Trinity Area School District

Course: Physical Science **Grade:** 8	**Overview of Course** (Briefly describe what students should understand and be able to do as a result of engaging in this course)**:** **The 8th grade Physical Science course gives students a chance to experience how a scientist works through many lab activities that the students perform in groups of two. Cooperation is essential in this course as students learn about energy, measurement, simple machines, structure of the atom, and use of the Periodic Table. A variety of reading strategies are implemented as students learn about the physical world around them.**

Overarching Big Ideas, Enduring Understandings, and Essential Questions
(These "spiral" throughout the entire curriculum.)

Big Idea (A Big Idea is typically a noun and always transferable within and among content areas.)	**Standard(s) Addressed** (What Common Core Standard(s) and/or PA Standard(s) addresses this Big Idea?)	**Enduring Understanding(s)** (SAS refers to Enduring Understandings as "Big Ideas." EUs are the understandings we want students to carry with them after they graduate. EUs will link Big Ideas together. Consider having only one or two EUs per Big Idea.)	**Essential Question(s)** (Essential Questions are broad and open ended. Sometimes, EQs can be debated. A student's answer to an EQ will help teachers determine if he/she truly understands. Consider having only one or two EQs per Enduring Understanding.)
cooperation	This is an important theme that we stress in 8th grade science because we do many lab activities in groups of 2, 3, or 4 all year long. Proper behavior is expected during these cooperative learning experiences. I don't know what standard to mark down or invent my own but we feel it is an essential element in a successful science class and is a life lesson as well. We don't always get to work with our friends but we put personality aside and get the job done.	When working in a cooperative group everyone shares in the work, nobody is the "boss", only talk to your group members, and the discussions are only about the task being done. Cooperative group members treat each other with respect and every person in the group deserves to be heard without any put down statements being made.	Why is cooperation of group members important when studying the natural world? What are some possible good and bad results of group work? What are the characteristics of a good group member?
(The first overarching Big Idea goes here.) inquiry	(The Common Core Standard(s) and/or PA Standard(s) that addresses the first overarching Big Idea go here.) 3.2.4.A 3.2.4.C 3.7.1A 3.7.1B	(The Enduring Understanding(s) for the first overarching Big Idea goes here. Scientific inquiry is the investigation and exploration of natural events and of new information that results from those investigations.	(The Essential Question(s) for the Enduring Understanding(s) for the first overarching Big Idea goes here.) What are some results of scientific investigations? How do scientists investigate the natural world?

	3.8.4.C	Scientific inquiry is cyclic and not a linear process. This means that a scientist may go back to any step of inquiry and make changes if necessary to get accurate results.	Why is measurement an important part of some types of scientific inquiry?
(The second overarching Big Idea…) **evidence**	3.2.1.A 3.2.1.B 3.2.1.C 3.7.1.A 3.7.1.B	Evidence is information gathered by direct observation, use of the senses, measurement, testing, and indirect observation that can be collected in a variety of ways.	What is the difference between a qualitative and quantitative observation? What is direct and indirect evidence? What kind of evidence is best for scientists to have and why? How can evidence help form a logical conclusion?
models	3.1.4.B 4.3.4.C	A model is a representation of an idea, or a system that is similar to the physical object or idea being studied.	Why are computers important in building models? Why do we use scientific models? What are strengths and limits of models?
patterns	3.1.4.C 3.2.4.B	A pattern is a sequence or repeat of a characteristic, event, or data that may be used to determine past processes or predict future events.	How can recognition of a pattern help make inferences? What would you do if one piece of data does not fit the pattern? Why?
measurement	3.2.1A 3.7.4A 3.2.1B 3.7.4B 3.2.1C 3.7.1A 3.7.1B	Measurement is the result of taking the dimensions or limits of an object when using the proper instrument for the quantity being studied. There is a proper way to use each tool of science designed to take measurement s of matter.	Why is the metric unit of measurement always used among scientists around the world? In your opinion, why is there still human error when using measurement tools in science? Give specific examples such as “using a graduated cylinder” or ‘use of a triple beam balance”.
graphs	3.2.1A 3.2.1B	Graphs are concise visual displays of data that help a scientist better analyze results and predict	Which is easier for you to understand, a data table or a graph of the information in the data

	3.2.1C 3.7.1A 3.7.1B	outcomes. There are bar graphs, circle graphs, and line graphs all of which show relationships between two variables.	table? Why? When given a completed data table, what are the steps you would take to create a graph from that data?

Big Ideas, Enduring Understandings, and Essential Questions Per Unit of Study
(These do NOT "spiral" throughout the entire curriculum, but are specific to each unit.)

