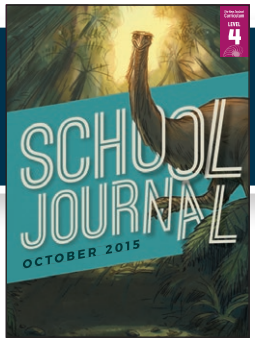
Return of the Moa?

by Quinn Berentson

School Journal
Level 4, October 2015
Year 8



Overview

Could moa really be brought back from extinction? This high-interest article considers the scientific and ethical issues related to the de-extinction of moa and other species. The ethical conundrums are explored using a "for" and "against" format, and further details are supplied in a humorous "how to" section. The final section puts forward several other contenders for de-extinction.

Although the text is long and contains some challenging concepts, students at this level will find that the information is set out clearly and the overall tone of the article is supportive.

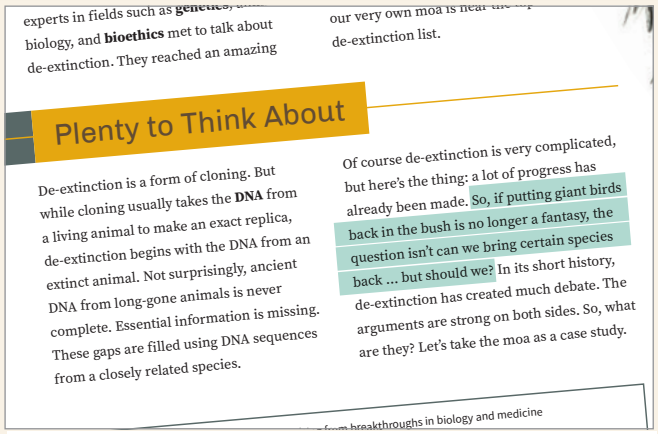
This article:

- requires some prior knowledge about the reasons why many species have become extinct and also some awareness of the possibility of "de-extinction"
- provides opportunities for students to consider ethical as well as practical considerations that scientists must deal with
- gives students opportunities to question the text, evaluate ideas, and discuss the pros and cons of scientific advances
- provides models for persuasive and procedural writing.

A PDF of the text is available at www.schooljournal.tki.org.nz

Texts related by theme **"Spirit of the Bird"** SJ L3 August 2015 | **"Richard Owen's Giant Mystery"** SJ L3 August 2015

Text characteristics from the year 8 reading standard


experts in fields such as **genetics**, biology, and **bioethics** met to talk about de-extinction. They reached an amazing

our very own moa is near the ... de-extinction list.

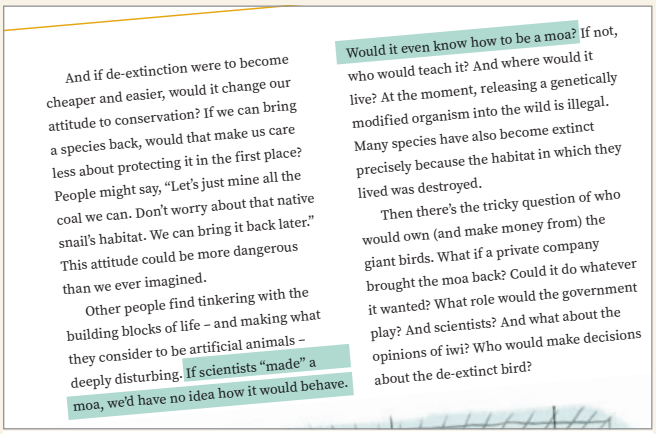
Plenty to Think About

De-extinction is a form of cloning. But while cloning usually takes the **DNA** from a living animal to make an exact replica, de-extinction begins with the DNA from an extinct animal. Not surprisingly, ancient DNA from long-gone animals is never complete. Essential information is missing. These gaps are filled using DNA sequences from a closely related species.

