

INTRODUCTORY CHEMISTRY

GRADE 8 ICH ANCHOR STATION

Science Anchors

Science anchors are ongoing engaging tasks that students can work on independently. They are curriculum based, clearly defined and differentiated for students. Students can work on science anchors as they complete work at varying rates, when the teacher is working with small groups of students, at the beginning or end of the school day, or when they are waiting for teacher assistance. Sample science anchor tasks include: reading and responding to text, journaling, learning or interest centers, listening or viewing centers, independent research or projects and hands-on minds-on science kit tasks.

Overview

The science anchor tasks included in this resource support the MCPS Grade 8 Introductory Chemistry unit. Provide a variety of anchor tasks at your anchor station to address the diverse learning styles and needs of your students.

Anchor Task	Topics
1-Changes in Matter Cartoon	States of Matter
2-Physical and Chemical Changes Rap or Song	Physical and Chemical Changes
3-Physical and Chemical Change Review Games	
4-Element Placemats	Elements and Compounds
5-Elementary, My Dear Watson p.142 <i>MCPS 8ICH</i> instructional guide (Also, see Alien Periodic Table task on p.106 <i>Chemical Building Blocks</i> Prentice Hall textbook)	Periodic Table
6-Element Webpage Design	Properties of Elements
7-Models of Atoms Research	Atomic Theory, Using Models

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Possible Anchor Tasks

Prentice Hall *Chemical Building Blocks All-in One Teaching Resources*:

Task	Topics
Design and Build a Density Calculating System- <i>Chapter Project</i> pp.38-44	Mass, Volume, and Density
Making Sense of Density - <i>Skills Lab</i> pp.59-60	
Math Skills- <i>Math Skills</i> p.77	
Is It Chemical or Physical?- <i>Enrich</i> p.66	Physical and Chemical Changes

Prentice Hall *Chemical Building Blocks Guided Reading and Study Workbook*:

Task	Topics
Measuring Matter- <i>Guided Reading and Study</i> pp.12-14	Mass, Volume, and Density
Introduction to Atoms- <i>Guided Reading and Study</i> pp.33-35	Structure of an Atom, Using Models

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Possible Anchor Tasks

Prentice Hall *Chemical Interactions All-in One Teaching Resources*.

Task	Topics
Models of Compounds- <i>Chapter Project</i> pp.38-44	Elements and Compounds, Using Models
Discovery of the Electron- <i>Enrich</i> p.50	Structure of an Atom
Atoms, Bonding and the Periodic Table- <i>Review and Reinforce</i> p.56	
The Rockets Red Glare- <i>Enrich</i> p.57	

Prentice Hall *Chemical Interactions Guided Reading and Study Workbook*:

Task	Topics
Elements and Atoms- <i>Guided Reading and Study</i> pp.9-10	Elements and Compounds, Using Models, Atomic Theory

GRADE 8 ICH ANCHOR STATION**Changes in Matter Cartoon****Anchor Task 1****Overview**

This anchor task is to be used by students in science as they are learning about states of matter in Lesson Sequence 1 Session 4 of the MCPS Grade 8 Introductory Chemistry unit.

Goals*Students should know*

matter is neither created nor destroyed, but can undergo change.

Students should understand

matter exists in three states.

atoms and molecules are in constant motion and that an increase in temperature will increase that motion.

Students should be able to

explain that atoms and molecules are in constant motion and that an increase in temperature will increase that motion.

Required Resources

- One Changes in Matter Cartoon prompt resource page per student
- One Changes in Matter Cartoon Rubric per student
- Blank paper for student cartoons
- Colored pencils and markers

GRADE 8 ICH ANCHOR STATION

Name: _____

Changes in Matter Cartoon

Anchor Task 1

Directions- Choose one of the options below. Create a cartoon that illustrates how the molecules in matter change.

