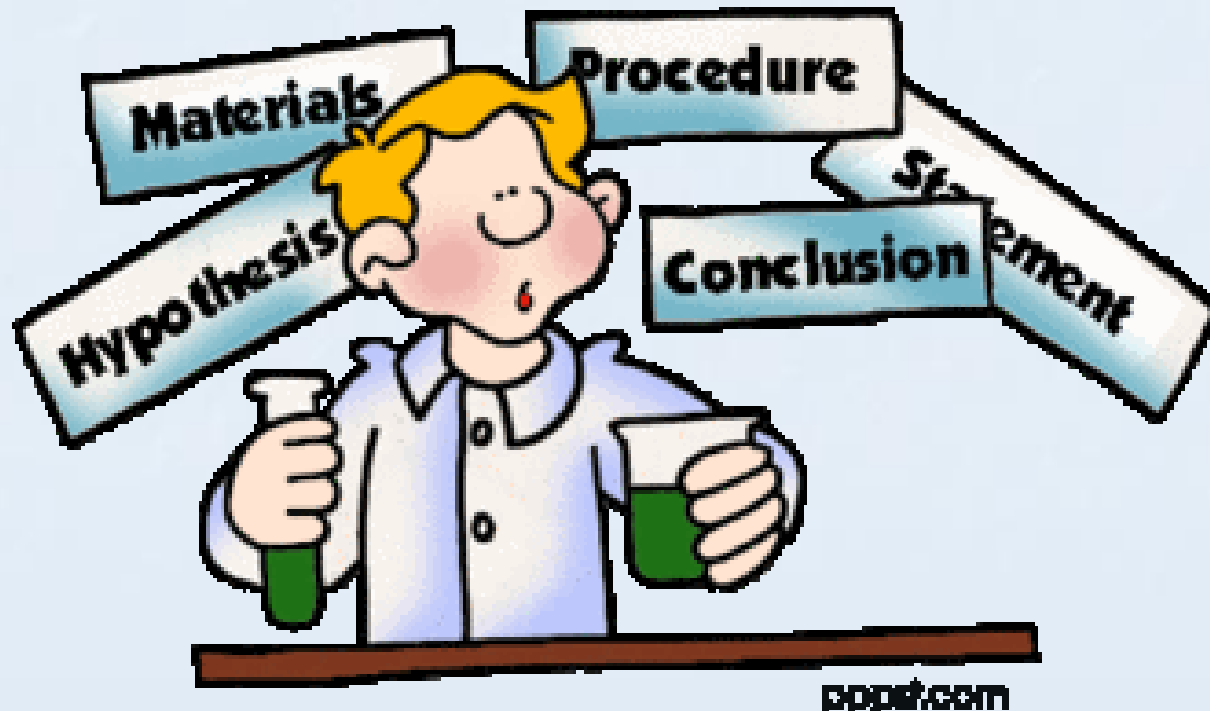


Science Fair Project Information

Bauder Elementary School



We're taking back your first place ribbon. — We found traces of your parents' DNA all over your science fair project.





Let's Do A



Science Project!

If we just read about Science and **DON'T DO** Science, we will **NOT** have the learning experiences necessary to be successful in Science.

Why are we doing this????

1. Twenty-five percent (25%) of the 5th grade SSA (State Science Assessment) and MAP tests requires understanding of "the nature of science" standards.
2. Completing a science research project is a powerful and authentic way for students to internalize this knowledge and to practice the process skills of science.

Ways to Support Your Child...A Guide for Parents:

- Begin your science project experience with a planning meeting.
- This entire process should be *fun*. It is a great opportunity to spend time together doing something of educational value.
- Budget more time for the project than you think you will need...*then double it.* *Use the project timeline (posted and given to your child) to pace your project.
- Topic selection should be at the child's level. Please keep in mind the final project choice should remain with the child.

Start With A Diary!



- Remember, a science project is the diary - this is also part of the rubric
- The board is simply the display
- Record all information in the diary
- The diary must be attached to the science fair project when the board is turned in
- You may use the Inquiry Journal for your diary - this is also posted on the website

Rubric for Project

This rubric will be used for judging and overall grade:

Science Showcase Rubric Grades 3-5 Individual projects

Using the Rubric: Begin in the left hand column (Required Elements). Mark each category by circling the description that best matches the project, and record that numeric score in the score box. Multiply each score with its weighting factor (wt column) to get a final score. Total the final scores to the bottom.

