An Activity for Teaching Heat Concept to Visually Impaired Students

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INTRODUCTION

Visual impairment is a decreased ability to see to a degree that causes problems not fixable by usual means. Concept in science and mathematics have been found inaccessible to students with visual impairment due to use of figures, equations and graphs. Teachers can make the world of science more accessible to students with visual impairments through collaboration and specific adaptations in both the science classroom and laboratory by providing students with a variety of opportunities to explore and examine real materials closely or use models.

Science materials may include talking devices, tactile charts, reading materials, etc. But traditionally science teaching mostly depends on visual instruction. But distinction must be made between compensatory skills and functional skills so that students with visual impairments can access the expanded core curriculum in addition to the core academic curriculum of general education.

METHOD

This study aimed to develop an activity, as part of a large project, which is accessible to visually impaired students in teaching heat concept which is found difficult to comprehend even by the sighted students. For this purpose we have designed an activity based on using tactile materials for making science more accessible to 8th grade students in a special school for visually impaired. Participant of this activity was six students including a blind student.

	Students	Gender	Visual acuity
Sample Group	Ö1	Male	Blind
	Ö2	Male	Low vision
	Ö3	Male	Low vision
	Ö4	Male	Low vision
	Ö5	Male	Low vision
	Ö6	Male	Low vision

Teaching materials and activity was designed toward 'heat' concept in line with the determined needs, and these designed teaching materials and activities were applied to 8th grade students with visually impaired.

Implementation

The activity is basically consists of simple, economical and easily accessible everyday materials. Two plastic bottles were used in the activity. The activity is basically consists of simple, economical and easily accessible everyday materials.

Two plastic bottles, one of which includes warm water and the other includes cold water was given to every students to hold them with their each hands. Then were questioned about relative decrease and increase the temperature of hands through inquiry based questions during the following 10 minutes.

Before the activity, participants were interviewed to see their conceptual understanding of heat. There were typical misconceptions among the students about heat.

RESULTS AND DISCUSSION

Teacher: What happened when you hold cold water?
Ö1, Ö3, Ö5: My hand started to cool
Teacher: Ok. Why did your hand start to cold?
Ö1, Ö4: Because, the water was cold.
Ö3, Ö6: But our hand was warm
Teacher: Yes, your hand was warm before the holding the bottle filled with cold water. Now I will give the second bottle filled with hot water
Teacher: what happened when you hold hot water ?
Ö2, Ö3. Ö5: My hand started to warm
Teacher: so, what is the reason for the change of the temperature of the hand?
Teacher: Why did one of your hand begin cold and the other warm up?
Ö2: Because, the heat has important role in this situation
Teacher: What kind of role?
Ö1: One of my hand cooled with cold bottle, at the same time my the other hand warmed up with hot bottle.
Ö4: Because the heat has been transferred
Teacher: Where the heat is transferred?
Ö5: Heat has been transferred from my hand to cold bottles
Teacher: Is that right?
Ö1, Ö3, Ö4, Ö5: Yes, teacher, it is right
Teacher: Then, why the other hand warmed?
Ö2: Because, the heat has been transferred from bottle to my hand
Teacher: Is that right answer?
Ö4, Ö5, Ö6: yes, teacher
Teacher: Then, heat is transferred energy, in other words heat is transferred energy from high temperature to low temperature

- Visually impaired students will typically need variety of assistance to explore and examine real materials or models together with some adaptations in the environment in order to let students having safe and full access to science.
- This study aimed to develop an activity to visually impaired students in teaching heat concept. For this purpose we have designed an activity based on using tactile for making science more accessible to 8th grade students in a special school for visually impaired.
- The activity is basically consists of simple, economical and easily accessible everyday materials.
- Then students were questioned through inquiry based questions during the following 5-10 minutes. In the follow up interviews two hours after the activity took place nearly all of the students were able to answer questions about heat concept.
- The result of learnings happening in the environments where the students are made to participate actively in the lessons being more effective.
- As a result, students who are blind or have low vision can participate in experiments and gain experience with measuring, balancing and weighing a variety of materials when provided with simple material adaptations or modifications.

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