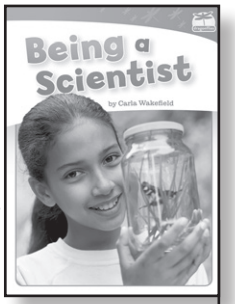
Being a Scientist
Anchor Books

by Carla Wakefield



The *Being a Scientist* anchor books are written at three levels – emergent, early, and fluent – to enable differentiated instruction. Each anchor book has the same images but the text becomes progressively more challenging and appropriate at each level. This allows the students to have access to core information, regardless of their reading level.

The anchor books "front load" the vocabulary and introduce the "big ideas" that are expanded on in the topic books, as seen below.

Big Ideas for *Being a Scientist*	Scientists study plants and animals.	Scientists study Earth and space.	Scientists study what things are made from and how they change.	Scientists study how things work.
Emergent Topic Books	*Where Do Animals Live?*	*Up in Space*	*What Is It Made From?*	*How Does It Move?*
Early Topic Books	*Welcome to the Desert*	*Our Solar System by Martin*	*Making Glass*	*Machines That Move*
Fluent Topic Books	*Fantastic Dragonflies*	*Stars*	*From Tree to Paper*	*Let's Build a Bike*

Use the *Being a Scientist* anchor books to:

- introduce the big ideas and discuss key vocabulary during the whole-class introduction
- take guided reading lessons at three levels – emergent, early, and fluent
- lead into the associated topic books, where the students can read more about the big ideas that the anchor books introduce.

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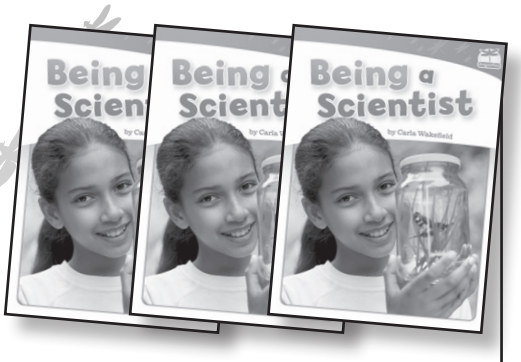


Whole-class Introduction

A whole-class introduction to this anchor book enables all students, regardless of their reading ability, to discuss core content. It allows them to develop an understanding of the big ideas and vocabulary in the unit.

Anchor words

Emergent
animals, experiments, live, made, moon, move, questions, scientists, space, stars

Early
animals, change, data, discover, Earth, experiments, graphs, habitat, machines, made, materials, move, parts, planets, plants, questions, scientists, solar system, space, stars, tools, work

Fluent
animals, change, compare, data, discover, Earth, evidence, experiments, features, forces, graphs, habitat, liquid, machine, materials, move, parts, planets, plants, questions, record, rules, scientists, solar system, solid, space, stars, state, survive, tools, universe, work

Introductory activity

- Showing students artefacts related to the topic can help to spark their interest.
- Role-play and discussion prepares students by promoting conversation, questions, and speculation.

The teacher comes into the classroom wearing a lab coat and carrying a microscope, some test tubes, a magnifying glass, a notepad, and a pencil.

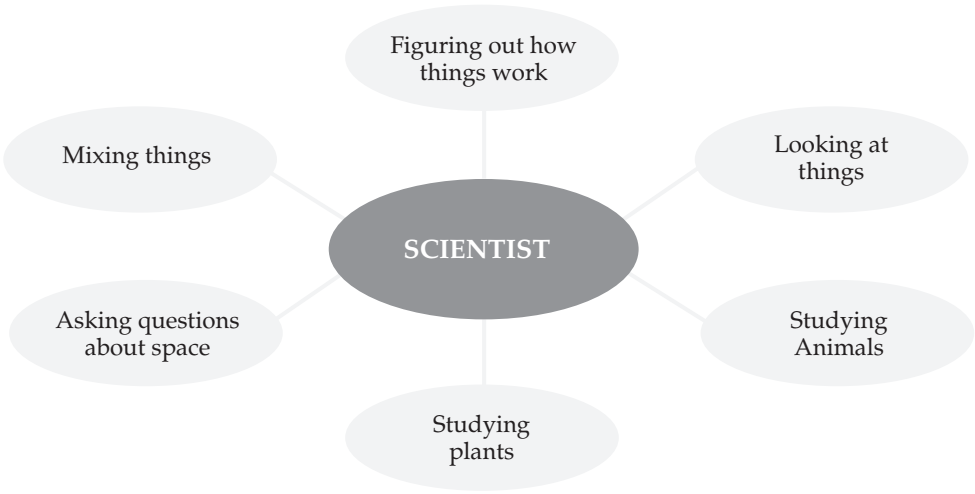
Sample outline of a possible script:
Thank you for inviting me to visit the class.
Do you know who I am?
Do you know what I do?
What questions you would like to ask about my job?
(Scaffold language if the students aren't forthcoming.)

