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Best Lesson Template

## 2<sup>nd</sup> Grade Science: Friction

1. Georgia Standards:
  - a. **(S2P3a,b)**: Students will demonstrate changes in speed and direction using pushes and pulls.
    - i. a. Demonstrate how pushing and pulling an object affects the motion of the object.
    - ii. b. Demonstrate the effects of changes of speed on an object.
  - b. **(S2CS3)**: Students will use tools and instruments for observing, measuring, and manipulating objects in scientific activities.
    - a. Use ordinary hand tools and instruments to construct, measure, and look at objects.
2. Target Grade level: 2<sup>nd</sup> grade
3. Materials
  - a. Empty plastic water bottles, with tops and labels removed
  - b. Uncooked rice, enough to fill all water bottles
  - c. Small funnel
  - d. Pieces of blank paper, cut to fit around bottle
  - e. Clear tape
  - f. Long pencil, preferably sharpened, for each student
4. How to facilitate lesson
  - a. Mini lesson: what is friction? Briefly explain friction and a few everyday examples of friction. Ask students to compare if more or less friction is desirable in each situation, incorporating critical thinking into the lesson.
  - b. Pass out a blank piece of paper to each child, have them draw what friction means to them (i.e. an example/scenario of friction). Also have them write 1-2 sentences on the paper describing the scenario.
  - c. Depending on size of class and time, have at least a few students explain what their scenario is, which forces them to also verbalize their thoughts.
  - d. Pass out empty water bottle to each student, help them tape their paper around their bottle
  - e. Go around to each student and fill water bottle almost entirely full with rice (leave about 1 inch from top) using funnel. The students LOVE to help hold the funnel and watch you pour the rice. (I considered pre-filling at of the bottles with rice before the lesson but am very glad I didn't because the students LOVED helping me/watching the process. It also meant that I had little helpers to clean up all of the rice that spilled!).
  - f. Demonstrate experiment by rapidly pushing pencil down into rice (graphite end first), pulling it out and repeating. Once rice is completely compacted in bottle, friction between rice and pencil will allow you to pick water bottle off of ground by simply holding end of pencil after plunging it into the dry rice.

- i. I chose to demonstrate/introduce the actual experiment until right before the students were allowed to perform it in order to keep their attention focused on drawing/writing out their friction scenario. I knew that if I showed them the highlight first, they wouldn't spend any time on their drawing and would want to do the actual experiment as soon as possible. This strategy seemed to work very well and allowed me to hold their attention.
    - g. Have each student try and explain/talk about what is happening with their neighbors and with you – what two surfaces are experiencing friction? Are you creating friction or removing friction? Why is this happening?
    - h. Ensure you pass out a bottle top to each student to help limit rice spillage
- 5. Safety: some students may get a little too forceful when plunging pencil into water bottle and hit their fingers on top of bottle. Nothing serious though. No major safety concerns
- 6. Future Modifications: ensure each student has a water bottle top that fits! Helps limit the rice spillage. Overall it went very well and the students loved it so no other modifications in mind.