

Evidence Builds Explanations

Compare how scientists in different fields develop and test ideas.

SC.8.N.1.5 "Analyze the methods used to develop a scientific explanation as seen in different fields of science."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each observation or measurement, circle each possible explanation, and number the methods scientists use to test or strengthen an explanation.

Two Investigations, Shared Practices

- ① When fish died in a Florida pond, biologist Maya Ortiz did not begin with a conclusion. She recorded water temperature, dissolved oxygen, and the number of dead fish at several pond sites for five mornings. Her measurements showed that oxygen was lowest near a thick mat of algae. Ortiz proposed that algae growth was linked to the deaths, but this was only a possible explanation. She collected water samples and compared them with samples from a nearby pond where fish were healthy. Repeated observations gave her evidence to examine.
- ② At a coastal cliff, paleontologist Daniel Kim studied a line of fossil footprints preserved in rock. He measured each print, photographed the surface, and noted the direction of the toes. To test whether the animal had been walking or running, Kim compared the spacing between prints with tracks made by living birds moving at known speeds. He also examined nearby rock layers to determine ancient shoreline conditions. His explanation combined measurements, comparisons, and evidence from geology rather than one clue alone.
- ③ Although Ortiz and Kim studied different questions, both separated observations from explanations and looked for evidence that could challenge an idea. Ortiz's comparison pond helped test an environmental cause, while Kim's modern bird tracks helped test an interpretation of fossils. In each field, other scientists can review the methods, repeat measurements, or collect new evidence. If later water tests show a different cause, or new fossils change the track pattern, the explanation must be revised. Scientific explanations become stronger when evidence, testing, and review agree.

2 ANSWER WITH EVIDENCE Use the passage

1 Which observation led Ortiz to her possible explanation, and why was it not yet a conclusion?

2 How did comparing water samples from a healthy pond help Ortiz test her explanation?

3 Describe two methods Kim used. What question did each method help him investigate?

4 State one way Ortiz and Kim developed explanations in a similar way and one way their methods differed.

3 YOUR TURN Your own words

Choose a new local mystery, such as fewer insects near a field or cloudy water in a stream. In one paragraph, state an observation and possible explanation, describe two methods from different science fields that could test it, and tell how one possible result could revise the explanation.

PART 1 • READ AND MARK

Underline each observation or measurement, circle each possible explanation, and number the methods scientists use to test or strengthen an explanation. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Which observation led Ortiz to her possible explanation, and why was it not yet a conclusion?	Ortiz found that dissolved oxygen was lowest near a thick mat of algae. This showed a link, but she still needed evidence to test whether algae growth caused the fish deaths.
2	How did comparing water samples from a healthy pond help Ortiz test her explanation?	The healthy pond provided a comparison. Ortiz could look for differences in the water that might support or challenge an environmental cause of the fish deaths.
3	Describe two methods Kim used. What question did each method help him investigate?	Kim compared footprint spacing with tracks of living birds at known speeds to investigate whether the animal walked or ran. He examined nearby rock layers to investigate ancient shoreline conditions.
4	State one way Ortiz and Kim developed explanations in a similar way and one way their methods differed.	Both used observations, measurements, comparisons, and evidence to test an idea. Ortiz compared water samples from ponds, while Kim compared fossil tracks with modern bird tracks and examined rock layers.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Students notice that a stream has fewer tadpoles than it had last spring. One possible explanation is that fertilizer runoff increased nitrate levels and encouraged algae growth. An ecologist could count tadpoles at several stream sites, while a chemist could test water samples for nitrates. If sites with high nitrate levels do not have fewer tadpoles, the runoff explanation would need revision.

Accept equivalent descriptions of the evidence and methods in the passage. For the open response, accept any testable explanation that includes an observation, methods from two fields, and a result that could lead to revision.