Name _____ Date _____

Scientific Method Vocabulary Review

Step 1: Question	Ask a question about a problem. (EX: Sugar is not good for people but honey is. Can honey be used instead of sugar in cookies?)
Step 2: Research	Conduct research to learn more about the problem. (EX: review information and experiments.)
Step 3: Hypothesis	Make an educated guess. (EX: Honey will change the texture and taste of cookies so will not be a good substitute.)
Step 4: Experiment	Conduct a structured experiment. (EX: Bake cookies using the same recipe with sugar and honey then compare the texture and taste.)
Step 5: Data Collection	Collect data and keep records. (EX: Have the same people try the cookies and give feedback.)
Step 6: Data Analysis	Analyze the data. (EX: Review their feedback and analyze what it means.)
Step 7: Conclusion	Reach a decision whether your hypothesis was correct or not. (EX: Decide if your hypothesis was correct or not.)

Match the scientific method steps to the examples.

a) question b) hypothesis c) research d) experiment
e) data collection f) data analysis g) conclusion

Butterflies and Flowers

1) She researches information about flowers and butterflies.

2) She puts lavenders and lilies on different sides of a garden, then for three hours per day she counts how many butterflies fly over to each type of flower.

3) Sara wonders which flower will attract the most butterflies.

4) She keeps careful records and notes of how many butterflies fly over to each flower during the three hours per day.

5) She guesses that lavender will attract more butterflies than lilies.

6) She concludes that lavender attracts the most butterflies, and decides her hypothesis was correct.

7) She analyzes all of her data to help herself reach a decision of whether her hypothesis was correct.

Put the scientific method steps in order from 1-7.

8) conclusion

9) hypothesis

10) data collection

11) research

12) question

13) data analysis

14) experiment

Variables

A variable is something that is **able** to **vary**. **Vary** is another word for change, just as the weather can **vary** from day to day, and what we wear **varies** depending on the weather.

In an experiment, variables are what the scientist changes AND what is changed by the experiment. The variable the scientist changes is called the INDEPENDENT VARIABLE. The variable that changes due to the experiment is called the DEPENDENT VARIABLE.

To better understand independent and dependent variables, review the example below.

RESEARCH QUESTION:

Scientist Smith wonders what can make grass seeds grow grass faster.

HYPOTHESIS:

He hypothesizes that if the grass is watered with a hose after the seeds are placed, the new grass will grow faster.

EXPERIMENT:

First, he divides a lawn into two equal parts. Both sides have the same type of dirt, get the same amount of sun, and are in the same yard. He uses a seeder to place the same brand of grass seeds evenly over both sides of the lawn. Both sides receive the same number of seeds and are done the same day.

INDEPENDENT VARIABLE:

Next, Scientist Smith uses a hose to water the grass seeds on **ONLY** SIDE A, but he **DOES NOT** water SIDE B. His watering only one side is called the **INDEPENDENT VARIABLE** because he independently decided and did it.

DEPENDENT VARIABLE:

How tall the grass on each side grows is the **DEPENDENT VARIABLE** because it ***depends*** on whether it was watered or not.

DATA COLLECTION:

Every three days for one month Scientist Smith measures how tall the new grass has grown for SIDE A and SIDE B. He records all measures in a chart.

RESULTS:

He finds that within one month, the grass on SIDE A in one month grew 7 inches tall while the grass on SIDE B only grew 5 inches. Also, the grass on SIDE A began sprouting within three days while the grass on SIDE B did not begin sprouting until 5 days. After that the grass on SIDE A was found to grow at a faster rate at every measurement.

CONCLUSION:

Based on his data, Scientist Smith concluded that watering the grass after the grass seeds were placed made the SIDE A grass grow faster. Therefore, he concluded that watering the lawn after putting down grass seeds is an effective way to make new grass grow faster.

To review, in experiments the INDEPENDENT VARIABLE is what is done by the scientist to cause a change. The DEPENDENT VARIABLE is what will change because of what the scientist is done.

Answer the questions.

15) In an experiment, what will change because of something done to it is the _____.

16) In an experiment, what is done by the scientist to change something else is the _____.

17) A student had trouble waking up on time in the morning. He only used his phone alarm and did not always hear it. He decided to use a regular alarm clock to see if he would hear it better and wake up on time. He tried it for five days and woke up on time each day.

Which is the independent variable (IV) and which is the dependent variable (DV)?

Whether he would wake up on time.

Using a regular alarm clock.

17) Ann decided to study five days instead of three days per week for her weekly math test to see if it would increase her grades.

Which is the independent variable (IV) and which is the dependent variable (DV)?

Studying five days per week instead of three

Whether her math test grades would increase

CONSTANTS

A **CONSTANT** in an experiment is something that stays the **SAME** for all subjects in the experiment. For example, review the things that stayed the same for SIDE A and SIDE B of the lawn in the experiment done by Scientist Smith:

"First, he divided a lawn into two equal parts, Side A and Side B. Both sides were the exact **same** size, had the **same** type of dirt, got the **same** amount of sun, were exposed to the **same** weather, and were in the **same** yard. He uses the **same** seeding machine to place the **same** brand of grass seeds evenly over both sides of the lawn. Both sides receive the **same** number of seeds and were planted on the **same** day.

All the things that stayed the **SAME** in the grass experiment were the **CONSTANTS**. It is important to have constants so scientists know changes came from what they do in the experiment, not other factors.

18) There were nine constants in the grass experiment. List them:

a) d) g)
b) e) h)
c) f) i)

19) Mr. Brown wanted to see which drink mix dissolved quickest. He tried five different drink mixes while keeping the type and size of glass, the spoon, amount of water, and water temperature the same.

What were the constants?

20) Why is it important for all experiments to have constants?