Elicit information such as:
- I am a scientist.
- I am very curious about things in the world.
- I like to look at things carefully.
- I like to record what I see.

Visual walk-through

Identify which students will be using emergent, early, or fluent anchor books. Hand out the books. Proceed through the books, page by page, with the whole class. At this point, the students will not be reading the text. They will be responding to the **same images** to share and develop their vocabulary and to become familiar with the big ideas about being a scientist.

Use the visuals in the anchor books to promote discussion and develop a web of the big ideas.
- Record the students' words, ideas, and questions as they respond to the visual content of the books.
- Take opportunities to discuss and record the **big ideas** and the **anchor words** as they occur.
- Encourage the students to **make connections** with their own knowledge and experiences.



Attributes on the web could be:

- Looking at things
  - *Many of the photos show scientists looking at things. Why do you think the scientists are looking at things so closely?*
  - List the things the scientists are looking at.
  - *Describe a time when you looked at something very carefully to understand more about it*. (Use your knowledge of the students to prompt them with specific examples such as a snail study or experiments with floating and sinking objects.)

- Studying animals
  - *What animal would you want for a pet?*
  - *What would it need?*
  - *What kind of home would you need to give it?*
  - *What would its habitat be?*

- Studying plants
  - *What plants are growing around your house?*
  - *What do they need to survive?*

- Asking questions about space
  - *When you look up at the stars, what do you wonder about? What questions do you have?*

- Mixing things
  - Tell the students that when you mix things, it is fun to see how they change.
  - *What have you helped bake or cook at home or watched your mum or dad make?*
  - *Does an egg look like a cake? Milk? Sugar? Flour? All these materials are mixed together to make something quite different.*

- Figuring out how things work
  - *What kind of moving things can you build with your lego/meccano set? What are some of the parts you use?* (wheels)

Display the completed web. It can be referred to throughout the unit and reviewed at the conclusion of the unit.

Questions

List the students' questions on a separate chart and return to the list over the following days. Discuss any answers the students have found and add any further questions.

Conclusion

Explain to the students that they will be reading more about scientists.

- Tell them that they will be:
  - able to add to the charts as they find out more about how scientists work.
  - working in small groups to read their own book about being a scientist.

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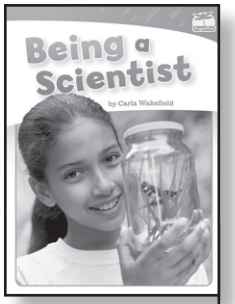

Guided Reading Lesson – Fluent

Overview

This lesson builds on the whole-class introduction and expands on the Being a Scientist unit for fluent readers. It looks at what scientists do and the areas they study: plants and animals, space, what things are made from and how they change, and how things work.

Content standards

This book supports the following content standards:

- NS.K-4.1 Science as inquiry
- NS.K-4.2 Physical science
- NS.K-4.3 Life science
- NS.K-4.4 Earth and space science
- NS.K-4.5 Science and technology

Suggested purposes

This book supports the following **comprehension strategies:**

- making connections between prior knowledge and the text MC
- identifying the main ideas MI
- asking questions. AQ

It supports the following **non-fiction strategies:**

- reading and using graphs
- using photographs to support the meaning of the text.

Key vocabulary

The key vocabulary that is focused on includes:

- Anchor words – *animals, change, data, discover, Earth, evidence, experiments, features, forces, graphs, habitat, liquid, machine, materials, move, parts, planets, plants, questions, record, rules, scientists, solar system, solid, space, stars, state, survive, tools, universe, work*
- High-frequency words – *another, find, into, live, look, many, some, their, use, want, work*

Features of the text

- Non-fiction features
  - introduction of science concepts and anchor words associated with the topic
  - general information about scientists (pages 2 to 7), followed by four double-page spreads about specific kinds of scientists
  - personal statement that ends the book
  - preview question on the back cover
  - photographs with text that supports and illustrates the concepts
  - captioned photographs
  - graph
- Word study
  - silent "c" after "s"
  - initial consonant blends – "dr-," "gr-", "pl-", "pr-", "sh-", "sp-"
  - digraphs – "ch", "st", "th"

Note: There is a lot of information in this book. You may like to cover it in two or more sessions. The first session could cover pages 2 to 7. You might take up to four sessions to cover the following four double-page spreads before concluding with page 16.

