

## The Lipstick Experiment

At first thought, Jack was horrified to find that he was working with a partner. “You two kids are supposed to design an experiment,” their teacher instructed. “An experiment,” he thought. Jack was well skilled in experimenting with the different types of liquids that would stick to his sister’s face, but an experiment for science class? “Impossible!” Jack’s partner Bridget did not share this same feeling. She was already quickly planning their experiment. “This sounds boring,” he determined. He laid his head down on the lab table and drifted off to sleep.

### SCIENCE FACT #1

**Scientific Method:** The scientific method is a method used by scientists to research and solve problems. Scientists generally use a similar system because it makes it easier to share this information with other scientists. For instance, if a scientist studies the food that a chimpanzee eats, another scientist might decide to use that information and study the type of habitat that the chimpanzee lives in. These two scientists can share this information with each other to make better conclusions on the best way to protect and care for the chimpanzee. The scientific method uses a list of steps to solve problems. There are specific steps in the scientific method; State the Question, Research the problem, State the Hypothesis, Plan the experiment (Procedures), Conduct the experiment, Collect Data (graphing), Analyze the results, State the Conclusion, and Publish the results. These steps may have different names depending on the scientists or the book that they are in, but the order of solving the problems is similar.

As Jack was drifting off to sleep, Bridget was planning their experiment. She thought and thought of different topics to experiment with. She wondered which color of lipstick would stay on the longest. Which brand of perfume attracted the most boys? Which hairspray would stay in the longest? All of these topics, she decided, just had to be tested. She decided that the lipstick experiment was the biggest problem that needed to be solved. She laid down her logbook and went to research her topic.

### Step #1

**State the Question:** To begin the experiment, you will first need to decide on a question that needs to be tested. This question should be something that is meaningful or helpful for society. The question should have a reason for being tested other than that it seems cool. Test something that you have wondered about. If this step stumps you, one good idea is to take a day or two to think about it as you are going about your day. Think about how things work and how they are made. Is there anything that you see or do that makes you wonder how or why it works?

### Step#2

**Conducting Research:** When conducting research make sure that the information you look for is based on your topic. Will the information that you discover send you closer to a conclusion? Try to vary your research and don’t get it from just one source. You will be pulled immediately to the internet. Do not be afraid to dust off an old science book and do some harder research. The internet is great and fast, but often has conflicting results. Be wary of trusting sources that are not well known or established. Government sites are often tested and are well known and established. If you are doing an experiment that deals with space, for instance, the first site to look at would be NASA. You would also be able to find lots of information in encyclopedias and other books related to astronomy. Check out other experiments on the same topics. You might even find that you are one of the first to test your question!

As Jack drifted into a deep sleep, thoughts of the experiment ran through his head. He dreamed about that crazy Science Guy that he remembered from science class. He dreamed that his 3<sup>rd</sup> grade science teacher stood up on a lab table and exploded a rocket. Crazy dreams streamed through Jack's head as Bridget researched their experiment. His dreams suddenly took a turn. Jack began to dream a dream that would ultimately wake him up in sheer terror. He began dreaming that he was walking through a forest surrounded by wild animals. The heat in the forest was almost unbearable. The sweat poured down his forehead and hit him in the eyes. Jack kept walking and walking towards the direction of the clearing. He was not sure what he was walking towards or even why. He just kept walking. As he approached the clearing, something slowed him down. Not sure if it was the fear roaring inside him, or the sense that something was around him, something made him stop just short of his destination. The sounds came loud and clear. There were loud noises almost like a squealing in the distance. Jack could not make out the sound. He could not connect it with anything he knew. He observed the area around him so that he could plan a different escape route, just in case he needed it!

**SCIENCE FACT #2**

**Observation:** the use of your five senses to gather information. Anything that you touch, taste, smell, hear and feel is an observation. There are two types of observations: Quantative and Qualitative. Quantative observations involve measuring. If you use a ruler to measure the height of a plant, then you are using Quantative observation. Qualitative observation is observation with your five senses without the use of a measuring tool.

