Modified Assessment for Experimental Design

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

WORD BANK

Hypothesis Observation Prediction Experiment

Dependent Variable Independent Variable

**Fill in the blank:** (10 points) Words may be used once, more than once, or not at all.

Designing a **science experiment** begins with making an 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The next step is to propose an **explanation**, which is called a 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Scientists then design an **investigation** which is carried out under controlled conditions and is called an 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Choosing variables for the study is important. The **variable** that the investigator directly **manipulates** is called the 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The **responding variable** is called the5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

WORD BANK

Control Group Prediction Hypothesis Quantitative Data Conclusion Quantitative Data Experimental Group

Scientific Method

If **data** from the experiment can be **measured using instruments**, it is called 6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A well-designed experiment also has an **untreated group** that can be compared to the experimental group. This is the 7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . Investigators then **analyze their data** using tables and graphs so that a 8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

can be drawn. This may **support or reject** the **initial** 9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . These **steps** are called the

10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

**Matching**: (10 points)

1.\_\_\_\_\_\_Hypothesis A. A phenomenon that can be witnessed and recorded.

2.\_\_\_\_\_\_ Scientific Method B. A possible explanation for the observations made.

3.\_\_\_\_\_ Observation C. Manipulated variable.

4.\_\_\_\_\_ Independent Variable D. Descriptive statements based on the five senses

5.\_\_\_\_\_\_ Qualitative Data E. step-by-step process that starts with making observations and ends with .  communicating experimental results

6. \_\_\_\_\_\_Experiment F. A procedure carefully done to examine the validity of a hypothesis.

7. \_\_\_\_\_\_Quantitative Data G. The variable a researcher is measuring.

8. \_\_\_\_\_\_Dependent Variable H. A statement of an observable occurrence that seems to have no

exceptions.

9. \_\_\_\_\_\_Lab Safety I.  Eye goggles, first-aid kit

10. \_\_\_\_\_\_ Scientific Fact J. Data that can be counted and measured.

**Multiple Choice**: (10 points)

1.In an experiment, the researcher **manipulates (changes)** the:

1. Dependent Variable
2. Independent Variable
3. All Variables

2. Sam is trying to find the best place to put his computer so that it has the strongest signal. All the following are independent variables **except**:

a. the number of devices on the router

b. the signal strength at the computer

c. the distance between the computer and the router

3. Choose the correct **order of steps** according to proper scientific methods:

a. Hypothesis, Observation, Pose Question, Prediction, Analysis, Conclusion, Design Experiment

b. Prediction, Analysis, Design Experiment, Hypothesis, Conclusion, Pose Question, Observation

c. Observation, Pose Question, Hypothesis, Prediction, Design Experiment, Analysis, Conclusion

4. Carlita wants to measure 35cc of saline for her experiment. Which of the following should she grab from the supply cupboard to **measure** this?

a. test tube

b. magnifying lens

c. graduated cylinder

5.Juanita decides that if she posts her selfie at 8pm, she’ll get the most likes. This is an example of:

a. An Independent Variable

b. A Hypothesis

c. An experiment

6. Malaria is a serious disease that people can get if they are bitten by mosquitoes carrying the malaria parasite. Recently, scientists have been able to modify (change) the genes in some mosquitoes so that they cannot spread malaria. In their experiment, they take modified mosquitoes and non-modified mosquitoes and see which group might cause more malaria. In the experiment, the control group is the:

a. modified mosquitoes

b. non-modified mosquitoes

c. malaria parasite

7. A scientist was in line to pay for groceries, and she noticed that on the front of a magazine it said, “Investigators discover new pill for weight loss!” Being skeptical, the scientist wanted to determine if the claims were true. Which of the following would be the best way to proceed?

a. Formulate a hypothesis

b. Identify the problem

c. Conduct an experiment

### 8.  Which of the following statements is true?

a. It's only important to know where safety equipment is during an accident, not before

b. Even with proper precautions lab accidents still occur

c. All lab accidents are preventable

### 9. What is the purpose of a ventilation hood?

A. To contain gases, fumes, and vapors

B. To contain lab fires

C. To provide a safe breathing area if there is a lab explosion

10. How many independent variables should be in a well-designed experiment?

A. 0

B. 1

C. 2-3

**Critical Thinking:** (10 points)

In the following scenarios, identify the Independent Variable (IV) and the Dependent Variable (DV)

1. LaTonya wants to see if Fertilizer effects the size of tomatoes.

IV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Carlos wants to know if the cat population where he lives is influenced by the dog population.

IV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Sydney wants to know if studying computational biology for 15 extra minutes per day will improve her next exam grade.

IV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Angel wants to know if the weight of her prize pig will effect the number of piglets in the litter.

IV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
DV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Jack wants to know if not drinking a soda every day will improve his next dental check-up.

IV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#### Why is it important to evaluate the works of other scientists?

1. To make sure that no one scientist gets all the credit
2. To point out all the things they did wrong
3. To produce the best possible science

1. In evaluating whether the scientific evidence provided supports the conclusions, what is the first thing to take into consideration?
2. What exactly the conclusions are
3. How long ago the experiment was performed
4. The quality of the data

#### What is the first step of the Scientific Method?

1. Analyzing data
2. Making observations
3. Asking scientific questions

#### What must happen before you can analyze data?

1. Run an experiment
2. Make observations
3. Both are correct
4. What is necessary before a good hypothesis can be created?
5. A scientific question needs to be asked
6. Conclusions need to be drawn
7. An experiment needs to be run

**Design an experiment:** (14 points)

Aaron loves to bake bread. He read in an article that adding vital wheat gluten to the flour makes the bread rise higher. Design an experiment that Aaron could perform to see if this is true.

1. What would be a correct Hypothesis? (3 points)
2. vital wheat gluten doesn’t work.
3. Vital wheat gluten makes dough stronger so it rises higher
4. Vital wheat gluten is added to flour.

What materials will be required for the experiment? (3 points)

1. Bread pans, chopsticks, scale
2. The bread dough, vital wheat gluten, a ruler
3. Microwave, strainer, scissors
4. Number the following in order with #1 as your first step:

\_\_\_\_ Analyze the results

\_\_\_\_ Bake the bread

\_\_\_\_ Determine the heights of the loaves

\_\_\_\_ Form a conclusion

\_\_\_\_ Put the data in a table

\_\_\_\_ Add vital wheat gluten to one loaf and none to the other loaf

Design a blank table that could be used for results: (2 points)

Put the following in order with the number 1 as your first step: (6 points):\_\_\_\_ Form a hypothesis