v=Knc_CSrZkcU

www.youtube.com/watch?v=GJRH0pX8d_A



The pattern of …

Talk for thought

- Which part of your body, that the author mentions, needs the most instructions? Why do you think this is?
- Looking at your class, how could you classify the different hair types?
- What does Nicola Davies mean, when she writes: *'when you were just a dot'* ?
- What is a microscope?
- Try and explain, in your own words to a partner, what you have learned on these two pages.

Number crunch

- Create bar charts, one showing hair types, and the other eye colours in your class. Don't forget to give the graph a title and label each axis.
- Devise some questions that you could ask each other, using the information on the bar charts.
- If 20,000 genes measures about 2 metres of DNA, how many genes would you find in 1 centimetre?



Half of your …

Illustration conversation

- What similarities and differences can you see between the different family members in the illustration?
- Why do you think the artist chose a picnic to illustrate the written information? What other choices might Emily Sutton have made?

Talk for thought

- Think about the different members in your family: are there any strong resemblances between any of them?

Create

- Make a diagram, showing the different nose shapes, eye colour and hair colour and texture for everyone in your family. What do you notice?



By studying how …

Illustration conversation

- Why do you think the artist chose a train station to illustrate the written information?
- Pick out any characters that you recognize.
- Point out any characters in the picture who have similarities.

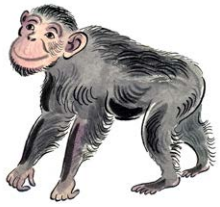
Talk for thought

- DNA samples are used by the police. Why do you think this is?

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Create

- Decide on a setting where there are lots of people and create your own drawing. Plan it so that there are people with similarities and others who are different.
- See if you can spot the similarities and differences in each other's pictures. How could you group the different people?



Animals and plants …

Talk for thought

- What similarities and differences can you see between humans and chimpanzees?
- Look at this website to see if you came up with same ideas:

  www.janegoodall.ca/our-stories/10-ways/

Investigate

- Find out more about Jane Goodall.

  Some of her quotes are worth discussing; what do you think they tell you about her character?

  'Every individual matters. Every individual has a role to play. Every individual makes a difference.'

  'The least I can do is speak out for those who cannot speak for themselves.'

  'The greatest danger to our future is apathy.'

5-minute challenge

- Make a list of as many different living things as you can that exist on land, river, sea, air. Share your lists.
- Which living things on your list do you think may share a similar genetic code?



But we share …

Illustration conversation

- What is the first thing you notice when looking at this page?
- Which creatures and plants can you name? How do you think the ones the illustrator has chosen could be grouped?

Talk for thought

- Why do you think it is important that we understand that *'we are all part of life's big family'*?



Our DNA connects

Illustration conversation

- Where do you think the children are?
- What can they see around them?

Talk for thought

- Why do you think it is important that we study things from long ago?

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Investigation

- Find out three interesting facts about something that existed long ago.
- Decide how to present these facts in the most interesting way possible to your class.



Because all life …

Talk for thought

- What language is the author talking about?
- Why do you think the idea of all living things having one language is important?

Create

- Write a thought bubble for the girl in the illustration.



Afterward: How Did You Grow

Talk for thought

- How has your body changed in the last year:
  - Are you taller?
  - Has your hair grown?
  - Have your nails grown?
- What different movements, controlled by muscle cells, do you make?
- What sort of messages do you think nerve cells carry?
- Why is thinking important?
- What happens when your skin cells are damaged? Has your body repaired itself at all?
- Why does every part of your body need oxygen?
- How does all this information make you feel about your own body and all living things?

Create

- Make your own diagram showing cell division, or mitosis. Look at the number pattern that emerges.

Investigate

- Find out what DNA stands for. How many syllables does it have?
- Find out about the scientists who received the Nobel Prize for Medicine in 1962 for their part in discovering DNA.
- Find out about Rosalind Franklin, who also played an important part in the discovery.

Create and celebrate

- Have fun writing and illustrating an alphabet of life, by choosing different living things and creating an interesting rhythmic, and possibly alliterative, sentence for each one.

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E.g

After dark, the aardvark ambles …

…..

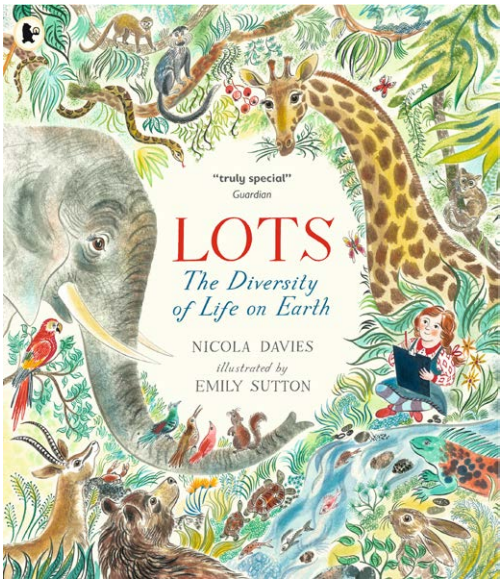
……

Zebras zig-zagging with zest.

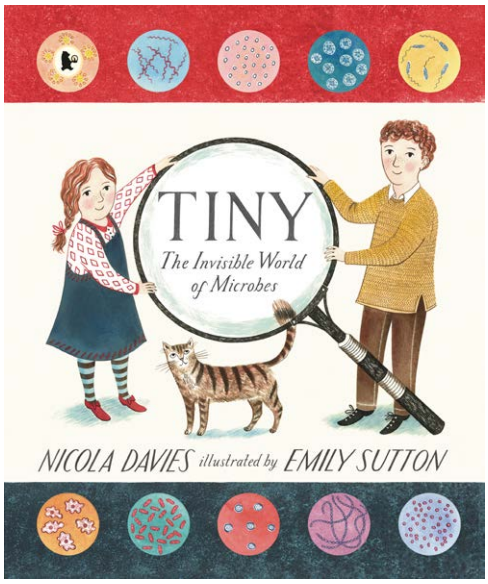
Final thoughts

- Discuss what you have learned from reading this book.
    - What did you find out that particularly interested you?
    - What did you find puzzling?
    - What questions has it triggered in your mind?

Also by Nicola Davies and illustrated by Emily Sutton



Lots: The Diversity of Life on Earth
9781406378894 • Paperback • £7.99
For readers aged 5 +



Tiny: The Invisible World of Microbes
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