Month of Instruction (In what month(s) will you teach this unit?)	**Title of Unit**	**Big Idea(s)** (A Big Idea is typically a noun and always transferable within and among content areas.)	**Standard(s) Addressed** (What Common Core Standard(s) and/or PA Standard(s) addresses this Big Idea?)	**Enduring Understanding(s)** (SAS refers to Enduring Understandings as "Big Ideas." EUs are the understandings we want students to carry with them after they graduate. EUs will link Big Ideas together. Consider having only one or two EUs per Big Idea.)	**Essential Question(s)** (Essential Questions are broad and open ended. Sometimes, EQs can be debated. A student's answer to an EQ will help teachers determine if he/she truly understands. Consider having only one or two EQs per Enduring Understanding.)	**Common Assessment(s)*** (What assessments will all teachers of this unit use to determine if students have answered the Essential Questions?)	**Common Resource(s)* Used** (What resources will all teachers of this unit use to help students understand the Big Ideas?)
August September	**UNIT 1 Safety in the Lab/Tools of the Trade/Measuring in Metric**	Cooperation Inquiry Communication Measurement	3.2.1A 3.2.1B 3.2.1C 3.7.1A 3.7.1B	State the most common safety rules to be followed in the lab. Describe what to do if an accident occurs. Identify and use the proper metric tools and units of measure for a specific job.	Of what benefit is communication among scientists concerning their study of the natural world? What are the most common pieces of lab equipment, how are they properly used, and what do they measure?	Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts Graphic organizers Models "Foldables" Worksheets Homework Quizzes Tests Discussion Class participation Oral responses Review games	**UNIT 1 PACKET** This was a combination of readings, worksheets, activities, visuals, and lab activities put together by the department using a multitude of resources that span a number of years.

				Through performance assessment students are to properly use a balance, graduated cylinder, spring scale, and thermometer.	What would you do if a lab accident occurred? What are some ways you can record or display observations made in the lab?	"Active Folders"	
October	**Unit 2 Scientific Inquiry**	**Cooperation Inquiry Evidence Measurement**	**3.2.1A 3.2.1B 3.2.1C 3.7.1A 3.7.1B**	**Science is the investigation and exploration of the natural world and of the new information that results from the investigation. There are several branches of Science each focusing on a different part of the natural world. When evaluating scientific information it is important to be skeptical. Scientific facts are backed by evidence and scientific opinions are not. Evidence is a collection of observations or facts that support a belief or judgement.**	**Why is an experiment important? What does Scientific Inquiry mean to you? What kinds of things should you consider when setting up a scientific investigation to answer a question? What is the difference between a good experiment and a bad experiment?**	**Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts Graphic organizers Models "Foldables" Worksheets Homework Quizzes Tests Discussion Class participation Oral responses Review games "Active Folders"**	**Unit 2 teacher made packet from: The Nature of Science and Technology, pages 1-21(Prentice Hall 2005) and Scientific Inquiry Lesson 1 Glencoe Physical Science 2012**

				Measurement using the metric system is common among scientists and is necessary for accurate communication among scientists. **Scientific Inquiry is a process that is cyclic not linear and can be revised at any point in the process.**			
October	**Unit 3 Foundations of Chemistry** **Classifying Matter**	**Cooperation** **Inquiry** **Models** **Patterns**	**3.1.1D** **3.2.1A** **3.2.1B** **3.2.1C** **3.4.1A** **3.7.1A** **3.7.1B**	**Matter is anything that has mass and occupies space.** **Physical properties are properties that do not change the identity of the matter.** **Chemical properties result in the changing of matter into a different substance with a different set of characteristics.**	**What is matter and how does it change?** **If you had to describe to a person who cannot see or touch a sample of matter, what kinds of characteristics could you use to describe it?** **Why would the melting of an ice cube in the Sun be a good example to use when describing phase changes of matter?**	**Vocabulary** **Notebooking** **Peformance assessments** **Lab activities** **Diagrams/charts** **Graphic organizers** **Models** **"Foldables"** **Worksheets** **Homework** **Quizzes** **Tests** **Discussion** **Class participation** **Oral responses** **Review games** **"Active Folders"**	**Book L Chapter 7 Glencoe 2012** **and** **Exploring Physical Science** **Chapter 2 Matter (Prentice Hall, 2005)**