Setting the scene

If you have introduced the unit using the whole-class lesson, review the discussion and the charts that you made. If you haven't used this, choose ideas from the Whole-class Introduction and encourage the students to make connections with their knowledge and experiences. Briefly introduce the big ideas, using the associated anchor words. List the anchor words, saying each one aloud, and briefly explain any unfamiliar words.

ELL support

ELL students learn best when they experience concepts first hand. It's important to plan opportunities for hands-on, experiential learning. As students experience the content, they will comprehend and internalise the language more quickly.

Introducing the book

Front cover – Show the cover to the students. Read the title and the name of the author. *What do you think the girl is doing? Why is she doing that? What do you know about scientists and science? What area of science do you like? What books about science and scientists have you read? What TV shows about science and scientists have you watched? Are scientists important? Do we need scientists? Why?* (Point out that the photo on the front cover is of a young girl and that children can be scientists too.) List the students' ideas about what a scientist does on a chart paper.

Back cover – Read aloud the preview question. Discuss the students' predictions.

Title page – Have the students reread the title. Draw their attention to the word "scientist". Explain the silent "c" after "s". Talk about how the word can be sounded out phonetically and have the students practise the word a few times. Break it into syllables and write it on the board (sci-en-tist).

The first reading

MI **Pages 2 and 3** – **(Main idea)** Scientist are learning about the world. *What are the people in these photographs doing?* MC **(Making connections)** Encourage the students to talk about their prior knowledge. *Why do you think they are doing these things? What questions might the scientists be asking? What do you think the author means when she says "they try to find rules for the way things work". What kinds of rules?*

Pages 4 and 5 – *What do you know about experiments?* MC *What is an experiment?* **(Making connections)** *Have you ever done an experiment?* Explain that an experiment can be as simple as putting your toes into a swimming pool to check the temperature. *What kinds of experiments do you think the scientists are doing? What "special tools" are they using? What tools have you used to do an experiment?*

Pages 6 and 7 – *What is "data"? What clues does the text give you? Can you guess?* If the students are unable to define the word, tell them that data means information. *What kind of information is the scientist collecting? What* AQ *does the graph tell you?* **(Asking questions)** *What questions would you have after reading this graph?* Help the students make connections with graphs they have made or used, such as during math.

MI **Pages 8 and 9** – **(Main idea)** Scientist study animals. Talk about the scientist in the photograph and where he might be. *What is he holding? What do you think he wants to know about snakes? What does the author mean by "living things"? What is a habitat?* Explain that a habitat is a place where an animal or a plant lives. *Why do we need to know about the habitats of living things?* **(Making connections)** *What is your habitat? What is special about your habitat? What is special about the snake's habitat?* MC Explain that the things that are special are the "features that help living things survive." Look at the photo and caption on page 9. *What kind of plant is this? What is its habitat? How do you think it is able to live here? How have you learned about these things? Where else might you find out about them?* (libraries, the Internet, TV shows, movies) *What do you think would happen if you put a bear in the desert?*

Pages 10 and 11 – Discuss any words the students find difficult. Tell them how to pronounce the word and discuss its meaning. Help them create a visual image for each word to help them remember it. Put these words on the word wall for reference.
(Making connections) *What do you know about the moon* MC *and the stars? How do you know that? Have you ever looked at the stars through a telescope or binoculars? What was it like?* **(Main idea)** *What do you think scientists are trying to* MI *discover about the solar system and the universe?*

Pages 12 and 13 – *Where do you think these scientists are? What are they investigating?* Explain that they are studying the ice and looking at how it changes. *What*

other ways can things change? Talk about things freezing, melting, hardening, setting, softening, dissolving, and how these things happen. *What happens when you boil water?* (changes into steam) *Why do you think the scientists want to find out about changes in the ice?* Make a list of three other materials that change. *How do they change? What do they change into?* (solid to liquid)

