

Writing Up an Investigation Assignment – Teacher Edition

Best Stain Remover

Background Information:

Many brands of liquid detergent are sold in the groceries. Each brand claims that it is the best when it comes to stain removal. But which one is really the best? You will find out in this laboratory activity which involves planning, conducting, and writing up a scientific investigation.



Learning Objective:

At the end of this laboratory activity, students are expected to:

- Plan, carry out, and report which brand of liquid detergent is best to use for stain removal.

Laboratory Proper:

In this laboratory, you will have access to the following equipment to help you collect data.

- 3 different brands of liquid detergent
- 3 pieces 4" x 4" white cloth
- pipette
- food coloring
- beakers
- stopwatch

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5. Draw a labelled diagram of your experimental set-up in the space below.

6. Conduct limited trials to check if your method is workable. Place any notes from your trials in the space below.

7. List any changes that you need to make to your method in the space below. If no changes are required, leave this section blank.

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Task 2: Conducting your Investigation

Carry out your experiment and collect data which allows a trend to be observed.

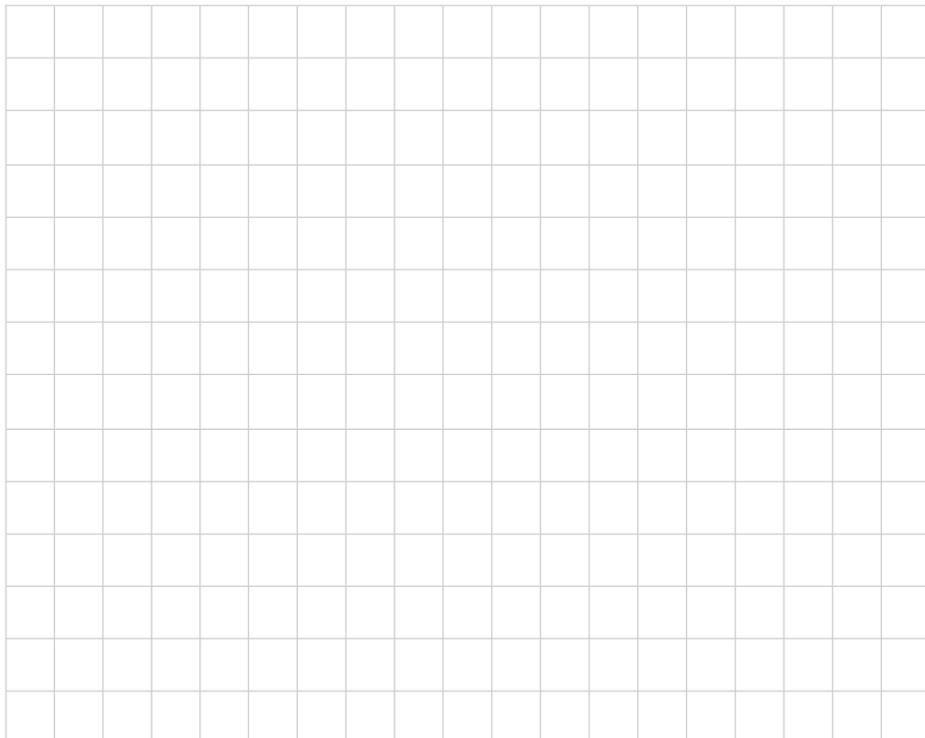
8. Draw a results table in the space below to record any measurements you obtained. You may also leave a space in your table for any processing you will do in Task 3.

Task 3: Writing Up your Investigation

Process and interpret your data to allow any trends to be identified and described.

9. Calculate the averages and present your data as a graph in the grid below. Remember to use an appropriate scale and labels.

Title: _____



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10. Write an interpretation of your data.

11. Summarize your findings as a conclusion which answers the hypothesis of the investigation.

12. Evaluate your investigation using the following criteria:

a. Identification of any outliers in your data and how they affected the trend.

b. Limitations to the investigation / difficulties faced in collecting your data.

c. Improvements you would make if you could repeat the investigation again.

