Ouachita River School District
Physical science UNIT PLAN (1)

Teacher: Linda Barnes__ Subject: _____Science____ Grade Level: ___9_ Date: ____1st term_____ Appx Length (Days): _____

UNIT TITLE: Energy	**Student Learning Objectives:** ***What Will the Student Know and Be Able to Do Successfully by the End of This Unit?***
Next generation science standards **PSI-PS3-1 Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.** **PSI-PS3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).** **PSI-PS3-3 Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*** **PSI-PS3-4 Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).**	**[AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on explaining the meaning of mathematical expressions used in the model. Models could include spreadsheet analysis or other computer interfaces] [AR Assessment Boundary: Assessment is limited to basic algebraic expressions or computations.]** **[Clarification Statement: Examples of phenomena at the macroscopic scale could include the conversion of kinetic energy to thermal energy, the energy stored due to position of an object above the earth, and the energy stored between two electrically-charged plates. Examples of models could include diagrams, drawings, descriptions, and computer simulations.] [AR Assessment Boundary: Assessment is limited to mechanical energy.]** **[Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency.] [Assessment Boundary: Assessment for quantitative evaluations is limited to total output for a given**

	input. **Assessment is limited to devices constructed with materials provided to** **students.]** **[Clarification Statement: Emphasis is on analyzing data from student** **investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually. Examples of investigations could include mixing liquids at different initial temperatures or adding objects at different temperatures to water.] [Assessment Boundary: Assessment is limited to investigations based on materials and tools provided to students.]**
Necessary Prerequisite Skills: ***What will the Student Need to Know at the Beginning of This Unit?***	**Interventions:** ***What are My Plans for Intervening when Students are not Successful on Daily or Interim Assessments?*** **one on one during intervention period**
Essential Questions/ Big Ideas: ***Enduring Understanding, Relevance to Students, Overarching Objectives***	
Learning Activities: ***What Will the Teacher DO to Accomplish the Student Learning Objectives?*** ***laboratories*** ***lab reports*** ***research topics as written reports***	**V** **O** **C** **A** **B** **U** **L** **A**

		R Y
		Resources/Technology:
Assessments Type: ***How Will I Know the Student Has Been Successful?***		
Daily/Exit Ticket	**Interim:**	**Formative:**

Stage 1 Desired Results

Performance Expectation (PE)	Clarification of PE
PSI-PS3-1 Create a computational model to calculate the change in the energy of one component in a	[AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on explaining the meaning of mathematical expressions used in the model. Models could include spreadsheet

system when the change in energy of the other component(s) and energy flows in and out of the system are known.	analysis or other computer interfaces] [AR Assessment Boundary: Assessment is limited to basic algebraic expressions or computations.]
PSI-PS3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).	[Clarification Statement: Examples of phenomena at the macroscopic scale could include the conversion of kinetic energy to thermal energy, the energy stored due to position of an object above the earth, and the energy stored between two electrically-charged plates. Examples of models could include diagrams, drawings, descriptions, and computer simulations.] [AR Assessment Boundary: Assessment is limited to mechanical energy.]
PSI-PS3-3 Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*	[Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency.] [Assessment Boundary: Assessment for quantitative evaluations is limited to total output for a given input. Assessment is limited to devices constructed with materials provided to students.]
PSI-PS3-4 Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	[Clarification Statement: Emphasis is on analyzing data from student investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually. Examples of investigations could include mixing liquids at different initial temperatures or adding objects at different temperatures to water.] [Assessment Boundary: Assessment is limited to investigations based on materials and tools provided to students.]
VIDEO LINKS FOR NGSS CORE IDEAS USED IN THIS UNIT: PS3.A PS3.B PS3.D ETS1.A ETS1.B	

Stage 2 - Assessment Evidence

Summative Exam
This exam will be released upon email notification from ToSA to Physical Science teachers. The exam will be collected by the Secondary Science ToSA for collection of best practices.

Stage 3- Learning Activities

The following lesson plans and instructional moves are suggested science lessons. Teachers are free to use these lessons as student need suggests. Teachers may substitute different text and videos if they desire and modify lessons to meet the needs of their students as long as the rigor of the task is the same or higher and addresses the focus standard(s).

Suggested Unit Plan, Topic 2: Energy	Physical Science-Integrated

• Lesson Plans
  ○
  ○
• Teacher Unit Notes for Topic 2
	• Exchange Folders
	  ○ To Find an Activity (by standard)
	  ○ To Donate an Activity

• Unit Plan - Rationale and breakdown for how the unit and lessons were built.	