
Scientist: Keys

Date: _____ - _____ HR: _____

QPOEE Quiz #1 Review

Success Criteria

1. Identify and explain the steps of the scientific method (knowledge probe and prediction).
2. Write a prediction that answers the investigation question and provide reasoning for the prediction using scientific knowledge.
3. Identify the independent variable and the dependent variable when given a scientifically testable question.

1. What are some things you should consider when coming up with a testable question?
Testable questions should be:

1. Important - Is it worth your time?
2. Clear, simple, understandable question that ends with a question mark.
3. not based on opinions or values/beliefs
4. a question you can make a prediction from.
5. testable & do-able - Can you answer it with a scientific investigation?
6. safe / ethical to investigate.
7. interesting (sparks your attention)

Other considerations: Are the supplies available/accessible?

2. Decide whether the following questions are testable or non-testable. Write T or NT.

- a. T How does changing the amount of water affect the growth of a watermelon?
- b. NT What makes grass grow greener?
- c. NT How do kites work?
- d. T How does changing the shape of a kite affect its ability to fly?
- e. T What types of fertilizer will make grass grow greener?
- f. T Does Pepsi have more carbonation than coke?
- g. NT What makes something sink or float?
- h. NT Are socks or slippers more comfortable?

3. Write a prediction for the following questions.

a. How does changing the type of fruit affect its ability to float? (Apple, grape, watermelon)

If I put an apple in the water,

then... it will _____ (float or sink)
This is because ...

b. Does changing the wing shape affect how far a paper airplane will fly?

If I make the wings small and triangular,

then... the plane will fall quick and not travel far

4. A student waters three sunflower plants with salt water. Each plant receives a different amount of salt in its water. A fourth plant receives pure water with no salt. After two weeks, the heights are measured.

a. What is the independent variable? amount of salt in water

b. What is the dependent variable? height of sunflower

c. What are the controls? type of flower / size of pot / amount of soil / amount of water / etc.

d. Write a prediction for this investigation. If I water sunflower plants with ^{different} amounts of salt water, then... the plant with no salt in the water
will grow the most (tallest)

5. Rose bushes are grown in a different lighted areas in a classroom for two months. The number of roses on each bush is counted at the end of the investigation.

a. What is the independent variable? amount of light

b. What is the dependent variable? number of roses on bush

c. What are the controls? same classroom / type of bush / amount of soil / amount of water / etc.

d. Write a prediction for this investigation. If... I put a rose bush in a fully lit area of the classroom
then... it will have the most roses on the bush.

6. Explain the following pieces of the QPOEE Method.

(18) a. question:

This is the main idea of the investigation. It asks how changing one variable affects another.

(9) b. prediction:

This part of the investigation is a description of the outcomes that the researcher expects to happen. It is written in the "If... then..." and includes reasoning based on scientific principles.

(1) c. independent variable

In an investigation, this is the variable that is being changed or altered by the scientist. ("manipulated variable")

(6) d. dependent variable

In an investigation, the variable that is being measured by the scientist. The variable that is being affected by the experiment. ("Responding variable")

(17) e. control

Variables that are kept the same and not changed

(16) f. scientific method

A process for experimentation that is used to explore observations and answer questions.

(5) g. knowledge probe

This is the part of the investigation that clarifies what the investigator and other scientists already know about the topic. In class, we will often watch videos and read articles to gather information for this section