Science Projects

Science Projects involve designing an experiment to test a hypothesis, while using scientific process skills to collect and record data. The data is organized into a table and the data is used to support and explain any conclusions. The project should examine a science standard with the rigor expected at your grade-level. The labels and descriptions show what you will need to display and explain on your project board.

SCIENCE LABELS	WHAT TO WRITE ON MY SCIENCE BOARD
Purpose	The **purpose** describes the how, what, when, where, which, or why about your investigation. It is a written statement about the idea or question you want to learn more about. Before writing your purpose, **research** the idea or question. Read to find out as much as you can about your topic in a library, media center, or on the internet before starting your experiment. The research you do should help you understand the idea better so you can write a hypothesis (prediction) and design an experiment (test) to investigate.
Hypothesis	The **hypothesis** is a prediction that can be tested. It is usually written in the form of a testable question describing what you think will happen. It could also be written as an "If ____, then __"statement. Your research should help you write a testable hypothesis. A good hypothesis tests one **variable,** or factor, at a time. The factor you think will change in your experiment is called the **test variable**. Any other variables which might affect the outcome of your experiment need to be measured and monitored so they will not change or interfere with the outcome. These factors are called **controls,** because you are measuring and monitoring them. Each control should be the same each time you experiment. Some experiments may have more than one control, but should only have one test variable. Repeat your experiment three (3) times with exactly the same test variable and controls used in your first experiment, the repetition within the experiment are called **trials**. Observe and record any changes in your test variable during each trial. The results of all three trials should be similar.
Materials	This is a list of all the **materials** and **tools** used in your experiment. Write a list including each material by quantity (how much of it you use). Describe all the consumables (materials used-up) and non-consumables (tools or equipment) you used. Use metric measuring tools (tape measures, balances, graduated cylinders, thermometers, etc.) rather than standard measuring tools (rulers, scales, cups, spoons, etc.) if they are available. Use a Fahrenheit thermometer (°F) to measure temperature if a Celsius (°C) thermometer is not available. Use a clock, watch, or stop watch to record time.
Procedure	The **procedure** is the steps of your experiment. Your experiment should be designed to tests your hypothesis. List all the steps in their order of operation. Be clear and keep it simple. Another scientist should be able to replicate your experiment by following your procedure. Ask your teacher or parent to check your procedure to make sure it is safe and doesn't harm you or your test subjects. If your experiment is using humans or animals as test subjects, you **must** complete a **Human Subject Approval** (pg. 21) or **Animal Subject Approval** (pg. 20) Form before you start experimenting. If your experiment involves human test subjects, they need to have a signed **Informed Assent Form** (showing their parent's permission) and also sign their own **Informed Consent Form** (confirming their own decision to participate in the experiment). These forms are combined and can be found on page 22. When all the required documentation has been signed, you may begin your experiment.

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Data Tables	**Data** are your recorded observations during each experimental trial. First, decide how you will observe and measure your data as you experiment. Record the amount of change using metric measuring tools (for length, height, mass, volume, or temperature). Apply the appropriate units (meters, grams, liters, and Celsius degrees). Measure and record any changes in frequency to the test variable using a clock, watch, stopwatch, or calendar in seconds, minutes, hours, or days. Record any changes in qualities like shape, size, color, odor, smell, or texture (qualitative data) to the test variable. The more accurate your measurements are (quantitative data) and the more precise your explanations are, the better. Try to have a balance of **quantitative** (number and units) and **qualitative** (descriptions) data. Organize your data into a **data table.** Include data from all three (3) trials so it is easy to compare data sets and identify any trends (patterns). The data table should be glued to the display board so judges can evaluate it. You can also make a graph contrasting your trials if you like (graphs are optional). Compare the results of each experimental trial. Notice how alike one trial is compared to another. Look for patterns (trends) in your data. Make as many **claims** (true assertions) as you can that describe each pattern. Match each claim with the **evidence** (from your data table) that supports it.
Conclusions	A **conclusion** explains the results and outcome of your investigation. It should either confirm (agree with) or reject (disagree with) your original hypothesis. Explain your results using the claims (patterns) and evidence (data) you gathered in the last step. A conclusion can be a simple statement like, "Apples grow from flowers." or "Magnets attract iron." Each claim you make should have evidence from your data to help support that claim. For example, "A fruit grows where a flower falls off the tree, because apples grew in the same place the flower fell off." or "The magnet pulled the nail, so the nail might contain iron." Write one sentence for each claim and evidence set. Link the claim and evidence with a conjunction. Conjunctions are words like, "and, but, or so," adverbs like, "instead, therefore, or for example," or subordinate conjunctions like, "as, since, or because." The more sentences you write, the stronger your conclusions.
Real World Connections	Real World Connections explain how your project relates to the real-world and how it pertains to everyday life. Does it help plants, animals, people, or the earth? Could it create new jobs or work? Could it become a new product or technology? How does it benefit or apply to our everyday experiences?

Science projects can be entered as a **Class** project (from grades K, 1, & 2), **Individual** project (from grades 3, 4, or 5) or **Team** project (from grades 3, 4, or 5). Projects are judged by grade-level in four different ability categories: Access (Access Point learners), Regular classroom (regular and inclusion learners), Dual Language (dual language learners), and Gifted (learners with a gifted IEP). Individual Science projects may also be entered as Theme Projects. The themes include Aviation, Green, Physical Science, and Energy. Individual Science projects can also be entered in the Digital Expo.