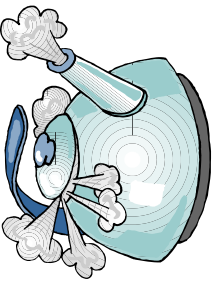
Option 1	Option 2	Option 3	Option 4
Cartoon illustrates: •arrangement of water molecules in an ice cube heated enough to melt •arrangement of molecules in water that is heated enough to vaporize	Cartoon illustrates: •arrangement of water molecules in an ice cube heated enough to melt •arrangement of molecules in water cooled enough to freeze	Cartoon illustrates: •arrangement of water molecules in an ice cube heated enough to melt •arrangement of molecules in water that is heated enough to vaporize •arrangement of molecules in water cooled enough to freeze	Cartoon illustrates: Teacher Approval:



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Changes in Matter Cartoon

Rubric

	1	2	3	4
	<ul style="list-style-type: none"> Explains the concepts of molecule speed, attraction and distance between with more than 4 mistakes 	<ul style="list-style-type: none"> Explains the concepts of molecule speed, attraction and distance between with 3-4 mistakes 	<ul style="list-style-type: none"> Explains the concepts of molecule speed, attraction and distance between with 1-2 mistakes 	<ul style="list-style-type: none"> Explains the concepts of molecule speed, attraction and distance between accurately
Text	<ul style="list-style-type: none"> Presents the concepts of molecule speed, attraction and distance between with more than 4 mistakes May or may not support the text 	<ul style="list-style-type: none"> Presents the concepts of molecule speed, attraction and distance between with 3-4 mistakes Helps reader understand text 	<ul style="list-style-type: none"> Presents the concepts of molecule speed, attraction and distance between with 1-2 mistakes Helps reader understand text 	<ul style="list-style-type: none"> Presents the concepts of molecule speed, attraction and distance between accurately Helps reader understand text
Illustrations				

GRADE 8 ICH ANCHOR STATION**Physical Chemical Change Rap or Song****Anchor Task 2****Overview**

This anchor task is to be used by students in science as they are learning about physical and chemical changes in Lesson Sequence 2 Sessions 1, 2, 3 of the MCPS Grade 8 Introductory Chemistry unit.

Goals

Students should know

that matter undergoes change.

Students should understand

the difference between physical and chemical changes.

Students should be able to

identify and explain various physical and chemical changes.

Engage

Show and discuss the “Physical and Chemical Changes Rap” video a remix of the song “In the Ayer” by thirteen year old Vaughn at the link below:

<http://www.youtube.com/watch?v=epDXLbbDZG8>

The lyrics of the song were provided by Vaughn for teacher reference. See next page.

Required Resources

- “Physical and Chemical Changes Rap” video segment
- One Physical Chemical Change Rap or Song resource page per student
- Music selections provided by teacher or students
- Computer(s) or audio player with headphones
- Blank paper
- Optional– Music composition paper

Extend

Have students make a music video.

GRADE 8 ICH ANCHOR STATION**Physical Chemical Change Rap Lyrics****By Vaughn****Teacher Reference**

Chorus

Physical Change, chemical change

It's chemistry and they are not the same

Chemical change is very strange,

It can't change back, change back, back, change, change back

(Repeat Twice)

Hey it can't change back

It's not an opinion, it is a fact

It just like a rotting pear

Or you burning your own hair

Blowing up things everywhere

Burning stuff like you just don't care

Here's physical change that can't go wrong

Smashing the movie case of King Kong

Or me tearing up this song

Changing the video game called PONG

It's like popping a volleyball

Or maybe shredding your sister's doll

Breaking a really unbreakable wall

Hey listen up now ya'll

Now you can see

That these changes can be tricky

GRADE 8 ICH ANCHOR STATION**Physical Chemical Change Rap or Song****Anchor Task 2****Directions**

Work with your group to choose your music, write your lyrics, and prepare your performance.

Your group will perform for the class on_____.

Work as a group to answer the questions below.

1. Will your group write a rap or another type of song?
2. Will your group generate its own music or re-write the lyrics to an existing song?
3. How will your group work together to produce a rap or song?

Extend:

Make a music video for your rap or song. An example of a physical change chemical change rap can be viewed at the link below:

<http://www.youtube.com/watch?v=epDXLbbDZG8>



GRADE 8 ICH ANCHOR STATION

Physical Chemical Change Review Games

Anchor Task 3

Overview

This anchor task is to be used by students to review physical and chemical changes during Lesson Sequence 2 Sessions 1, 2, 3 of the MCPS Grade 8 Introductory Chemistry unit. To access games log onto:

http://vital.cs.ohiou.edu/physical_chemical_change.html

Goals

Students should know

that matter undergoes change.

