

1st Grade Plants and Animals Unit Student Misconceptions

Common Student Misconception about the nature of science and scientific inquiry (AAAS, 1993, p. 33)

Some students of all ages believe science mainly invents things or solves practical problems rather than exploring and understanding the world.

Common Student Misconceptions about the living environment (AAAS, 1993, pp. 341-342)

Meaning of the words "animal" and "plant"

Elementary- and middle-school students hold a much more restricted meaning than biologists for the word "animal" (Mintzes et al., 1991). For example, most students list only vertebrates as animals. Elementary- and middle-school students use such criteria as number of legs, body covering, and habitat to decide whether things are animals. Elementary- and middle-school students also hold a much more restricted meaning than biologists do for the word "plant." Students often do not recognize that trees, vegetables, and grass are all plants (Osborne & Freyberg, 1985).

Distinguishing between living and nonliving

Elementary- and middle-school students typically use criteria such as "movement," "breath," "reproduction," and "death" to decide whether things are alive. Thus, some believe fire, clouds, and the sun are alive, but others think plants and certain animals are nonliving. (Bell & Freyberg, 1985; Leach et al., 1992).

Understanding heredity

By the end of 2nd grade, students know that children resemble their parents and realize that reproduction underlies this resemblance. Students at this age can also begin to understand the difference between learned resemblance and inherited resemblance (Carey, 1985).

When asked to explain how physical traits are passed from parents to offspring, elementary-school, middle-school, and some high-school students express the following misconceptions: Some students believe that traits are inherited from only one of the parents (for example, the traits are inherited from the mother, because she gives birth or has [the] most contact as children grow up; or the same-sex parent will be the determiner). Other students believe that certain characteristics are always inherited from the mother and others come from the father. Some students believe in a "blending of characteristics." It may not be until the end of 5th grade that some students can use arguments based on chance to predict the outcome of inherited characteristics from observing those characteristics in the parents (Deadman & Kelly, 1978; Kargbo, Hobbs, & Erickson, 1980; Clough & Wood-Robinson, 1985b).

Relationships between organisms

Lower elementary-school students can understand simple food links involving two organisms. Yet they often think of organisms as independent of each other but dependent on people to supply them with food and shelter. Upper elementary-school students may not believe food is a scarce resource in ecosystems, thinking that organisms can change their food at will according to the availability of particular sources (Leach et al., 1992). Students of all ages think that some populations of organisms are numerous in order to fulfill a demand for food by another population (Leach et al., 1992).

Plant and Animal Nutrition

Some students of all ages hold misconceptions about plant nutrition (Bell & Brook, 1984; Roth & Anderson, 1987; Anderson et al., 1990). They think plants get their food from the environment rather than manufacturing it internally, and that food for plants is taken in from the outside. These misconceptions are particularly resistant to change (Anderson et al., 1990). Even after traditional instruction, students have difficulty accepting that plants make food from water and air, and that this is their only source of food. Understanding that the food made by plants is very different from other nutrients such as water or minerals is a prerequisite for understanding the distinction between plants as producers and animals as consumers (Roth & Anderson, 1987; Anderson et al., 1990).

Common Student Misconceptions about death (Excepted from National Science Resources Center, 2002, pp. 221-222)

Studies have show that even young children are capable of understanding [the following] concepts about death. Most children, in fact, learn them between the ages of 5 and 7. Education has been shown to even further advance the understanding of the young child (that is, pre-kindergarten through 2nd grade). But teachers need not create formal death-education classes in the primary and elementary grades. Instead, ... [teachers should] make a conscious effort to integrate information about death into existing curricula and take advantage of spontaneous class discussions and naturally occurring events, such as when a student finds a dead goldfish in the class tank or a dead bug on the playground.

Death is irreversible

Children need to understand that death is a permanent phenomenon. There is no return or recovery from death, no matter how much we may wish otherwise.

All life functions cease at the time of death

Children must understand that all of the activities of body and mind--eating, breathing, cognition, sensation, and so on--cease completely at the time of death. Young children who do not understand this may wish to bury pet food with their dead dog, or may be unduly concerned about a deceased relative's being hungry, cold, or in pain. They will

tell you that dead people don't see well because it is dark underground, or that they can't move "as much" because they are restrained by the coffin.

There are true causes why living things die

The child must develop a realistic understanding of the true causes of death. Young children, who lack this understanding, will often reach the conclusion that bad thoughts or unrelated actions (or omissions) were responsible for the death of a loved one.

Death is inevitable

The child must learn that death is a natural phenomenon; every living thing eventually dies.

Sources:

American Association for the Advancement of Science (1993). *Benchmarks for science literacy*. New York: Oxford University Press.

National Science Resources Center (2002). *STC Organisms teacher's guide*. Washington, DC: National Science Resources Center.