November	Unit 4 States of Matter	Cooperation Inquiry Models Measurement Patterns	3.1.1B 3.1.1C 3.1.1E 3.2.1A 3.2.1B 3.2.1C 3.4.1A 3.7.1A 3.7.1B	Solids have a definite shape and volume, liquids have a definite volume and no definite shape, and gases have no definite shape or volume. Thermal energy must be added or removed for matter to change state. Boyle's and Charles's Laws explain the behavior of gas.	When given a picture example, how would you go about identifying all of the solids, liquids, and gases? What role does energy play in the changing of matter from one state to another? How does a bicycle pump work? Describe the changes in a balloon if it is "normal" at room	Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts Graphic organizers Models "Foldables" Worksheets Homework Quizzes Tests Discussion Class participation Oral responses Review games "Active Folders"	Book L Chapter 8 States of Matter (Glencoe 2012) And Chapter 3 Solids, Liquids, Gases (Prentice Hall 2005) Exploring Physical Science

					temperature and you take it out in the Sun or put it into the freezer. Why do these changes occur?		
December	Unit 5 Chemistry Unit	Cooperation Inquiry Models Patterns	3.1.1B 3.4.1A	Atoms contain protons, neutrons, and electrons. The number of electrons in the valence shell determine the type of bonding that will occur. The Periodic Table is a resource that can be used to determine the structure of the atoms in a certain element and predict the chemical reactivity of an atom.	If you were allowed to use ordinary objects found at home to make a model of an atom, what would your model look like? Why would you make it that way? Why is the Periodic Table such a valuable resource to a Scientist? If I put a copy of the Periodic Table in front of you, what kind of information can you tell me just from looking at it?	Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts Graphic organizers Models "Foldables" Worksheets Homework Quizzes Tests Discussion Class participation Oral responses Review games "Active Folders"	Teacher Made Unit that is written so the student can read and answer the questions without the help of the teacher. It describes the structure of the atom and how bonding occurs. Glencoe 2012 Book M Chapter 10 The Periodic Table
January	Unit 6 Chemical Reactions	Cooperation Inquiry Models Patterns	3.1.1B 3.2.1B 3.2.1C 3.4.1A 3.4.1B 3.7.1A 3.7.1B	Elements are pure substances made of only one kind of atom but the natural world consists mainly of combinations of elements. Atoms combine in certain ratios to form molecules.	How can so few elements form so many compounds? If you were given 5 different colors of modeling clay, how would you make a model to show an element?	Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts Graphic organizers Models "Foldables" Worksheets	Teacher Made Unit Prentice Hall 2005 Exploring Physical Science Chapter 6 Chemical Reactions and Glencoe 2012 Book M Chapter 11 Elements and Chemical Bonds

					a compound? a mixture? Explain what they look like when done and why you made it this way?	Homework Quizzes Tests Discussion Class participation Oral responses Review games "Active Folders"	
January / February	Unit 7 Acids and Bases	Cooperation Inquiry Evidence Measurement	3.2.1A 3.2.1B 3.2.1C 3.4.1A 3.7.1A 3.7.1B	Acid + Base yields Salt + Water The pH scale is used as a reference to tell the strength or weakness of an acid or base. Litmus paper and/or pH paper is used to identify if a liquid is an acid or base by the color change in the paper. Acids and bases have opposite properties.	You are given a clear unknown liquid and red litmus paper and blue litmus paper. Describe an experiment you could do to find out if the liquid is an acid, base, or just plain water.	Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts Graphic organizers Models "Foldables" Worksheets Homework Quizzes Tests Discussion Class participation Oral responses Review games "Active Folders"	Teacher Made Unit Prentice Hall 2005 Exploring Physical Science Chapter 7 Acids and Bases and Glencoe 2012 Book N Chapter 13 Acid/Base Solutions
Feburary	Unit 8 Describing Motion	Cooperation Inquiry Measurement Evidence Graphs	3.1.7C 3.1.7D 3.1.7E 3.7.1A 3.7.1B	Speed = Distance/Time Velocity is speed in a given direction Acceleration is a change	What are some ways you can describe the motion of an airplane? As you are riding in a car, you notice that a	Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts	Teacher Made Unit Prentice Hall 2005 Exploring Physical Science Chapter 9 Describing Motion

