**Students will be able to identify and describe the general properties of scientific inquiry. Students will be able to examine an example of scientific inquiry and draw a conclusion based on data.**

**#1** Mr. D was having a difficult time getting his students to get good grades on quizzes. He was trying to think of a way that he could reward his students. He read an article that said that lab rats that were rewarded with sunflower seeds ran though a maze faster than rats that were not rewarded with sunflower seeds. Since improving student quiz scores was a problem that he was interested in solving, Mr. D set up an experiment to test the seeds as a reward scenario.

**#2** Being testable is a characteristic that must be true of a good hypothesis. Mr. D stated, "I think that if I give sunflower seeds to my students, then the better they will do on a quiz." This prediction of his was easily *testable* and involved a *natural* explanation to the problem. As a result he decided to proceed with an actual experiment.

**#3** He divided the class into three groups. The groups were all the same size, had the same number of boys and girls, and were all the same ability level. Each student took the same quiz and had the same amount of time to complete it. Group one was given zero sunflower seeds before the quiz and acted as his control group. Group two was given 25 sunflower seeds before quiz. Group three was given 50 sunflower seeds before quiz. Students were allowed to eat the seeds while completing the quiz.

**#4** Group one (control group) received an average of 70% on the quiz. Group two received an average of 65% on the quiz. Group three received an average of 60% on the quiz. The results were pretty *consistent* with typical student scores on quizzes.

**#5** He looked at his results and concluded that the amount of sunflower seeds given to students does indeed affect their quiz scores. The student scores dropped by 5% each group.

**DIRECTIONS: Fill in the Data Table below with the information from the experiment and create a bar graph of the results.**

|  |  |  |
| --- | --- | --- |
| **Group** | **Number of Seeds** | **Quiz Average** |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |

**DIRECTIONS: Answer the following questions in full sentences or circle the correct answer.**

1. What was the problem that Mr. D. was trying to solve?
2. Circle Mr. D’s hypothesis or prediction in the passage.
3. What was Mr. D.’s hypothesis or prediction based on?
4. In science, what do we call a prediction to the problem?
5. Guess
6. Conclusion
7. Data
8. Hypothesis
9. According to the scientific method, how does a scientist test hypotheses?
10. by defending an opinion
11. by interpreting graphs
12. by experiments
13. by stating conclusions

1. A hypothesis must be:
2. proven correct
3. testable
4. observed
5. experimental
6. A group that is treated exactly like the other experimental groups except that the variable is not applied to it and nothing is changed is called a(n) \_\_\_\_ group. a. dependent b. independent c. responding d. control
7. In order for Mr.D’s experiment to be valid and fair scientifically, all groups must:

a. receive the same quiz

b. receive sunflower seeds

c. have the same number of boys and girls

d. all of these

1. Handing out sunflower seeds to students was the variable that Mr. D tweaked or changed in the experiment. We call this the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or manipulated variable. a. dependent b. independent c. responding d. hypothesis
2. A good way to organize and record your results and observations is \_\_\_\_.

a. in a data table

b. by using a calculator

c. with a balance or spring scale

d. by having a hypothesis before you begin your experiment

11. Facts, figures, and other evidence learned through observation and experimentation are called

* 1. variables.
  2. experiments.
  3. questions.
  4. data.

12. In a controlled experiment, the dependent variable is \_\_\_\_.

* 1. the measured results of the experiment
  2. the variable that stays the same
  3. changed to test the hypothesis
  4. always time

13. When Mr. D. decided whether or not the data supported his hypothesis, he was

* 1. making an inference.
  2. making an observation.
  3. drawing a conclusion.
  4. posing a question.

14. When passing out the quiz and sunflower seeds, Mr. D had a student give him the sunflower seeds back. What inference might he make about the return of the seeds?

1. They do not like sunflower seeds
2. They are well prepared to take the quiz
3. The student is ready to take the quiz
4. They are skillful at counting.

15. What is one inference that could be made concerning the drop in student scores and sunflower seeds?

16. How was the data collected quantitative instead of qualitative?

17. Which of the following criteria were met by this experiment and specifically mentioned in the passage. Circle all that apply. (Consistent)(Observable)(Natural)(Predicable)(Tentative)(Testable)

IS IT SCIENCE? IS IT A SCIENTIFIC STATEMENT? Six Criteria of Science: **C**onsistent, **O**bservable, **N**atural, **P**redictable, **T**estable, and **T**entative. The sequence is not important, but the acronym "CONPTT" makes a good long term memory hook.

Take the statements below and qualify them as scientific (S) or non-scientific (N), based on the six CONPTT criteria. If they are non-scientific, explain which of the six criteria is not met.

18.\_\_\_\_\_\_ Green plants will grow toward a light source. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. \_\_\_\_\_\_ Walking under a ladder will cause bad luck. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20.\_\_\_\_\_\_\_ Extraterrestial beings have visited earth. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

21. \_\_\_\_\_\_\_ Ghosts always wear clothes. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

22. \_\_\_\_\_\_ Without sunlight, green plants will die. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_