Project: Sharing Matter

FOR THE TEACHER

Summary
In this project, students will design a lesson and activity about the states of matter to share with elementary school students. This project embraces the spirit of the famous quote by Roman philosopher Seneca: “by teaching, we learn.” In order to successfully teach one of the states of matter to younger students, each group must have advanced knowledge of the subject.

Grade Level
Middle School

Objectives
By the end of this project, students should be able to
- Explain one of the states of matter
- Develop a lesson plan and activity

Chemistry Topics
This project supports students’ understanding of
- States of matter

Time
Teacher Preparation: minimal
Lesson: 2-3 hours

Materials
- Materials will vary

Safety
- No specific safety precautions need to be observed for this activity.

Teacher Notes
- Depending on time and resources, it may be beneficial to partner with an elementary class (or classes) so that the students can share their project. If your students are unable to share their project with an elementary school, it is still important for them to share their projects with their classmates (or another science class).
- Students should be divided into groups of 2 to 4. Each group should be given a packet that includes instructions and grading rubric. Each group will pick a state of matter.
- It is important that the students have at least a basic understanding of the states of matter. This will give them a baseline in which to begin their research and brainstorming.
- It may be a good idea to monitor the feasibility of each group’s activity if the class is going to share the lesson and activity with an elementary class. In this case, it would be important to make sure that the materials for the group’s activity can be obtained. It is advisable to limit the list of technology to those available in your classroom.
- One of the requirements for this project is that some form of technology (examples: PowerPoint, video, dataloggers, interactive materials, etc.) must be integrated into the lesson or activity. There are multiple websites that give ideas on how to integrate technology into the classroom and you may want to share some of the ideas that are accessible in your classroom.
- Based on how much time you allot for the development of this project, have the student groups come up with a timeline to keep them on track. Things that need to be addressed in the timeline
include: research, brainstorming, lecture development, and activity development. To ensure success of this project, it is important to create deadlines for each stage.

**FOR THE STUDENT**

**Lesson**

**Sharing Matter**

**Background**
Solid, liquid, and gas are different states of matter. Each has a set of characteristics and attributes that can be used to distinguish it from the other states of matter. Matter can transition between these states by changing its temperature and/or pressure.

**Objective**
Your group will develop a lesson and activity to teach one of the states of matter to a group of elementary school students.

**Materials**
Your group will need to develop a list of materials that is needed for your activity. Remember that the materials must be obtainable and approved by your teacher. You will need to incorporate technology into either the lesson or the activity, so make sure that your chosen technology is accessible to your audience and is available at your school.

**Safety**
Remember that your activity will be shared with young students and must be safe for them to complete.

**Procedure**
1. Select a state of matter and get approval from your teacher.
2. Conduct research on your state of matter and create detailed notes to help with the creation of your lesson.
3. Brainstorm ideas for an activity that demonstrates the chosen state of matter. Share your ideas with your teacher.
4. Create a 10 minute lesson on the state of matter that you will share with elementary students. Make sure that you use language and concepts that are appropriate for the age group. Each group member needs to participate in the presentation of the lesson.
5. Create a 15 minute activity that demonstrates and explains the state of matter that the elementary students can complete. You will need to guide the students through each step of the process and complete the activity as a class.
6. Use the lesson plan sheet and grading rubric to build your lesson and activity.