

Objectives for this unit:

- **Is able to communicate experimental results in graphical and tabular form and correctly analyze the experimental data in a well constructed conclusion.**
- **Data is neatly organized in an appropriately labeled data table.**
- **Is able to formulate a testable question and hypothesis, with a possible explanation (If...then...) and includes the independent and dependent variables in the statement.**
- **Identifies the components, like independent variable, dependent variable, controls and constants and explains their importance to the design of a valid experiment.**

1. What are the steps to the scientific method that we discussed in class?

2. What is the definition of an independent variable?

3. What is the definition of a dependent variable?

4. What are constants?

5. What is the proper way to set up a hypothesis? (What kind of statement?)

6. Read the following experiment. Then answer the questions that follow.

A researcher is curious to find out what effect classical music has on people's level of relaxation. He thinks that listening to classical music will make people feel more calm and relaxed. He lets one group of 10 people listen to classical music for one hour. He lets another group of 10 people sit in a quiet room for one hour. After one hour, he monitors the heart rate of each participant to measure their level of relaxation.

a. Write a hypothesis:

b. What is the independent variable? _____
*Explain **why** that is the independent variable.:*

c. What is the dependent variable? _____
*Explain **why** that is the dependent variable.:*

- d. What are some constants?
- e. Identify the experimental group. _____
- f. Identify the control group. _____
Why is the control group important?
- g. Make a data table out of the following data (Be sure to make an average column!!):

No exposure to music

Heart rates taken in beats per minute (bpm):

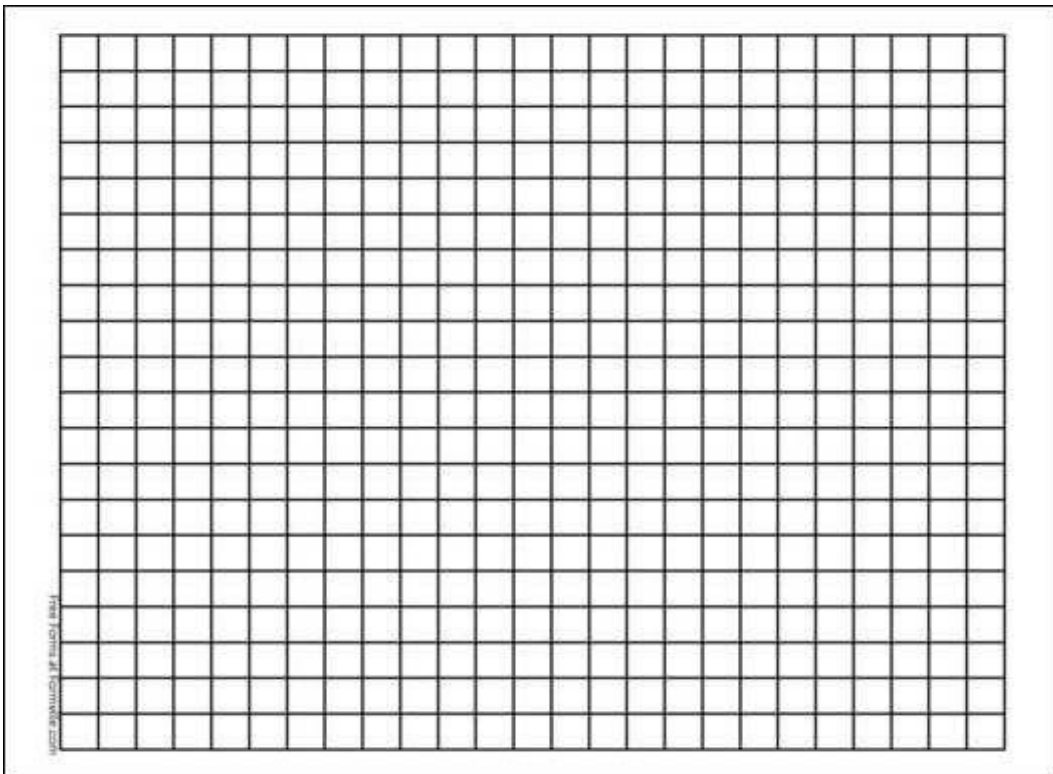
Person 1- 75; Person 2- 82; Person 3- 70, Person 4- 90; Person 5- 98

Exposure to classical music

Heart rates taken in beats per minute (bpm):

Person 1- 65; Person 2- 70; Person 3- 72; Person 4- 80; Person 5- 68

- h. Graph the two averages in a bar graph. Be sure to put labels on the x and y axis and to provide a title.



i. What are the five components to writing a conclusion?

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j. Write a conclusion based upon your data:

7. Why is it important to only change **one** variable in an experiment?

8. Be prepared to design your own experiment (such as from the criteria below) and identify the important components.

A student wants to find out if different brands of popcorn will have a different amount of unpopped kernels left in the bag after popping. Design an experiment to test this problem and be sure to include the following information.

Your task:

In the space provided (below and on the back of this paper), form an experiment to test the number of unpopped kernels of different brands of popcorn. You need to include:

- A **purpose**
- A **hypothesis**
- A **procedure** (Step by step process for how to complete your experiment)
- The **independent variable, dependent variable** and all **constants**
- An **experimental group** and a **control group**
- Make fake data and design a **data table**.
- Sketch a **graph** to represent your data.
- Write a **conclusion** based upon your fake data