Required Elements	0	1 Point	2 Points	Score	Wt	Final Score
Research Question (A question that explains what was studied)	E L E M E N T	States a research question; but inaccurate, incomplete, or lacks enough detail.	Accurately states research question: includes cause and effect (x and y), and provides ample detail to investigate project.		x 3	
Predictions (Lists the three possible outcomes of the experiment and identifies the outcome that will most likely occur)		States one or more predictions; but inaccurate, or incomplete, or lacks enough detail to follow.	Accurately states three predictions that include cause and effect (x and y); Clearly identifies the most likely outcome.		x 3	
Independent Variable (Describes the one thing that the students changed)	N O T	States what will be changed but with inaccurate or incomplete details.	Accurately states what will be changed with enough detail to assure accuracy.		x 3	
Dependent Variable (Describes what the students measured)		States what will be measured but inaccurate or incomplete details.	Accurately states what will be measured with enough detail to assure accuracy.		x 3	
Control Group (Describes the set of data measured under normal conditions)	P R E S E N T	Identifies the set of data that will be measured under normal conditions but is inaccurate.	Accurately states the set of data that will be measured under normal conditions.		x 4	
Set-Up Conditions (List all of the things that were kept constant)		Lists some constants; some inaccurate or incomplete.	Lists all necessary constants with good detail and description of set-up.		x 3	
Materials List (List of all of the items that were used to complete the experiment)	O R	Lists partial, confusing, or inaccurate materials; or lacks quantities or measurements.	Lists complete set of materials; sufficient detail to duplicate directions. (metric)		x 3	
Procedures (List of steps in order of exactly what was done)		Gives partial, confusing or non-sequential directions; or lacks enough detail to follow.	Gives complete list of procedures with detail such that the experiment could be duplicated by another. (metric & safety)		x 3	
Data Collection (Chart with the data that was measured in the experiment)	N O T	Most data shown; some data missing, or not organized in chart form, or missing units or averages.	Proper chart shown with complete data; 10 or more trials and averages; all units, labels, and detail present.		x 5	
Graph (Mathematical picture of the data)		Graph shown; some elements incomplete or inaccurate.	Proper graph shown; all elements complete and accurate.		x 5	
Results (Tells what happened with the data using mathematical language)	S C O R E A B L E	Lists some results; some statements inaccurate or incomplete.	Lists at least three mathematical results accurately and with detail.		x 3	
Explanation (Summary of findings that evaluate the experimental procedure and provides scientific reason that supports experiment findings)		Explanation statement present but inaccurate or incomplete.	Explanation is accurate and provides specific scientific detail related to experiment.		x 4	
Real World Uses relating to Research (Ways that the information might be used)		States one or more uses; but incomplete, inaccurate, or lacks details.	States three or more possible uses related to the research question; with good detail.		x 3	
Science Journal		Some elements are missing, incomplete or inaccurate.	All elements present, accurate, good detail and few errors; dated narrative present.		x 2	
Display Board		Some elements are missing, incomplete or inaccurate.	All elements present and accurate with good detail and few errors.		x 3	

Comments:

Total Score
/100

Research Question

A research question should be phrased properly. It should reflect the student's understanding of what he/she is testing.

When I change _____, what happens to _____?

Does _____ affect _____?

Example Questions:

Does the height of a ramp affect the distance a marble will roll in centimeters?

How does the weight (number of paperclips) of a paper airplane affect the time it stays in flight?

Predictions

There are three ways an independent variable (the one thing that changes) can affect the dependent variable (what you are measuring).

Example:

1. The **paperclips** will increase how long the paper airplane stays in flight.
2. The **paperclips** will decrease how long the paper airplane stays in flight.
3. The **paperclips** will have no affect on how long the paper airplane stays in flight.

Example:

1. The **height** of the ramp will increase how far a marble rolls down a ramp.
2. The **height** of the ramp will decrease how far a marble rolls down a ramp.
3. The **height** of the ramp will have no affect on how far a marble rolls down a ramp.

