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Misconception of heat and temperature Among physics students

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Abstract

This Study was designed to find out Students misconception in heat and temperature. It was conducted by administering a questionnaire to 53 students from different major and manner (physics, chemistry, biology, and mathematic). In faculty of education Al.fateh university. The results were analyzed by (SPSS) (subject package for social science) to identify Students' misconception on heat and temperature. The findings revealed that most of the students held alternative conceptions of heat and temperature. Finally, Implications and Suggestions for the Teacher for Teaching and Learning

Selection and/or peer-review under responsibility of Dr. Zafer Bekirogullari of Y.B.

Misconception in physics, students achievement, heat and Temperature,

Introduction:

All children's conceptual frameworks develop from their daily experiences and change as they mature. However, frequently their intuitive understanding of the world around them, does not agree with the scientific concepts explanation. It is important in planning instruction to know how these naïve conceptions differ from the scientific explanation, and why children construct these ideas. The reason for exploring learners' ideas parallels the theory that students' ideas constrained and channeled learning, so knowledge of students' ideas should inform teaching. Teachers should identify their own students existing ideas by diagnostic assessment. Development of complex concepts takes place in many small steps. Missing steps can make the correct explanation illusive or downright unattainable. This makes high-quality, age appropriate instruction at each grade level vital to the development of children's understandings of key science concepts. Some 'constructivist' approaches recommend using students' existing ideas as an explicit starting point for developing new learning.

Much research in science education has focused on students' misconceptions about science. While searching through the literature sounds like a great way to spend a Saturday, there are easier ways to locate common misconceptions. The Operations Physics Project has compiled an extensive list of students' misconceptions on a variety of science topics. Of course, this by no means should be considered the *only* misconceptions a student might have.

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Concept of Misconceptions:

Misconceptions might also be referred to as preconceived notions, non-scientific beliefs, naive theories, mixed conceptions, or conceptual misunderstandings. Basically, in science these are cases in which something a person knows and believes does not match what is known to be scientifically correct, also most people who hold misconceptions are NOT aware of their ideas.

Misconception: Hancock (1940) defined “misconception" as "...any unfounded belief that does not embody the element of fear, good luck, faith, or supernatural intervention" (p. 208).

Barrass (1984) wrote of "mistakes" or errors, "misconceptions" or misleading ideas, and "misunderstandings" or misinterpretations of facts, saying that teachers and brighter students can correct errors.

Preconceptions: Ideas expressed that do not have the status of generalized understandings that are characteristic of conceptual knowledge (Ausubel, 1968).

Naive conceptions, Naive theories, Alternative conceptions, Alternative frameworks, Alternative [conceptual] frameworks, Minitheories , Intuitive theories, LIPH for "Limited or Inappropriate Propositional Hierarchies." (Helm & Novak, 1983)

- **Literature review:**
- Elwan (2004), (Misconception of the Concept of Force and Newton’s laws, and the Special Factors Affecting the Presence of Secondary School Student in Tripoli- Libya), found the students have many misconceptions related to force and Newton’s laws as fellow:
- Misunderstanding the concept of force.
- If an object is at rest, no forces are acting on the object.
- Only animate objects can exert a force. Thus, if an object is at rest on a table, no forces are acting upon it.
- Force is a property of an object. An object has force and when it runs out of force it stops moving.
- The motion of an object is always in the direction of the net force applied to the object.
- Large objects exert a greater force than small objects.
- A force is needed to keep an object moving with a constant speed.
- Misunderstanding the concept of third Newton’s law.
- Elwan (2008), (Some of Wrong physical Concepts (Concepts of Kinematics). Students Study the physics Department, Teacher preparation faculty in Tripoli)) , found the students have many misconception related to (Speed, Velocity, Acceleration, Position) as fellow:
- Doubling the speed of a moving object doubles the kinetic energy.
- The only “natural” motion is for an object to be at rest.
- The motion of an object is always in the direction of the net force applied to the object.
- The terms distance and displacement are synonymous and may be used interchangeably. Thus the distance an object travels and its displacement are always the same.
- Velocity is another word for speed. An object’s speed and velocity are always the same.
- Acceleration is confused with speed.
- Acceleration always means that an object is speeding up.
- Acceleration is always in a straight line.
- Acceleration always occurs in the same direction as an object is moving.