Sanae Haichar 12/4/2013

Fatma Ayoub

Somia Ahmed Khan.

Lesson plan

Topic: Physical and chemical changes.

Grade level/s: 11th grade chemistry.

Class size: 30 students.

Approximate Duration of the Lesson: Approximately 20 minutes.

Aim: in our lesson for today, students will be taught the concept of chemical and physical changes.

Curricular Objectives: upon the completion of this lesson the student will be able to:

1- Define the term physical changes with 85 % accuracy.
2- Define the term chemical changes with 85% accuracy.
3- Distinguish physical and chemical changes and cite examples of both types of change with 85 % accuracy.

Language Objectives: When the lesson is complete the student will be able to correctly pronounce and define the new vocabularies learned in today's class.

Additional learning objectives: Students will explain the difference between physical and chemical changes. Students will associate chemical and physical changes with daily products.

National Science Education Standards: properties and changes of properties in matter a substance has characteristic properties, such as density, a boiling point, and solubility, all of which are independent of the amount of the sample. A mixture of substances often can be separated into the original substances using one or more of the characteristic properties. Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties. In chemical reactions, the total mass is conserved. Substances often are placed in categories or groups if they react in similar ways; a metal is an example of such a group.

New standards performance standards:

- S1b- student demonstrates an understanding of structure and properties of the matter.

NYS core curriculum guidelines Standards: standard 4: Key Idea 3:

- Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

- Distinguish between Physical and Chemical Change.

Benchmarks:

- Atoms and molecules are perpetually in motion. Increased temperature means greater average energy, so most substances expand when heated. In solids, the atoms are closely locked in position and can only vibrate. In liquids, the atoms or molecules have higher energy, are more loosely connected, and can slide past one another; some molecules may get enough energy to escape into a gas. In gases, the atoms or molecules have still more energy and are free of one another except during occasional collisions.

- There are groups of elements that have similar properties, including highly reactive metals, less-reactive metals, highly reactive nonmetals (such as chlorine, fluorine, and oxygen), and some almost completely nonreactive gases (such as helium and neon). An especially important kind of reaction between substances involves combination of oxygen with something else -- as in burning or rusting. Some elements don't fit into any of the categories; among them are carbon and hydrogen, essential elements of living matter.

New York State Department of Education Standards:

- **Standard 1:** Students will use scientific inquiry, as appropriate, to pose questions, seek answers, and develop solutions**.**

- **Standard 2:** Students will access, generate, process, and transfer information using appropriate technologies.

- **Standard 4:** Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science**.**
- **Standard 7:** Students will apply the knowledge and thinking skills of science to address real-life problems and make informed decisions.

Materials:

Student provided:

- paper/notebook
- Pencils/pens.

Teacher provided:.

- Worksheet for each student.
- Any materials needed for lecture i.e.: slides, PowerPoint, dry erase markers and erasers, Laptop, animations.
- Other material and equipments for demonstration purposes: Ice, baking soda, vinegar, nail polish, fabric, old leaves, old nail, wood, paper, sugar, water, and milk.

Safety precautions: Before beginning the experiments, remind students to refrain from using their sense of taste!

Background/ preparation: Students should be familiar with the concept of matter and the properties of matter (e.g.-size, shape, color, texture, etc.) Students should be familiar with the states of matter.

Lesson Title: Physical and Chemical changes of matter.

Procedure:

WARM-UP/REVIEW: (ESTIMATED TIME: 5 MINUTES)

- Greet students and introduce myself.
- Take attendance.
- Ask students what they have learned in class last time.
- Ask: "Have you heard any words or expressions you couldn't understand since our last class?/ who can remind us of some important concepts we have learned in our last class?

(Students respond, discuss meanings, etc.).

Introduction :(ESTIMATED TIME: 2 MINUTES)

- Explain: "Today, we will identify physical and chemical changes of the matter, and then we will distinguish between both changes and finally cite different examples illustrating both types of changes." This short introduction will give students an overview about the topic of our lesson today.

DO NOW (2-3 minutes):

- Student will be asked to manipulate the Play Dough into different shapes Such as Ball, Cubes, Triangle or any shapes you want to make. Then they will be posed the question: what changes do you see?

ENGAGE: (ESTIMATED TIME: 5 MINUTES)

- Teacher launches the lesson with a do now activity that will gauge student's prior knowledge about physical and chemical changes of the matter.
- This is a formative assessment that will help the student to approach the new knowledge with apprehension. In addition, it would help me as a teacher to see the ideas my student was familiar and not familiar with on the topic we were about to study. So I build on what he already knew to make sense of the new learning and make my lesson plan accordingly.

Motivation: Before beginning this topic, students are highly recommended to review the movies Solids, Liquids, and Gases (http://www.brainpopjr.com/science/matter/solidsliquidsandgases/preview.weml) and Changing States of Matter (http://www.brainpopjr.com/science/matter/changingstatesofmatter/preview.weml) for review.