Predictions must be worded in this format and the prediction MUST be marked of what you think will happen in the experiment. You will comment about your prediction in your explanation.



Independent Variable

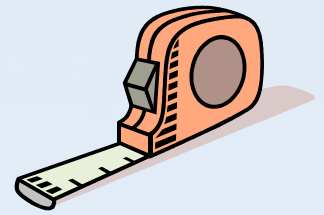
The one thing (or object) you will **change** in the experiment.

Example:

I will CHANGE the height of the ramp to see how far a marble will roll.

I will CHANGE the weight of the paper airplane by adding paperclips to the airplane.

Dependent Variable



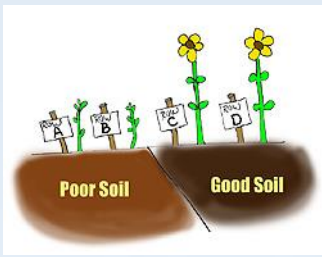
What will you measure in this investigation?

The dependent variable is _____.

Example:

I will MEASURE the distance the marble rolls down a ramp in centimeters.

I will MEASURE the time the paper airplane stays in flight using a stopwatch, measured in seconds.



Control Group

A control group in a scientific experiment is a group separated from the rest of the experiment where the independent variable being tested cannot influence the results. It is the set of data under "normal conditions".

For example:

There will be a set of trials of the paper airplane without any paperclips. So your control group will be: *Paper airplane measured in seconds with no paperclips.*

For the ramp experiment - you would start with a baseline ramp such as 10cm and then increase from that distance. Your control group would be: *The ramp is at 10cm for the control group.* You would then do ten trials and use this data to compare to an increased height.

Set-Up Conditions



Also known as the "Constants" these are the things (materials & procedures) that will remain **constant** to ensure the independent variable is the only thing being tested.

Example:

If you decide to change only the amount of water given to the radish plant (Independent Variable), then you must keep everything else constant.

These would include:

- ✓ Same temperature (How will temperature be the same?)
- ✓ Same soil type (specify soil type)
- ✓ Same soil amount (specify how much soil per cup or plant)
- ✓ Same amount of sunlight (How will sunlight be the same?)
- ✓ Same growing location (describe the location)

Materials List



This is the list of items that will be used in the investigation. It should be very specific and include the **size**, **quantity**, and **descriptions** of each material needed so someone else could duplicate your project.

Example:

Water: 10mL in one cup, 20mL in one cup (amount used in watering daily)

Seeds: 25 radish seeds in each cup

Cup: 3-500mL, clear plastic cups

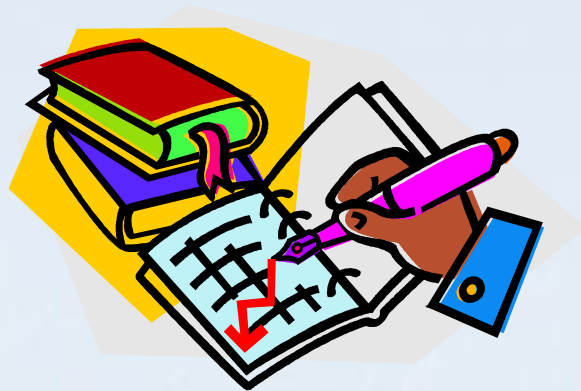
Procedures

This is a step-by-step list of how to set up the investigation and what you did (or how each item in your material list will be used) and the exact order it was done.

Be specific!



NON-EXAMPLE	EXAMPLE
1. Water plants	1. gather materials necessary to conduct the experiment
2. Measure plants	2. measure and add 250mL of soil to each of the three sets of cups
3. Repeat steps 1 and 2	3. spread 25 radish seeds on top of the soil in each of the three sets of cups



