

General Principles of Middle School Grading in Science

General Principles of Middle School Grading:

- Grades should represent student mastery of essential standards in a subject.
- Non-academic factors such as participation, effort, and attitude should be reported separately from academic grades.
- Student work should be measured based on predetermined levels of quality (proficiency scales) rather than subjective or changing criteria.
- Grades should provide meaningful feedback to help drive improvement.
- Students learn material at different rates, so they should have the ability to relearn and re-assess in order to show improvement.

Is a Science grade based on *content or skills*? The quick answer is **both**.

- Grades reported by Science teachers represent student proficiency in the **essential skills** of Science. The simple reason for this is that pieces of knowledge are not easily repeated, practiced, or assessed through predetermined levels of quality. Gener Compelling research and current thought in our field calls upon educators to prepare students to think, reason, and act as responsible citizens. For this reason, we choose to value **skills** that are transferable and that can be developed over time.

Focus of New Missouri Learning Standards For Science

Science expectations transitioned from fact, memorization–based to an application-based approach.

The new expectations ask students to use scientific processes in context throughout the year. Students must also do more research-based inquiry. (Research is conducted from student generated questions)

These expectations seek to encourage students' natural scientific curiosity about the world around them.

How can you help your child be more successful in science?

Developing Your Child's Scientific Understanding

Unifying Concepts and Processes

Children can be introduced gradually to basic scientific concepts that will provide a framework for understanding and connecting many scientific facts and observations.

Systems, Order and Organization

1. The natural world is so large and complicated that scientists break it down into smaller parts in order to study it in depth. These smaller units are called systems. Scientists look for patterns through which they can classify—or organize—things into systems. For instance, animals that have fur or hair are classified as mammals. ***When you encourage your child to gather and organize objects according to their size or color—for example, leaves or insects—you are helping prepare her to think in terms of systems.*** Furthermore, scientists believe that nature is understandable and predictable—that there is an order to it. For instance, low barometric pressure is often followed by storms. ***Challenging your child to make reasonable predictions such as this will further prepare her to look at the world in a scientific way.***

Evidence, Models and Explanations

2. Scientists test the explanations they come up with, and the results of their tests are evidence on which to base their explanations. Sometimes they call their explanations "theories" or "models" or "hypotheses". ***Children can test their theories about the world too: Is it the baking soda that makes my pancakes thick? Can I make thicker pancakes with more soda?***

Change, Constancy and Measurement

3. The natural world changes continually. Some objects change rapidly and some at a rate too slow for us to observe. ***You can encourage your child to look for changes by asking him to observe and talk about:***
 - What happens to breakfast cereal when we pour milk on it?
 - What happens over time when a plant isn't watered or exposed to proper sunlight?
 - What changes can be reversed? Once water is turned into ice cubes, can it be turned back into water? Yes. But if an apple is cut into slices, can the slices be changed back into the whole apple?
4. Children can observe change more carefully through measurement. ***Keeping a growth chart or making a graph of the temperature each day will give your child practice looking for differences and measuring them—and help him to understand how he'll need to use math skills in learning science. You can also include your child while cooking. Providing practice in measuring and observing physical and chemical changes.***

Evolution and Equilibrium

5. It's hard for children to understand evolution (how things change over time) and equilibrium (how things attain a steady and balanced state of being). During these early years, you can, however, talk about how things change over time and point them out to your child. For instance, ***show your child a series of photos of himself from birth to the present and talk about the many ways he's changed. And, you can talk about balance and the work it often takes to achieve it: Learning to ride a bicycle or walk with a book on his head are good examples.***

Form and Function

6. One of the simplest themes in science is all around: The shape of a natural thing is almost always related to its function. Begin with man-made objects. ***Can your child guess the use of a thimble, a corkscrew, a phonograph record? When you are looking at animals, ask him questions such as: "What might those plates do on the stegosaurus's back?" "What sort of habitat would a web-footed platypus like?" His best guess will almost always be correct.***

Scientific Integrity

Science fiction writer Isaac Asimov describes science as a "way of thinking." It is a way to look at the world that involves special principles of conduct, and middle school is a good time to start teaching children scientific ethics.

We should help them understand how important it is to:

- Observe carefully;
- Record accurately;
- Try to look for patterns in an objective,
- Share their observations (or results) honestly and in a way that allows others to test what they've said;
- Realize that they might make mistakes;
- Respect curiosity; and
- Stay open to criticism and change

Science is all around us!