Lesson: Simple Machines

Length: 30 minutes for activity
30 minutes to type out group responses

Age or Grade Intended: 4th

Academic Standard(s):
4.6.1 Demonstrate that in an object consisting of many parts, the parts usually influence or interact with one another.

Performance Objective:
Given a machine, students will sketch its different parts on paper from several angles while it operates, with 100% accuracy.
Given a worksheet, the students will list the elements of their gadget, explaining their importance to the gadget with 100% accuracy.
On a piece of paper, students will sketch how the moving parts in a machine relate to and affect each other with 100% accuracy.

Advanced Preparation by Teacher:
Gadget Breakdown Sheet (see attachment)
Gather gadgets for hands-on experience such as: car jack, can opener, garlic press, tongs, pizza cutter, nutcracker, egg beater, and stapler.

Procedure:

Introduction/Motivation: Has anybody ever used a can opener before? Have you ever really looked at a can opener and studied how it worked? Is it simply one piece of metal? No, there are a lot of little parts that we do not notice a can opener has. Today, we are going to look at some gadgets that we tend to use throughout life and see how they work. Does this sound fun?

Step-by-Step Plan: Students will be put into 8 groups of 3, assuming it is a class of 24 students. As they gather into their groups, each group will be given a gadget in which they will study. As papers are being passed out, the students will be asked to study the gadget from a certain angle without touching it. Next, they will be asked to draw what they see from their angle and analyze how the parts of the gadget work with one another.
After each group member finishes his/her sketch from the first angle, they will rotate around the group to draw a sketch from other point of view. After each student has drawn three different sketches of the gadget, they will be able to interact with the gadget and make assumptions as to how it works. Throughout the lesson, continually ask the students questions to keep them engaged in the activity. What does this part help the device do? What can this part do on its own? What can this part do when combined with other parts? The students are to fill out the Gadget Breakdown worksheet where they will
draw a sketch of the gadget and show with arrows how the gadget works. On the second page of the worksheet, they are asked to identify important parts of the gadget and its main purpose. The group is to share their ideas with one another and come up with a consensus on how the gadget works and how the pieces of the gadget work with one another.

**Closure:** After all groups are ready (30 minutes has passed), the students will go to the computer lab and type up their recordings about the gadget they studied together as a group. The following day in class, the groups will be asked to present to the rest of the class their results and gadget they studied.

**Assessment:** When students have completed their designs, each member of the group will complete a journal entry in which they document their work, sketching and labeling the parts in the final design. Students should also write about any problems that arose or any improvements that they would make if they had access to unlimited materials. Next, the students will take turns going to the computer lab as a group to type out their results from the Gadget Breakdown worksheet. Have students present their completed designs to the class.

**Adaptations/Enrichment:** For those individuals with learning disabilities, I feel that this will be a wonderful activity because it is a hands-on activity and involves a lot of drawing rather than writing down answers. However, when it comes time to fill out the Gadget Breakdown worksheet and questions portion, they can be assisted with reading the questions and coming up with ideas. For individuals with physical disabilities, the group will be located in a spot in the classroom which best suits his/her needs and if necessary, they can do their activity in another room. For those students that are gifted and talented, they can think of ways in which the gadget can be used for other things, but of course, at the same time, other students can think beyond the activity as well.

**Bloom’s Taxonomy:**
- Can you name what your gadget is?
- Can you illustrate the different parts of the gadget?
- Can you recognize the different parts of the gadget and their purposes?
- Can you explain how the gadget works?
- Can you write your assumptions about the gadget?
- Can you support your recordings about the gadget?

**Gardner’s Multiple Intelligences:**
- **Logical-Mathematical:** The students use logic to figure out how/why the gadget operates as it does. They are to analyze the gadget and transfer what they see onto paper in a sketch.
- **Interpersonal:** The students are forced to work with others in a group. They will be forced to communicate with one another their ideas and come up with assumptions as to why the gadget does what it does.
- **Intrapersonal:** The students work from within themselves and come up with ideas that they share with their partners.