Students should understand

the difference between physical and chemical changes.

Students should be able to

identify and explain various physical and chemical changes.

Required Resources

- Computer with physical and chemical change game at link below:

<http://steam.cs.ohiou.edu/~mleitch/ChangeLab.swf>

- Additional physical vs. chemical review games can be found at the following link:

<http://www.reviewgamezone.com/game.php?id=376>

GRADE 8 ICH ANCHOR STATION

Element Placemats

Anchor Task

Overview

This anchor task is to be used by students in science as they are learning about elements in Lesson Sequence 4 Session 1 and other chemistry related principles in the MCPS Grade 8 Introductory Chemistry unit.

Placemat Format

Provides an opportunity for students to analyze a set of images to determine how they are connected.

Goals

Students should be familiar with

the names and symbols of the elements in the Periodic Table.

Students should understand

all matter is made of elements or combinations of elements.

Students should be able to

describe that all matter is made up of elements or combinations of elements.

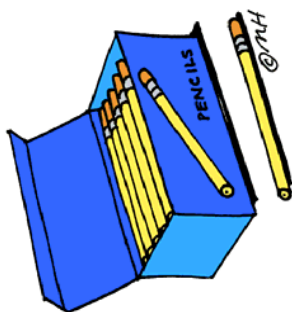
Required Resources

- One placemat A or B resource page per student
- Blank paper for student notes and responses

Engage

Show the “The Periodic Table Song” video segment created by students in Nebraska at the link below to introduce this task:

<http://www.youtube.com/watch?v=FbzXXpsmfWY>



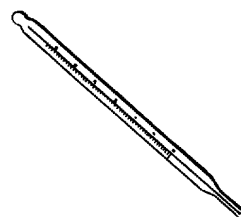
Placemat A

Part I

- What Chemistry principle ties these images together?
- Recommend other images that could be added to this placemat.

Part II

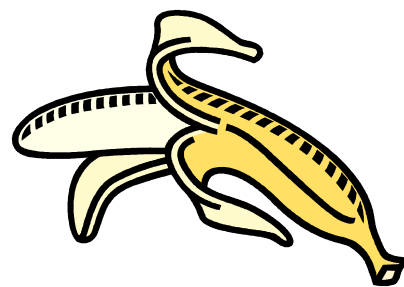
- Create a placemat on another Chemistry related principle.
- Have three of your peers analyze your placemat.





Placemat B

- What Chemistry principle connects all of these pictures?
- What could the title of the placemat be?
- Write a paragraph to explain your thinking.



GRADE 8ICH ANCHOR STATION**Elementary, My Dear Watson****Anchor Task 5****Overview**

This anchor task is to be used by students in science as they review the Periodic Table in Lesson Sequence 4 Session 1 of the MCPS Grade 8 Introductory Chemistry unit.

Goals

Students should be familiar with

the names and symbols of the elements located in the Periodic Table.

Students should understand

how to read the Periodic Table.

Students should be able to

identify and record the abbreviations for the names of elements and compounds to solve a riddle.

Required Resources

- One copy of Elementary, My Dear Watson resource page MCPS 8ICH instructional guide p. 142 per student

GRADE 8 ICH ANCHOR STATION**Element Webpage****Anchor Task 6****Overview**

This anchor task is to be used by students in science as they are learning about elements in Lesson Sequence 4 Session 1 of the MCPS Grade 8 Introductory Chemistry unit.

Goals

Students should be familiar with

the names and symbols of the elements in the Periodic Table.

Students should understand

elements have unique properties.

Students should be able to

research an element and describe its unique properties.

Required Resources

- Various print and electronic resources on elements
- One copy of the Element Webpage Design resource page per student
- Blank paper
- One copy Element Webpage Sample Format page posted
- Scaffold-Provide webpage design template from Webpage Sample Format page to students that need more structure
- Markers and colored pencils
- Optional– Computer for students to conduct research and/or print pictures

Extend

Create a class website about elements.

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Name _____



Element Webpage Design

Anchor Task 6

Directions

You will design a webpage for an element of your choice. The webpage must include the following information:

- | | |
|---------------------------------------|-------------------------------------|
| _____ name and symbol | _____ where element is found |
| _____ human use(s) | _____ what its natural abundance is |
| _____ density in natural state | _____ how it is obtained |
| _____ melting point and boiling point | _____ atomic mass and atomic number |

The webpage needs to include **at least two** more interesting facts. You can pick from the suggestions below or choose your own.

