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Introduction

Many students do not gain a full understanding of the concepts in a unit before the class moves on to the next unit. My goal was to measure the effectiveness of spending a class period re-teaching the concepts to these students in a small group setting to see if it would help them gain a better understanding of the concepts.

Investigation

This study took place during a 10th grade Biology class unit on evolution. I taught the major concepts of evolution using engaging laboratory activities, inquiry investigations, video clips, paper labs, problem based learning, and lectures. The students took a summative assessment that included an essay question at the end of the unit. If they scored below a 70% on the assessment, then they participated in a one day small group instruction, and retook a similar exam the following day. During the intervention, I attempted to clarify conceptual misunderstandings by discussing the major concepts of evolution with the small groups of students. Twenty-three students participated in the study.

Connection to Industry

In the workplace, people typically learn new skills or content in a small group setting. If they do not have a full understanding of the concepts, then they typically keep trying to learn until they have grasped the concepts or skills. Too often in a classroom, students who do not understand concepts are passed over as the class moves on to the next unit. I wanted to see if small group instruction would be effective in teaching students who did not understand the concepts at the culmination of the unit.

Sample Student Misconceptions

- Mutations always become more common in a population
- They ate something that went into the genes
- Squirrels mutated because they were separated
- Their behavior changed their shells
- Animals can get longer legs to move faster
- Get a long neck because it needs it to reach higher
- Genes adapted because they needed to reach food
- Tortoises got used to environment

Data Collection and Analysis

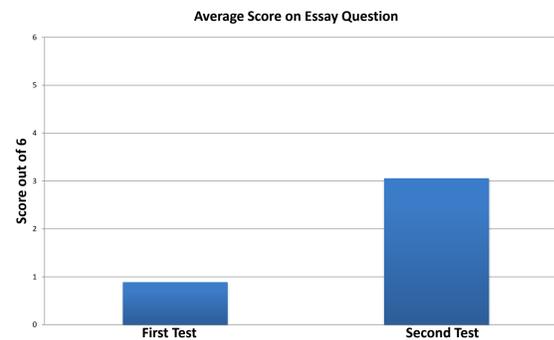
The essay question was scored using a six point system. There were six different required components to the essay question. Each written answer was awarded a point for explaining each of the six concepts. The scores ranged from 0 – 6.

Misconceptions stated in the essays were also noted and analyzed.

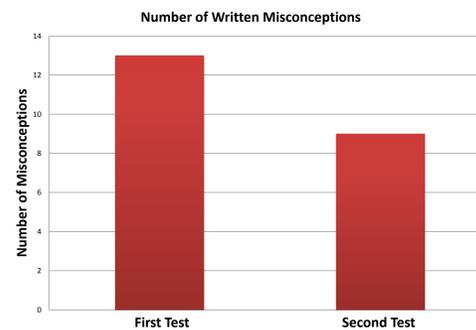
Findings

Re-teaching substantially increased student understanding of concepts of evolution.

- Students scored an average of .89 points on the first summative assessment and 3.06 points on the second summative assessment.



- The number of written misconceptions decreased from a total of 13 written misconceptions on the first summative assessment to 9 total misconceptions on the second summative assessment.



- 1 student received a 0% on his first essay and a 100% on his second essay.

Conclusion

In my classroom, students are assessed daily and I adjust my teaching appropriately according to what they have shown that they understand. However, there are students who still do not understand the major concepts at the end of the unit. This research shows that if students are given time in a small group setting, they may be able to gain the understandings that they originally did not have. Readjusting a unit schedule to include small group instruction with select students will be more successful for students and the teacher.

Changes to Classroom Practice

In the future, I will design my units so that they include more one on one time for students who may be struggling to develop major understandings. Although this can be a challenge in a classroom, this research shows the effectiveness of providing this time and space for students. Incorporating daily small group discussions into the classroom will be even more effective.

References

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1A: The Nature of Scientific Arguments: Handout 2-Galapagos Tortoises

The Galapagos Islands are home to giant tortoises that feed on green vegetation. Originally, tortoises lived only on Isabela Island and had dome-shaped carapaces, or shells (see figure 1). Isabela has a relatively wet climate and varied plant life.

Today tortoises are found on the other islands as well. On the small islands such as Española (Hood), there are tortoises that have a saddleback carapace (see figure 2). The saddleback carapace is elevated above the neck and flared above the hind feet. On the small islands the climate is drier and there is almost no ground vegetation. Prickly pear cactus (a major source of food and water for the saddleback tortoises) has a tree-like form; the woody trunk holds fleshy green parts of the plant high off the ground.

Using the information provided here, please answer the question on the next page.

Figure 1: domed tortoise

Figure 2: Saddleback Tortoise

This is the essay question used for the first assessment. It was designed by Modeling for Understanding in Science Education, available at: <http://ncisla.wcerur.org/muse/naturalselection/materials/section1/lesson1A/handouts/handout2.pdf>

