Year 11 Science: The features of science and how to write about them

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Your turn: name the feature

Name the main feature of science shown by each sentence.

1. Scientists at Baring Head near Wellington have measured carbon dioxide in the air the same way for over fifty years, so other stations can compare with them.

2. Tuna counts in a river fall in the years after a dam is built upstream.

3. NIWA researchers worked with iwi who use hīnaki and know when tuna migrate.

4. A study's results were checked by other experts before the journal published them.

5. Early results suggested the chemical alone was enough, but later work found the whole seaweed worked better.

Your turn: an exam-style question

Resource: Longfin tuna are taonga to many iwi, and they are sensitive to pollution, so their health shows the health of a river. Iwi have caught tuna in hīnaki for generations and know their seasons. NIWA now samples eels with fyke nets, which catch eels above a set size, and with electric fishing, which stuns eels briefly so they can be measured and returned. Results from many rivers are compared to see which factors, such as farming or dams, change eel numbers. Focus on two features: varied perspectives (including mātauranga Māori) and the development and use of technology.

6. How does varied perspectives contribute to the idea? (Achieved)

7. How does technology contribute to the idea? (Achieved)

8. Why is each of these features significant to the idea? (Merit)

9. How do the two features work together to develop the idea? (Excellence)

Fix the mistake

10. Correct this statement: "Cattle farming is important, so the science helps farmers keep their jobs."

11. Correct this statement: "The study proved that the seaweed reduces methane."

12. Correct this statement: "Interactions: the scientists interacted with farmers and other scientists."

13. Correct this statement: "Technology made the data more accurate."

Answer key (for parents and tutors)

1. Scientists at Baring Head near Wellington have measured carbon dioxide in the air the same way for over fifty years, so other stations can compare with them.
   Repeatable, checkable data (a long record taken the same way).
2. Tuna counts in a river fall in the years after a dam is built upstream.
   Patterns and interactions (tuna numbers linked to a dam).
3. NIWA researchers worked with iwi who use hīnaki and know when tuna migrate.
   Varied perspectives, including mātauranga Māori.
4. A study's results were checked by other experts before the journal published them.
   Checking claims (peer review).
5. Early results suggested the chemical alone was enough, but later work found the whole seaweed worked better.
   Tentativeness: the idea changed when new evidence came in.
6. How does varied perspectives contribute to the idea? (Achieved)
   Achieved: Iwi have long-term knowledge of where and when tuna run and use them to judge river health; this tells scientists where and when to sample.
7. How does technology contribute to the idea? (Achieved)
   Achieved: Fyke nets and electric fishing let scientists catch, measure and return eels, so they can count them without killing them.
8. Why is each of these features significant to the idea? (Merit)
   Merit: Mātauranga is significant because it holds observations over many generations, far longer than any science record, so it shows changes a short study would miss; without it, sampling could be at the wrong place or season. Technology is significant because standard nets and electric fishing give counts taken the same way everywhere, so rivers can be compared; without that, a pattern linking farming or dams to eel numbers could not be seen.
9. How do the two features work together to develop the idea? (Excellence)
   Excellence: Mātauranga points to where and when eels gather, so the nets and electric fishing are used where they give the most useful data; the standard counts then test and add numbers to what iwi have noticed, such as fewer tuna below a dam. Each makes the other stronger, and together they give evidence that can guide kaitiakitanga of the river.
10. Correct this statement: "Cattle farming is important, so the science helps farmers keep their jobs."
    That is science helping society. For a social factor, show society shaping the science: farming matters, so researchers looked for ways to cut methane without cutting herds.
11. Correct this statement: "The study proved that the seaweed reduces methane."
    Evidence supports an idea but never proves it; say the trials gave strong evidence, and that more research is still testing it.
12. Correct this statement: "Interactions: the scientists interacted with farmers and other scientists."
    In science an interaction is a link between variables, such as more seaweed in the feed and less methane; people working together is collaboration.
13. Correct this statement: "Technology made the data more accurate."
    Data must always be reliable; say what the technology let them measure or do that they could not before, using the resource.