- _____ explanation of structure
- _____ chemical properties/reaction tendencies
- _____ common and/or important compounds involving the element
- _____ historical background

Other:

Use a blank piece of paper or the provided template to design a webpage about your element.

Extend:

Create an electronic interactive version of your webpage.

Element Webpage Design Template

Anchor Task 6

Title:	Interesting Facts • • • • • • •	
Element Name and Symbol:		

GRADE 8 ICH ANCHOR STATION**Models of Atoms Research Project****Anchor Task 7****Overview**

This anchor task is to be used by students in science as they are learning about atoms in Lesson Sequence 4 MCPS Enrichment Session 6 of the MCPS Grade 8 Introductory Chemistry unit.

Goals*Students should know*

elements are composed of atoms with different numbers of neutrons, protons and electrons.

Students should understand

how to identify common elements and explain that the elements are composed of atoms with different numbers of neutrons, protons, and electrons.

how atomic theory developed from Democritus to Bohr.

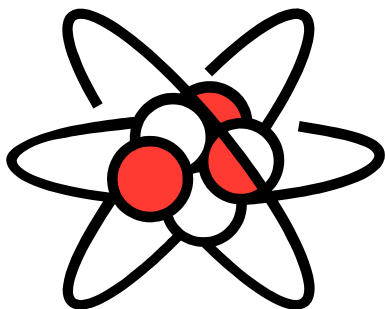
Students should be able to

communicate why we use models to explain atomic particles.

explain how people from different cultures and times have made important contributions to the advancement of science, mathematics and technology in different cultures at different times.

Required Resources

- One copy of the Models of Atoms Research Project resource page per student
- Various print and electronic resources on the scientists who worked on models of an atom (see p.76 of *Chemical Building Blocks* Prentice Hall textbook for general overview)

GRADE 8 ICH ANCHOR STATION**Models of Atoms Research Project****Anchor Task 7**

Name: _____

**Scientists Who Worked on
Models of the Atom**

- Democritus
- John Dalton
- J.J. Thomson
- Hantaro Nagaoka
- Ernest Rutherford
- Niels Bohr
- James Chadwick

Select a Scientist

Select and research one of the scientists who worked on models of the atom. Write an interview with this person to discuss his work with him.

The scientist I will research is _____.

Research The Scientist

Use the resources provided to find at least ten interesting facts about your scientist. Record your facts in the space below. Use a separate sheet of paper if you need more space.

GRADE 8 ICH ANCHOR STATION**Write An Interview**

Write an interview in which you discuss your scientist's work with him. Your interview should be written in the format modeled below.

Your Name: (question generated by you)

Name of Scientist: (use your research findings to generate scientist's possible response)

Your Name: (question generated by you)

Name of Scientist: (use your research findings to generate scientist's possible response)

Your interview should include:

- at least 5 questions with responses

information from your research in each response

My Interview With _____

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SCIENCE INDICATORS

GRADE 8

INTRODUCTORY CHEMISTRY (8-ICH)

4A. Structure of Matter

4.7.A.1. Cite evidence to support the fact that all matter is made up of atoms, which are far too small to see directly through a microscope.

- a. Recognize and describe that the atoms of each element are alike but different from atoms of other elements.
- b. Recognize and describe that different arrangements of atoms into groups compose all substances.
- c. **Provide evidence from the periodic table, investigations and research to demonstrate that elements in the following groups have similar properties.**
 - Highly reactive metals, such as magnesium and sodium
 - Less-reactive metals, such as gold and silver
 - Highly reactive non-metals, such as chlorine, fluorine, and oxygen
 - Almost non-reactive gases, such as helium and neon
- d. Provide examples to illustrate that elements are substances that do not break down into smaller parts during normal investigations involving heating, exposure to electric current or reactions with acids.

4.8.A.1. Provide evidence to explain how compounds are produced. (No electron transfer)

- a. Describe how elements form compounds and molecules.
- b. Investigate and describe what happens to the properties of elements when they react chemically with other elements.
- c. **Based on data from investigations and research compare the properties of compounds with those of the elements from which they are made.**

4B. Conservation of Matter

4.8.B.1. Provide evidence to support the fact that the idea of atoms explain conservation of matter.