Pages 14 and 15 – If possible, bring a bicycle into the classroom. **(Making connections)** Ask the students to list the machines they know. *What makes these machines work? What features do these machines have in common? What things are different about them?* Clarify anything the students don't understand. You may need to explain the concept of "forces". ("Forces" means the power to make things work.) *How do you think understanding the "forces" that make things move helps scientists? What are the metal rings on page 14? What might they do? Have you ever seen them before? Where?* Talk about the bicycle on page 15. *How does a bike work? What are the different things that help it move?* (pedals, cogs, chain, legs and feet)

Page 16 – *Would you like to be a scientist? Why/why not?* **(Asking questions)** *What would you like to discover?* Prompt the students to use how, why, when, what, and where questions about what they would like to discover. **(Main idea)** How do scientists help us to understand our world? Revisit the chart of the students' predictions about scientists from the beginning of the lesson.

Vocabulary activity

Focus word: evidence (page 5)

1. Turn to page 5. Read: *They look for evidence to prove their ideas.*
2. Ask the students to say "evidence" with you, clapping once for each syllable (ev-i-dence). Repeat until the students are familiar with the shape and sound of the word.
3. Explain that evidence shows whether something is true. It can help to prove that an idea or theory is right. Remind the students that one reason that scientists do experiments: to find evidence to prove their ideas.
4. Can you think of some other ways we might use the word "evidence"? (information that shows a person is guilty of a crime; spoken or written statements from witnesses; medical evidence; the term "in evidence", meaning present or apparent).
5. As an example, perform a simple experiment such as stirring jelly crystals into boiling water. My idea is: I think that the crystals will dissolve in the boiling water. Do the experiment and show that the crystals have dissolved. This is evidence that my idea is true. What do you think will happen if we stir jelly crystals into cold water? Ask the students for their ideas, then perform the experiment. Ask them to use "evidence" in a sentence to explain the experiment.
6. *What is the word we have been learning that means something that shows that an idea or theory is true? Say "evidence" with me.*

ELL activity

Language objective: True/false Statements – building listening skills and assessing aural comprehension of a familiar text

- Tell the students that they're going to develop true or false statements about the book. *What does it mean if a statement is true? What does it mean if a statement is false? What's another word for true? For false?* (right/wrong)
- Model an example of a true or false statement. *Scientists only study Earth and space. True or false?* Ask a volunteer to share a true or false statement with the group.
- Have the students work in pairs or small groups to develop true and false statements they can ask one another about the book. They can record each statement on a card. As they are developing their statements, check for comprehension and word and language usage. Collect the students' cards.
- Reread the book. Mix up the true and false statement cards and redistribute them to the students.
- Ask them to read their card to the group. If the students think the statement is true, they can put their thumbs up. If they think the statement is false, they can put their thumbs down. The student can tell the group if their statement is true or false.
- If the students disagree on an answer, check in the book to support their comprehension and concept development. If they disagree on the answer to an inference statement, support their understandings with a group discussion.

Ideas for revisiting the text

1. Review and check

- Review the concepts and vocabulary in the book, identifying any that may need further discussion or explanation.
- Identify and discuss the main idea in each section of the book.

- Help the students to reach a conclusion about being a scientist. For example, scientists are people who study things, and there are many different kinds of scientists.

2. Stop and learn

a. Decoding/word attack activity

BLM – Sorting words into groups
The students can sort the anchor words into groups. They can give each group a title. They can then discuss their work with a partner and explain their reasons for the different groups. Check the students' understanding of the anchor words and discuss any confusion.

b. Comprehension activity

BLM – Asking questions
The students can choose a scientist that they'd like to find out more about. They can pretend that they are a reporter who is going to interview the scientist. They can write a list of questions, then interview a partner.

c. Writing activities

Tell the students that scientists keep a record of what they do and see. They write the date, the time, and a description of what happened. Model an example. *I am a scientist looking at the moon.* Write on the board, for example:

18 January 2013

4:00 p.m.	I went to the hills behind my house to get a good view of the sky.
5:00 p.m.	The sky is getting dark.
6:00 p.m.	The sky is dark.
6:15 p.m.	The moon is coming up behind the hill.
6:30 p.m.	I can see the whole moon. It is full and very bright.

Ask the students to choose one of the scientific activities they have read about and pretend they are a scientist doing that activity. Organise a chart to record their observations/actions. Include the date and time if relevant.

3. Suggestions for further activities

- Write a report or news article based on the interview with the scientist.
- Design a simple machine.
- Create a diorama of an animal in habitat.