Of course de-extinction is very complicated, but here's the thing: a lot of progress has already been made. So, if putting giant birds back in the bush is no longer a fantasy, the question isn't can we bring certain species back ... but should we? In its short history, de-extinction has created much debate. The arguments are strong on both sides. So, what are they? Let's take the moa as a case study.

... from breakthroughs in biology and medicine

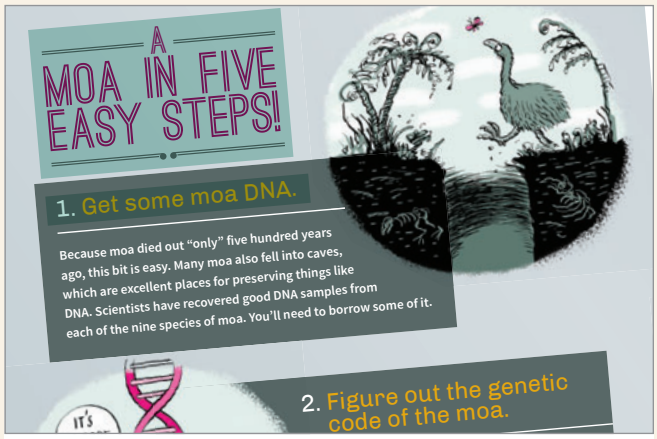
Elements that require interpretation, such as complex plots, sophisticated themes, and abstract ideas


And if de-extinction were to become cheaper and easier, would it change our attitude to conservation? If we can bring a species back, would that make us care less about protecting it in the first place? People might say, "Let's just mine all the coal we can. Don't worry about that native snail's habitat. We can bring it back later." This attitude could be more dangerous than we ever imagined.

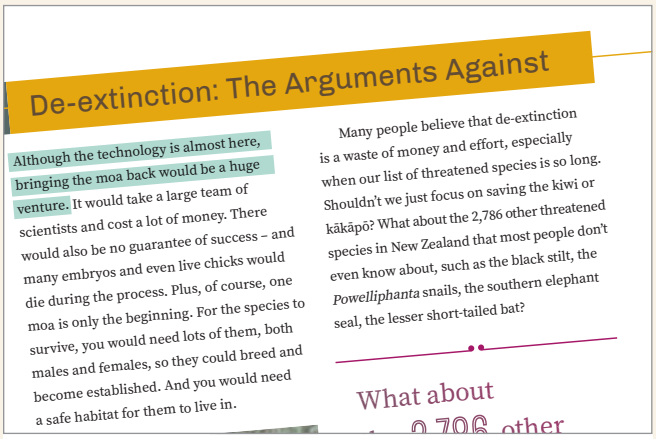
Other people find tinkering with the building blocks of life – and making what they consider to be artificial animals – deeply disturbing. If scientists "made" a moa, we'd have no idea how it would behave. Would it even know how to be a moa? If not, who would teach it? And where would it live? At the moment, releasing a genetically modified organism into the wild is illegal. Many species have also become extinct precisely because the habitat in which they lived was destroyed.

Then there's the tricky question of who would own (and make money from) the giant birds. What if a private company brought the moa back? Could it do whatever it wanted? What role would the government play? And scientists? And what about the opinions of iwi? Who would make decisions about the de-extinct bird?

Complex layers of meaning, and/or information that is irrelevant to the identified purpose for reading (that is, competing information), requiring students to infer meanings or make judgments



Non-continuous text structures and mixed text types


De-extinction: The Arguments Against

Although the technology is almost here, bringing the moa back would be a huge venture. It would take a large team of scientists and cost a lot of money. There would also be no guarantee of success – and many embryos and even live chicks would die during the process. Plus, of course, one moa is only the beginning. For the species to survive, you would need lots of them, both males and females, so they could breed and become established. And you would need a safe habitat for them to live in.

