

Forces and Motion Unit Reflection

My unit on Forces and Motion was overall successful in that the students had fun, learned about Newton's Laws and were able to use vocabulary correctly when explaining new concepts. There are many things that could be improved for next year, however. This unit is one that is the hardest for me conceptually so doing this reflection was very beneficial!

There are several labs and procedures that worked very well. I am going to incorporate small, weekly vocabulary quizzes in my other units. The students got the hang of making flashcards and practicing their new words. The quizzes were expected and routine which is very helpful. Almost all students could recite Newton's Laws of Motion, as we practiced them in class. Using hand gestures and movement was not only easy to get the students involved, it was easy to remind kids of the laws by simply starting the movement and that would trigger a memory. The two labs that really seemed to grab students attention was the gravity lab that involved water balloons (lesson plans day 15) and the momentum lab (lesson plans day 4). Both labs were engaging, involved independent and dependent variables (something I try to bring up as often as possible), group work and hands on learning. Also, the students really enjoyed "Game of Tubes"(lesson plans day 1). This game involved several concepts including speed, velocity, momentum, mass and friction and could be referenced throughout the unit. When students competed against each other (boys vs girls for example) the level of excitement increased significantly! Finally, the inertia demonstration that involves pulling a tablecloth out from underneath some dishes, worked well and inspired some good discussions about why certain masses of objects moved more than others. Using this demonstration along with appropriate videos was effective.

The next time I teach this unit there are several things I need to do differently. The first important change is the order and organization of material. The vocabulary words, Newton's Laws and labs can be restructured to build on each other better. The computer simulation labs should be used to solidify concepts, not introduce them. I should completely remove the station day that involved a lot of PhET labs (day 6 - 8). There were too many concepts introduced at once and the students didn't get sufficient practice. I corrected this problem when introducing centripetal force. Students moved quickly through several stations that demonstrated centripetal force in different ways. This lab was engaging and fun. At the end of the class period, the students had a chance to practice their knowledge with a game on the ipads (see day 15 race track interactive).

The pre- and post-test results revealed several things about test-taking, my teaching methods and what the students could apply. To begin with, I think the test was really difficult.

The questions and the multiple choice answers were very wordy and unlike most tests that the students had been doing in my class. The pictures that were incorporated in each question were helpful but for most students there were too many concepts being tested in each question. Also, there were only 8 questions so I think the sample size was too small. I also only prepared the student by doing labs and taking vocabulary quizzes. These vocabulary quizzes were focused on rote memorization and not on applying the knowledge of what the vocabulary word means. During the unit I did not give them enough feedback and practice doing the question style that was on the test. While I didn't want to "teach to the test" I definitely needed to let the students practice breaking apart such hard questions and teaching how to eliminate answers. Or alternatively, use a different pre- and post-test that reflected the learning style of the unit. The questions could incorporate experiences that the students had in class with the balloon lab and the momentum lab to explain Newton's laws of Motion. Students who had a superior level of reading comprehension tended to do better on the test. This test did not reveal how well students were understanding the concepts learned in the unit. When I would explain the correct answer to the students or eliminated one or two of the multiple choice answers many students were able to explain how Newton's Laws of Motion applied in each situation.

Overall the unit was successful because students enjoyed learning Newton's Laws through several fun labs and mind-bending questions. Ending the unit by building and setting off rockets on field day was not only a great end to the Unit, it was also a great end to the school year! While there are many things to change for next year, including the format of the pre- and post-test, this was a great unit to do some serious reflection on what works and doesn't work with my teaching, organization and this grade level.