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Practice: [Answer Key: Study Guide 2012: Experimental Design and Scientific Inquiry](http://team9titans.weebly.com/uploads/2/5/7/1/2571181/answer_key_for_2012_rev_sheet_pdf.pdf)

Worksheet: Identifying Controls & Variables

**Independent Variable** – the variable you purposely change – variable “I” control – also called the “manipulated” variable. **THINK OF THIS AS THE CAUSE IN THE EXPERIMENT.**

**Dependant Variable** – the factor that you measure or may change as a result of the manipulated variable – “depends” on the independent – also called the “responding” variable. **THINK OF THIS AS THE EFFECT IN THE EXPERIMENT.**

**Control Variable** – anything that is kept constant. Sometimes an individual or group is kept from the independent variable completely – then it is called a **Control Group**.

[Scientific Method Review Identifying Variables Worksheet](http://www.plainlocal.org/userfiles/500/my%20files/scientific_method_review.pdf?id=537663): For the following experiments, define the IV (independent variable), DV (dependent variable), and CV (control variable(s)).

1. Different rose bushes are grown in a greenhouse for two months. The number of flowers on each bush is counted at the end of the experiment.

IV different rose bushes DV number of flowers. CV same greenhouse, time (two months)

2. You water three sunflower plants with salt water. Each plant receives a different concentration of salt solutions. A fourth plant receives pure water. After a two-week period, the height is measured.

IV different concentrations of salt solutions DV height. CV plant type (all sunflowers), time (two months) - plant receiving pure water is also considered a control group since it does not receive salt at all

3. Three redwood trees are kept at different humidity levels inside a greenhouse for 12 weeks. One tree is left outside in normal conditions. The heights of the trees are measured once a week.

IV different humidity levels DV height CV same tree type(redwood), time (12 weeks) – tree left outside I normal conditions is also considered a control group as it experiences no humidity change

4. Pea plant clones are giving different amounts of water for three-week period. The first pea plant receives 400 milliliters a day. The second pea plant receives 200 milliliters a day. The third pea plant receives 100 milliliters a day. The fourth pea plant does not receive any extra water: the plant only receives natural ways of receiving water. The heights of the pea plants are recorded daily.

IV different amounts of water DV height CV plant type (pea plant clones), time (3 weeks) – the plant that receives no extra water is also considered the control group as it does not receive a different amount of water

5. One tank of gold fish is fed the normal amount of food once a day. A second tank is fed twice a day. A third tank is fed four times a day during a six week study. The fish’s weight is recoded daily.

IV different amount of time fed DV fish’s weight CV same fish type (goldfish), time (six weeks)

6. You decide to clean the bathroom. You notice that the shower is covered in a strange green slime. You try to get rid of this slime by adding lemonade juice. You spray half of the shower with lemonade juice and spray the other half of the shower with water. After 3 days of spraying equal amounts 3 times a day, there is no change in the appearance of the green slime on either side of the shower.

IV different cleaners (lemonade & water) DV appearance of slime CV 3 days, equal amounts, 3 times a day

7. You decide to clean your bedroom. You notice that your floor is covered with clothes. You try to get rid of the clothes by throwing them into the air. You throw clothes from 1/3 of the room into the closet and a second 1/3 of the room straight up in the air. The last 1/3 of the room you leave the clothes on the floor. After 30 minutes of “cleaning” the floor of the room is now visible.

IV different places to throw clothes DV floor visibility CV same amount of clothes (1/3) to each area

8. You want to test which size of soccer ball is easiest to juggle with your feet. You test a size 3, size 4, and size 5 ball. You count the seconds the ball stays in the air for each of the trials. You allow yourself to use both of your feet, knees, and head to juggle the ball.

IV different sizes of soccer balls DV ease of juggling/time in air (seconds) CV it should be with what you juggle – feet – however the experimenter used other parts so you don't know if it was ball size or with what parts they juggled that made it easier

([Experimental Variables Worksheet with key](http://imyscience2012.weebly.com/uploads/1/2/9/6/12960805/wkst_experimental_variables_key.pdf))

More Practice!!

[For each item below, specify the independent and dependent variables, as well as constants.](http://www.monroecti.org/cms/lib07/PA03000492/Centricity/Domain/37/variables_worksheet.pdf)

1. A study was done to find if different tire treads affect the braking distance of a car.

I: different tire treads D: braking distance. C: same car or car type, same speed, same conditions

2. The time it takes to run a mile depends on the person’s running speed.

I: different person’s running speed D: time. C: same person

3. The height of bean plants depends on the amount of water they receive.

I: different amounts of water D: height. C: plant type (bean plants)

4. The higher the temperature of the air in the oven, the faster a cake will bake.

I: different temperatures D: baking time. C: same oven, same cake type

5. Lemon trees receiving the most water produced the most lemons.

I: different amounts of water D: amount of lemons C: none written here but all other growing conditions would have to be the same between different lemon plants

6. An investigation found that more bushels of potatoes were produced when the soil was fertilized more.

I: different amounts of fertilizer D: amount of bushels of potatoes C: none written here but all other growing conditions would have to be the same between different potato plants

7. Students measured the temperature of the water at different depths in Lake Skywalker and found that the temperature varied.

I: different water depths. D: water temperatures. C: same students, same lake

8. The amount of pollution produced by cars was measured for cars using gasoline containing different amounts of lead.

I: different amounts of lead in gasoline D: amount of pollution. C: same type of car

9. Four groups of rats are first massed and then fed identical diets except for the amount of vitamin A they receive. Each group gets a different amount. After 3 weeks on the diet, the rats’ masses are measured again to see if there has been a decrease.

I: different amounts of vitamin A D: rat’s mass C: identical diets, time (3 weeks)