Many people believe that de-extinction is a waste of money and effort, especially when our list of threatened species is so long. Shouldn't we just focus on saving the kiwi or kākāpō? What about the 2,786 other threatened species in New Zealand that most people don't even know about, such as the black stilt, the *Powelliphanta* snails, the southern elephant seal, the lesser short-tailed bat?

What about ... 2,786 other

Adverbial clauses or connectives that require students to make links across the whole text

Reading standard: by the end of year 8

Possible curriculum contexts

SCIENCE

(Nature of science)

Level 4 – Participating and contributing

(Living world)

Level 4 –Ecology

ENGLISH (Reading)

Level 4 – Structure: Show an increasing understanding of text structures.

ENGLISH (Writing)

Level 4 – Structure: Organise texts, using a range of appropriate structures.

Possible reading purposes

- To find out why some people think the moa could be brought back from extinction and how they think it could be done
- To understand and evaluate the technical and ethical arguments for and against de-extinction
- To understand scientists' decision-making processes as they consider practical experiments.

Possible writing purposes

- To use the text as a model for presenting your own arguments for or against an issue
- To respond to the text in an amusing way, for example, with a futuristic setting.

The New Zealand Curriculum

Text and language challenges

VOCABULARY

- Possibly unfamiliar words and concepts, including "legendary", "breakthroughs", "replica", "sequences", "venture", "embryos", "established", "tinkering", "amphibian", "devastating", "iconic", "verge"
- Technical and scientific terms (some of which are in the glossary): "de-extinction", "bioethics", "zoologist", "cloning", "DNA", "genetic code", "genetically modified organism (GMO)", "geneticist", "embryo", "chemically stimulate", "egg cell", "surrogate", "ecologists", "ecosystem", "browsers"
- Colloquial expressions: "here's the thing", "sweet-talk"
- Metaphors: "within reach", "tinkering with the building blocks of life", "playing God", "wiped out".

Possible supporting strategies

Some of these suggestions may be more useful before reading, but they can be used at any time in response to students' needs.

- Identify the (non-scientific) words that may be unfamiliar or not completely understood. Find ways to incorporate them into daily vocabulary. For example, discuss the words "legendary" and "iconic", then challenge students to notice their use elsewhere and to use the words appropriately as many times as they can through the day.
- Use this as an opportunity to deliver a mini-lesson on root words and affixes (for example, "de-extinction"). Challenge students to think of other examples of words with the prefix "de-".
- List scientific words and support students to use strategies such as context and word analysis to work out their meanings.
- *The English Language Learning Progressions: Introduction*, pages 39–46, has useful information about learning vocabulary.
- See also ESOL Online, Vocabulary, for examples of other strategies to support students with vocabulary.

SPECIFIC KNOWLEDGE REQUIRED

- Knowledge of the meanings of "endangered" and "extinct"
- Knowledge of the moa and its characteristics
- Some knowledge of why and how species become extinct
- Some knowledge of the idea of cloning
- Some basic understanding of the processes involved in the creation and development of animal embryos
- Experiences of reading, hearing, and making arguments for and against an idea or issue.

Possible supporting strategies

- Activate and/or build prior knowledge by providing and discussing resources about moa, extinction, and cloning.
- Review what students know about cloning. *Why would people want to clone animals? What is the difference between cloning and de-extinction?*
- Encourage students to be sensitive to the fact that some members of the class may have religious or ethical objections to cloning or de-extinction. Take some time to review rules of respectful debate.

TEXT FEATURES AND STRUCTURE

- An article that includes detailed arguments for and against the de-extinction of moa and other species
- An opening section that introduces the topic by imagining a moa crashing through the bush
- A text box that gives technical information on the de-extinction process as "steps to make a moa"
- A text box that lists other contenders for de-extinction
- The use of humour to help make the content accessible
- The use of questions that provide a summary of issues or facts
- The abstract question, "Would it even know how to be a moa?"
- The final sentence that links back to the introduction.

