NAME_____

SCSh 1-9. Characteristics of Science Standards

Opening: Define the vocabulary word you received below and be prepared to explain what your word means in relation to science.

The Scientific Method is a Process

| | |
|---|---|
| Introduction/Background research | |
| Hypothesis | |
| Experimental design | |
| Collect/Analyze data | |
| Conclusion | |
| Publish | |

Related Vocabulary Terms:

1. Independent variable-
2. Dependent variable-
3. Constants-
4. Control-
5. Quantitative-
6. Qualitative-
7. X-axis-
8. Y-axis-

*Directions:* For each of the following scenarios write a hypothesis and determine the variables indicated.

**Scenario 1 Brands of Car Wax**

Jack wanted to test which brand of car wax was most effective. He tested four brands of wax. He cleaned the hood of his car and removed the old wax. He measured four equal sections on the hood of the car. Each of the waxes was used to cover a section. An equal amount of wax, the same type of rag, and equal buffing were used. Five drops of water were placed on each square, and the diameter of each drop was measured (cm) (quantitative). Jack could have used a qualitative dependent variable by developing a rating scale for amount of shine, from dull to very shiny.

Hypothesis: If _____then_____.

Independent Variable: Constants:

Dependent Variable: What could Jack use as a control?

**Scenario 2 Compost and Bean Plants**

After learning about recycling, members of John's biology class investigated the effect of various recycled products on plant growth. John's lab group compared the effect of different-aged grass compost on bean plants. Because composition is necessary for release of nutrients, the group hypothesized that older grass compost would produce taller bean plants. Three flats of bean plants (25 plants/flat) were grown for 5 days. The plants were then fertilized as follows: (a) Flat A: 450 g of 3-month-old compost, (b) Flat B: 450 g of 6 month-old compost, and (c) Flat C: 0 g compost. The plants received the same amount of sunlight and water each day. At the end of 30 days the group recorded the height of the plants (cm).

Hypothesis: If _____then_____.

Independent Variable: Constants:

Dependent Variable: Control:

**Scenario 3 Perfumes and Bees' Behavior**

JoAnna red that certain perfume esters would agitate bees. Because perfume formulas are secret, she decided to determine whether the unknown Ester X was present in four different perfumes by observing the bee's behavior. She placed a saucer containing 10 mL of the first perfume 3 m from the hive. She recorded the time required for the bees to emerge and made observations on their behavior. After a 30-minute recovery period, she tested the second, third, and fourth perfumes. All experiments were conducted on the same day when the weather conditions were similar; that is, air temperature and wind.

Hypothesis: If _____then_____.

Independent Variable: Constants:

Dependent Variable: Control:

**Scenario 4 Fossils and Cliff Depth**

Susan observed that different kinds and amounts of fossils were present in a cliff behind her house. She wondered if changes in fossil content occurred from the top to the bottom of the bank. She marked the bank at five positions: 5, 10, 15, 20, 25 m from the surface. She removed 1 bucket of soil from each of the positions and determined the kind and number of fossils in each sample.

**Scenario 5 *Aloe vera* and Planaria**

Jackie read that *Aloe vera* promoted healing on burned tissue. She decided to investigate the effect of various amounts of *Aloe vera* on the regeneration of planaria. She bisected the planaria to obtain 10 parts (5 heads and 5 tails) for each experimental group. She applied concentrations of 0%, 10%, 20%, and 30% *Aloe vera* to the groups. Fifteen mL of *Aloe vera* solutions were applied. All planaria were maintained in a growth chamber with identical food, temperature, and humidity. On day 15, Jackie observed the regeneration of the planaria parts and categorized development as full, partial, or none.