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Learning Objective:

At the end of this laboratory activity, students are expected to:

- Plan, carry out, and report which brand of liquid detergent is best to use for stain removal.

Teacher Instruction:

The activity can be executed in a variety of ways depending on the class and whether this is to be a formative or summative assessment. For example:

- The planning and writing up can be done as individual tasks under test conditions with the experiment itself completed in small groups. It is recommended that students ensure that they have a copy of the data before beginning the write up.

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- The planning and experiment can be done in small groups and the write up completed as an individual task.
- All three parts can be carried out as a formal assessment under test conditions.

Laboratory Proper:

In this laboratory, you will have access to the following equipment to help you collect data.

- 3 different brands of liquid detergent
- 3 pieces 4" x 4" white cloth
- pipette
- food coloring
- beakers
- stopwatch

Task 1: Planning the Investigation

Write a scientific plan which shows how you will carry out your experiment.

1. Formulate a hypothesis for your investigation.

Any sensible answer. Ex. If the stain was removed at a fastest rate, then the detergent is considered as the best stain remover.

2. Write down the variables for your investigation.

Independent Variable	Dependent Variable	Controlled Variables
Different brands of liquid detergent	Rate at which the stain was removed	Amount of food coloring
		Kind of cloth
		Size of cloth

3. Describe how you will measure the dependent variable for this investigation to obtain some data.

By measuring the time it would take for the stain to be removed after the cloth with stain is soaked in water with liquid detergent.

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4. Write a detailed method which describes how you will collect your data.

1. Put three drops of food coloring on each cloth. Let it dry for 5 minutes.

2. Measure 150 mL of water in each beaker. Add 10 drops of the first brand of liquid detergent in the first beaker, the 10 drops of the second brand of liquid detergent on the second beaker, and 10 drops of the third brand of liquid detergent on the third beaker. Label each beaker with the brand of the detergent.

3. Soak each cloth with stain in the beaker with liquid detergent. Make sure to soak each cloth at the same time.

4. Record the time it will take for the stain to be removed.

5. Draw a labelled diagram of your experimental set-up in the space below.

Students may draw a labeled diagram of their beakers with cloth inside it. Diagrams do not have to be correct scientific drawings.

6. Conduct limited trials to check if your method is workable. Place any notes from your trials in the space below.

Answers here may vary depending on the proficiency of the student to write a method.

7. List any changes that you need to make to your method in the space below. If no changes are required, leave this section blank.

Answers here may vary depending on the proficiency of the student to write a method.

Task 2: Conducting your Investigation

Carry out your experiment and collect data which allows a trend to be observed.

8. Draw a results table in the space below to record any measurements you obtained. You may also leave a space in your table for any processing you will do in Task 3.

Results may vary. Table should show independent variable on the left-hand side, clearly labelled and the dependent variable across the top row of the table.

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Brand of Liquid Detergent	Time of Stain Removal (in minutes)			
	Trial 1	Trial 2	Trial 3	Average
Brand X				
Brand Y				
Brand Z				

Task 3: Writing Up your Investigation

Process and interpret your data to allow any trends to be identified and described.

- Calculate the averages and present your data as a graph in the grid below. Remember to use an appropriate scale and labels.

Graph should have the following attributes:

- Appropriate title
- Labels for both axes
- Appropriate size
- Ruled axes and lines
- Even scales

- Write an interpretation of your data.

Students should rank the detergent based on the length of time it takes for the stain to be removed based on their findings.

- Summarize your findings as a conclusion which answers the hypothesis of the investigation.

Conclusion must reflect results of the investigation and interpretation of data. The conclusion must also mention both the independent and dependent variables.

- Evaluate your investigation using the following criteria:

- Identification of any outliers in your data and how they affected the trend.

Students should quote outlying data if there's any and explain how it affects the general trend

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- b. Limitations to the investigation / difficulties faced in collecting your data.

Any challenges students faced related to measuring and collection of data must be mentioned here

- c. Improvements you would make if you could repeat the investigation again.

Answers here may vary