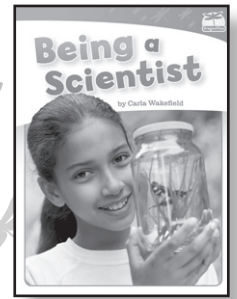


Being a Scientist Anchor Books

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 <i>Being a Scientist</i>	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	<i>Where Do Animals Live?</i>	<i>Up in Space</i>	<i>What Is It Made From?</i>	<i>How Does It Move?</i>
Early Topic Books	<i>Welcome to the Desert</i>	<i>Our Solar System by Martin</i>	<i>Making Glass</i>	<i>Machines That Move</i>
Fluent Topic Books	<i>Fantastic Dragonflies</i>	<i>Stars</i>	<i>From Tree to Paper</i>	<i>Let's Build a Bike</i>

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 would you 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.

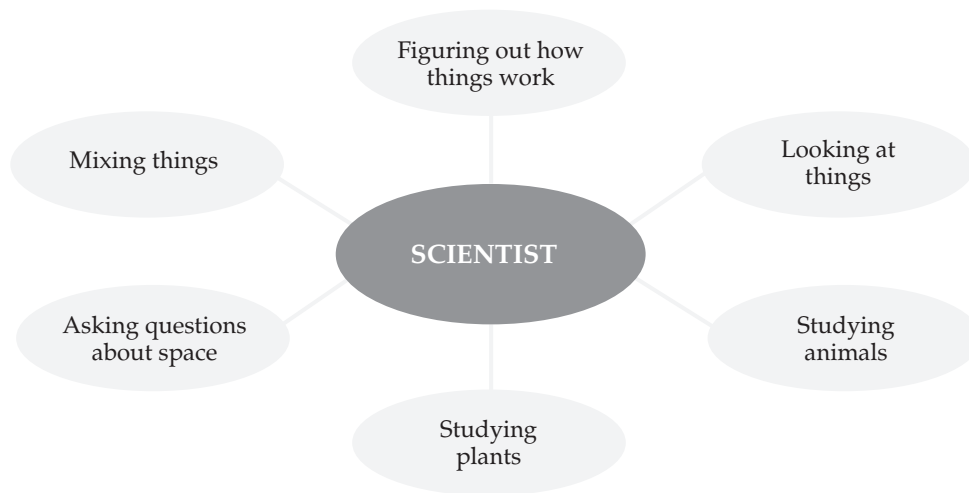
Visual walk-through

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.

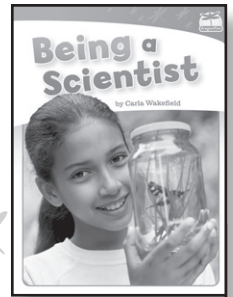
Conclusion

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.
- reading and using graphs

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Guided Reading Lesson – Early

Overview

This lesson builds on the whole-class introduction and expands on the Being a Scientist unit for early 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 
- identifying the main ideas 
- asking questions. 

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, experiments, graphs, habitat, machines, made, materials, move, parts, planets, plants, questions, scientists, solar system, space, stars, tools, work*
- High-frequency words – *down, from, has, have, how, make, one, our, some, them, they, us, what, when, your*

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 close text matches to support and illustrate concepts
 - captioned photographs
 - graph
- Word study:
 - initial consonant blends – “qu-”, “st-”, “pl-”, “sp-”, “dr-”
 - digraph sounds – “ch”, “th”
 - multisyllabic words – *understand, experiments, discover*
 - silent “c” after “s”

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 Introduction, review the discussion and the charts that you made. If you haven't used this, choose ideas from the 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

Create multiple opportunities for ELL students to interact with other students. Make sure they work with a range of students when they're in literacy or content groups. Working with different partners will expose them to different experiences. ELL students need as many language experiences as possible.

Introducing the book

Front cover

Show the cover to the students. Read aloud the title and name of the author, then discuss the photograph. **(Making connections)** *What do you think this person is doing? Why do you think that? What clues tell you? Where have you seen people doing this before? This is a scientist. A scientist is a person who ...* Prompt the students to make connections with books or TV programs, as well as their own experiences. *What kinds of things would she do in her job? Why do you think we need scientists?* (Point out that the photo is of a young girl and that children can be scientists too.) List the students' ideas on chart paper.

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

Title page – Point to the word “scientist”. Tell the students that the “c” behind the “s” is silent. Have the students follow the letters with their fingers as they read the word slowly. Say the word together several times.

The first reading

MI **Pages 2 and 3** – **(Main idea)** *Turn to a partner and talk about the photographs. What do the photographs show?*

MC *What are the people doing?* **(Making connections)** Have the students share their ideas with the group, making connections with their prior experience. Look at page 3. *What questions do you think this scientist is asking?*

Pages 4 and 5 – *What are the scientists doing? Why do you think they are doing that?* (Anchor word) *What is an “experiment”?* (Explain that an experiment can be as simple as trying different kinds of toothpaste to find out the best one.) *Why do scientists do experiments?*

MC **(Making connections)** *Have you ever done an experiment? What? How? Why?* Bring in a magnifying glass and look closely at something. Explain that the microscope in the photo is like a magnifying glass.

Pages 6 and 7 – Point to the word “data” and help the students decode it. *What sound does the first “a” have? What sound does the second “a” have?* Tell them that data means information. **(Making connections)**

MC *Scientists collect information.* Help the students to make connections between the graph on page 7 and any graphs they have used or seen themselves, such as in maths. Ask them to make connections between the two pages with a partner. *What data is the scientist collecting? How many caterpillars did he find? How many worms?*

Pages 8 and 9 – Talk about where the scientist might be. *What has he found? What is he learning about where snakes live?* Explain that the different places that plants and animals live are called habitats. *Our habitat is the city (or town, rural area). What is special about our habitat? What is special about the snake's habitat? Why might we need to know about the different habitats of plants and animals? What might happen if you tried to grow a cactus in a wet swamp?* Encourage the students to share what they know about different habitats and the plants and animals that live in them. **(Making connections)** *How do you think we have learned about these things?* Discuss the books, TV programs, and other ways that we learn about the information found by scientists.

Pages 10 and 11 – Help the students to pronounce any words they had difficulty with and talk about their meanings. Add these words to the word wall.

(Making connections) *What have you noticed when you have looked at the stars at night? Why might scientists look at the stars and planets? What do you know about our solar system?* Allow time for the students to share their prior knowledge and make connections with the information in the text.

Pages 12 and 13 – Look at page 12. *Where are these scientists? What do you think they are doing?* Explain that they are studying the ice and how it changes. *How might ice change?* Ask the students to turn to a partner

and talk about why scientists might want to study ice. *What happens when an ice cream or a frozen drink melts?*

MC (Making connections) *What other materials change?*

Prompt the students to recall examples of materials changing such as water boiling or glue sticking, setting, and going hard. *What happens when you stir boiling water into a packet of jelly crystals? What happens when the jelly cools?* Talk about the ways that scientists can help us, for example, by collecting data so we know when the ice on a lake will melt or by helping to make useful things, such as glue that sticks well. (Making connections)

Pages 14 and 15 – Look at the bicycle on page 15. (If possible, bring a bicycle into the classroom.) *How does a bike move?* Encourage the students to understand the concept of “machines” (things that have parts that work together to do something). *What machines do you know? How do those machines move? What makes them work?* Examine the photograph on page 14. Explain that these metal rings are called cogs. Discuss how the parts of a bicycle have cogs and that your legs and feet make the chain turn the cogs. (Making connections) *How do your legs and feet make a bicycle move?* The students can read these pages independently.

Page 16 – Read this page together and discuss the statements. *Would you like to be a scientist? Why/why not? If you were a scientist, what kinds of things would you like to study? What would you want to find out about?* Revisit the chart of the students’ predictions and ideas from the beginning of the lesson.

Vocabulary activity

Focus word: experiments

1. Reread page 4. *Scientists do experiments.*
2. Say “experiments” with me.
3. Explain that an experiment is like a test. *It’s a way of finding something out.* Talk about some other (non-scientific) experiments, for example, putting your toes into a swimming pool to check the temperature.
4. Tell the students that you are going to describe some situations and you want them to tell you whether it is an experiment. *I mixed red and yellow paints to see what colour they made. Is that an “experiment”? Why?*
5. Ask the students to discuss their answers with a partner, using the format “It is an experiment because ...” or “It is not an experiment because ...” Ask some volunteers to share their thinking. Repeat the same process with these examples:
 - a. *The train pulled into the station, and some passengers got on. Is that “an experiment” or “not an experiment”? Why?*

b. *We wanted to know what pet food our cat liked. We gave her three different kinds to see which one she liked best. Is that “an experiment” or “not an experiment”? Why?*

6. *What is the word we’ve been learning that means a way of finding something out? Say “experiments” with me.*

ELL activity

Language objective: Sentence/picture matching

Provide copies of the book with key sentences covered up. Cover the sentences on pages 4, 7, 8, 10, and 14. Create the following sentence strips: *Scientists do experiments. Scientists write things down. Scientists look at where plants and animals live. Scientists look at the moon and stars. Scientists look at how things move.*

- Read the book to the students. Ask them to listen carefully and think about the different things the scientists are doing.
- Give each student a copy of the book with the words covered up. Explain that they’ll be able to see the pictures but not the words. Ask them to match the sentence strips with the photos.
- Read each sentence strip with the students. Then read the book using a shared reading approach. Stop at page 4 and ask the students which sentence best matches the picture. Read the sentence together.
- Keep reading, then stop at page 7 and repeat the activity.
- Keep reading, then stop at page 8. *What is happening? What is the scientist doing? Which sentence best matches this picture?* Match the sentence strip to page 8 and read the sentence together. Continue the activity on page 10.
- Read pages 12 and 13. Stop at page 13 to let the students discuss what they see. Match the last sentence strip to page 14 and read the sentence together. Read page 16 and repeat the activity.
- For review, you could reread the book using the sentence strips or reread it in its original format.

Ideas for revisiting the text

1. Review and check

- Review the concepts and vocabulary in the book with the students, 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 scientist.

2. Stop and learn

a. Decoding/word attack activity

BLM – Breaking words into syllables

If the students haven't worked with syllables before, spend a few minutes practising clapping the syllables as you say them aloud together. Write some of these words on the board and show how to mark the chunks by drawing lines between them.

b. Comprehension activity

BLM – Asking questions

The students can match the pairs of sentences to find out why scientists study different things. They can then write what kind of scientist they would like to be.

c. Writing activity

- Choose a simple experiment from the list in the vocabulary activity and carry it out with the students. Talk to them about what you are doing and what is happening. Ask questions about what they think you should be doing and what might happen, then discuss the outcome.
- Have the students record what happened. They could draw a series of pictures and write a sentence to go with each one.

3. Suggestions for further activities

- Have the students choose a kind of scientist they would like to know more about. They can use the library or the Internet to find information and report back to the class.
- Visit a science museum to explore some of the areas of science in the book.
- The students can choose one aspect of science and carry out a simple experiment, such as a study of birds that visit a tree in their garden or opening a stapler to see how it works.

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 early books from the science unit to use in further guided reading lessons – *Welcome to the Desert*, *Our Solar System by Martin*, *Making Glass*, and *Machines that Move*.

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, habitats

- 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 in 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 to throw an object into each container (planet).
- The further 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 brightly 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.