Correlation vs Causation Worksheet

Algebra 1 · Common Core HSS-ID.C.9

> Distinguish between correlation and causation.

Practice

Builds the skill step by step.

1. Ice cream sales and drownings both rise in summer. What best explains the correlation?
   A. ice cream causes drowning
   B. hot weather affects both
   C. it is impossible
   D. drowning causes ice cream sales

2. Which statement is true?
   A. Correlation is the same as causation.
   B. Causation never produces correlation.
   C. Correlation does not prove causation.
   D. Correlation always proves causation.

3. Which kind of study can best show that one variable causes another?
   A. a scatter plot
   B. an observational survey
   C. a single interview
   D. a randomized controlled experiment

4. What is a lurking variable?
   A. a variable not studied that affects both variables
   B. the x-variable
   C. the y-variable
   D. a calculation error

5. In elementary school, shoe size and reading level are positively correlated. What lurking variable explains it?

   A. shoe brand

   B. reading speed

   C. the weather

   D. age

6. More firefighters at a fire are associated with more damage. What best explains this?

   A. Damage attracts firefighters for no reason.

   B. It is a coincidence.

   C. Bigger fires bring more firefighters and cause more damage.

   D. Firefighters cause damage.

7. Which relationship is most clearly causal?

   A. pressing a car's gas pedal and its speed

   B. ice cream sales and sunburns

   C. shoe size and vocabulary

   D. number of TVs and life expectancy

8. What can an observational study show?

   A. nothing

   B. an association

   C. causation for certain

   D. only experiments

9. Students who eat breakfast tend to have higher grades. What can you conclude?

   A. Eating breakfast is associated with higher grades.

   B. Breakfast causes higher grades.

   C. Higher grades cause breakfast.

   D. There is no relationship.

10. Which is an example of possible reverse causation?

    A. Rain causes wet ground.

    B. People who exercise are happier, but happier people may exercise more.

    C. Studying raises scores in an experiment.

    D. Heat melts ice.

Correlation vs Causation Worksheet

Algebra 1 · Common Core HSS-ID.C.9

On Level

Grade-level practice.

1. A study finds that students who watch more TV have lower grades. Explain why this doesn't prove TV lowers grades.

2. Cities with more churches have more crime. What is the most likely lurking variable?

   A. the weather

   B. crime rates in other cities

   C. population

   D. church size

3. How should a researcher test whether a new study method causes higher scores?

   A. Compare students who chose each method.

   B. Ask students which method they like.

   C. Look at last year's scores.

   D. Randomly assign students to the new method or the usual one and compare scores.

4. Two variables have $r = 0.9$. Which statement is justified?

   A. They are unrelated.

   B. One causes the other.

   C. They have a strong positive linear association.

   D. They have a negative relationship.

5. Some unrelated data sets, like cheese eaten per person and the number of a certain type of accident, are strongly correlated by chance. What is this called?

   A. a controlled experiment

   B. a residual

   C. causation

   D. a coincidental (spurious) correlation

6. Describe an experiment to test whether listening to music while studying improves test scores.

7. What is confounding?

   A. when a study uses random assignment

   B. when another variable's effect is mixed up with the effect being studied

   C. when data are graphed

   D. when $r = 0$

8. Which claim is justified by observational data from a survey?

   A. Taller kids tend to know more words.

   B. Growing taller causes bigger vocabularies.

   C. Learning words makes kids grow.

   D. Height and vocabulary are unrelated.

9. "People who exercise are happier." Which explanation shows reverse causation?

   A. There is no relationship.

   B. Exercise causes happiness.

   C. Happier people may be more likely to exercise.

   D. Weather affects both.

10. Why is random assignment important in an experiment?

    A. It removes the need for a control group.

    B. It tends to balance other variables between the groups.

    C. It makes the study cheaper.

    D. It guarantees a large effect.

Correlation vs Causation Worksheet

Algebra 1 · Common Core HSS-ID.C.9

Challenge

Multi-step and word problems that stretch it.

1. Cities with more hospitals have more deaths each year. Explain why hospitals probably don't cause deaths.

2. A study finds coffee drinkers live longer. What is the best conclusion?

   A. Coffee drinking is associated with living longer, but other factors may explain it.

   B. Coffee makes people live longer.

   C. Living longer makes people drink coffee.

   D. Coffee is unhealthy.

3. What is the purpose of a control group in an experiment?

   A. to get more data

   B. to choose the treatment

   C. to make the treatment work

   D. to compare against the group that gets the treatment

4. Which result best supports a causal claim?

   A. Farms that use more fertilizer have taller plants.

   B. Gardeners say fertilizer helps.

   C. Fertilizer sales rose with plant height.

   D. Plants randomly given more fertilizer grew taller in a controlled experiment.

5. Two variables have r = 0.99. What can you conclude?

   A. They are unrelated.

   B. They have a very strong linear association; causation is not established.

   C. The data are wrong.

   D. One causes the other.

6. Countries with more TVs per person have longer life expectancy. What lurking variable best explains this?

   A. the number of channels

   B. TV screen size

   C. national wealth

   D. the time zone

7. A headline says "Students who sit in the front row get better grades, so sit in front!" Evaluate the headline.

8. Why do some experiments give one group a placebo?

   A. So the groups differ only in the real treatment.

   B. To save money.

   C. To make the treatment stronger.

   D. To avoid collecting data.

9. Which study type can establish cause and effect?

   A. a randomized controlled experiment

   B. a survey

   C. a correlation study

   D. a case study

10. Towns with more police officers have more crime. Which explanation shows reverse causation?

    A. Officers cause crime.

    B. More crime leads towns to hire more officers.

    C. Population causes both.

    D. It is a coincidence.