- a. Use appropriate tools to gather data and **provide evidence that equal volumes of different substances usually have different masses.**

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Indicators:

- b. Cite evidence from investigations that the total mass of a system remains the same throughout a chemical reaction because the number of atoms of each element remains the same.
- c. Give reasons to justify the statement, “ If the number of atoms stays the same no matter how the same atoms are rearranged, then their total mass stays the same.”

4C. States of Matter

4.6.C.1. Provide evidence and examples illustrating that many substances can exist as a solid, liquid, or gas depending on temperature.

- a. Use evidence from investigations to describe the effect that adding heat energy to different types of matter has on the rate at which the matter changes from one state to another.
- b. Based on data from investigations describe the effect that removing heat energy from different types of matter has on the rate at which the matter changes from one state to another.
- c. Analyze data gathered and formulate a conclusion on the effects of temperature change on most substances.

4.8.C.1. Describe how the motion of atoms and molecules in solids, liquids, and gases changes as heat energy is increased or decreased.

- a. Based on data from investigations and video technology, describe and give reasons for what happens to a sample of matter when heat energy is added to it (most substances expand).
- b. Describe what the temperature of a solid, or a liquid, or a gas reveals about the motion of its atoms and molecules.
- c. Formulate an explanation for the different characteristics and behaviors of solids, liquids, and gases using an analysis of the data gathered on the motion and arrangement of atoms and molecules.

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Indicators:

4D. Physical and Chemical Changes

4.6.D.1. Cite evidence to support the fact that some substances can be separated into the original substances from which they were made.

a. Investigate and identify ways to describe and classify mixtures using the observable and measurable properties of their components.

- Magnetism
- Boiling point
- Solubility in water.

b. Based on data gathered, identify and describe various processes used to separate mixtures.

- Filtration
- Evaporation
- Paper chromatography

c. Use data gathered to provide a reasonable explanation for the idea that the mass of a mixture is equal to the sum of the masses of its components.

4.8.D.1. Compare compounds and mixtures based on data from investigations and research.

a. Cite evidence from investigations to explain how the components of mixtures can be separated.

b. Use evidence from data gathered to explain why the components of compounds cannot be separated using physical properties.

c. Analyze the results of research completed to develop a comparison of compounds and mixtures.

4.8.D.2. Cite evidence and give examples of chemical properties of substances.

a. Based on data from investigations and research, identify and describe chemical properties

of common substances.

- Reacts with oxygen (rusting/tarnishing and burning)
- Reacts with acids
- Reacts with bases

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Indicators:

- b. Use **information** gathered from investigations using indicators **to classify materials as acidic, basic, or neutral**.

4.8.D.3. Provide evidence to support the fact that common substances have the ability to change into new substances.

- a. Investigate and **describe the occurrence of chemical reactions using the following evidence:**
- Color change
 - Formation of a precipitate or gas
 - Release of heat or light
- b. Use evidence from observations to identify and describe factors that influence reaction rates.
- Change in temperature
 - Acidity
- c. Identify the reactants and products involved in a chemical reaction given a symbolic equation, a word equation, or a description of the reaction.
- d. Provide data from investigations to support the fact that energy is transformed during chemical reactions.
- e. Provide examples to explain the difference between a physical change and a chemical change.

5A. Mechanics

5.8.A.3. Recognize and explain that every object exerts gravitational force on every other object.

- a. Explain the difference between mass and weight.
- Mass is a measure of inertia.
 - Weight is a measure of the force of gravity.

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TEACHER FEEDBACK

School _____

Date _____

Feedback about this document will be helpful to the Division of Accelerated and Enriched Instruction as new anchors are developed. Please complete this feedback form and return it to Kristi Cameron in the Division of Accelerated and Enriched Instruction, CESC Room 177.

Please indicate your feedback on the effectiveness by checking the appropriate box.

Effectiveness Indicator	Strongly Agree	Agree	Dis-agree	Strongly Disagree
1. The organization of this document is user friendly. Comments:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The suggested anchor tasks promote access and opportunities for all students. Comments:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The anchor tasks support the MCPS science curriculum. Comments: <i>Provide an example of an task that worked well and one that could be improved.</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments: