Science 5–6

Chapter 10 — Nature and development of science

Aboriginal and Torres Strait Islander content has been excluded as accuracy cannot be guaranteed, and it is better to be respectful than cover the entire curriculum inaccurately.

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How scientific knowledge changes

Owns: VC2S6H01 — *scientific knowledge changes over time, often resulting from collaboration or by building on the work of others, and leads to advances in science.*

Words to know scientific knowledge — the claims about the world that science currently supports with evidence · **claim** — a statement put forward as true · **evidence** — information gathered from tests and careful watching that shows whether a claim holds up · **collaboration** — scientists working together · **contribution** — something one person or team adds to an idea · **advance** — a step forward in what science knows or can do · **timeline** — a line of events in time order · **biofluorescent** — glowing in colour under UV light · **remote sensing** — watching a place from far away, without touching it

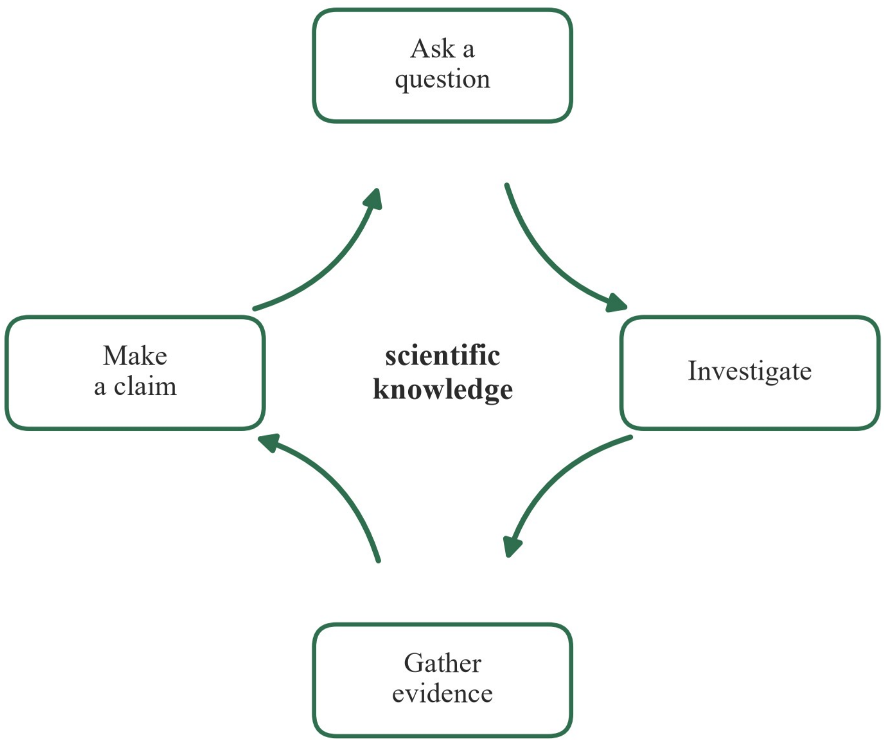
Think of science as a story that is still being written. Every so often a new piece of evidence arrives, or a new team joins in, and a page of the story gets rewritten. In this section you will see real cases where scientific knowledge changed — and you will see *why* changing is a strength of science, not a weakness.

Theory

What is scientific knowledge?

In science, a **claim** is a statement put forward as true: *the Earth goes around the Sun*, *gases can be squashed*, *this animal lays eggs*. **Evidence** is the information gathered from tests and careful watching that shows whether a claim holds up. **Scientific knowledge** is the set of claims that the evidence currently supports.

Knowledge is not a fixed list. Scientists keep testing claims, and a claim is kept only while the evidence supports it.



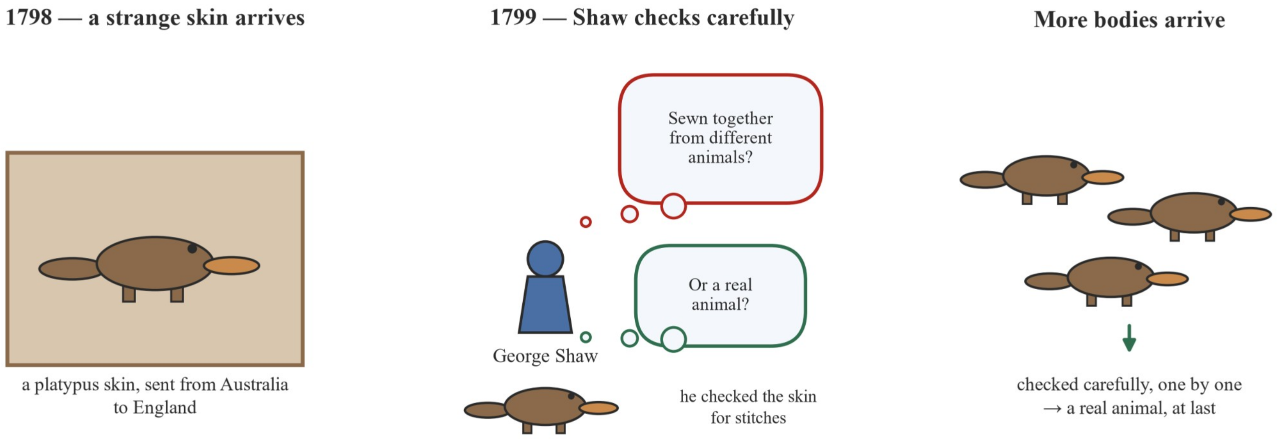
A claim is kept only while the evidence supports it.
When better evidence arrives, the claim can change.

A loop of four boxes joined by arrows: ask a question, then investigate, then gather evidence, then make a claim, and back to a new question. In the middle are the words "scientific knowledge". The caption says a claim is kept only while the evidence supports it.