The sounds were ferocious. The smells were astounding. As Jack cleared the path, he was blown back by the heat, but what he saw he would never forget. There was a fire in the woods that sent all the animals running. The blazes were high enough to set the tops of the trees on fire. The running animals caught Jack's attention as he watched the forest burn. He had seen news footage of this type of event before, but never gave it much thought. He watched as a helicopter dropped water over the fire without much success. He watched worried people looking on as the fire spread. Jack wondered what all of this was caused by and how it could be stopped. Just then a large cloud of smoke blew him back into the woods. He caught his breath and felt all over his body to make sure he was not on fire.

In class, the students suddenly heard loud snorting and snoring sounds coming from Jack. The snoring was so loud that it even woke Jack up from his dream. The entire class burst out laughing. The teacher was not amused. Jack tried to come to his senses, but he was a little disoriented and confused at what had just happened. As he searched around to figure out what he should be doing, he saw his lab partner Bridget gathering supplies. She had paper and glue, and she even had a pink tri-fold board in her hand. Jack rushed over to the supply table.

"Well, look who has decided to join us," Bridget said as she gathered her last materials and went to their seat. Jack asked Bridget why in the world she had a pink tri-fold board. Bridget explained that this was the perfect color to highlight the lipstick they would be

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Date \_\_\_\_\_

testing. She asked Jack if he enjoyed his nap and suggested that he go back to dreaming. Jack wondered why she seemed so mad. He explained to her that he was just thinking about their project and that laying his head down was the best way for him to think.

Bridget laughed and went on recording things into her logbook. Jack told her about his dream and how real it had seemed. Bridget continued to write as Jack talked. Class time would be ending soon and she wanted to get a good start on the project before they left for the day. Jack looked at the experiment that Bridget had planned and defiantly decided that he did not want to turn in a project about lipstick. He would never live that one down, he thought.

Jack told Bridget how real his dream was and tried to get her to listen. She put down the book and told him that he was just dreaming about something that he had seen on TV. Jack told her about the animals running and how scared they seemed. He told Bridget that he thought they should plan their experiment around the animals in his dream.

Bridget did not seem convinced as she looked over the research she had gathered from the internet. Jack told her that they needed to make their experiment about something meaningful. He was searching for some way to convince Bridget not to do the experiment about lipstick, but at the same time, he did want to do a useful experiment.

Bridget stopped what she was doing and told Jack to tell her his ideas. Jack started, "Well, I have not really gotten that far yet." Bridget said, "Well that figures." Jack said, "No, wait, what if we look at an experiment about animal habitats." What if we test different types of trees to see which type resists fire the longest?" Bridget said, "Go on." Jack began, "The animals were all losing their homes and running from the fire. What if we tested different types of trees to see which ones resist fire or burn the slowest? If there was a fire in a forest that had really slow-burning trees, the fire fighters would be able to put it out faster and fewer animal homes would be harmed." Bridget agreed that this might be a better idea than the lipstick experiment. They finally had a question to research. Jack and Bridget began to research their idea.

Jack and Bridget found lots of information on forest fires and why they burn. They learned that drought causes forest fires to be worse by allowing the dry timber to catch fire more quickly and burn up faster. This causes the fires to spread very quickly through a forest. They also discovered that the use of fertilizers can help the trees to stay healthy longer and eliminate dead plants on the forest floor. Jack and Bridget almost jumped as their teacher came over to their desk. Jack immediately and very excitedly told their teacher about their idea. He told the teacher how they were going to design an experiment where they would burn different things to see how fast they could catch fire and burn up. The fear in the teachers face was evident to Bridget. She decided to steer Jack away from fire. This might be deadly, she thought. The teacher told them to plan their procedures carefully when setting up their experiment. She explained to them that if they wanted to do an experiment that involved fire, they would need to get it approved before beginning to burn things. This would involve getting a form signed to make sure it was safe. Bridget definitely thought this was a good idea!

Name \_\_\_\_\_

Date \_\_\_\_\_

This step comes after the hypothesis!

**Procedures List:** a careful and detailed layout of your experiment. This should be recorded step by step in such a way that anyone else could repeat your experiment for future testing. You should note the type of item and the amount used very specifically. If you use one cup of water in your experiment for example, you should state that you used tap water and tell where the water was from, and you should state the amount used in metric units. One 8oz cup would be the equivalent of 237 ml in metric units.

