

TxCETP Course Component: Understanding Scientific Inquiry

This material is based on work supported by the National Science Foundation under Grant No. DUE 9987332.

III. Assessment & Evaluation

Pre-Test Questions for the Course Component *Understanding Scientific Inquiry*

Inquiry A Evaluation

1. Which of the following questions would be considered “scientific”?
 - A) What is the effectiveness of this cancer-fighting drug?
 - B) Which religion is best?
 - C) Which painting is more attractive?
 - D) Which model is more attractive?
 - E) Which political party is best?

2. Which of the following are considered to be basic tenets of science?
 - A) objectivity.
 - B) measurability.
 - C) explanations are tentative.
 - D) a and b.
 - E) a, b, and c.

3. Write a question which would be considered "scientific".

4. Write a question which would not be considered "scientific".

5. Explain your rationale for your answers to questions #3 and #4.

6. Name five basic tenets upon which science must adhere.

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Inquiry B Evaluation

1. Your friend was recently cooking potatoes and wondered why cubed potatoes cook faster than whole potatoes. Your friend thinks that the water boils more quickly with the cubed potatoes. They devise an experiment. Four identical ceramic bowls are filled with equal amounts of water on four identical hotplates. A whole potato was placed in the first, halved potatoes in the second, a cubed potato in the third, and no potatoes in the final bowl. The container with the cubed potatoes boils first and your friend concludes that his hypothesis was correct. What is wrong with this scenario?

Choose all that apply.

- A) Potato size was not standardized.
 - B) There were not enough replicates of the experiment.
 - C) There were too many uncontrolled variables.
 - D) There was no control in the experiment.
 - E) The question posed by your friend is not testable using scientific inquiry.
2. What are the common “sins” committed in the name of science? Why is this the case? What are the implications of these sins?
 3. Describe your experiment. How does it compare to Dethier’s experiment? Identify your variables and controls.
 4. What is wrong with the flea and intoxication experiments described in the reading from Dethier?
 5. What are some common fallacies in scientific inquiry? Describe some of the good practices used in scientific inquiry.

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Inquiry C Evaluation

Based on some observation your instructor assigns, design an original experiment that would be scientific in nature and would incorporate the tenets of science. Support your introductory materials and conclusions using appropriate references. Use the following evaluation rubric as a guide.

Some examples that could be used by instructors:

1. Why are horned lizard populations declining in size?
2. What are the pollinators of Yucca plants?
3. Why do rabbit populations increase in size during droughts in some parts of the world?
4. Maples are extremely common in the northern and eastern portions of the United States but rarely occur naturally in Texas. Why does one large population occur in the Hill Country of Texas?
5. A manager of a catfish farm is greatly concerned about large numbers of fish dying just before harvest time. How can you find out what is causing the catfish deaths?