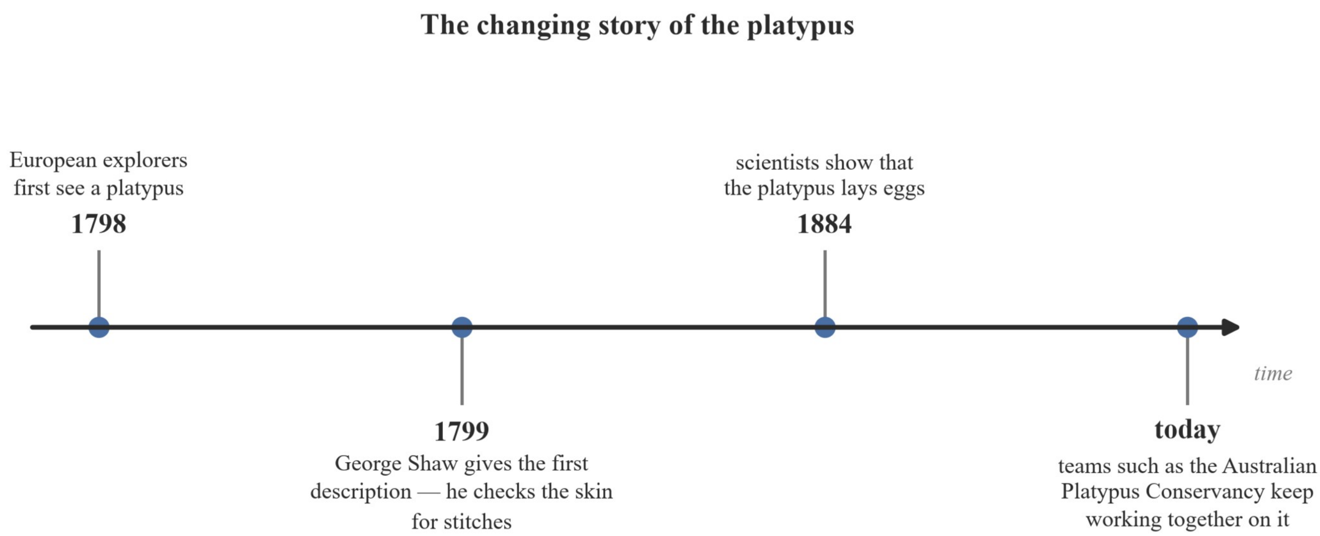
Better evidence can change a claim

In 1798, European explorers saw a platypus for the first time. A skin was sent to England, and in 1799 the scientist George Shaw gave the animal its first printed description. But Shaw was not sure the skin was real. No one in Europe had ever seen such a thing — a warm, furry body with a duck-like bill — so Shaw checked the skin for stitches, in case it was a fake sewn together from parts of different animals.

More bodies arrived from Australia and were checked carefully, one by one. The stitches were never found, and the claim changed: the platypus is a real animal. Then in 1884, new evidence changed the story again — scientists showed that the platypus lays eggs, unlike the other furry animals known at the time. The story is still growing: today, groups such as the Australian Platypus Conservancy keep working together to understand how platypuses live.



Three panels. Left: a platypus skin in a wooden crate, sent from Australia to England in 1798. Middle: George Shaw with two thought bubbles, "Sewn together from different animals?" and "Or a real animal?", checking the skin for stitches. Right: several platypus bodies examined one by one, accepted as real at last.



A timeline with four points. 1798: European explorers first see a platypus. 1799: George Shaw gives the first description and checks the skin for stitches. 1884: scientists show that the platypus lays eggs. Today: teams such as the Australian Platypus Conservancy keep working together on it.

Source: Shaw, G., The Naturalist's Miscellany (1799); Australian Museum, 'Platypus', australian.museum — retrieved 2026-08-21.

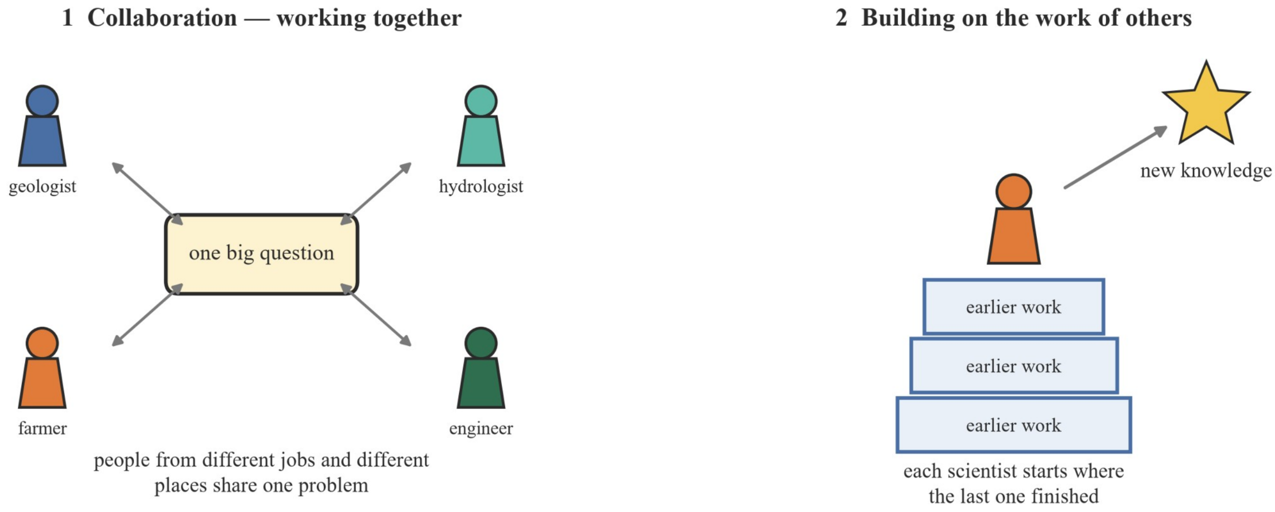
Two engines: working together, and standing on earlier work

Most advances in science happen in two ways at once.

Collaboration. Big questions are usually too big for one person. Scientists work in teams, across fields of science and across countries — and with engineers, farmers and manufacturers too. Each person brings what they know.

Building on the work of others. Hardly anyone starts from nothing. A scientist starts where the last person finished, uses their methods and tools, and adds one more step.

Individual work matters too — one careful thinker can change a whole field. But look at any real advance and you will nearly always find both engines running.

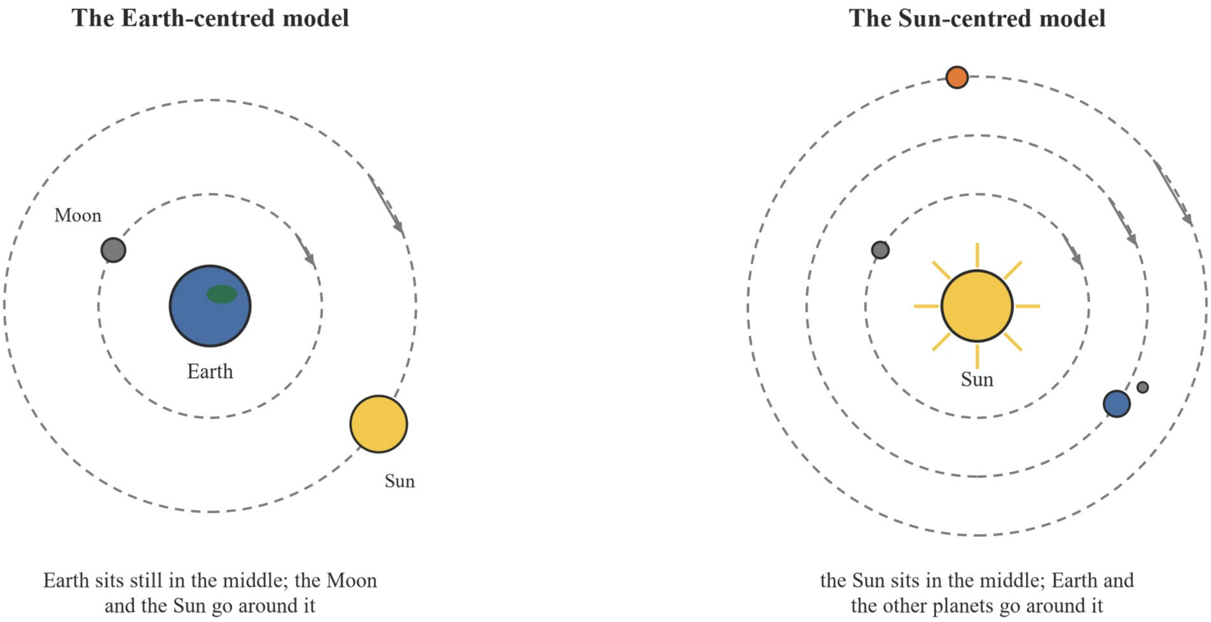


Two panels. Left, collaboration: a geologist, a hydrologist, a farmer and an engineer joined by two-way arrows to one box labelled "one big question". Right, building on the work of others: a figure standing on a stack of three blocks labelled "earlier work", reaching up to a star labelled "new knowledge".

