Unit of Instruction

Physical Science

Janice Bezanson
EdTech 506
Fall 2010
Physical Sciences

Unit Goals

Students will understand and answer the following questions:
• What are the properties of matter?
• What makes up matter?
• What are compounds?
• How can we separate mixtures?
• What are physical and chemical changes?
• How does matter change state?
• What are some kinds of chemical reactions?
• How are chemical properties used?

Physical Sciences is one of three blocks of science taught in fifth grade. It will be taught over a nine-week period during the second trimester.

This Physical Science unit is part of California State Standards. Science is on the state test in fifth grade.

Science Content Standards for California Public Schools
1. Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept:

   a. Students know that during chemical reactions the atoms in the reactants rearrange to form products with different properties.

   b. Students know all matter is made of atoms, which may combine to form molecules.

   c. Students know metals have properties in common, such as high electrical and thermal conductivity. Some metals, such as aluminum (Al), iron (Fe), nickel (Ni), copper (Cu), silver (Ag), and gold (Au), are pure elements; others, such as steel and brass, are composed of a combination of elemental metals.

   d. Students know that each element is made of one kind of atom and that the elements are organized in the periodic table by their chemical properties.

   e. Students know scientists have developed instruments that can create discrete images of atoms and molecules that show that the atoms and molecules often occur in well-ordered arrays.

   f. Students know differences in chemical and physical properties of substances are used to separate mixtures and identify compounds.
g. *Students know* properties of solid, liquid, and gaseous substances, such as sugar (C6H12O6), water (H2O), helium (He), oxygen (O2), nitrogen (N2), and carbon dioxide (CO2).

h. *Students know* living organisms and most materials are composed of just a few elements.

i. *Students know* the common properties of salts, such as sodium chloride (NaCl).

**Learner Characteristics**

This unit is intended for fifth grade students in a regular-ed classroom setting. The students typically range in age from ten to twelve. There are no special needs students during the 2010 – 2011 school year.

This unit is designed for students that have successfully completed fourth grade science. Laptops will be used during some of the lessons and students should have keyboarding skills and the ability to navigate the web.

The learning will take place in a regular-ed classroom at Magnolia Elementary School. There are currently 31 students in this class. Instruction for this unit will include whole group instruction and small group instruction. Students will also be in pairs to use the computers, as there are 16 laptops for 31 students.

**Introduction**

This unit will be introduced with up warm up activity that will activate prior knowledge. The question “What makes up everything around us?” will be written on the Interwrite board when the students return to the classroom after lunch. They will talk in their small groups for a few minutes and each group will come up with a short answer. They will then be asked to describe objects in the classroom. They will be encouraged to use adjectives that successfully describe various objects.

The students will receive a handout with the list of goals written in the form of questions for this unit.

The students will take part in a directed inquiry that will answer the question “How can properties change during a chemical reaction?”

**Directed Inquiry:**

Students will:

1. Put 100 ml. of cold water and a thermometer in a cup. Put 100 ml. of warm water and a thermometer in another cup.
2. After 1 minute record temperature.

3. Add 2 fizzy antacid tablets to each cup.

4. Observe and record any changes.

After the directed inquiry, students will discuss in their small groups the way temperature affected the speed of the reactions and draw or infer a conclusion.

**Materials, Media and Resources**

Textbook – California Science, Scott Foresman (Students have a hard cover book and can also access their text book online)

Materials required for Directed Guided Inquiries:

How can properties help you separate a mixture?

- Foam cups
- Spoon
- Salt
- Sand
- 3 Marbles
- Graduated Cylinder
- Coffee Filter
- Rubber Band
- Piece of Foil

What is one clue that a chemical reaction has occurred?

- Graduated Cylinder
- Magnesium Sulfate
- Calcium Chloride
- Plastic Cups
- Spoons
- Balance and gram cubes

What materials can conduct electricity?

- Battery and battery holder
- Light bulb and bulb holder
- Insulated wires
- Meter stick

DVD – Quiz Show – Interactive game for students to play that covers the course goals.

9 visuals that will be made for this assignment:

1. A graphic illustrating what makes up matter and the states of matter.
2. A graphic illustration of a decomposition reaction, combination reaction and a replacement reaction.

3. A chart illustrating the parts of an atom including the protons, neutrons and electrons.

4. A graphic that shows how a molecule is formed.

5. A poster comparing the differences in particles in a solid, a liquid and a gas.

6. A graphic design of a mixture.

7. A graphic design of a solution.

8. A graphic design using topography to express meaning of words through shape.

9. A graphic showing a person is 70% water.

**Assessments**

Students will be formally assessed using the publisher’s lesson quizzes, chapter tests and unit test. They will also be tested on the California State Test.

They will be informally assessed through observations and execution of experiments.

The assessments will show a clear indication if the student has achieved the learning goals of this unit. Remediation will be provided throughout the duration of this unit to any student that does not pass the assessments.

* Adapted from Unit Plan at [http://edtech.tennessee.edu/~bobannon/unit_plans.html](http://edtech.tennessee.edu/~bobannon/unit_plans.html)