Possible supporting strategies

Skim and scan the article with the students to help them get a sense of its structure and purpose. Prompt students to:

- use the headings and illustrations to identify the focus of each section
- notice the information contained in the text boxes
- notice the use of questions to engage the reader to think about important issues.

Sounds and Words

Instructional focus – Reading

Science: Nature of Science (Level 4 – Participating and contributing); Living World (Level 4 – Ecology)

English (Level 4 – Structure: Show an increasing understanding of text structures.)

First reading

- Set the purpose for reading.
- Activate and build prior knowledge to support students to make connections when they read, using the suggestions on pages 1 and 2 of these notes.
- After an initial skim and scan of the text to identify the overall structure, ask questions that will prepare students to read each section, for example: *What kind of information do you expect to find under each heading? What are you already wondering about for this section? What questions do you have about the text?*
- Allow time for students to read the article independently. *What is your initial response to the idea of the de-extinction of moa?*

If the students struggle with this text

Remind students of strategies that are particularly useful on a first reading, such as reading on, rereading, and making connections with their prior knowledge. Use one of the following approaches, depending on students' needs:

- Focus on one section at a time in a shared reading approach, taking several sessions if necessary. Read the section aloud as students follow along in their own copies or (better) on an enlarged version of the text. Clarify words and concepts so that students get the gist of each section.
- Revisit key information about the moa and its extinction to make sure the students have the necessary background knowledge.
- Work through the text section by section, supporting students to use the text features and structure to locate and summarise the main idea of each section. Chart these ideas for later discussion.
- Assign sections to pairs of students. Use a jigsaw approach, asking each pair to read their section, to decide on the most important or most interesting idea and then to share that with the group. Write the ideas on a whiteboard and encourage the whole group to discuss them.
- Use a world map to point out some of the locations mentioned in this text (for example, Mauritius, Siberia).
- Help students from other countries to make connections by having them share their knowledge about extinct or endangered animals from their part of the world.

Subsequent readings

The teacher

Ask questions to help students identify the most important issues around de-extinction.

- *Why is it being discussed?*
- *How is it similar to cloning? How is it different?*
- *Why do scientists argue about de-extinction? How does this relate to current opinions about preventing extinctions?*

The teacher

When the students have become familiar with the text, have them debate the issue of de-extinction. (If necessary, review the way a formal debate is conducted.)

- *Reread the text to identify the arguments and supporting evidence and decide which speakers will use which arguments.*
- *Build your case carefully by using relevant information from the text and elsewhere.*
- *Think about the rhetorical strategies you can use to make an oral presentation (some are provided, for example, the use of questions and reasons).*
- *Come up with a strong conclusion for your side's position.*

When the students are ready, appoint a timekeeper and let the debate begin. Afterwards, ask questions to find out if the debate helped the students gain more understanding of the issue.

- *Did this process help you understand the issues better? How?*

The teacher

Prompt the students to make connections.

- *For each of the other contenders for de-extinction, do the arguments and procedures in the text strengthen or weaken their claim to be brought back from the dead? Why do you think that?*
- *Bring together what you know about endangered species and what you have read in this article to reassess and form your own opinions about cloning, de-extinction, ecology, and conservation.*

The students:

- reread to identify and discuss the big ideas in the article
- make connections between the text, their knowledge of movies that imagine dinosaurs returning, and the way scientific advances are debated publicly to infer that the idea of bringing moa back to life is one that captures public imagination
- locate information in the text to compare de-extinction and cloning and identify their similarities and differences
- draw on what they already know about conservation and the reasons for extinction to understand that the impact de-extinction could have on ecology is complex and would not necessarily be beneficial.

The students:

- reread the assigned sections to identify each argument, the reasons given, and the examples provided
- determine the relevance of information from this and other sources and discard competing information
- integrate and interpret information as they organise their assigned points
- use rhetorical strategies to present their arguments
- evaluate the debate, and reflect on the impact it had on their understanding of the text.

