FCAT Review – The Practice of Science

SC.8.N.1.1 Define a problem from the 8th grade curriculum using appropriate reference materials to support scientific understanding; plan and carry out scientific investigations of various types, such as systemic observations or experiments; identify variables; collect and organize data; interpret data in charts, tables, and graphics; analyze information; make predictions; and defend conclusions. (Also assesses SC.6.N.1.1 6th grade curriculum and SC.7.N.1.1. 7th grade curriculum)

SC.6.N.1.3 Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.

SC.7.N.1.3 Distinguish between and experiment (which must involve the identification and control of variables) and other forms of scientific investigation, and explain that not all scientific knowledge is derived from experimentation.

SC.7.N.1.4 Identify test variables (independent variables) and outcome (dependent variables) in an experiment.

SC.8.N.1.3 Use phrases such as “results support” or “fail to support” in science, understanding that science does not offer conclusive “proof” of a knowledge claim.

SC.8.N.1.4 Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.

Essential Questions and Answers

1. **What is a hypothesis?**

   A hypothesis is a possible answer to a scientific question and it must be testable. It is not a guess since it is based on scientific background knowledge (research), prior experience, preliminary observations, and logic. A hypothesis can either be supported or fail to be supported by data from an experiment, but it cannot be “proven”.

2. **What is a test variable (independent variable)?**

   The test variable (independent variable) is the variable that is purposely changed to test the hypothesis. (Independent variable – I can control it)

3. **What is the outcome variable (dependent variable)?**

   The outcome variable (dependent variable) is the variable that may change in response to the test variable (independent variable).

4. **What is a controlled experiment?**

   An experiment to test a hypothesis in which only one variable is manipulated at a time, data is collected, and results analyzed to form a conclusion.

5. **What are other types of scientific investigations?**

   - observational research
• opinion based research
• making models

6. **You need to be able to:**
   * Interpret data in a chart, table, graph, or other graphic
   * Analyze data to make a prediction
   * Defend a conclusion using data

**Sample Questions**

1. Pat has two kinds of plant food, “Quickgrow” and “Supergrow”. What would be the best way for Pat to find out which plant food helps a particular type of houseplant grow the most?

   A. Put some Quickgrow on a pant in the living room put some Supergrow on a plant of the same type in the bedroom, and see which one grows the most.
   B. Find out how much each kind of plant food costs, because the most expensive kind is probably better for growing plants.
   C. Put some Quickgrow on a few plants, put the same amount of Supergrow on a few other plants of the same type, put all plants in the same place, and see which group of plants grow the best.
   D. Look at the advertisements for Quickgrow and Supergrow to see which one says it helps plants grow the most.

2. Colleen waters the plants in her greenhouse once everyday. She wants to find out if the plants will grow more leaves if they are watered more often. She counts the number of leaves on each plant before she starts. She then continues to water half of each type of plant once daily, but she waters the other half of each type twice a day. What is the outcome variable (dependent variable)?

   A. the type of plant being grown
   B. the number of leaves the plant grows
   C. the amount of light the plant receives
   D. the number of times the plants are watered

3. Christy wants to find out if the birds that visit the bird feeders in her backyard would rather build nests in birdhouses or in trees. She puts a birdhouse next to the feeder containing sunflower seeds and hangs a feeder containing cracked corn from a tree. She observes the birds’ nesting activities over the next two weeks and records her observations. Which of the following would improve Christy’s investigation?

   A. Putting more food next to both bird feeders
   B. Setting the feeders up closer to each other
   C. Putting the same kind of food in both bird feeders
   D. Setting up a third bird feeder containing fruit near a bird bath