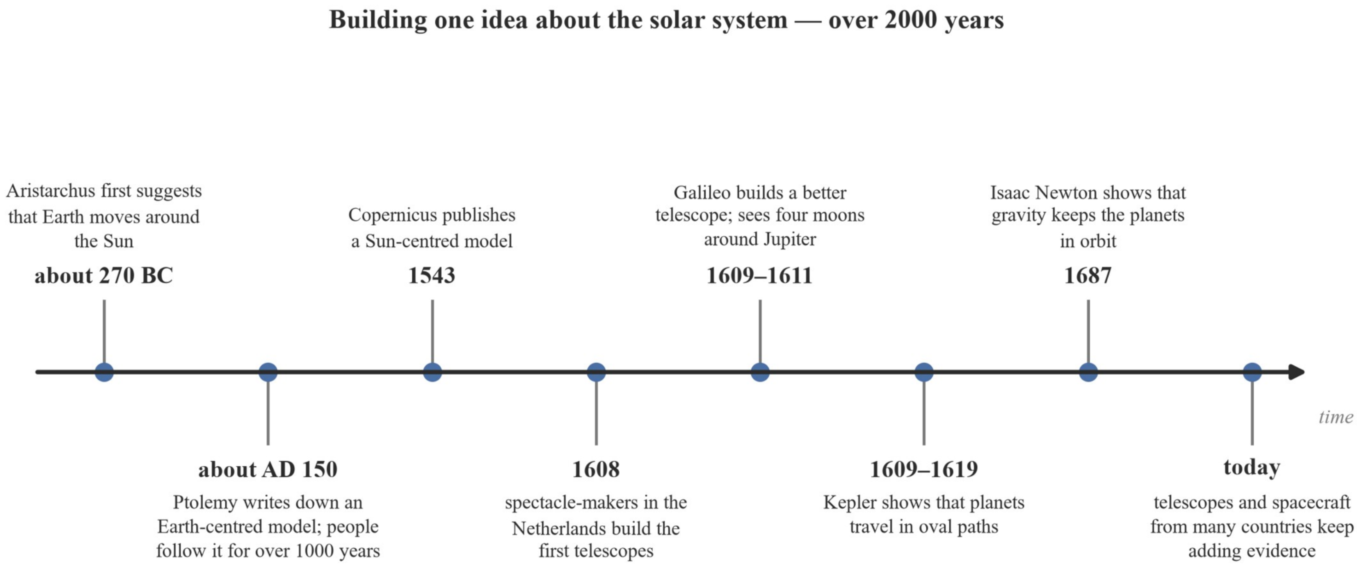
Case study 1 — A 2000-year team project: the solar system

The idea of the solar system you met in Chapter 8 — Earth and the other planets going around the Sun, held by gravity — was built piece by piece over more than 2000 years, in many countries.

About 270 BC, Aristarchus was the first we know of to suggest that Earth moves around the Sun. His idea did not win at the time: about AD 150, Ptolemy wrote down an Earth-centred model, and people followed it for over 1000 years. In 1543, Copernicus published a Sun-centred model again. What changed minds this time was new evidence from a new tool. Spectacle-makers in the Netherlands built the first telescopes in 1608; Galileo, in Italy, heard of them and built a better one. Pointed at the sky, it showed him four moons going around Jupiter — proof that not everything goes around the Earth — and Venus changing shape like our Moon, as it should if it circles the Sun. Kepler showed that the planets travel in oval paths, and Isaac Newton showed that gravity is what keeps them in orbit. Today, telescopes and spacecraft from many countries keep adding evidence to the same idea.



Two models side by side. Left: the Earth-centred model, with Earth still in the middle and the Moon and the Sun going around it. Right: the Sun-centred model, with the Sun in the middle and Earth and the other planets going around it.



A timeline of eight points: about 270 BC, Aristarchus first suggests that Earth moves around the Sun; about AD 150, Ptolemy writes down an Earth-centred model that people follow for over 1000 years; 1543, Copernicus publishes a Sun-centred model; 1608, spectacle-makers in the Netherlands build the first telescopes; 1609–1611, Galileo builds a better telescope and sees four moons around Jupiter; 1609–1619, Kepler shows that planets travel in oval paths; 1687, Isaac Newton shows that gravity keeps the planets in orbit; today, telescopes and spacecraft from many countries keep adding evidence.

Source: primary works as named (Copernicus, 1543; Kepler, 1609 and 1619; Newton, 1687); NASA, "Solar System Exploration", science.nasa.gov — retrieved 2026-08-21.

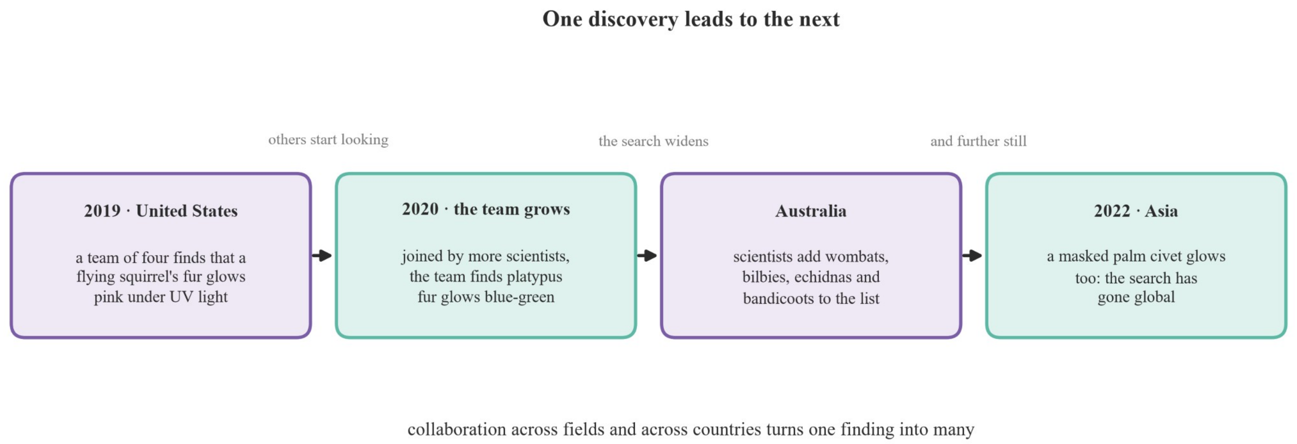
Case study 2 — One glow leads to many

In Chapter 6 you sorted living things by their features. Here is a modern story about exactly that.

