

Grade 8 Science

Unit 1: Introduction and Safety

The Scientific Method

Today we are going to review the scientific method. To do this we will watch a Mythbusters experiment. Once complete, we will look to define and provide examples, from this experiment, for each of the following:

- Purpose
- Hypothesis
- Equipment
- Procedure
- Safety Precautions
- Independent Variable
- Dependent Variable
- Constant Conditions
- Control
- Observations
- Data
- Discussion
- Sources of Error
- Conclusion

Following today's lesson you will be using most of these in an assignment.



The Scientific Method

Purpose

Definition: The scientific reason the experiment is being conducted. Should include a reference to both the independent variable and dependent variable.

Example: To determine if the use of an eye patch improves the wearer's ability to see better immediately in darker settings.

Hypothesis

Definition: An educated guess as to what the outcome of the experiment will be. Must relate the two variables. It should also provide reasoning to your thoughts.

Example: By not exposing an eye to light a person will be able to see better when in the dark because the rods in the eye will be adjusted already.

Equipment

Definition: A bulleted list of all of the materials required to perform the experiment.

Example: - Pirate Obstacle Course
- Eye Patches
- Timer etc

Procedure

Definition: A numbered, step-by-step list of the actions taken in order to complete the experiment.

Example: 1. Build a pirate themed obstacle course.
2. Participants wear an eye patch, while in the light, for 30 minutes.
3. etc

*These are simplified examples.

Safety Precautions

Definition: Actions taken to ensure the safety of all those involved in the experiment.

Example: While doing the obstacle course, Adam and Jamie wore helmets under their pirate hats.

Independent Variable

Definition: The factors of the experiment that are being tested. The scientist chooses to change the independent variable.

Example: The amount of time the eye has to adjust to light, immediately or 30 minutes of eye patch time.

Dependent Variable

Definition: The factors of the experiment that are being measured. The scientist has no control over the change of the dependent variable.

Example: The amount of time taken to complete the obstacle course.

Constant Conditions

Definition: The factors of the experiment that are not permitted to change. These are things that, if they changed, would affect the outcomes of the experiment. There are often multiple constant conditions.

Example: The same people did the test as the independent variable changed.
The same obstacles were used.
The thickness of the eye patch was kept constant.
etc

Control

Definition: A set of factors used to eliminate error in an experiment, a starting point, something to which you can compare your results.

Example: By having them do the obstacle course the last time without changing the orientation, they eliminated the error of the participants learning the course.

Observations

Definition: Information obtained from the experiment by using your senses. The words "I think" should never appear in observations.

Example: "I can't see a thing".
"It's like night and day."
(Note: this only covers sight, observations should use all available senses)

Data

Definition: Measurements or statistics obtained from the experiment by using instruments or tallying.

Example: Adam, unadjusted eye, 5:40
Adam, adjusted eye, 1:55

Discussion

Definition: Ideas/information obtained from an experiment. This will include personal thoughts and should draw upon knowledge of the topic.

Example: The ophthalmologist discusses why she feels Carrie can see the low light levels very quickly after wearing the patch, explaining how the results relate to her knowledge of how the eye works.

Sources of Error

Definition: Things that change in the experiment, affecting the results, that are out of the scientists control.

Example: They did not actually time how long the eyed patch was worn.
The eye patch may not have fit properly, allowing some light to leak in.

Conclusion

Definition: A final statement indicating the outcome of the experiment in terms of the hypothesis. It should include reference to the hypothesis, including both the independent and dependent variables.

Example: In the final scene they discuss the experiment, indicating how they tested the variables, and stated that their hypothesis is "plausible."

The Scientific Method

Last year you performed a simple experiment to start the year. The Ball Drop experiment was designed to help you learn and remember the scientific method. This year you will not perform an experiment, but instead develop the experiment yourself. You will choose a problem to solve and plan out a worksheet that would guide students as to how to test your problem. Let's review the ball drop experiment sheet, which we will use as reference for your assignment.



Homework:

Before next class I would like you to start thinking of an experiment for which you could develop a worksheet. The experiment can be one you have seen, one you have heard of, or one you have done. It can be a real experiment or it can be 100% fictional (for example, how to best become a super hero.)

Next class I will fully explain the assignment, you will get in a group of 3 and you will begin working on this task.

Attachments

1-2 Bouncing a Ball Experiment Sheet.pdf



Mythbusters.mp4