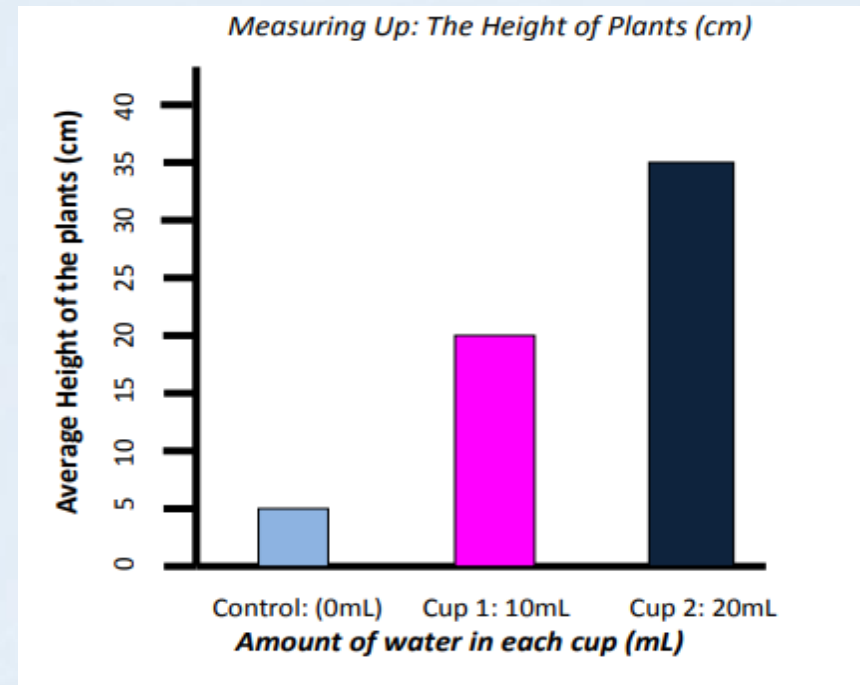
Data Collection

(Chart with the data that was measured in the experiment)

This is an **organized** and complete account of everything that was **measured and observed** in the experiment (using metric units). There should be at least 10 trials of each variable and control group.

Graph

This is a mathematical picture of the data, using averages (mean) to plot the data in the experiment.



Results



Use the data and graphs (from the experiment) to **explain** what happened in the experiment. List at least three data results for full rubric points. When writing the results statement, integrate mathematical terms such as twice as much, one-third as much, or no significant difference.



Explanation

- This statement explains whether your data supports your identified prediction. Does what you change (independent variable) affect what you measured (dependent variable)? Describe the affect. It is acceptable if your data does not support your prediction.
- Be accurate and specific in your explanation
- This is a summary of findings that evaluate the experimental procedure and provides scientific reason that supports experiment findings

Real World Uses

This is a description of the ways, places, or situations in which the **information** from your experiment might be **useful**.

List at least three real-world uses to earn full rubric points.