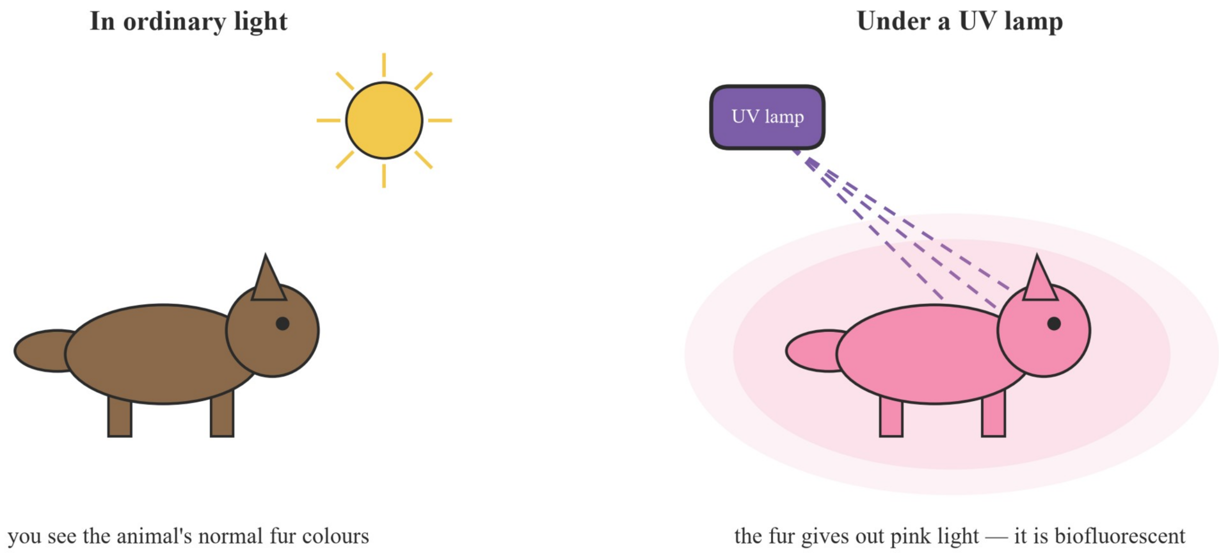
In 2019, a team of four scientists in the United States found that the fur of a flying squirrel glows pink under UV light — a kind of light our eyes cannot see. An animal that takes in light and gives it back in a new colour is called **biofluorescent**. The news made other scientists ask: *do more animals glow?*

In 2020, the same team — joined by more scientists — reported that platypus fur glows blue-green. Scientists in Australia added wombats, bilbies, echidnas and bandicoots to the glowing list, and in 2022 researchers in Asia found the glow in a masked palm civet — a small cat-like mammal. The search had gone global, and every new answer raised the next question — *why do so many mammals glow?* — which teams are still chasing.

One finding, three continents, and teams building on each other's work: collaboration turned a single squirrel into a whole new field of questions.



A chain of four boxes joined by arrows. 2019, United States: a team of four finds that a flying squirrel's fur glows pink under UV light. Arrow "others start looking". 2020: the same team, joined by more scientists, finds platypus fur glows blue-green. Arrow "the search widens". Australia: scientists add wombats, bilbies, echidnas and bandicoots to the glowing list. Arrow "and further still". 2022, Asia: a masked palm civet glows too, and the search has gone global.



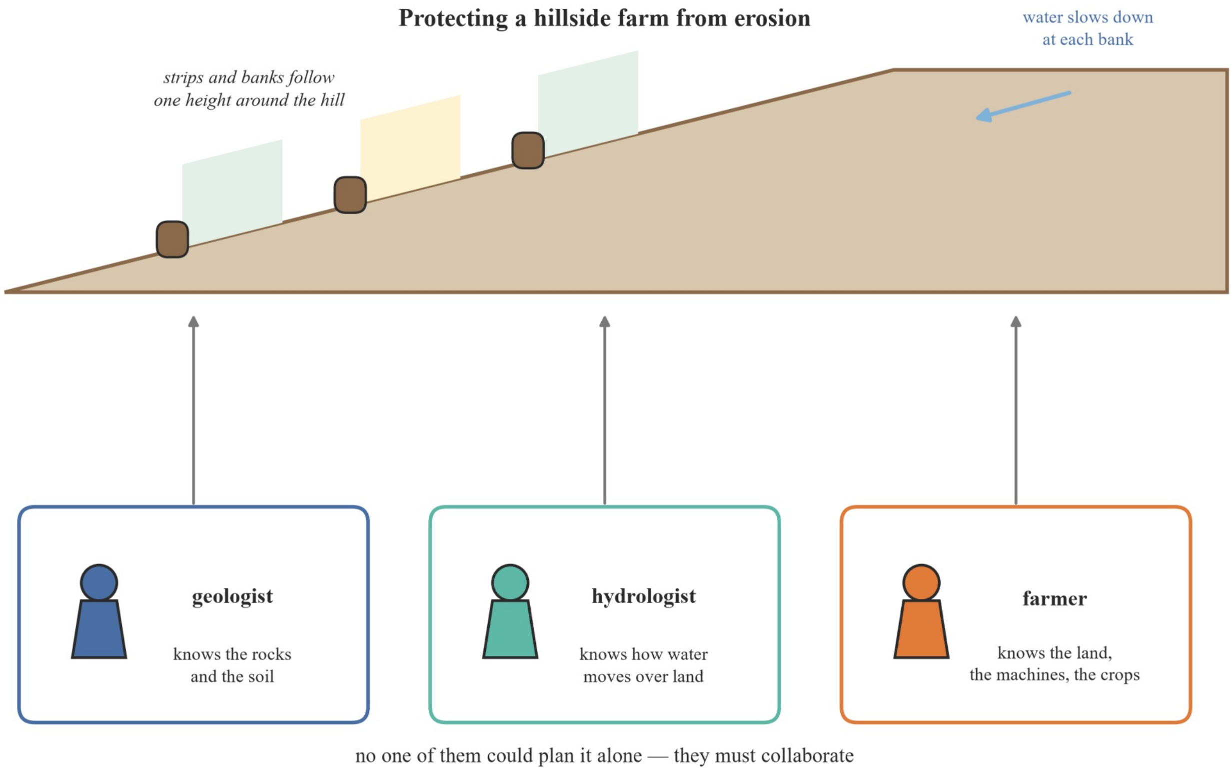
Two panels showing the same small furry animal. Left, in ordinary light: you see the animal's normal fur colours. Right, under a UV lamp: the fur gives out pink light and the animal is biofluorescent.