				in speed, a change in direction, or a change in speed and direction of a moving object.	fly is resting on your shoulder. Explain how the fly can be described as moving. Explain how the fly can be described as not moving. If you are given a data table that includes the distances an object traveled and the times it took to go that far, describe how you would make a graph showing the speed of the object.	Graphic organizers Models "Foldables" Worksheets Homework Quizzes Tests Discussion Class participation Oral responses Review games "Active Folders"	and Glencoe 2012 Book K Chapter 1 Motion and Forces
March	Unit 9 The Laws of Motion	Cooperation Inquiry Measurement Evidence Graphs	3.2.1C 3.4.1B 3.4.1C 3.7.1A 3.7.1B	A force is a push or pull. Forces change the motion of objects Friction is a force that opposes motion Force = Mass x Acceleration Newton's 3 Laws of Motion describe the behavior of moving objects.	Use the motion of riding a bicycle to explain Newtons Laws of Motion. When given a picture of a group of objects in different situations, find 2 examples of static friction, sliding friction, rolling friction, and fluid friction. Explain why you put them into these categories. Why would the game of pool be a good	Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts Graphic organizers Models "Foldables" Worksheets Homework Quizzes Tests Discussion Class participation Oral responses Review games "Active Folders"	Teacher Made Unit Prentice Hall 2005 Exploring Physical Science Chapter 10 Forces and Glencoe 2012 Book K Chapter 2 The Laws of Motion

					example of showing Newton's Laws of Motion?		
April	Unit 10 Work and Simple Machines	Cooperation Inquiry Measurement Evidence Graphs	3.1.1A 3.2.1A 3.2.1B 3.2.1C 3.4.1C 3.7.1A 3.7.1B	Work = Force x Distance There are 6 kinds of simple machines; lever, screw, wedge, inclined plane, pulley, and wheel and axle. Simple machines do not change the amount of work being done but can multiply the force or change the direction of the force. Compound Machines are 2 or more simple machines working together to get the work done.	How do you think machines make doing work seem easier? Looking around a playground, describe the different simple machines that you see and why they are an example of that type of simple machine. How is doing work on the moon different than doing work here on Earth? Think of some of the tools that you have used in Industrial Technology. Which tools contain simple machines and what are those simple machines?	Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts Graphic organizers Models "Foldables" Worksheets Homework Quizzes Tests Discussion Class participation Oral responses Review games "Active Folders"	Teacher Made Unit Prentice Hall 2005 Exploring Physical Science Chapter 12 Simple Machines and Glencoe 2012 Book K Chapter 3 Work and Simple Machines

April/May	Unit 11 Energy and Energy Resources	Cooperation Inquiry Measurement Evidence	3.1.1A 3.1.1E 3.2.1A 3.2.1B 3.2.1C 3.7.1A 3.7.1B	The source of all energy traces back to the Sun. Energy is the ability to cause change. Energy exists in different forms all of which are either kinetic or potential. Some forms of energy are renewable and others are nonrenewable.	Choose 3 electric appliances in your home and identify the forms of energy that electric energy is being transformed into. Why is it important to conserve energy? You are given the task of building an energy plant to send electricity to all homes in the Trinity School District. What type of energy would run your power plant and why did you choose this one? Some people in the community are opposed to your power plant. What is their main concern? Others in the community are very happy you are building this kind of power plant. Why are they in favor of it?	Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts Graphic organizers Models "Foldables" Worksheets Homework Quizzes Tests Discussion Class participation Oral responses Review games "Active Folders"	Teacher Made Unit Prentice Hall 2005 Exploring Physical Science Chapter 13 Energy and Glencoe 2012 Book L Chapter 5 Energy and Energy Resources

May (if time)	**Unit 12 Thermal Energy**	**Cooperation Inquiry Evidence Models Patterns Measurement Graphs**	**3.7.1A 3.7.1B 3.7.7A 3.7.7B 3.1.1B 3.1.1E 3.2.1C 3.4.1B 3.4.1C**	**Thermal energy is commonly called heat and is not the same thing as temperature. Heat travels from hot objects to cooler ones. The 3 methods of heat transfer are conduction, convection, and radiation. Conductors allow heat to pass through easily and insulators prevent heat from traveling through.**	**How does a thermometer measure temperature and how is temperature related to heat? How does a hot air balloon work? How do you explain this statement? "There is no such thing as cold. Cold is the absence of heat." How does a refrigerator work? Now that you know all about thermal energy, what are some things you can do at home to save money on the heating bill?**	**Vocabulary Notebooking Peformance assessments Lab activities Diagrams/charts Graphic organizers Models "Foldables" Worksheets Homework Quizzes Tests Discussion Class participation Oral responses Review games "Active Folders"**	**Teacher Made Unit Prentice Hall 2005 Exploring Physical Science Chapter 14 Thermal Energy and Heat and Glencoe 2012 Book L Chapter 6 Thermal Energy**

***** Some teachers may need to think about the assessments and resources used in order to determine the Big Ideas, Enduring Understandings, and Essential Questions embedded in their courses. At this point in your curriculum mapping, you might want to ignore the “Common Assessments” and “Common Resources Used” columns. However, you may use them if you wish.