

Salt and Duckweed

Use investigation results and source evidence to build and critique a scientific explanation.

LS.1.d.ii “constructing and critiquing conclusions and explanations construct scientific explanations based on valid and reliable evidence obtained from sources (including the students’ own investigations)”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline evidence from the investigation, circle evidence from the outside source, and number one statement that shows a limit on the conclusion.

Testing Road Salt

- ① In an eighth-grade investigation, students asked whether road salt changes duckweed growth. They placed equal amounts of duckweed in twelve identical containers of water. Four containers received no salt, four received a low salt level, and four received a higher salt level. The groups kept light, temperature, container size, and starting number of plants the same. For ten days, they counted green duckweed fronds in each container. Repeated containers helped the class notice whether a single unusual result changed the pattern.
- ② At the end, the no-salt containers averaged 36 fronds, low-salt averaged 25, and higher-salt averaged 11. Each set of four containers showed the same order, although exact counts differed. The class checked its counting method by having two students independently count several containers, with matching totals. They also read a state environmental agency report explaining that dissolved salts can make it harder for freshwater plants to take in water. The report named its data sources and was published by scientists, so it supported, but did not replace, the class results.
- ③ Based on these results, the class concluded that, under the tested conditions, more road salt was associated with less duckweed growth. This conclusion matches both the repeated measurements and the agency report. A stronger explanation says that salt may reduce a plant's ability to take in water, which can slow growth. However, the investigation did not test every kind of freshwater plant or every outdoor condition. Claiming that any amount of road salt always kills all pond plants would go beyond the evidence.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Identify two parts of the class investigation that made its evidence more reliable. Explain how either part helped.

2 What investigation result supports the conclusion that more road salt was associated with less duckweed growth? Include the numbers.

3 Why would the claim, "Any amount of road salt always kills all pond plants," be too broad?

4 How does the environmental agency report strengthen the explanation, and why does it not replace the class investigation?

3 YOUR TURN _____ Your own words

A class tested whether earthworms affect leaf-litter breakdown. In three bins with earthworms, leaf mass decreased by an average of 8 g, while in three bins without earthworms, it decreased by 3 g; all bins began with 20 g of dried leaves and had the same moisture, temperature, and seven-day test period. A university extension article written by soil scientists states that earthworms eat and break apart dead plant material. Write exactly four sentences that state a conclusion, use the class evidence, explain how the source supports it, and name one limit on the conclusion.

PART 1 • READ AND MARK

Underline evidence from the investigation, circle evidence from the outside source, and number one statement that shows a limit on the conclusion. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Identify two parts of the class investigation that made its evidence more reliable. Explain how either part helped.	They used four containers at each salt level and kept light, temperature, container size, and starting plant number the same. They also had two students independently count several containers, with matching totals. Repeated containers and checked counts reduce the effect of unusual results or counting errors.
2	What investigation result supports the conclusion that more road salt was associated with less duckweed growth? Include the numbers.	The no-salt containers averaged 36 fronds, the low-salt containers averaged 25 fronds, and the higher-salt containers averaged 11 fronds.
3	Why would the claim, "Any amount of road salt always kills all pond plants," be too broad?	The investigation tested only duckweed, three salt levels, and the specific conditions in the containers. It did not test all pond plants, all salt amounts, or all outdoor conditions.
4	How does the environmental agency report strengthen the explanation, and why does it not replace the class investigation?	The report supports the explanation that dissolved salts can make it harder for freshwater plants to take in water. It does not replace the investigation because the class results provide direct evidence from the duckweed containers they tested.

PART 3 • YOUR TURN (SAMPLE ANSWER)

The evidence supports the conclusion that earthworms increased leaf-litter breakdown during this seven-day investigation. Bins with earthworms lost an average of 8 g, while bins without earthworms lost 3 g, and the class used three bins in each group while controlling moisture and temperature. The university extension article supports an explanation that earthworms eat and break apart dead plant material. This conclusion applies to these bins and conditions, not to every soil animal or habitat.

Accept conclusions that accurately compare the two groups, cite the 8 g and 3 g results, connect the source to a reasonable explanation, and state a limit. Students may word the conclusion as an association or as an effect supported by the controlled investigation.