Source: Kohler, Olson, Martin & Anich, Journal of Mammalogy 100 (2019); Anich, Anthony, Carlson, Gunnelson, Kohler, Martin & Olson, Mammalia (2020); Borzée & Wang, Taprobanica (2022); the glowing wombats, bilbies, echidnas and bandicoots as in the VC2S6H01 elaboration contexts, Victorian Curriculum F–10 Version 2.0 — retrieved 2026-08-21.

Case study 3 — A hillside needs three kinds of know-how

Chapter 8 showed how erosion moves soil, and how fast rain can carve a bare hillside. One fix used on real farms is a system of **contour banks** — low banks of soil built across a slope, following one height all the way around the hill — together with **strip-cropping**, growing different crops in stripes along the same height. The banks slow the water down so it cannot carry the soil away.

Planning that system takes three kinds of know-how. A **geologist** knows the rocks and the soil: which slopes slip, which soils wash away. A **hydrologist** knows how water moves over land: where it pools, how fast it runs. A **farmer** knows the land, the machines and the crops: what the banks must look like for a tractor to work around them. No one of the three could plan it alone — the fix exists because they collaborate.

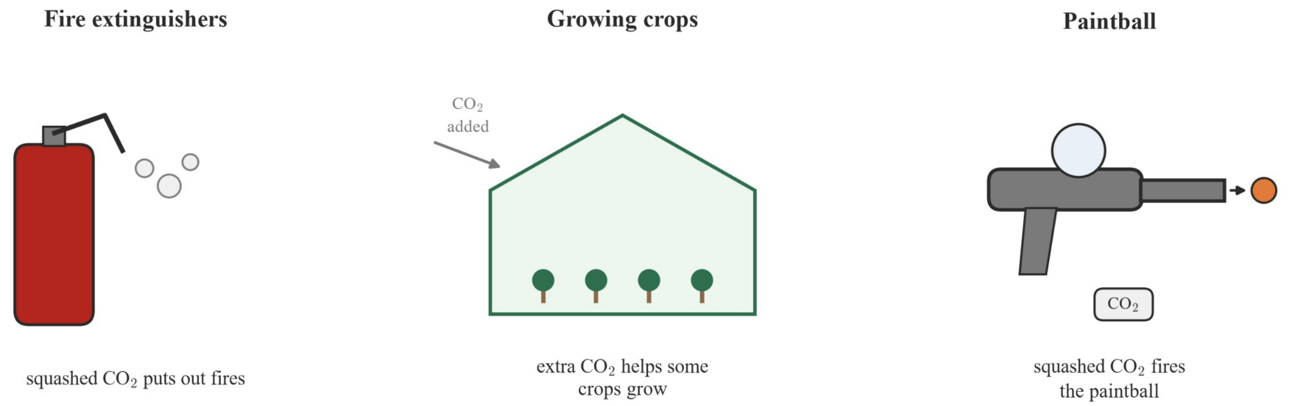


A hillside farm with crop strips and small contour banks following one height around the hill, and water slowing at each bank. Below, three cards — a geologist who knows the rocks and the soil, a hydrologist who knows how water moves over land, and a farmer who knows the land, the machines and the crops — with arrows up to the hillside. The caption: no one of them could plan it alone, they must collaborate.

Source: contour banks and strip-cropping as erosion controls, as in the VC2S6H01 elaboration contexts, Victorian Curriculum F–10 Version 2.0 — retrieved 2026-08-21.

Case study 4 — From the lab to everyday life: squashed CO2

Chapter 7 showed that gases can be squashed into less space. Putting that knowledge to work took **scientists**, **manufacturers** and **farmers** collaborating. Carbon dioxide (CO_2) squashes into a small space, and squashed CO_2 puts out fires — so it is used in fire extinguishers. Added to the air of a glasshouse, extra CO_2 helps some crops grow. Squashed into small capsules, it fires the paintballs in a paintball marker. One fact about a gas, three very different uses, and three kinds of people needed to make each one real.



from lab to life: scientists, manufacturers and farmers working together

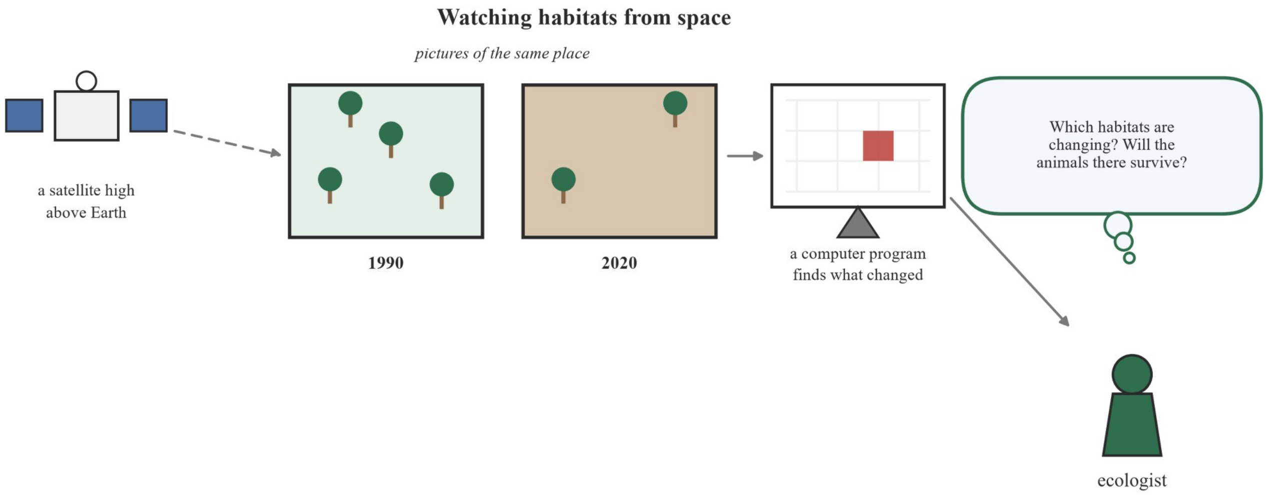
Three panels. Left: a fire extinguisher with a spray of squashed CO2 putting out fires. Middle: a glasshouse with rows of crops and CO2 added, helping some crops grow. Right: a paintball marker with a small CO2 capsule firing the paintball. The caption: from lab to life, scientists, manufacturers and farmers working together.

Source: uses of compressed carbon dioxide — fire extinguishers, crop growing and paintball — as in the VC2S6H01 elaboration contexts, Victorian Curriculum F–10 Version 2.0 — retrieved 2026-08-21.

Case study 5 — Watching habitats from space

Chapter 6 showed that the conditions in a habitat decide what can live there, and that habitats can change. So how do **ecologists** — scientists who study living things and their homes — watch habitats change across a whole country? They cannot be in every place at once. Instead they collaborate with **engineers**, who build satellites and the sensors on them, and with **computer scientists**, who write programs that search thousands of pictures for patterns of change.