Connecting with the topic books

The big ideas and anchor words in the anchor book are repeated and expanded on in the topic books. Select from these fluent books from the science unit to use in further guided reading lessons – *Fantastic Dragonflies*, *Stars*, *From Tree to Paper*, and *Let's Build a Bike*

Unit Activities

These activities can be started after the introduction of the anchor book and throughout the reading of the topic books.

1. Learning centre

Include materials and activities so the students can become actively involved in building their understandings of the big ideas.
For example:

- A wind-up clock so the students can see how it works
- Water containers, eye droppers, water, food colouring
- Cornflour and water mixture to see how things change from solid to liquid
  - Mix 4 cups of cornflour with 1 cup of water. Some food colouring could be added.
- A globe
- Grow a bean plant – have paper and pencils available to record its progress
- A magnifying glass, binoculars, or a microscope to observe small objects
- An animal such as a pet mouse (Research its habitat. How can you make its home like its home in the wild? It doesn't have much space. Its habitat is small. How can you make it more interesting?)
- Lego, meccano, and other building sets.

2. Writing

Gives further practice with the anchor words: scientist, work, questions

Tell the students that they will be writing about a day in the life of a scientist. Have them visualise themselves as a scientist before writing. Ask the following questions to help them picture themselves as scientists.

- *What are you studying?*
- *Where are you? Where do you work?*
- *What are you curious about? What questions do you have?*
- *What are you wearing?*
- *Has anything exciting happened today?*

Ask the students to draw a picture and write a story about being a scientist for a day.

- **Emergent** – for the students at this level, the drawing will be the important part. Scribe their story if they need some help or get one of the students to buddy.
- **Early** – the students at this level should be able to write up to three sentences.
- **Fluent** – the students at this level should be able to develop a story of at least five sentences.

3. Graphing

Gives further practice with the anchor words: data, record, graph

- Have the students brainstorm questions that they would like to ask their classmates about bicycles.

  What colour is your bike?
  How long have you had your bike?
  Who gave it to you?

- Ask the students to survey their classmates. Record the information on a graph.

4. Looking at change

Gives further practice with the anchor words: materials, tools

- Make a bowl of jelly. Describe the process as you do each step.

What materials and tools am I using to make the jelly?

5. Animals – habitat

Gives further practice with the anchor words: animal, plants, habitat.

- Ask the students to choose their favourite animal. Have them visualise this animal.

  What does it look like?
  What is it doing?
  Does it feel safe?
  Where does it live?
  What kind of plants are growing nearby?
  Is there any water?
  What else do you see?
  What is its habitat?

- Ask the students to draw the animal in its habitat.
- They can then write about the animal and its habitat and an adventure it might be having.

6. Habitat lap sit

Explain that an animal's habitat includes food, water, shelter, and space for it to live.

- Ask the students to form a circle and hold hands, facing the centre.
- Walk around the circle and name the first student an animal, the next food, then water, then shelter, and then space. Repeat around the circle.

- Tell them that they are all holding hands because they all need to be there for the animal to live.
- Lap sit
  - Ask the students to drop their hands and close in so they are standing shoulder to shoulder.
  - Ask them to turn right so they are looking at the back of the head of the student in front of them. At the same time, they can take one step towards the centre of the circle. (They need to be standing close together.)
  - Have the students place their hands on the shoulders of the person in front of them.
  - Explain that you will count to three, and on three, the students are to sit down … on the knees of the person behind them, keeping their own knees together to support the person in front.
  - Explain that food, water, shelter, and space are all needed for the animal to live and survive in its habitat.
  - Tell the students that there is no water because it hasn't rained for a long time. The students who are water should move out the circle. Watch the circle collapse.

7. Game: Planet Toss

You can play this game on the floor.
You will need: 8 containers, 8 objects per student (you could use bean bags or something similar)

- Label each container with the name of one of the planets.
- Place the containers (planets) on the floor in the correct position in relation to their orbit around the sun.
- Each student can then place themselves in the position of the sun. They have to try and throw an object into each container (planet).
- The farther away containers have more points. The student who gets the most points wins.

8. Art

Gives further practice with the anchor words – stars, space

- Make a mobile of paper stars. (have instructions ready)
- Stars in space – making a crayon resist

  You will need: crayons, black paint, paper
  - Draw stars or a constellation using bright, coloured crayons. Press hard.
  - Paint over with black paint. The paint won't stick to the crayon parts so the colourful picture will shine through.