Name: _____ Period: _____ Date: _____

Planning an Investigation Assignment – Student Edition

I. Multiple Choice

Each sentence below describes a step in a scientific investigation. Match each sentence with a step of the scientific method listed below. Write the **letter** of the correct answer on the blank.

A. identifying a problem
B. formulating a hypothesis
C. testing the hypothesis with an experiment
D. collecting data and results

_____ 1. Stephen predicted that seeds would start to grow faster if an electric current traveled through the soil in which they were planted.

_____ 2. Jonathan's data showed that household cockroaches moved away from raw cucumber slices.

_____ 3. Rene grew bacteria from the mouth on special plates in the laboratory. She placed drops of different mouthwashes on bacteria on each plate.

_____ 4. Kathy used a survey to determine how many of her classmates were left-handed and how many were right-handed.

_____ 5. Jose saw bats catching insects after dark. He asked, "How do bats find the insects in the dark?"

_____ 6. Alice soaked six different kinds of seeds in water for 24 hours. Then she planted the seeds in the soil at a depth of 1 cm. She used the same amount of water, light, and heat for each kind of seed.

_____ 7. Kevin said, "If I grow five seedlings in red light, I think the plants will grow faster than the five plants grown in white light."

_____ 8. Justin wondered if dyes could be taken out of plant leaves, flowers, and stems.

_____ 9. Angela's experiment shows that earthworms move away from light.

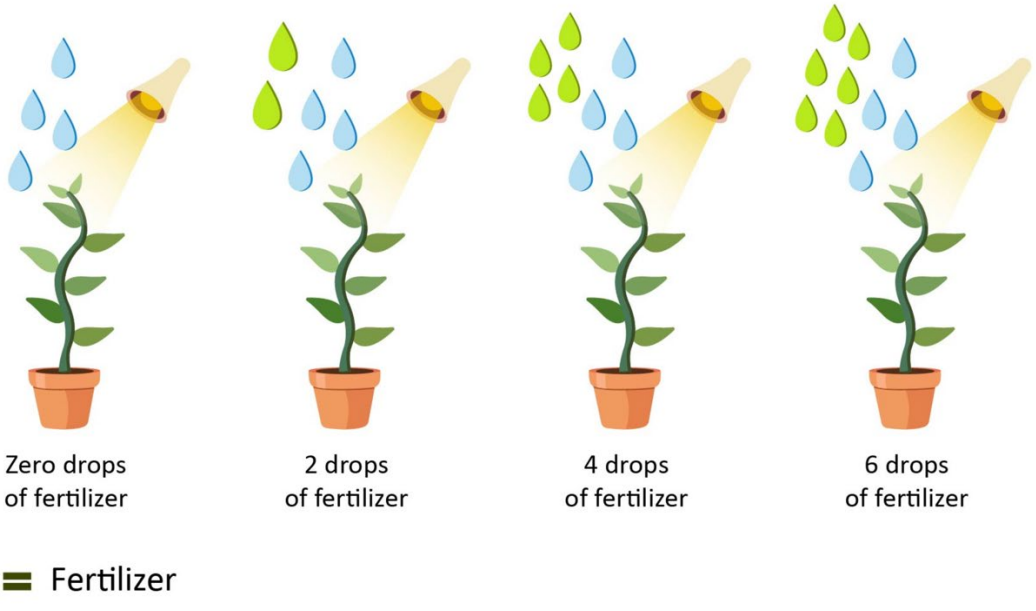
_____ 10. Bob read about growing plants in water. He wanted to know how plants could grow without soil.

Name: _____ Period: _____ Date: _____

Planning an Investigation Assignment – Student Edition

II. Identification

Analyze the below diagram of an experimental setup. Then, identify the three main variables in this experiment.



Independent Variable	Dependent Variable	Controlled Variables
(1)	(2)	(3)
		(4)
		(5)

Which is the control group in the experiment?

_____

Which is the experimental group?

_____

Name: _____ Period: _____ Date: _____

Planning an Investigation Assignment – Student Edition

III. Planning an Investigation

Apply what you have learned about the scientific method by writing down a plan of investigation based on the given problem below.

How does the temperature of water affect the rate of spreading food coloring?

1. What hypothesis can you formulate based on the given problem? **Use the if and then format in formulating your hypothesis.**

   _____

   _____

   _____

Below is the list of equipment that you have access to in doing this investigation:

Equipment List

- ✓ beaker (250 mL)
- ✓ cold water source
- ✓ hot water source
- ✓ food coloring
- ✓ pipette
- ✓ stopwatch

2. Based on the list of materials, can you tell which variable are you changing in this experiment? What kind of variable is this?

   _____

   _____

   _____

Name: _____ Period: _____ Date: _____

Planning an Investigation Assignment – Student Edition

3. Which variable will result from the change you made in this experiment? What kind of variable is this?

_____

_____

_____

4. How will you measure the dependent variable in this experiment?

_____

_____

_____

5. Which factors should you keep **constant** as you test your hypothesis? How will you control each variable?

_____

_____

_____

_____

_____

_____

_____

_____

6. Write a step-by-step method that describes how to carry out this investigation.

_____

_____

_____

_____

_____

_____

_____

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_____

_____

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_____

7. Explain the importance of carrying out a trial of the experiment.

_____

_____

_____

_____

_____

8. On the space below, draw a diagram or a flowchart to show how you will set up and run your experiment.

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9. Design a results table that you could use to record your results.

10. Describe how you could make sure that your investigation is reliable.

_____

_____

_____

_____

_____