This is **remote sensing**: watching a place from far away, without touching it. In Australia, the Digital Earth Australia program lines up satellite pictures of the same places taken in different years, so change — forest thinning, wetlands drying — shows up as a pattern a person can check. Ecologists then use the pattern to predict which living things may not survive, and where help is needed first.



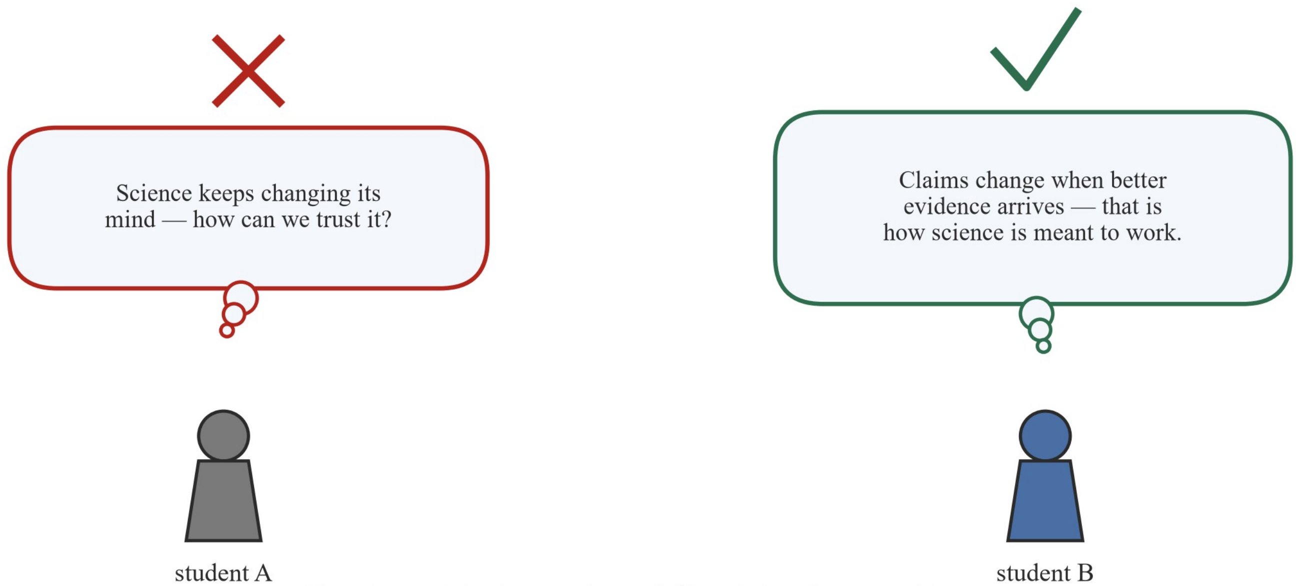
remote sensing: watching a place from far away, without touching it

A satellite high above Earth sends down pictures of the same place in 1990, full of trees, and in 2020, with fewer trees. A computer program finds what changed, and ecologists ask: which habitats are changing, and will the animals there survive? The caption defines remote sensing: watching a place from far away, without touching it.

Source: Geoscience Australia, Digital Earth Australia, ga.gov.au — retrieved 2026-08-21.

Changing our minds is science working

When a scientific claim changes, it can look like science got it wrong and cannot be trusted. Think it through the other way. A claim that *never* changed — no matter what new evidence arrived — would not be following the evidence at all. The platypus claim changed because more bodies arrived. The solar-system claim changed because a telescope saw what eyes alone could not. The change is the evidence doing its job.



Changing a claim is not science failing. It is science working.

Two students with thought bubbles. Student A: "Science keeps changing its mind — how can we trust it?", marked with a cross. Student B: "Claims change when better evidence arrives — that is how science is meant to work.", marked with a tick. The caption: changing a claim is not science failing, it is science working.

Worked examples

Example 1 — with support

Use the solar-system timeline above.

(a) Pick **two** people or groups from the timeline who built on the work of others, and say what earlier work each one used.
(b) What new evidence helped change the claim from *Earth in the centre* to *Sun in the centre*?
(c) Give one example of collaboration across countries from the timeline.

Working	Comment
(a) Galileo built on the spectacle-makers of the Netherlands: he used their new invention and made it stronger.	Building on the work of others — he did not start from nothing.
The space teams of today build on Newton and Kepler: their spacecraft fly using the rules those two wrote down.	Every entry on the timeline stands on earlier entries.
(b) Telescopes showed four moons going around Jupiter — so not everything goes around Earth — and Venus changing shape, as it should if it circles the Sun.	Better evidence changed the claim.
(c) Today, telescopes and spacecraft from many countries add evidence to the same idea.	Collaboration across countries.
∴ The timeline shows both engines at work: scientists building on earlier work, and teams across countries collaborating, with better evidence changing the claim.	Both engines + evidence = an advance.

Example 2 — with support

Use the platypus story.

(a) What was Shaw's claim in 1799, and why was it a fair question to ask at the time?
(b) Name two pieces of evidence that changed what scientists claimed about the platypus.
(c) "Scientists changed their minds about the platypus, so science failed." Do you agree? Explain.

Working	Comment
(a) Shaw's claim: the skin might be a fake, sewn together from parts of different animals. It was fair to ask because no one in Europe had seen a live platypus, and the body mixed features no one had seen together before.	A claim has to fit what is known *at the time*.
(b) 1: more bodies arrived and were checked carefully, with no stitches found. 2: in 1884, scientists showed the platypus lays eggs.	Each piece of better evidence moved the claim.
(c) Disagree. The claim changed *because* better evidence arrived — that is the knowledge loop doing its job.	Changing a claim = science working.
∴ Shaw's doubt was honest science, and the claim changed only when the evidence did.	Evidence leads, claims follow.

Example 3 — by yourself

Use the glowing-mammals chain.

(a) Explain how the 2019 flying-squirrel finding led to more findings.
(b) Give two different ways the scientists collaborated (hint: think *fields* and *countries*).
(c) Why does the whole chain count as an advance in science?

Model answer: (a) The squirrel finding raised a new question — do more animals glow? — so other scientists tested more fur: the same team, now with more scientists, found the platypus glows, scientists in Australia added wombats, bilbies, echidnas and bandicoots, and researchers in Asia found a glowing civet. (b) Across countries: the work spread from the United States to Australia and Asia, with teams in each place taking it further. Across fields: field scientists who watch living animals worked with museum people who look after animal bodies. (c) It is an advance because each step added new knowledge that the next team could use: one squirrel became a growing list of glowing mammals and a new question — *why?* — for teams to chase. ∴ One finding + collaboration across fields and countries = a whole new line of knowledge.

Practice questions

With support

Q1 (3 marks). Match each word to its meaning.

Word	Meaning
1 claim	A information gathered from tests and careful watching
2 evidence	B scientists working together
3 collaboration	C a statement put forward as true

Q2 (3 marks). Name the two main ways scientific knowledge moves forward, and give one example of each from this section.

