

Success in an Elementary Science Classroom

All activities in a student's science education should be based on science as inquiry. Students at all grade levels should have opportunities to use scientific inquiry to develop the ability to think, question, plan, conduct investigations, use appropriate tools and techniques, think critically and logically about relationships between evidence and explanations, and communicate scientific arguments.

According to the National Science Education Standards, engaging students in inquiry serves the following five essential functions:

- *Assists in the development of understanding of scientific concepts.*
- *Helps student "know how we know" in science.*
- *Develops an understanding of the nature of science.*
- *Develops the skills necessary to become independent inquirers about the natural world.*
- *Develops the dispositions to use the skills, abilities, and habits of mind.*

In grades 3-5, students should engage in science that centers on basic process skills such as observing, classifying, communicating, measuring, predicting, and inferring. It is the responsibility of the primary teacher to ensure that this type of learning takes place.

An elementary science classroom should be an environment that fosters the creativity of self-exploration. It should be one that is non-threatening to the curious child who has to ask "just one more question." Students will thrive on the opportunity to work in teams or cooperative groups. In doing so, they should be able to explore, discover, learn from each other, and question the world in which they live.

At a time when the demonstration of academic achievement is imperative to a school's success, the need for proven instructional strategies is increasing. One such strategy is the alignment of subject areas.

The alignment of instruction across the curriculum is a critical tool for students as well as teachers. The integration of subject areas reinforces the students' development of content-based concepts, as well as addresses the issue of time management for teachers.

To facilitate the integration of other content areas such as language arts, teachers should have a plethora of science-based literature to enhance scientific learning. A variety of realistic fiction and non-fiction literature will provide needed background information as well as stimulate prior knowledge. Some of the benefits of using the identified literature connections are listed below:

- Class discussion of the literature piece provides an informal means of identifying students' prior knowledge.
- Students' reading/language art skills are further developed and enhanced.
- Students' awareness of science topics through indirect science instruction is intensified.
- Students' are more open to content instruction due to an increased interest level (curiosity is piqued by the use of stories and poems).
- Stories and poems are often real-world based.
- Literature can span several age groups depending on desired content goals.
- Students can often articulate or demonstrate comprehension by acting out or re-creating a story.
- Students can better relate to and retain information in story form as opposed to isolated facts.

Teachers should promote creative and critical thinking through the use of interactive centers. In doing so, students will be at liberty to make inferences independent of the teacher. While at these centers, students can generate questions that may be explored by the whole class or test self-generated hypotheses. To boost critical thinking, the following activities should be incorporated:

- the use of interactive bulletin boards;
- the keeping of journals not only to maintain a record of the details of an experiment, but as a form for reflection to build on previously learned concepts;
- a list of words learned that should be displayed;
- the maintenance of lab folders that are accessible to the teacher and students; and

- the access to technology to enhance problem-solving and to facilitate research.

To complement the class setting, teachers should promote field study experiences to solidify concepts studied within the classroom. By doing this, real-world connections can be made. The promotion of hands-on/minds-on experiments will provide exposure to a variety of lab tools needed for students to be successful scientists. Another way to groom successful scientists is to integrate mathematics in science activities whenever possible.

A comprehensive science classroom will enhance many other disciplines and produce a student who is not only ready for the next grade but will produce perpetual learners.