Bridget and Jack still had a lot of work to do with their experiment. Before they could even begin their procedures list, they would need to write their hypothesis. For now, they would have to wrap things up because class was over. Jack and Bridget decided to think about their hypothesis at home that night and come to class ready to talk about it the next day. Bridget wondered if Jack would be just as interested in helping or if he would decide that he needed to lay his head down again. I guess only tomorrow will tell, Bridget thought as they packed up to leave.

**Step#3**

**Stating the hypothesis:** A hypothesis is a testable statement that guides your experiment. It is an answer to your original question. It should be written in an if...then format. It should also be researched and should be written as a guess of what you believe the outcome of the experiment will be. It is often called an educated guess. This simply means that you have researched and educated yourself in the topic at hand and, before beginning, you have determined that this is the best possible outcome of your experiment. The hypothesis is not right or wrong, but it will be supported or not supported by the end of the experiment.

<p style="text-align: center;"><b>Lesson Plan: The Lipstick experiment</b> <b>Designed for students in grade 5</b></p>
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**Students will learn:**

- how to use the scientific method.
- How to use metric units.
- why scientists use the scientific method for designing an experiment.

Example: Student Task #1:

- Students should read the story “The Lipstick Experiment” and then follow it up with brainstorming their own topic. You could use Jack’s method for brainstorming to make it a little bit more fun for the students. You could ask the students to close their eyes and think through their weekend. Tell them to think about anything they saw or used that made them wonder why or how it worked. You might need to lead them into their inquiry by telling them about past experiments. In 2008 at the ISEF science fair a variety of topics were tested. There was a test on which brand of bottle grows bacteria the fastest after it has been refilled and replaced in the refrigerator. There was a test on which beverage stains teeth the fastest. Topics tested at the ISEF fair can be found online.
- This step should be followed up with a question selection and a science fair project.

Example: Student Task #2:

- Students should read the story “The Lipstick Experiment.” You could follow up with a class science fair experiment where you and the students test something in the classroom together. You could then walk through the steps as a class while highlighting all types of things like science safety, following directions, being specific when stating procedures, and each step in the inquiry process.

## The Lipstick Experiment

**Directions:** Use the story “The Lipstick Experiment” to answer the following reading questions. Try to answer as many questions as you can without looking back for the answers. Remember to answer in complete sentences and to watch your spelling.

1. In the story, Bridget and Jack are working on a science fair project together. What is the scientific method that they refer to in the story?

\_\_\_\_\_

2. What are the different steps to the scientific method?

\_\_\_\_\_

3. Mark the following sentence as true or false. The steps to the scientific method are always exactly the same and have to be followed in an exact order.

True  False

Why is it good to follow the scientific method when planning an experiment?

\_\_\_\_\_  
\_\_\_\_\_

4. When writing procedures, what are two rules that should be remembered?

1) \_\_\_\_\_

2) \_\_\_\_\_

5. In the story, you were told how to write a hypothesis. There are four things needed to make a good hypothesis. What are they?

1) \_\_\_\_\_

2) \_\_\_\_\_

3) \_\_\_\_\_

4) \_\_\_\_\_

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

## The Lipstick Experiment

### ANSWER KEY

- 1) In the story, Bridget and Jack are working on a science fair project together. What is the scientific method that they refer to in the story?

**The scientific method is a method used by scientists to research and solve problems.  
The scientific method is list of steps used to solve those problems.**

- 2) What are the different steps to the scientific method?

**There are specific steps in the scientific method; State the Question; Research the Problem; State the Hypothesis; Plan the Procedures; Conduct the Experiment; Collect Data (graphing); Analyze the Results; State the Conclusion; Publish the Results. These steps may have different names depending on the scientist or the book, but the procedure for solving the problems is similar.**

- 3) Mark the following sentence as true or false. The steps to the scientific method are always exactly the same and have to be followed in an exact order.

True  False

Why is it good a good idea to use the scientific method when planning an experiment?

**Scientists generally use a similar system to make it easier to share information with other scientists.**

- 4) When writing procedures, what are two rules that should be remembered?

**Be specific  
Write amounts in metric units.**

- 5) In the story, you were told how to write a hypothesis. There are four things needed to make a good hypothesis. What are they?

**An educated guess;  
An answer to the question;  
A testable hypothesis;  
An if...then statement;**