Q3 (3 marks). (a) Why did George Shaw check the platypus skin for stitches? (b) What made scientists change their claim and accept the platypus as real? (c) Why is that change an example of science working, not failing?

Q4 (3 marks). Planning contour banks and strip-cropping takes a geologist, a hydrologist and a farmer. Say what each one brings that the others do not have.

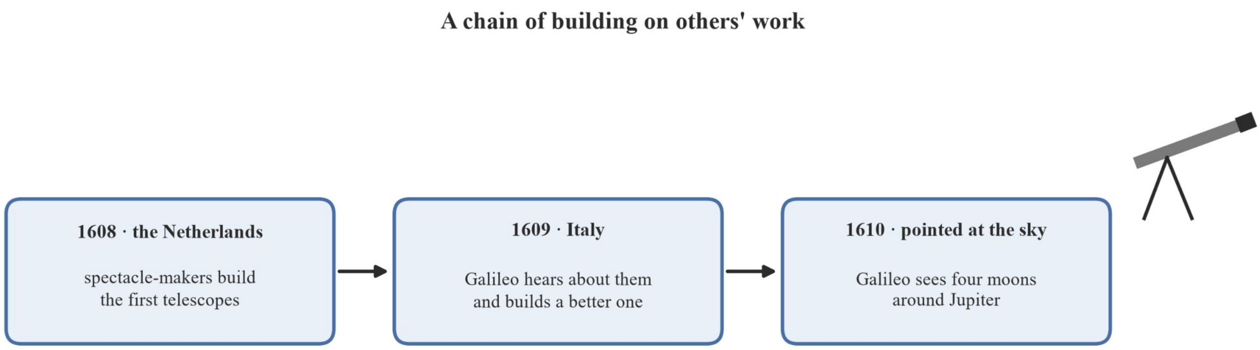
Q5 (3 marks). (a) What is remote sensing? (b) Name the three kinds of people who collaborate to make it work. (c) What do ecologists use the pictures to predict?

Q6 (4 marks). True or false? Fix each false statement.

(a) Scientific knowledge is a fixed list that never changes.
(b) Collaboration means scientists working together.
(c) When a scientific claim changes, science has failed.
(d) One person already knows everything needed to plan a contour-bank system.

By yourself

Q7 (3 marks). Use the figure below.



A chain of three boxes. 1608, the Netherlands: spectacle-makers build the first telescopes. 1609, Italy: Galileo hears about them and builds a better one. 1610, pointed at the sky: Galileo sees four moons around Jupiter. A small telescope stands beside the chain.

(a) How did Galileo build on the work of others? (b) Explain why this chain is an advance in science, not just three separate events.

Q8 (3 marks). (a) Which animal was first found to glow, and in what year? (b) Name two Australian mammals later found to glow. (c) How did the first finding lead to the later ones?

Q9 (3 marks). Galileo saw four moons going around Jupiter. Explain how that one observation weakened the Earth-centred model.

Q10 (3 marks). "If science could be trusted, its claims would never change." Do you agree? Use one case from this section to support your answer.

Q11 (2 marks). Give one example of collaboration *across fields of science* and one example of collaboration *across countries*, from this section.

Q12 (2 marks). A hydrologist knows how water moves over land. Explain why a hydrologist alone still could not plan a contour-bank system for a working farm.

Q13 (3 marks). "Advances in science are only ever made by big teams." Evaluate this claim using one example from this section.

Q14 (3 marks). SCENARIO — A student finds an old book stating that the Sun goes around the Earth. "This proves scientists of the past were silly," the student says. Using the solar-system timeline, write two or three sentences answering the student.

Q15 (3 marks). Make a claim of your own about something you have noticed at school or at home. Then describe one piece of better evidence that could make you change that claim.

Q16 (5 marks). Choose one advance from this section (the Sun-centred solar system; glowing mammals; contour banks; remote sensing). In your answer: name the advance; describe the contribution of at least two people or groups; show how they built on earlier work or collaborated; and explain why the advance changed scientific knowledge.

Practical — Build a timeline of contributions to one scientific idea

> **PRACTICAL** — this page plans or analyses work done in the classroom, laboratory or field. It is not a substitute for doing it.

This page rehearses the investigation skill of **constructing and presenting a timeline of contributions to one scientific idea** (VC2S6I06).

Question: How has one scientific idea been built by many people, over time?

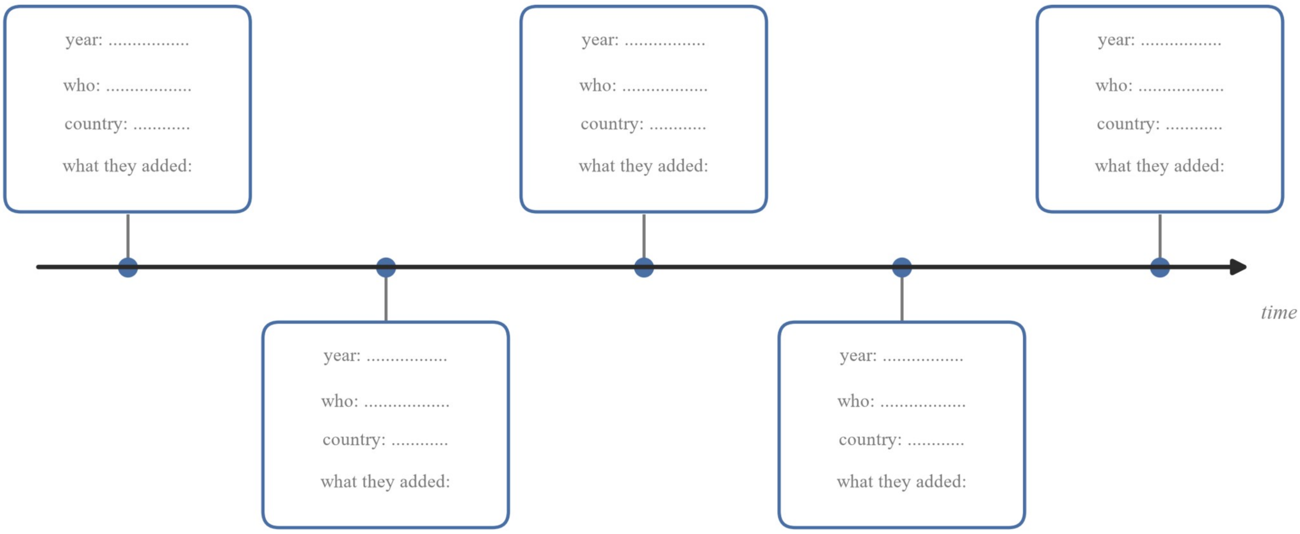
Choose one idea (from what this book has taught): the Sun-centred solar system · glowing mammals · protecting soil from erosion · watching habitats from space.

Your timeline must show:

- at least **five** contributions, in time order;
- for each entry: the year (or *about* year), the person or team, their country, and what they added;
- at least one entry where **better evidence changed a claim**;
- at least one entry where someone **built on earlier work**;
- a list of your sources at the end.

