

The Biggest Snake in History

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School Journal
Level 3, September 2011
Year 6



Overview

Imagine a snake longer than a bus and big enough to swallow a cow. That was *Titanoboa*, one of the most ferocious predators on Earth some sixty million years ago – five million years after the dinosaurs died out.

This engaging article begins with a timeline that shows *Titanoboa*'s place in evolution. It goes on to outline what the snake ate, where it lived, and what its remains tell us about prehistoric times. Underlying the text is the idea that everything

scientists “know” about *Titanoboa* is a “best guess” based on remaining evidence.

The text is organised into clear sections, with subheadings and topic sentences that help to communicate the main points. Familiar comparisons clarify information, and the technical language is well supported in the text and illustrations.

Texts related by theme “On the Dinosaur Trail” SJ 4.1.11

Text characteristics from the year 6 reading standard

a significant amount of vocabulary that is unfamiliar to the students (including academic and content-specific words and phrases), which is generally explained in the text by words or illustrations

sentences that vary in length and in structure (for example, sentences that begin in different ways and different kinds of complex sentences with a number of subordinate clauses)

Fossilised vertebra of *Titanoboa*

Vertebra of anaconda

How big is big?

The biggest snake alive today is the anaconda. Anacondas can weigh up to 250 kilograms, and they can grow to a length of 9 metres or more.

To find out how big *Titanoboa* would have been, scientists compared a vertebra* from an anaconda with a fossilised vertebra from *Titanoboa*. The scientists worked out that *Titanoboa* was about 13 metres long and weighed around 1100 kilograms. That means it would have been longer than the average bus. At its largest point, it would have reached to the waist of an adult human being.

26

*one of the bones forming an animal's backbone

Where Did *Titanoboa* Live?

Sixty million years ago, the area where *Titanoboa*'s fossilised bones were found would have been covered with thick rainforest. *Titanoboa* could move around both on land and in water, although it spent most of its time in the water, which helped to support its huge weight.

Colombia, where *Titanoboa*'s bones were found, still has many species of snakes, including anacondas, but none are as large as *Titanoboa*.

What Does *Titanoboa* Tell Us about Climate Change?

Snakes are cold-blooded creatures, and they need heat to give them energy and help them to grow. The largest snakes are found in the warmest parts of the world. There are no snakes in places such as Antarctica, where the ground stays frozen all year round.

Because of *Titanoboa*'s huge size, scientists now believe that sixty million years ago, the tropical parts of the world (such as present-day Colombia) were about 5 degrees Celsius warmer than they are today.

Are You Ophiophobic?

Many people are frightened of snakes. The word for a fear of snakes is “ophidiophobia”.

If you suffer from ophiophobia, you should be grateful that you live in New Zealand because it is one of the very few places in the world that are entirely free of snakes. And you should be very grateful that you weren't alive sixty million years ago, when *Titanoboa* roamed the Earth!

illustrations by Bridget Monro

27

illustrations, photographs, text boxes, diagrams, maps, charts, and graphs that clarify or extend the text and may require some interpretation

some information that is irrelevant to the identified purpose for reading (that is, some competing information), which students need to identify and reject as they integrate pieces of information in order to answer questions

abstract ideas, in greater numbers than in texts at earlier levels, accompanied by concrete examples in the text that help support the students' understanding

Reading standard: by the end of year 6

Possible curriculum contexts

SCIENCE (Living World)

LEVEL 3 – Evolution: Explore how the groups of living things we have in the world have changed over long periods of time and appreciate that some living things in New Zealand are quite different from living things in other areas of the world.

ENGLISH (Reading)

LEVEL 3 – Ideas: Show a developing understanding of ideas within, across, and beyond texts.

ENGLISH (Writing)

LEVEL 3 – Ideas: Select, form, and communicate ideas on a range of topics.

Possible reading purposes

- To find out how the biggest snake in history evolved and lived
- To learn about the evolution of prehistoric life and make comparisons with the world today
- To find out how scientists know what they know about *Titanoboa* and how they know what the snake's remains tell us about prehistoric life.

See [Instructional focus – Reading](#) for illustrations of some of these reading purposes.

Possible writing purposes

- To summarise the main ideas about *Titanoboa*
- To practise using accurate wording to express approximations
- To practise using comparisons or examples to explain scientific or mathematical ideas.

