



Constructing a Hypothesis

A hypothesis is a proposed theory or explanation for an observation, phenomenon or problem; which can be tested through further study and/or experimentation. An effective hypothesis should be a clearly stated and testable prediction of an outcome.

State Your Problem

Once your team has selected and saved its Mission Challenge, you are ready to start constructing a hypothesis statement. To begin, state the problem you are trying to solve; this is known as the problem statement.

Example: One of the highest costs for our school district is energy bills and purchasing new light bulbs.

Form Your Hypothesis

The next step is to use your problem statement to form your hypothesis. As a team, brainstorm ideas for the explanation or solution to the problem statement.

Teams are encouraged to research possible solutions to their problem statement and develop a workable hypothesis that can be tested through experimentation. Classroom discussion, and the eCYBERMISSION Discussion Forums and Team Talk are great places to discuss your findings and achieve consensus on possible solutions to the problem identified.

If your team is stuck, encourage the students to chat with a CyberGuide on the Discussion Forums. Your team may also contact Mission Control to request a Private Chat Room with a CyberGuide for a more detailed discussion.

Hypothesis Statement Checklist

An effective hypothesis statement should be:

Clear, Simple & Direct

Hypothesis statements should be easy to read, short and understandable. They should be written in simple English and should be framed as if you are explaining the problem to other students, teachers or community members. This is not the place for technical jargon or high level analysis. A good guideline for a clear and direct hypothesis statement is to aim to keep the hypothesis to 20 words or less.

Testable Through Experimentation

An effective hypothesis is one that can be tested. In other words, students need to ensure that the hypothesis includes information on what they plan to do and how they plan to make it happen.

After the preliminary research is complete, construct a hypothesis, or an educated guess, on the outcome of the experiment(s). The hypothesis must be worded so that it can be tested in the experiment(s) and it must include **both independent** and **dependent** variables.

- An **independent** variable is the variable that is varied or manipulated during an experiment to affect change in the dependent variable.
- A **dependent** variable is the variable that is studied. Changes in the dependent variable depend on changes in the independent variable.



Example: Raising the temperature of a cup of coffee will increase the amount of sugar that dissolves.

- The *temperature* is the ***independent*** variable.
- The *amount of sugar* is the ***dependent*** variable.

An “If-Then” Statement

Finally, reword the hypothesis as an “if-then” statement, using the ***independent*** and ***dependent*** variables, and make sure it states the prediction and not the question.

“If _____ [*I do this*] _____, then _____ [*this*] _____ will happen.”

Example: If we implement the use of Compact Florescent Light bulbs (CFL) throughout the schools then we will save energy and money.



Constructing a Hypothesis

Instructions: Identify the independent and dependent variables from the provided problem statements, then create an “if – then” hypothesis statement.

1. **Problem Statement:** An increased amount of car accidents have occurred in the last year because of cell phone use while driving.

- a. **Prediction:** We think that using a new technology device in the car would eliminate the need for using a cell phone while driving and would decrease the amount of accidents.

- Independent Variable: _____
- Dependent Variable: _____
- Hypothesis Statement: _____

2. **Problem Statement:** The Indiana bat is an endangered species in our community. One of the reasons for this species’ endangerment is due to the urban sprawl and removal of their habitat.

- a. **Prediction:** Creating a protected area of ideal habitat for the Indiana bat will increase the number of species in our area.

- Independent Variable: _____
- Dependent Variable: _____
- Hypothesis Statement: _____

3. **Problem Statement:** During the winter when the roads are icy or snowy, large amounts of salt are used to create safer driving conditions. The salt used on our roads is decreasing the quality of the roads and creating runoff that is not good for our environment.

- a. **Prediction:** After conducting research, our team will create a new ice-melting solution that will not harm the environment or the roads.

- Independent Variable: _____
- Dependent Variable: _____
- Hypothesis Statement: _____



Constructing a Hypothesis

Instructions: Identify the independent and dependent variables from the provided problem statements, then create an “if – then” hypothesis statement.

1. **Problem Statement:** An increased amount of car accidents have occurred in the last year because of cell phone use while driving.
 - a. **Prediction:** We think that using a new technology device in the car would eliminate the need for using a cell phone while driving and would decrease the amount of accidents.
 - Independent Variable: **new technology device**
 - Dependent Variable: **the amount of cell phone-related accidents**
 - Hypothesis Statement: **If we create a new technology for use in cars that eliminates the use of cell phones, then the amount of cell phone-related accidents will decrease.**

2. **Problem Statement:** The Indiana bat is an endangered species in our community. One of the reasons for this species' endangerment is due to the urban sprawl and removal of their habitat.
 - a. **Prediction:** Creating a protected area of ideal habitat for the Indiana bat will increase the number of species in our area.
 - Independent Variable: **protected area of ideal habitat**
 - Dependent Variable: **the number of Indiana bats in the area**
 - Hypothesis Statement: **If we create a protected area of ideal habitat for the Indiana bat, then the number of species in that area will increase.**

3. **Problem Statement:** During the winter when the roads are icy or snowy, large amounts of salt are used to create safer driving conditions. The salt used on our roads is decreasing the quality of the roads and creating runoff that is not good for our environment.
 - a. **Prediction:** After conducting research, our team will create a new ice-melting solution that will not harm the environment or the roads.
 - Independent Variable: **new ice-melting solution**
 - Dependent Variable: **road conditions and quality of runoff**
 - Hypothesis Statement: **If we create an improved ice-melting solution, then we will have better road conditions and less harmful runoff.**