Drexel-SDP GK-12 ACTIVITY

Subject Area(s): Chemistry

Associated Unit: None

Associated Lesson: None

Activity Title: Adopt an Element

Grade Level: 7 and 8 (7-9)

Activity Dependency: None

Time Required: 45 minutes

Group Size: 1 students

Expendable Cost per Group: US $0

Summary

Each student is assigned their own element in which calculate the number of protons, neutron and electrons with information they obtain from the periodic table and then research other facts about the element. Then with the information the students obtain, they construct an advertisement for their element that includes a slogan.

Engineering Connection

Elements are the building blocks of materials science and materials engineering. Understanding the fundamentals of atoms such as neutrons, electrons and protons is important to necessary to learn the concepts of materials science and materials engineering.

Keywords atom, proton, neutron, electron, atomic number, atomic mass, peiodic table

Educational Standards

- Science: 3.4.7
- Math: None

Learning Objectives

After this lesson, students should be able to:

- Determine the atomic number and atomic mass of an element from the periodic table.
- Calculate the number of protons in an atom
- Calculate the number of electrons in an atom.
- Calculate the number of neutrons in an atom.

Materials List

Each group needs:

- Worksheet

To share with the entire class:

- Computers

Introduction / Motivation

Everything around us is made up of elements, each of these elements is listed in the periodic table of elements. Each of these elements is made of atoms; and each of these atoms is made up of protons, electrons and neutrons. Understanding how elements, atoms, electrons, protons and neutrons is important to be able to understand the concepts on materials science and materials engineering. The electrons in the atoms/elements are what give materials their specific material properties, such as how they will bond to other materials. How the elements form into different structures is dependent on the electrons on the atom. Understanding elements and atoms at this basic level is important as a building block to be able to start adding more complication materials science concepts.

Vocabulary / Definitions

Word	Definition
Atom	the smallest unit of an element that maintains the properties of that element
Nucleus	in physical science, an atom's central region, which is made up of proton and netrons
Neutron	a subatomic particle that has no charge and that is found in the nucleus of an atom
Proton	a subatomic particle that has a positive charge and that is found in the nucleus of an atom
Electron	a subatomic particle that has a negative charge
Atomic Mass	the mass of an atom expressed in atomic mass units
Atomic Number	the number of protons in the nucleus of an atom; the atomic number is the same for all atoms of an element

Procedure

Background

The number of protons, neutrons and electrons of an element can be calculated from the atomic number and atomic mass. The atomic number is equal to the number of protons and electron. The atomic mass is the number of protons plus the number of neutrons.

So for example:
Sodium, Na has an atomic number of 11 and an atomic mass of 23 amu. Sodium has 11 protons, 11 electrons and 12 neutrons.

Before the Activity

- Print out the two handouts for each student

With the Students

1. Give out the copies of the handouts and explain the first part is to be done in class and the poster is to be done at home (if you choose to do it that way).
2. Assign each student a different element (start with helium for ease of calculations).
3. Let the students work through the worksheet – using the computers as necessary.
4. Collect the in class worksheets from the students when they finish and the posters when they are due.

Safety Issues

- None

Troubleshooting Tips

There are no common issues with this activity.

Investigating Questions

- If you have the same number of protons and electrons what is the total charge on the atom?

Assessment

Pre-Activity Assessment

Class Discussion:

- The three states of matter should have already been covered in class, in addition to melting and boiling points.
- Talk about the elements, the periodic table and why they are important. Also mention atomic mass and atomic number.
- Talk about atoms, neutrons, electrons and protons.

Activity Embedded Assessment

Handout: Have the students fill out the handout and review their answers as a measure of the concept comprehension.

Post-Activity Assessment

Poster/homework: The element advertisement goes over all of topics covered in the activity and adds in a creative aspect.

Activity Scaling

- For upper grades, additional concepts can be added such as groups and periods of the periodic table.

References

http://sciencespot.net/Media/adtelempjt.pdf

Owner

Drexel University GK-12 Program

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Name _____

Date _____

Adopt An Element

My element is_____. The **symbol** for my element is _____.

The **Atomic Number** is _____. The **Atomic Mass** is _____.

The number of **neutrons** is _____.

The number of **protons** is _____.

The number of **electrons** is _____.

Melting Point _____ºC. Boiling Point _____ºC. Phase _____.

Cost = _____ for _____.

My element is a (circle one): Nonmetal, Metal, Metalloid

My element belongs to the _____ family.

My element was discovered by _____ in _____.

Some interesting facts about my element (uses, common compounds, etc..)

1.

2.

3.

4.

5.

6.

Now it's time to make an advertisement for your element!

Using an unlined 8 ½ x 11" sheet of paper (like a piece of copier, printer or construction paper) you need to make an advertisement for your element.

The advertisement must include:

- **Element's name**
- **Symbol**
- **Atomic Number**
- **Atomic Mass**
- **Number of Protons**
- **Number of Electrons**
- **Number of Neutrons**
- **Cost**
- **Advertising slogan for the element**

Use this as an opportunity to be creative! You can use colored paper, markers, pictures, or anything else that you think will help sell your element but remember a big part of selling your element is the slogan.