Motivating Students in the Science Curriculum

In this article, I’ll illustrate some steps that should help get and keep your students motivated. I’ll include examples from various units in a general Science curriculum.

Motivating students to learn is continually important in teaching, with science being no exception. Motivated students are easier to teach and do achieve more optimally. The science teacher must select relevant objectives for students to attain. There needs to be balance among knowledge, skills, and attitudinal objectives. Each is salient. Knowledge pertains to the vital science facts, concepts, and generalizations that learners need to acquire, inductively and deductively. Skills emphasize using content from the knowledge obtained. Finally, attitudinal objectives are an outgrowth of learning activities, to help students achieve the desired knowledge and skills objectives.

Factors involved in motivating your students

There are a plethora of factors involved in motivation. First, students need to be engaged in an ongoing learning experience. For example, in a science unit on classification of animals, pupils may observe fish in the classroom aquarium. Many characteristics of fish may be noticed such as how they move, how they breathe and stay under water, and what they eat. Illustrations that you will show later in your teaching, would help clarify concepts pertaining to fish. Motivated pupils gather much knowledge from observations made. Questions raised and classroom discussions further elaborate on vital ideas pertaining to the topic at hand. Meticulous observations made objectively are characteristics of a good scientist!

A chart may be developed of observations made, showing characteristics of vertebrates classified as fish. To branch out for further learning activities, children might be guided to develop a scrapbook, individually or in a group, of different kinds of fish and their accompanying pictures. Reading science subject matter is another good way to attain necessary information. All experiences need to be challenging and success-oriented (Ediger and Rao, 2003).

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Second, students need to first experience background information in order to understand new teachings. In classifying a second category of vertebrates, students might study amphibians. During the spring months, pupils could study tadpoles swimming in a jar. As they mature, tadpoles become more like frogs. Direct observation, again, is salient to noticing these changes in time. Students could keep a journal of the changes occurring from tadpoles in water to frogs on land. Illustrations drawn by the kids could accompany the respective write-ups. The Internet may be utilized to gather in-depth information pertaining to amphibians, in order to check the direct observations made. Of course, library books provide even further information on amphibians (See Cuniff and McMillen, 1996).

Third, suppose students need to study the category of reptiles. These can be quite diverse in their representation and include snakes, turtles, alligators, and crocodiles. To become and remain motivated, pupils must attach meaning and understand what is taught and what they are learning. A PowerPoint presentation may identify specific features for each reptile named above and assist in making the learning meaningful. Individually, or in committees, pupils may list features which distinguish reptiles from amphibians and fish. Likenesses also need to be explored, such as being cold-blooded. The listings need to be compared and accurate conclusions drawn. A variety of reference sources may be used to corroborate or refute findings. Objectivity is a key element in learning (See Horejsi, 2003).

Birds provide a fourth category of invertebrates. Here, the science teacher may have students look outdoors to see different kinds of birds. A bird feeder located outside the classroom window attracts blue jays, cardinals, sparrows, and finches. Kids tend to be fascinated with birds, taking notice of and discussing the various characteristics of different species. Pupils are usually interested in knowing that this is the first category of vertebrates which are warm-blooded and whose body temperature is much higher than that of human beings. During the school year, they notice which birds migrate, such as robins. Children learn which birds eat seeds, which eat insects, or those that feed on both. In one class I monitored, a comparison chart was developed by separate groups to show how birds differ from reptiles, frogs, and fish. A video was then played showing these comparisons and students could check their charted hypotheses from that in the video. A lively discussion followed pertaining to in other regions in the world. The duck billed platypus of Australia, for example, has characteristics of both birds and mammals. Students need to think critically when separating these categories and explaining the similarities and differences between species. Critical thinking is a major objective in teaching science (See National Research Center, 1996).

Next, mammals could be studied in ongoing lessons together with other vertebrates. Many children have a pet cat or dog as a source of information. Many texts contain illustrations and information on a diverse selection of mammals, as well as other categories of vertebrates. Illustrations are helpful, to provide children with additional information while reading the content. Any new words being encountered may be printed on the chalkboard or put on screen for the class to become familiar with and discuss. This will help students identify the new words when they are doing any assigned reading on their own. Readiness for reading by possessing background information and by being able to identify the new words in print is salient. Students will no doubt raise questions prior to the reading activity on mammals. These questions may be printed on a flip chart to assist them in securing needed information while reading. The new words may also be printed on a word wall for future reference. Answers to questions might well be a follow-up activity. The teacher may identify additional questions and problems for discussion. It takes time to identify a hypothesis to be tested. The use of additional reference sources for further study and analysis can be helpful. (See Blough and Schwartz, 1984).
When reading science content, students also need to monitor their comprehension individually to notice if they are understanding the content and not just learning the words. By rehearsing or repeating the subject matter read, students will realize if they are comprehending the content. Two pupils reading the same content may listen to each other explain the subject matter read. In this way, both become more conscious of the content, and it helps both comprehend it better. Metacognitive strategies acquired by pupils help learners to reflect upon what has been read. Then they can ascertain if:

- ideas possessed clarity
- content is nebulous and needs more in-depth study
- improved reading strategies might be used, and if so, which ones?
- different word attack skills need to be used
- critical thought needs to be used pertaining to a conclusion reached
- creative thinking is necessary to explore novel ideas (See Fitzburgh, 2006)

Creative thinking stresses that students come up with unique ideas in ongoing discussions. Poetry, in particular, emphasizes originality of thought and making novel comparisons. The science content studied may be transposed into different kinds of verse written by the children. In this way, student actually use the science subject matter they are studying. Thus, they need to attach meaning to and write free verse, for example:

Fish breathe through gills, not lungs
use the tail and fins to propel motion
live in water, not on land
swim rapidly to secure food and avoid enemies
lay eggs to provide offspring.

Rhymed verse may include a quatrain, containing four lines with alternate lines of rhyme, for example:

Amphibians live part of their lives in water
they also live on land,
amphibians begin life with gills, then lungs later
and may also live on sand.

Additional kinds of rhyme include couplets (two lines of rhymed verse), triplets with three lines of rhymed verse, and limericks whereby lines one, two, and five rhyme with lines three and four rhyming. Poetry containing a selected number of syllables per line, such as haiku with its five, seven, five progression of syllables per line is another format, for example:

Cold blooded turtles
They live on both land and sea
Their young hatch from eggs.

Many students, when ready, like to experiment with writing different kinds of poetry. (Tiedt, 1982). They find it fascinating to put science knowledge to use in a creative manner and this should aid in retention of subject matter. There are a variety of ways to use content learned in addition to those discussed previously. They include the following:

- self evaluation of subject matter acquired
- teacher evaluation of student achievement, such as in anecdotal statements
- charts developed to show the progression of stages in each category of vertebrates
• scrapbooks containing illustrations of each category of vertebrates with vital subject matter explaining each
• models of vertebrates made from paper maché and/or paper toweling (such as fish, snakes, turtles, birds, and mammals). When I supervised student teachers, I noticed these kinds of models made by sixth graders and then suspended with string from the classroom ceiling.
• portfolios developed individually (See Bowers, 2005)

As students make these models, they ask questions about vertebrates and seek more related information. **Motivation** to learn is then indeed high!

**References**


