Research on Student Learning

Lower elementary-school students fail to conserve weight and volume of objects that change shape. When an object's appearance changes in several dimensions, they focus on only one. They cannot imagine a reversed or restored condition and focus mostly on the object's present appearance. [1] The ability to conserve develops gradually. Students typically understand conservation of number between the ages of 6 and 7, of length and amount (solid and liquid) between 7 and 8, of area between 8 and 10, of weight between 9 and 11, and of displaced volume betwee 13 and 14. These ages will vary when different children are tested or the same children are tested in different contexts. [2]

Many students cannot discern weight conservation in some tasks until they are 15 years old. The ability to conserve weight in a task involving transformation from liquid to gas or solid to gas may rise from 5% in 9-year-old children to about 70% in 14- to 15-year-old children. [3] More complex changes, such as chemical reactions, especially those where gas is absorbed or released, are still more difficult to grasp as instances of weight conservation. [4]

References

[1] Gega, P. (1986). *Science in elementary education*.

[2] Donaldson, M. (1978). *Children's minds*.

[3] Stavy, R. (1990). Children's conceptions of changes in the state of matter: From liquid (or solid) to gas. *Journal of Research in Science Teaching*, 27, 247-266.

[4] Stavy, R. (1990). Children's conceptions of changes in the state of matter: From liquid (or solid) to gas. *Journal of Research in Science Teaching*, 27, 247-266.