Lesson 16 Alternate Lesson – Elevator Project I: Building with PVC pipe – Build a structure to support a pulley

Note: This lesson can replace both Lesson 14 and Lesson 15 if there is not enough time to devote two lessons to this.

Objectives: Students will have hands-on experience using PVC pipe as a building material.

Students experiment with ways to make their PVC pipe structures strong.

Materials: For each group:

- PVC pipe – ½", cut into pieces: 6", 12", 18"
- PVC pipe fittings for ½" pipe: 15 T-connectors, 15 L-connectors, 8 straight connectors
- Small binder or folder with place for inserting loose leaf paper for journal
- Handout for students to use to document process: Building a PVC Pipe Structure to Support a Pulley
- Extra sheets of blank paper, pencils, markers
- Camera to take pictures of group projects
- Pulley and string
- Plastic grocery bag with 4 – 500 gram weights
- Handout with directions for making simple, secure knots.
- Meter stick

Sponge: Review handout for students to use to document process.

Initial Discussion: What is PVC pipe used for? Why might we be using it in this class? Introduce project for next several classes: build an elevator. Suggest that teams consider coming up with a team name.

Discuss project portfolio (journal) and handout. Why is it important for engineers and scientists to document their work?

Talk about pulleys used in potato chip factory unit and need for a structure to hold the pulley.

Safety issue – be sure that the structure is sturdy while building it and while pulling up the weight using the pulley. Watch out for getting conked on the head if the structure comes apart.

Project: Build a structure about a meter high that can support a pulley while pulling up 2000 grams. Start by pulling 500 grams, and add to the weight in the bag. If the structure seems unstable, redesign and rebuild.

Students should draw a detailed diagram of their sturdiest structure (or the structure of another group, if they like that structure better) because they will need to make a similar structure for the next lesson.

Group must complete the page for the project portfolio. Toward end of class period, suggest that one or more team member designs a cover page for the elevator project.

Vocabulary: PVC pipe – pipe often used for sprinklers made of polyvinyl chloride

Final Discussion: Students show their projects to the class, telling what they learned in the process. Discuss which structures are most stable when pulling up weight. Groups complete handout for portfolio.

Next project, students will use a motor to make an elevator. Students should think about how to build an elevator.

Clean up: Take all connectors off PVC pipe.

Home

Connection: Talk with family members about how an elevator might work and how to build an elevator using PVC pipe, a pulley, and a motor.