**DEMONSTRATIONS VS. EXPERIMENTS**

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**Demonstrations allow teachers and students to observe and witness a**

**scientific principle or concept in action. The results of demonstrations are well**

**known and do not require the teacher or the student to control any of the**

**conditions that will make it work; an experiment does. In an experiment the**

**experimenter must have control of all the conditions required for something to**

**happen except one; the condition he or she is testing for. This condition being**

**tested is called the « independent variable ».**

**EXAMPLES OF DEMONSTRATIONS**

**1.** It is a well-known science fact that electricity flows through metals.

 Therefore, showing that metals conduct electricity and that wood and

 plastic don’t is just a demonstration and not an experiment.

**2.** Plants grow at different rates depending on the species of the plant.

 Tomatoes grow faster that pine trees. That is a fact. Therefore, growing a

 tomato tree and a pine tree to show which one grows faster is just a

 demonstration and not an experiment.

**3.** Salt water is denser than fresh water. Therefore, when salt water is added to

 fresh water it sinks to the bottom. Showing this is a demonstration and not

 an experiment.

**EXAMPLES OF EXPERIMENTS**

**1.** Testing how well different metals conduct electricity by measuring their

 resistance is an experiment. This would require the student to test different

 metals with a voltmeter to measure the current that travels through the

 metal.

**2.** Testing to see how different amount of sunlight (or different amounts of

 fertilizer) affect the growth rate of a tomato plant is an experiment.

**3.** When salt is dissolved in water, the density, the freezing point, the boiling

 point and other physical properties of water also change. Testing to see

 how different concentrations or amounts of salt affect one of these physical

 properties would be an experiment.

**What makes a science fair project a good project? There are three things I**

 **consider important for making a good science fair project:**

**1. The presence of an independent variable.** The experimenter makes sure

 that only one condition is being changed in every one of his or her setups.

 Thus, the outcome of the experiment can only be the result of that one

 variable.

**2. The experiment must have a « control group ».** A control group is the set

 up that has all the normal conditions intact, i.e., no changes have been

 done to it. A control group does not contain the independent variable, i.e.,

 the factor being tested.

**3. The experiment must produce quantifiable data, i.e., data that can be**

 **measured**. This type of data is known as «quantitative data». Quantitative

 data is both measurable and can be shown visually in the form of graphs.