Experimental Design Practice Questions

Experimental Design Practice #1

Sam wished to investigate how fertilizer run-off affects the growth of algae in freshwater lakes and streams. He set his experiment up this way.

- He placed 900 Ml of water into (5) 1,000 Ml glass beakers
- To each beaker he added 5 Ml of water from an aquarium which contained a large concentration of algae.
- The beakers were placed under a growth light which was timed to provide 12 hours of light each day.
- Liquid fertilizer was added to the beakers in the following amounts

Beaker 1	no fertilizer
Beaker 2	2 ml of fertilizer
Beaker 3	4 ml of fertilizer
Beaker 4	6 ml of fertilizer
Beaker 5	8 ml of fertilizer

Each week a random sample from each of the beakers was examined under a microscope to get a count of the number of algae cells present.

1. Independent variable _____
2. Dependent variable _____
3. Control Group _____
4. Constants _____

Experimental Design Practice #2

Brittany wanted to find out which wheels were the best for her skateboard. She purchased 4 new different sets of wheels (all different brands). She and a friend set up a course on her driveway. Brittany rode through the course 5 times on each set of wheels, including her original wheels. Her friend timed her with the same stopwatch each time and recorded the times in a data table. They then averaged the times for each set of wheels.

1. Independent variable _____
2. Dependent variable _____
3. Control Group _____
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4. Constants _____

GLUE / STAPLE HERE

Experimental Design Practice #3

Henry wanted to know if the amount of salt in water would affect how quickly the salt would dissolve. He did some research about the chemical components of salt and water. After doing his research, Henry suggested a solution to the problem. He believed the more salt that was added to the water the faster the salt would dissolve. He set up the following experiment to see if he was correct.

Using large glass beaker, Henry placed the following amount of salt in 400mL of water.

Beaker A - 6 grams
Beaker B - 12 grams
Beaker C - 18 grams
Beaker D - 24 grams
Beaker E - 30 grams
Beaker F - 0 grams

Henry used the same stirring pace and stirred the water until no more salt crystals could be seen in the beakers. Using his stopwatch, he timed how long it took for the salt in each beaker to dissolve.

He repeated the entire procedure two more times.

1. Problem: _____
   _____
2. Hypothesis: _____
   _____
3. Independent variable: _____
4. Dependent variable _____
5. Control Group _____
6. 4 Constants _____
   _____

GLUE / STAPLE HERE

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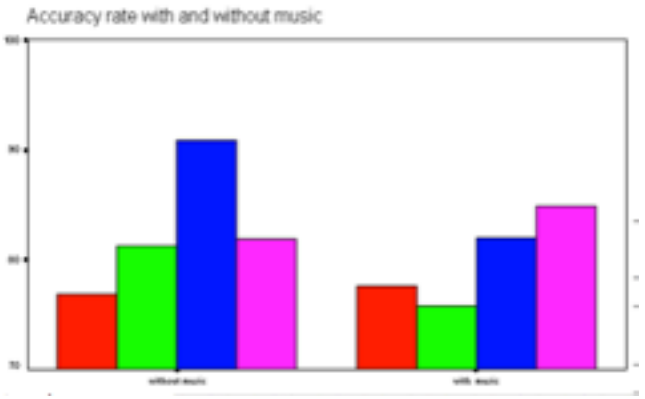
   _____

GLUE / STAPLE HERE

Experimental Design Practice #4.

John's parents would not let him study while listening to CD's in his room. They told him that he could not concentrate with the background noise. He decided to test this idea with an experiment on his class. Each Friday his English class took a vocabulary quiz on 25 new words learned that week. John got his teacher's permission to try his experiment with eight classmates. On the first Friday there was a test, he played a rock song in the classroom while the class took the test. All eight students maintain an A average. Four are female, four are male. The first four, two males & two females, studied the vocabulary words with music, the second four, two males & two females, studied the same words without music. The following Friday the class took the test with the normal quiet atmosphere of a classroom. John calculated the average score on the two vocabulary tests.



1. Problem: _____
   _____
2. Hypothesis: _____
   _____
3. Independent variable _____
4. Dependent variable _____
5. Control Group _____
6. Constants _____
7. Conclusion: _____
   _____

GLUE / STAPLE HERE

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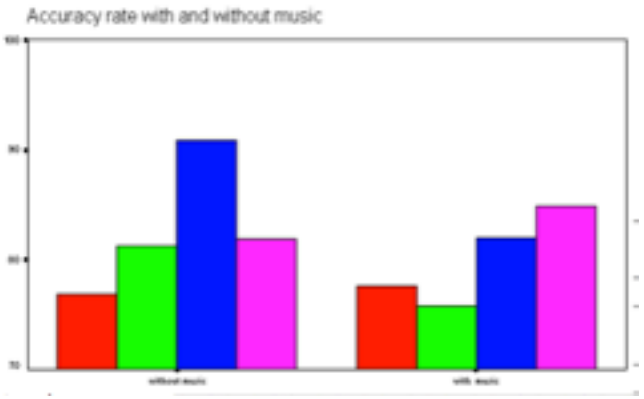

1. Problem: _____
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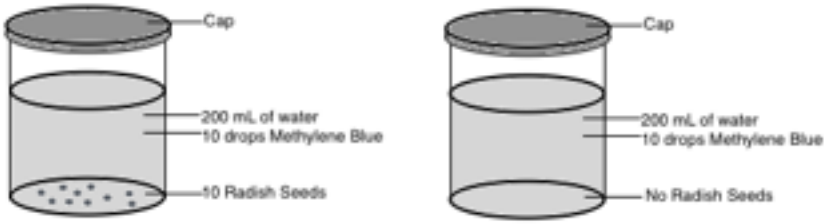
7. Conclusion: _____
   _____

GLUE / STAPLE HERE

Experimental Design Practice #5

A student set up the experiment below to determine of radish seeds take up oxygen as they germinate. Methylene blue is a chemical that is blue when oxygen is present, but is colorless when oxygen is not present.



Identify the following parts:

1. Underline the Experiment (Scientific Question).
   - Dependent Variable: _____
   - Independent Variable: _____
2. Control Set-Up (comparison): _____
3. Experimental Set-Up: _____
4. Constant (may be more than one): _____

_____

Experimental Design Practice #6

Sarah and Michael tested electromagnets to see if the size of the wire they used would make the magnets stronger. They selected 6 steel nails of the same size to make the magnets. Using 6 different sizes of insulated wire, they put 50 turns around each nail. Then each nail was hooked to 2 "D" cell batteries to make the electromagnet. The strength of each magnet was tested by counting the number of paper clips which could be picked up by each magnet.

1. Independent variable _____
2. Dependent variable _____
3. Control Group _____
4. Constants _____

GLUE / STAPLE HERE

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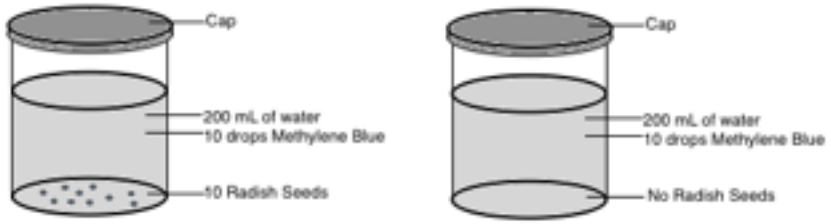

Identify the following parts:

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   - Dependent Variable: _____
   - Independent Variable: _____
2. Control Set-Up (comparison): _____
3. Experimental Set-Up: _____
4. Constant (may be more than one): _____

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