

Writing Operational Definitions

Suppose that your class and another class work together on an experiment. You're trying to determine what kinds of balls roll the fastest. When the experiment is finished, you all want to compare your data, so you must all perform the experiment in the same way. That means that each time a team of students repeats the experiment, they have to use the same materials and procedure as every other team. They must also make their measurements in an identical manner.

Scientists also repeat investigations - their own and those of other researchers - to be sure that specific data are reliable. To make such repetition possible, scientists use operational definitions. An operational definition is a statement that describes how a particular variable is to be measured, or how an object or condition is to be recognized. Operational definitions tell you what to do or what to observe. (The word "operational" means "describing what to do.") Operational definitions need to be clear and precise so that future researchers can conduct an exact replication of your research. It is important to understand that operational definitions allow for true "replication" of a study.

The key to writing effective operational definitions is that whatever you are studying has to be able to be measured. For example, saying that a person will "feel better if they dress warmly when it is cold" is not acceptable. What is "warmly?" Is it a long-sleeve shirt, or a sweater, or a ski-jacket? What is "cold?" Is it 50°F? Is it 45°F? What about 32°? Those figures can be measured and are acceptable definitions. What about "dress warmly?" How could that statement be operationally defined so that it could be measured?

In the experiment described in the first paragraph, the two classes could agree on a common procedure: Set up a ramp exactly 10 centimeters high and 2 meters long, and use tape to make a "finish line" at the bottom of the ramp. Make a series of tests by letting two different balls to roll down the ramp at the same time. By using the following operational definition, the classes would eventually determine which ball rolls the "fastest".

Operational definition: The fastest ball is the one that crosses the finish line before the other balls.

Look at the following three problems in which the hypotheses are too vague. Come up with two different ways each vague description could be operationally defined and write them in the space below the hypothesis.

- Rearrange the list of zoo animals, starting with the biggest one.
- People who take a driver's education course are probably better drivers than drivers who do not.
- You will test these two fertilizers to determine which one helps plants grow faster.

Check your work: Can your definitions be **MEASURED**? If they can, you've got it. If not, try again.