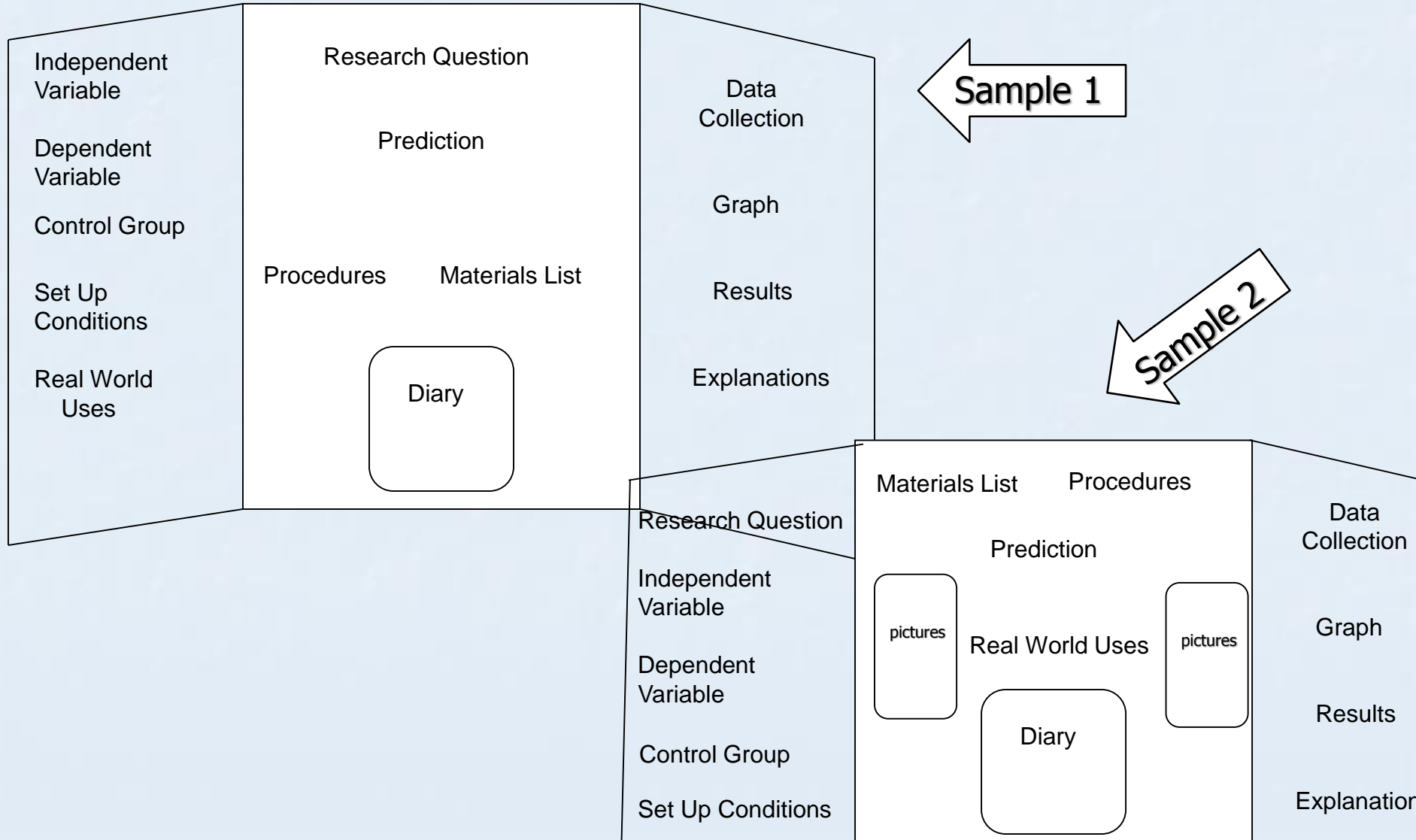
Science Diary



- The science diary (journal) is an ongoing record from day one that contains each phase of the scientific process along with anecdotal records of observations and further wonderings
- Each page should contain the date and specific details of record keeping either in the form of summary statements, numbers or diagrams
- You may use the Inquiry Journal for your diary - this is posted on the Bauder website

Display Board Organization

This is just a sample of how the board will look – there is no certain order for the board setup but must contain these components



Component Headlines

You can print out to be used on your board

Research Question	Prediction
Independent Variable	Dependent Variable
Control Group	Set-up Conditions
Materials List	Procedures
Data Collection	Graph
Results	Explanation
Real World Uses	Science Diary

Do's & Don'ts for your project

- **Your project cannot display the following.** No sharp object; glass; food; liquid (including water); chemical; microbe; laser operation; unshielded wiring; temperature exceeding 70° C; loud or distracting sound; bright or distractive light; pressurized gas; unshielded belt, pulley, chain or moving part may be displayed. Pictures of these (except as prohibited in the regulations above) may be taken to document and explain what was done in the experiment.
- **No brand names of products**
- No vertebrate animal may be used in any way
- No humans may be used as subjects of experimentation
- No living organism is to be harmed in any way (plants excluded)
- No drugs (including over the counter medications such as aspirin, cigarettes, alcohol) or substances that may be a safety/health hazard may be used
- No microbes (mildew, **mold, fungus**, bacteria) may be cultured or used
- No explosives of any type, including firecrackers and/or firearms, may be used
- No burning of materials in an uncontrolled environment may be used

Do's & Don'ts for your project

- Do NOT put your name on the front of the display board – it should be on the back right hand corner (when board is closed) – a sticker will be provided by your child's teacher
- MAKE sure to average (mean) your data to use in the graph – you are NOT graphing every trial – only the AVERAGE of each trial
- Make sure to use **metric units** when recording data
- Make sure to have ALL component headings on the display board and attach the science diary to the board
- Turn your board in ON TIME – points will be deducted each day it is late
- Follow the science project timeline and rubric
- Use the word "affect" instead of "effect" in your research question
- Make sure your prediction is clearly marked (for example, circle it or put a star next to it)
- Make sure your science diary is complete and reflects your experiment in detail