See [Instructional focus – Writing](#) for illustrations of some of these writing purposes.

Text and language challenges

VOCABULARY:

- The technical words (most of which have good support in the text and illustrations), for example, “fossilised”, “*Titanoboa*”, “evolved”, “Mesozoic era”, “Triassic period”, “Jurassic period”, “Cretaceous period”, “Cenozoic era”, “Palaeogene period”, “Neogene period”, “Quaternary period”, “mammals”, “predators”, “food chain”, “hominins”, “prehistoric”, “extinct”, “modern-day anaconda”, “constrictor”, “prey”, “vertebra”, “backbone”, “species”, “cold-blooded creatures”, “present-day Colombia”, “degrees Celsius”, “ophidiophobia”
- Adjectives expressing size and power – “biggest”, “fearsome”, “powerful”, “giant”, “ferocious”, “enormous”.

Possible supporting strategies

Identify new vocabulary that the students should prioritise for learning. *The English Language Learning Progressions: Introduction*, pages 39–46, has useful information about learning vocabulary. ESOL Online has some ideas for working on vocabulary at: <http://esolonline.tki.org.nz/ESOL-Online/Teacher-needs/Pedagogy/Vocabulary>.

Read the title. Have students work in pairs to brainstorm their ideas about snakes. Provide bilingual dictionaries where appropriate and have students who share the same first language work together. Ask the pairs to share their ideas and create a class mind map on snakes. Have the students look through the illustrations and think, pair, and share about what they can see and what they think the text is about. You could then brainstorm adjectives to describe snakes and dinosaurs and tell the students to look out for them when they read.

SPECIFIC KNOWLEDGE REQUIRED:

- Knowledge of dinosaurs and other prehistoric animals, snakes and other reptiles, food chains, and basic world geography (for example, where South America, Antarctica, and the tropics are)
- Understanding of evolution and the vast periods of time involved
- Familiarity with the structure and features of articles and other non-fiction texts.

Possible supporting strategies

Encourage your students to share their knowledge of dinosaurs and the time in which they lived. “What other animals lived with or after the dinosaurs?”

Before reading: To help the students conceptualise the time periods involved, visually explore the extent of dinosaur and human history in relation to the Earth's history. The Earth formed about 4600 billion years ago, so measure a line 4.6 metres (4600 millimetres) long. Each millimetre represents 1 billion years. Mark the period when dinosaurs lived (from 230 to 65 million years ago). Modern humans evolved about 250 000 years ago – that's just one four-thousandth of a millimetre! After reading, add the period when *Titanoboa* lived.

TEXT FEATURES AND STRUCTURE:

- The underlying idea that scientists can't know everything about *Titanoboa* because it existed millions of years before humans evolved, as indicated by wording such as “about”, “probably”, “around”, and “scientists now believe that”
- The comparisons with things familiar to readers, including “big enough to swallow a cow and then gulp you down for dessert”
- The comparative and superlative forms, including “the biggest”, “the most fearsome”, “the most ferocious”, “longer than”
- The footnotes and brackets that offer definitions of technical words
- Range of time frames and consequently different verb forms, for example, “discovered”, “has ever lived”, “had died out”, “is”.

Possible supporting strategies

Prompt the students to preview the illustrations and subheadings to get an idea of the content. For students who are likely to find this text challenging, you could spend some time previewing the content (and the language). Give pairs or individual students copies of the illustrations and/or the headings and ask them to make notes under each one, predicting the content, sharing their knowledge, or simply labelling the illustrations (according to their abilities). To create more genuine information sharing at the end and to make the task quicker, you could give the pairs or individuals different sections. Have all of the students share their ideas and record them as a group.

During this discussion, also note and introduce key vocabulary and record it, beginning a vocabulary list that the students add to as they read. After this discussion, you could also provide a list of key vocabulary items and ask students to find or match the definitions. Students could write definitions, find them in dictionaries, and/or match definitions that you have provided.

Instructional focus – Reading

Science (Living World, level 3 – Evolution: Explore how the groups of living things we have in the world have changed over long periods of time and appreciate that some living things in New Zealand are quite different from living things in other areas of the world.)

English (Level 3 – Ideas: Show a developing understanding of ideas within, across, and beyond texts.)

Text excerpts from “The Biggest Snake in History”

Students (what they might do)

Tyrannosaurus rex was probably the most fearsome dinosaur that ever lived. No other creature ...

But sixty-five million years ago, at the end of the Cretaceous period, the dinosaurs became extinct. After the dinosaurs had died out, the giant snake *Titanoboa* became one of the most ferocious predators on Earth.

Because it was so large, *Titanoboa* had an enormous appetite. It could easily have swallowed ...

Like the modern-day anaconda, *Titanoboa* was a constrictor. Constrictors squeeze their prey until the animal stops ...

Anacondas can eat small deer ...

To find out how big *Titanoboa* would have been, scientists compared a vertebra* from an anaconda with a fossilised vertebra from *Titanoboa*. The scientists ...

The students **ask questions** about why the first sentence says “probably”, how the dinosaurs became extinct, and whether *Titanoboa* existed alongside the dinosaurs or evolved later. They **make connections** with their prior knowledge and other parts of the text to answer these questions.

The students **make connections** within the text to work out what “top of the food chain” means and that “one of the most ferocious predators on Earth” is another way of saying this. They **integrate** all this information to **identify the main idea** of this page – that *Titanoboa* had a status similar to that of the most fearsome dinosaur before it. They **locate** and **evaluate** information from the timeline to realise that this didn’t happen immediately – 5 million years passed in between.

The students notice the language used, in response to the question of what *Titanoboa* ate, to **infer** that scientists aren’t certain. Students might **ask questions** about the text, including how scientists know that *Titanoboa* was “so large”.

They use the comparison and “modern-day” to **infer** that the anaconda is a snake that exists now. They distinguish the shift in subject in the final sentence – that is, *Titanoboa* didn’t eat deer; anacondas do (competing information).

The students use the two topic sentences to help **identify the main ideas** here – that *Titanoboa* ate very large creatures and that it crushed its prey.

The students **make connections** between the asterisk and the footnote to identify what vertebra means. They **visualise** *Titanoboa*’s size by using the comparisons in the text and the images.

They **integrate** and **evaluate** this and previous information to **identify the main idea** of the page – that *Titanoboa* is much bigger than the biggest snake today. They might **ask questions** about the size of prehistoric and modern animals in a more general sense, **making connections** with the earlier information about dinosaurs.

METACOGNITION

- How did your prior knowledge of dinosaurs help you to understand this text?
- Has the text given you a better understanding of the amount of time involved in the evolution of life? If so, what aspects helped you the most?
- What strategies did you use when you came across unfamiliar vocabulary?
- How did you pull together information across the text to find the main idea?

Teacher (possible deliberate acts of teaching)

MODEL asking questions that the text raises for you and the connections you need to make to understand it.

- Asking questions as we read can help us to find information. So when I read this, I notice that the first sentence says “probably” – I wonder why? Do you think scientists can be completely sure about the information? Why or why not?

PROMPT the students to think, pair, and share to ask questions of their own. Questions could include;

- Did *Titanoboa* evolve after the dinosaurs became extinct, or did it live with them but not die out?
- How did the dinosaurs die out?
- Remind students to use time and sequence markers to help them understand the sequence of events.

ASK QUESTIONS to check the students’ understanding.

- What does “top of the food chain” mean? What in the text supports your idea?
- What would you say the main idea of this page is? Why? Remember that the focus of the article is on *Titanoboa*, not *Tyrannosaurus rex*.

PROMPT the students to think critically about the text.

- I’ve noticed that the text doesn’t tell us exactly what *Titanoboa* ate. It says “could easily have swallowed”. Why do you think the author wrote it this way?
- I wonder whether the crocodile and giant turtle existed at the time of *Titanoboa* or whether they are mentioned to give us an idea of the size of the animals it ate? Let’s go back to the timeline to see if it helps us.

ASK QUESTIONS to check your students’ understanding.

- Did *Titanoboa* eat deer?
- If the students answer “yes”, encourage them to re-examine the text to identify that the final sentence refers to the anaconda, not *Titanoboa*. Discuss why the anaconda has been used as a comparison.

PROMPT the students to extend their thinking about the size of animals “then and now” and to elicit the underlying ideas about how much scientists know – and how they know it.

- The subheading asks “How big is big?” How much bigger than an anaconda was *Titanoboa*? Do you think most animals were bigger then than now? Why or why not? What might have affected their size? Does our understanding of “big” depend on our context?

GIVE FEEDBACK

- I noticed you used both the pictures and the text to help you to understand the size of *Titanoboa*.
- You used the information in the timeline to support your understanding of whether *Titanoboa* existed at the same time as the dinosaurs. Integrating information helps us to gain a full understanding from a text.

Reading standard: by the end of year 6

The Literacy Learning Progressions

Assessment Resource Banks

Instructional focus – Writing

Science (Living World, level 3 – Evolution: Explore how the groups of living things we have in the world have changed over long periods of time and appreciate that some living things in New Zealand are quite different from living things in other areas of the world.)

English (Level 3 – Ideas: Select, form, and communicate ideas on a range of topics.)

Text excerpts from “The Biggest Snake in History”

Because of *Titanoboa*'s huge size, scientists now believe that, sixty million years ago, the tropical parts of the world (such as present-day Colombia) were about 5 degrees Celsius warmer than they are today.

This snake would have been big enough to swallow a cow and then gulp you down for dessert. But don't panic – *Titanoboa* lived about sixty million years ago.

“What Did *Titanoboa* Eat?
Where Did *Titanoboa* Live?
What Does *Titanoboa* Tell Us
about Climate Change?”

Examples of text characteristics

ACCURATE LANGUAGE

When writing about scientific topics, especially ones with many unanswered questions, authors need to use accurate language. In this text, “scientists now believe that” communicates that they might not have thought this in the past and may change their understanding in the future. The word “about” indicates that “5 degrees” is an approximate figure.

COMPARISONS AND ADDRESSING THE READER

Making comparisons with things that your readers are likely to know about can help them understand ideas. Addressing the reader as “you” – and connecting to their likely responses to the topic – can also help draw them into the text.

HEADINGS IN QUESTION FORM

Some writers engage their readers by writing their headings in question form. The questions might even guide what content they include. For example, a writer might first work out what questions their audience is likely to have about the topic and then use those questions to frame their ideas. Notice how the key words in these headings are in bold to further help readers who are scanning the text for specific information.

METACOGNITION

- How did you make sure your wording was accurate in your scientific writing?
- How did thinking about your purpose for writing help to shape your language choices?
- How did thinking about your audience's likely questions help you to select content and organise your ideas?

Teacher

(possible deliberate acts of teaching)

PROMPT the students to come up with words that indicate approximations (for example, about, approximately, around). Provide opportunities for them to practise using these words in sample sentences. This could be in the form of a cloze activity or by students co-constructing or independently constructing sample sentences.

DIRECT the students to revise their scientific writing to check that they are using accurate language when describing information that contains unanswered questions.

PROMPT your students to consider the knowledge and interests of their audience.

- What comparisons would help your audience to understand this idea?
- What thoughts or feelings might your audience have about this subject, and how can you capture those in your text? For example, are they likely to react with amazement, fright, or disgust?
- What opportunities exist to refer to the reader as “you” and make them feel part of your text?

As a group, brainstorm adjectives to describe *Titanoboa*. Have the students work in pairs to sort the adjectives into categories according to the rules for making comparative and superlative forms. Confirm the rules for each adjective. Ask the students to think, pair, and share comparisons they could make to help describe *Titanoboa* to their families. Prompt the students to use these forms to support descriptions in their speaking and writing.

MODEL converting the question headings into statement headings, for example, “*Titanoboa*'s Diet” or “What *Titanoboa* Ate”; “*Titanoboa*'s Habitat” or “Where *Titanoboa* Lived”. Ask the students to do the same with the other headings.

- Which versions do you think are most effective? Why?

PROMPT the students to consider what questions their audience might have about their topics.

- Could these questions guide your choice of content or the order in which you present your ideas?
- What is the clearest and most effective way of phrasing the questions?
- What are the key words, and how can you include them in your headings?

GIVE FEEDBACK

- By adding “Some people think”, you've communicated that this idea is a hypothesis rather than a fact and that other people think differently.
- These questions are ones that I definitely have about this topic, and I'm keen to find out the answers by reading on.

 Writing standard: by the end of year 6

 The Literacy Learning Progressions