The students:

- ask questions about the reasons given for "bringing back from the dead" the six species named and locate information elsewhere in the text that would support or oppose this
- evaluate and synthesise information in the text with their own knowledge and opinions and reassess their understandings.

GIVE FEEDBACK

- *You integrated the information across the text to make a convincing case for bringing back moa, even though you didn't agree with the idea.*
- *I noticed you were showing David three different parts of the text that helped you persuade him that de-extinction was a good idea. I wonder if you could use other parts to persuade someone to have an opposite opinion.*

METACOGNITION

- How do you form your opinions on controversial issues? What kinds of facts or opinions are most likely to influence your thinking? Why?
- How did the process of turning written facts into oral arguments help you understand the text better? Is this a strategy you would use again when you're reading? How and why might you do that?

Reading standard: by the end of year 8
The Literacy Learning Progressions
Assessment Resource Banks

Instructional focus – Writing

Science: Nature of science (Level 4 – Participating and contributing); Living world (Level 4 – Ecology)

English (Level 4 – Structure: Organise texts, showing a range of appropriate structures.)

Text excerpts from "Return of the Moa?"	Examples of text characteristics	Teacher (possible deliberate acts of teaching)
Although the technology is almost here, bringing back the moa would be a huge venture. It would take a large team of scientists and cost a lot of money. There would also be no guarantee of success – and many embryos and even live chicks would die during the process.	**SUPPORTING AN ARGUMENT** When a writer wants to persuade readers of an opinion or idea, they need to give reasons and, if possible, support them with examples.	Prompt the students to consider how to structure their writing. ▪ *What is your purpose for writing? What do you want to communicate to readers? For example, do you want to inform, persuade, explain, or instruct?* ▪ *What structure would fit with your purpose?* ▪ *Once you've decided on the structure, make a plan to help you make further decisions about content, organisation, and any research needed.* ▪ *Make sure you have provided several supporting reasons for each of your main points.*
If scientists "made" a moa, we'd have no idea how it would behave. Would it even know how to be a moa? If not, who would teach it? And where would it live?	**POSING QUESTIONS** Posing questions leads the reader to think about what might happen. They can raise issues without necessarily resolving them. This puts the onus onto the reader to think about possible answers.	Ask the students to review the way questions are used in the text. ▪ *Why do you think the writer used these questions?* ▪ *Think about your purpose for writing: could a well-placed question help you make readers more aware of an idea or issue?* ▪ *Try using questions in places where you want to nudge your readers into thinking more deeply.*
Wouldn't bringing the moa back fix a mistake from the past – and open the door to doing the same with other important species?	**APPEAL TO EMOTIONS** In a persuasive text, writers may appeal to their reader's emotions and well as to their intellect.	Have the students consider whether they should also appeal to their readers' emotions. ▪ *Is there an emotional side to this topic?* ▪ *Where could you include it in your writing?* ▪ *Would it help your argument?* ▪ *What is the best way of appealing to your readers' emotions?*
Just imagine: you're walking through the bush, nothing but birds all around, then you hear crashing footsteps …	**FRAMING** A story or article can be framed by starting and finishing it with a repeated idea, structure, or image.	Prompt students to review the overall structure of their writing. ▪ *As you review and revise, consider your readers: would it help them to focus by framing the writing in some way?* ▪ *Using ideas in this and other texts, try out some ideas or mental images you could use to start and end your text.*

GIVE FEEDBACK

▪ *You've chosen to write an argument for fencing off all areas of native bush in the city. The reasons you've given are clear, and you've including some thought-provoking questions for readers to consider.*

METACOGNITION

- Tell me how you decided on the structure you've used. How did your purpose for writing help you make the decision?
- Can you anticipate the other side of the argument? How can you argue against that point of view in your writing?
- How does feedback help you when you're planning, writing, and revising? Tell me how you and your partner work together to support each other.

Writing standard: by the end of year 8

The Literacy Learning Progressions

MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

New Zealand Government

ISBN 978-0-478-16465-7 (online)