Presentation: (ESTIMATED TIME: 10-15 MINUTES):

Scientists divide the changes in matter into two categories: **physical changes** and **chemical changes**. A **physical change** is a change in the appearance or physical properties of a substance. A physical change does not produce a new substance. For example, tearing a piece of paper in half is a physical change. Although the paper is smaller, it is still paper. Some other examples of physical changes are listed below:

- A grape when stepped on (changes shape)
- Blowing up a balloon (changes size and shape)
- Liquid water turning to ice (changes state of matter)
- Liquid water turning to steam (changes state of matter)
- Mixing salt and sugar (changes the appearance, but you can still
- separate the mixture)
- Mixing water and salt (changes the appearance, but you can still separate the mixture)

A **chemical change** is a change that makes a new substance. Suppose that you take the same piece of paper you tore in half and throw it into a fireplace. The burning of paper is a chemical

change. The ashes left over by the burning process no longer look and feel like the original paper because it has been chemically changed into different substances that have different properties. But how will we know if a new substance has been produced? Some of the common signs that a chemical change has occurred are:
1. Production of gas bubbles
2. Change in the way something smells
3. A release of energy such as a flash or a sound (like a firecracker)
4. A precipitate forms (two liquids mixed together form a solid and a liquid).
Here are some examples of chemical changes:
• Metal rusting (new substance formed)
• Stomach digesting food (break down of food to new substances)
• Plant carrying out photosynthesis (putting water and carbon dioxide together to make sugar)
• Mixing baking soda and vinegar (makes a neutral liquid and a gas)

Vocabulary list:

- **Chemical changes**: change during which a new substance is created; usually cannot be reversed.
- **Physical changes:** change during which the shape or size of matter has been changed but not permanently; usually can be reversed.
- **Solid:** a state of matter in which the size and shape stays the same.
- **Liquid:** a state of matter in which the substance takes on the shape of the container into which it is poured.
- **Gas:** a state of matter in which the substance completely fills any available space.
- **Evaporation:** state a substance reaches when it changes from a solid or liquid to a gas either at room temperature or boiling temperature.
- **Mixture:** this occurs when two or more substances are mixed together but do not create a new substance and can be separated.
- **Solution:** one substance is mixed with another and dissolves in the substance.
- **Properties:** the characteristics of a substance.
- **Water Vapor:** the gaseous state of water.

Describe your procedure step by step:

1. The presentation will be launched by asking students about last class topic and what they have learned from it.

2. Then the teacher moves on to do a short introduction to today's topic which is physical and chemical changes of the matter.

3. After introducing today's topic, the students should do the do now activity which will gauge their prior knowledge about today's topic.

4. Afterward the teacher will show slides/PowerPoint of physical and chemical changes of the matter and students should participate in answering any questions about characteristics of physical and chemical changes and provide examples supporting their answers. This activity will appeal to the auditory/visual learners as well as give English language learner and disabled students the opportunity to ask questions and participate in the discussion.
5. Have the students copy the information in their science journal.

6. Give examples of chemical change in the real world like leaves changing colors in the fall, wood burning, and fireworks.

7. Tell students that today we will look at everyday uses of products that are made by physical and chemical changes.

8. Teacher uses videos for students to have a deeper understanding about physical and chemical changes. This activity will appeal to those students who are visual learners as well as give ELL student and disabled students a visual support to have a better understanding of what are physical and chemical changes of the matter.
9. At the end of this lesson, the teacher should distribute the following materials to each group of students: ice, water, paper, vinegar, fabric, nail polish, banana, milk, baking soda, and sugar.

10. Students will perform the experiments as instructed. In addition, students will provide a written explanation as to whether a physical or chemical change has occurred.

11. The students' findings and explanations are discussed. Lead students to conclude that the vinegar and baking soda caused a chemical change.

12. After completing this activity, the teacher will distribute a vocabulary list that can be used to help ESL and disabled students to stay in touch with the vocabulary that will be used during this lesson. The teacher will also read the list of vocabularies and make sure the student understands it.

13. To assess students' understanding, the teacher will hand out a worksheet that has to be individually completed by each student within a time frame of 10 minutes. ESL and disabled students will be given extra time if needed.

Include discussion questions and possible answers at appropriate points in the lesson plan: Ask students the following questions: Why do cars rust? Once they have

rusted, is there anything you can do to get the original metal back? This question will motivate students and engage them to think like scientists in search of answers.

Closure:

- Think about the chemical and physical changes that we have learned about today. Can anyone tell me what are the differences between physical and chemical changes of the matter?
- Make a chart on the Smart board comparing/ contrasting physical and chemical change with students' answers.
- Have them copy the chart into their journals.
- Teacher should allow students to ask questions about today's topic and any additional terms or expressions they didn't understand. If students ask questions that I don't know the answers to, take note of them and find answers for next class meeting

Adaptations for students with disabilities: Be sure to check the student's IEP for specific accommodations/ use of visual support for students with auditory complications / vocabulary list is provided/ use of large fonts for students with visual problems/ small group activity.

Possible ways technology might be incorporated: Computer, PowerPoint software or PowerPoint Viewer (free download), computer, and projection device

Assessment and Evaluation :(ESTIMATED TIME: 10 MINUTES)

- **Distribute worksheet:** This worksheet is a formal evaluation with any extra questions/evaluations thrown in that may be needed based on the informal evaluations done throughout the lesson. Students read and answer the questions.
- Go through the assignment rules and check the students all understand what they have to do. The teacher circulates and helps as needed.
- The use of a worksheet after each lesson will also lend structure to classroom instruction and help keep students focused during the lecture.
- **Exit slip**: At the end of the class, the students should write at least three examples of physical changes around them and three other examples of chemical changes around them. This exit slip technique helps the teacher :
    - Self evaluating her work.
    - Check on students' understandings.

Extension activities: Students would enjoy having a cooking contest. Each student could bring their product to school and detail the physical and chemical changes required to make the item. Prizes could be awarded for best appearance, best taste, and most physical changes.

References:

- **http://www.wsanford.com/~wsanford/gr8ps/FCPS-Gr8-PBs/05-06/Gr8-PB-S05.pdf**
- http://alex.state.al.us/lesson_view.php?id=7023