Project: Elemental Art – A Visual Periodic Table

FOR THE TEACHER

Summary
In this activity students will research an assigned element of the Periodic Table and then create a poster that visually explains and expresses the element. The final posters can be arranged into a classroom Periodic Table.

Grade Level
Middle School

Objectives
By the end of this project, students should be able to
- Understand how the elements of the Periodic Table are organized
- Recognize basic trends in the arrangement of elements
- Differentiate between the subatomic particles in an atom

Chemistry Topics
This project supports students’ understanding of
- Periodic Table
- Elements
- Atomic Structure
- Subatomic Particles

Time
Teacher Preparation: 15 minutes
Lesson: 2 days for research

Materials
- Chromebooks or computer lab time (for research)
- Construction paper or poster board
- Element Fact Sheet handout
- Magazines
- Markers
- Stickers
- Colored paper (for creating the visual poster)
- Glue Sticks
- Scissors

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

- For review about the elements or the Periodic Table visit this website.
- If you’re planning on keeping the student projects to organize in the shape of a periodic table on the classroom wall or in the hallway, you might try coordinating with your school’s copy room or librarian to laminate the projects to make them more durable.
- Give students a list of resource website to use for their research and help direct their thinking. I normally post links to “useful” websites on my website or in Google Classroom.
- If finding paper supplies poses an issue, students can create their visual elements using PowerPoint or Google Slides.
- For high level students: instead of creating a poster, these students could create a short cartoon describing the element. Websites such as PowToon are reasonably priced and are safe for student use.
- For lower level students: give them a template for creating their project or further limit their research options.
- I normally post ALL student handouts in Google Classroom for students to complete.
- This could also be organized as a lapbook instead of a poster.
- For timing, I allow one day for completing the element fact sheet and 1 day for creating the poster.
- Analysis questions are provided for after the project is completed. Students can look at the collection of posters that are organized as the periodic table to complete this section.
- The analysis section will require that students are given a paper copy of the periodic table.

FOR THE STUDENT

Project

Elemental Art – A Visual Periodic Table

Background
Understanding the elements of the Periodic Table can seem like an impossible task. Some of the elements have crazy names (einsteinium or americium), while others have names you’ve heard before (oxygen or carbon). But why do you need to learn about the elements? Obviously you need oxygen to breathe, but do some of the other elements really serve any purpose? For this project, you will be researching a specific element to present to the class. You will discover how your element is used and how it affects your daily life.

Prelab Questions
Define the following words:

1. Atom
2. Nucleus
3. Proton
4. Neutron
5. Electron
6. Energy Level (Electron Shell)
7. Valence Electron
8. Period
9. Group
10. Atomic Number
Objective
After completing this project you will understand how the elements of the Periodic Table are organized and recognize the uses of different elements.

Procedure
1. Review the research questions below.
2. Fill out the document as you complete your research and make sure you provide links to the website where you found the answer to each question.
3. When your research is finished, submit it to your teacher for review.
4. Begin brainstorming how to visually represent your element on a poster.
5. When you are ready to begin constructing your poster, make sure you have a plan! You have a limited amount of time and supplies, so create a rough sketch of your layout and pictures before gluing or writing/drawing anything with markers.
6. Make your work neat! Type your information and print it out if needed! Remember: these posters will be displayed in the hallway, so make sure your final product is something you’re proud of.
7. You will complete the analysis section after everyone has completed their element poster.

Research Questions
Answer the following questions regarding your assigned element:
1. What is the atomic number? (1 point)
2. How many protons, electrons, and neutrons does an average atom have? (3 points)
3. How many shells and valence electrons does an atom have? (2 points)
4. What was it named after? (2 points)
5. Where was it discovered? (2 points)
6. Who discovered it? (2 points)
7. When was it discovered? (1 point)
8. Where can it be found? (3 points)
9. Does the human body use it? Explain. (3 points)
10. What are some of its main uses? Do we experience this element in everyday life? How? (7 points)
11. Is it poisonous / hazardous? (3 points)
12. In what compounds or forms is it commonly found? (5 points)
13. How abundant is it? (4 points)
14. In which group (column/family) can it be found on the periodic table? (1 point)
15. What are some of its properties? (physical and chemical) (5 points)
16. What state of matter is it commonly found? (1 point)
17. What are at least 2 interesting facts about this element? (6 points)
18. Include a drawing of its atomic structure/Bohr model (4 points)
Analysis
Look at the collection of posters presented on the wall and use the information to answer the following questions:

1. Explain any patterns or trends you notice in how the elements are arranged in terms of their atomic number and atomic mass.

2. What do the atomic mass and atomic number of an element tell you?

3. Color-code the provided Periodic Table by element category. Use blue for metals, red for non-metals, and yellow for metalloids. Do you notice any patterns? What are they?

4. You discover a new element. You notice that the element is always bonded with chlorine and explodes when in contact with water. What group does this element most likely belong to?