Sample Questions

Suggestions from PCS Project Inquiry

Heat and Temperature:

- Does the temperature of the water affect how fast an Alka-Seltzer tablet will dissolve?
- Does the color of water affect the time it takes to freeze?
- Does the kind of water affect how long it takes to boil?
- Does the kind of water affect how quickly it will evaporate?
- Does the surface area of a container of water affect its evaporation rate?
- Does the depth of the water affect its evaporation rate?
- Does the temperature of water affect its evaporation rate?
- Does the kind of material used to insulate a refrigerated can of soda affect its temperature change?
- Does the color of a can affect its rate of temperature change when placed in the sun?
- Does the kind of soil (sand, gravel, clay) affect its temperature change in the sun?
- Does the color of a crayon affect its melting rate?
- Does the temperature of a tennis ball affect how high it bounces when dropped?
- Does the shape of an ice cube affect how slowly it melts?
- Does the mass of an ice cube affect how slowly it melts?
- Does temperature affect the density of a liquid?
- Does the temperature of water affect the height at which an object floats?

Sample Questions

Force and Motion:

- Does the number of coils of wire in an electromagnet affect its magnetic strength?
- Does voltage affect the strength of an electromagnet?
- Does the weight of a permanent magnet affect its strength?
- Does the height of a ramp affect the distance a toy car will roll?
- Does the mass of a car affect the distance it will roll from the bottom of a ramp?
- Does the material that the ramp is made of affect the distance a toy car will roll?
- Does the distance a rubber band is stretched affect how far it will fly when released?
- Does the amount of weight suspended from a rubber band affect how far it stretches?
- Does the weight of a wooden block affect the force that it takes to drag it across a table top?
- Does the height from which a rubber ball is released affect the height that it bounces?
- Does the surface of the ground affect how far a ball will roll?
- Does the amount of air (pressure) in a basketball affect how high it bounces?
- Does the number of blades of a propeller affect how fast it will turn in the wind?
- Does the angle of a wing affect the amount of lift it develops in the wind?
- Does the number of pulleys affect the force necessary to lift a weight?
- Does the length of a lever (from the fulcrum) affect the force necessary to lift a weight?
- Does the length of a pendulum affect its period (time it takes to swing)?
- Does the weight of a pendulum affect its period (time that it takes to swing)?

Sample Questions

Plants:

- Does the type of fertilizer affect the height that a bean plant grows?
- Does the amount of fertilizer affect the height that grass will grow?
- Does the kind of water affect the number of leaves on a Marigold plant?
- Does the size of a bean seed affect its germination rate?
- Does temperature affect the germination rate of bean seeds?
- Does the amount of sunlight affect the germination rate of radish seeds?
- Does the amount of moisture affect the germination rate of pepper seeds?
- Does temperature affect the height of petunias?
- Does classical music affect the height of tomato plants?
- Does the diameter of an apple affect the number of seeds inside?
- Does the circumference of a pumpkin affect the number of seeds inside?
- Does water drainage affect the height of sunflower plants?

Sample Questions

Earth/Space and Environmental:

- Does the kind of soil affect the rate of water erosion?
- Does moisture affect the rate of decomposition in a compost pile?
- Does the slope of the surface affect the rate of water erosion?
- Does the kind of soil affect how much water it will hold (retain)?
- Does salt affect the freezing rate of water?
- Does wind speed affect the evaporation rate of water?
- Does the rotation of the earth (time of the day) affect the length of a shadow?
- Does the kind of water (fresh or salt) affect how long it takes an ice cube to melt?
- Does the velocity of the wind affect the height of waves?
- Does the direction of the wind affect the outdoor temperature?
- Does the velocity of the wind affect the timing (high and low) of the tides?
- Does barometric pressure affect the chance of rainfall?
- Does the phase of the moon affect the height of the tides?
- Does gravel affect the rate that sand erodes on a beach?

Bauder Website

<http://www.bauder-es.pinellas.k12.fl.us/>

Go to Academics - Click Science Fair