Equipment: the template below (or a ruler and a long sheet of paper), pencil, and sources your teacher approves — this section's case studies are a good start.

A template for your own timeline



add as many entries as you need — one for each contribution you find

A blank timeline with five empty entry boxes alternating above and below the time arrow. Each box has dotted lines for: year, who, country, what they added. The caption says to add as many entries as you need, one for each contribution you find.

Method:

1. Copy the template, or rule a long time arrow of your own.
2. For your chosen idea, list every contribution you can find in this section, then look for two or three more in approved sources.

3. Put each contribution on the timeline in time order, filling in year, who, country and what they added.
4. Circle one entry where better evidence changed a claim; underline one entry where someone built on earlier work.
5. Check the order with a partner — does every entry sit after the work it used?
6. Choose how to present it for your audience: a poster for the classroom wall, a drawn timeline you talk the class through, or a few slides.
7. Present in under two minutes, pointing to the entries as you go.

Thinking about your timeline:

1. Which contribution needed a new tool or machine before it could happen?
2. Which countries appear on your timeline? Where did teams join across countries?
3. Which claim on your timeline changed? What better evidence changed it?
4. What could a scientist add to your timeline in the next ten years?

Claim and defence: in one or two sentences, say how collaboration and building on earlier work changed your idea. Be ready to defend it by pointing at entries on your timeline.

Answers

Q1. 1–C, 2–A, 3–B. **Q2.** Collaboration (e.g. geologist + hydrologist + farmer planning contour banks) and building on the work of others (e.g. Galileo using the Netherlands' telescopes). **Q3.** (a) No one in Europe had seen such an animal, so a fake was a fair claim to check. (b) More bodies checked carefully with no stitches; eggs shown in 1884. (c) The claim followed the evidence — that is science working. **Q4.** Geologist: rocks and soil. Hydrologist: how water moves. Farmer: the land, the machines, the crops. **Q5.** (a) Watching a place from far away without touching it. (b) Ecologists, engineers, computer scientists. (c) Which living things may not survive, and where help is needed first. **Q6.** (a) F — it changes when better evidence arrives. (b) T. (c) F — a changed claim is science working. (d) F — it takes a geologist, a hydrologist and a farmer together. **Q7.** (a) He used the spectacle-makers' new invention and made it stronger. (b) Each step gave the next person something to use: the tool made the observation possible, and the observation added evidence to a growing idea. **Q8.** (a) The flying squirrel, 2019. (b) Any two of: wombat, bilby, echidna, bandicoot, platypus. (c) It raised the question *do more animals glow?*, so teams with more scientists tested more fur and then hunted for the cause. **Q9.** Moons going around Jupiter showed that bodies can go around something other than Earth — so Earth is not the only centre things can orbit, which the Earth-centred model said it was. **Q10.** Disagree — e.g. the platypus claim changed because better evidence arrived; a claim that never changed would not be following evidence, and *that* would be untrustworthy. **Q11.** Across fields: ecologists + engineers + computer scientists (remote sensing). Across countries: the glow chain (United States, Australia and Asia) or today's space teams. **Q12.** The plan must also fit the soil and rock (geologist) and the machines and crops of a real farm (farmer); water knowledge alone is not enough. **Q13.** The claim is too strong: teams made most advances on the timelines, but single thinkers matter too — e.g. Aristarchus' Sun-centred idea, or Kepler's oval paths, were individual steps that teams later built on. **Q14.** Sample: the old book records the best claim of its time, not silliness. Claims follow evidence, and the evidence available then supported an Earth-centred sky; better tools brought better evidence and a better claim. **Q15.** Any clear claim + one piece of better evidence that would change it. **Q16.** Any case with: the advance named; two contributions; a built-on or collaboration link; and why knowledge changed.

Full solutions

Q1 (3). 1–C (1), 2–A (1), 3–B (1).

Q2 (3). The two ways: collaboration (1) and building on the work of others (1); one correct example of each from the section (1).

Q3 (3). (a) The body mixed features no one in Europe had seen together, and no live animal had been examined — so "is it a fake?" was an honest claim to test (1). (b) More bodies arrived and were checked with no stitches found, and in 1884 the platypus was shown to lay eggs (1). (c) The claim changed because the evidence did; following evidence is science working (1).

Q4 (3). One mark per role: geologist — which rocks and soils slip or wash away; hydrologist — where water pools and how fast it runs; farmer — what the land, machines and crops need for the system to work on a real farm.

Q5 (3). (a) Watching a place from far away, without touching it (1). (b) Ecologists, engineers and computer scientists (1). (c) Which living things may not survive the change, and where help is needed first (1).

Q6 (4). One mark per item: (a) false, knowledge changes when better evidence arrives; (b) true; (c) false, a changed claim is the evidence doing its job; (d) false, the three kinds of know-how must be combined.

Q7 (3). (a) Galileo built on the spectacle-makers: their 1608 invention became his stronger 1609 telescope (1). (b) The chain is an advance because each link gave the next one something to stand on — the tool made new evidence possible, and the new evidence (moons around Jupiter) was added to the growing idea of the solar system (2).

Q8 (3). (a) Flying squirrel, 2019 (1). (b) Any two of wombat, bilby, echidna, bandicoot, platypus (1). (c) The first finding raised a new question, so the team grew and museums tested more fur, leading to more findings and then to the cause of the glow (1).

Q9 (3). In the Earth-centred model, everything in the sky goes around Earth (1). Four moons plainly going around Jupiter showed a body can orbit something other than Earth (1), so the old model's central claim could not be the whole story (1).

Q10 (3). Disagree (1); a case, e.g. the platypus: the claim changed from “fake?” to “real, and an egg-layer” as better bodies and evidence arrived (1); a claim that never changed would ignore evidence, so changing with the evidence is exactly what makes science trustworthy (1).

Q11 (2). One mark each: across fields — ecologists, engineers and computer scientists building remote sensing; across countries — the glow chain (United States, Australia and Asia), or today’s space teams from many countries.

Q12 (2). The banks must also suit the soil and rock, which is the geologist’s knowledge (1), and the machines and crops of the working farm, which is the farmer’s knowledge (1); water knowledge alone leaves both out.

Q13 (3). Judgement: the claim is too strong (1); teams carry most of the story, e.g. the glow chain or the erosion team (1); but individual steps started or moved ideas — Aristarchus’ early Sun-centred suggestion, or Kepler’s oval paths — which later teams built on (1).

Q14 (3). The old book records the best-supported claim of its time, not silliness (1); with the evidence available then, an Earth-centred sky fitted what people could see (1); better tools (telescopes) brought better evidence, and the claim improved — that is science doing its job (1).

Q15 (3). A clear, testable claim about something noticed (1); a sensible piece of better evidence that would change it (1); and a correct link — the claim would change *because* the evidence does (1).

Q16 (5). Advance named (1); first contribution described (1); second contribution described (1); a correct built-on or collaboration link between people, fields or countries (1); and a closing line on why scientific knowledge changed — better evidence, more knowledge, or a new use (1).