

- Jewely: Calcium Chloride Potassium Chloride At least 30 Baggies Coloring supplies Tan trays Notebooks student examples
- Nikki: 50 Reading Copies 15 Thermometers **15** Rulers 15 Graduated cylinders **Participant** Notebooks - 50 Notebooks student examples Dongle
- Diane: **15 Mini Water Bottles** 30 Plastic Containers **Teaspoons** Notebooks student examples



Nikki Luckin - Fairmont Elementary

Jewely Lickey - Sanger Academy Charter School

Diane Loflin

- Quail Lake Environmental Charter School







Who Are We?

Jewely Lickey - Teaching 7th and 8th grade science for 15 years, 12 years at Sanger Academy Charter School, K-8 in Sanger Unified, Science Fair Coach

Nikki Luckin - Teaching 7th and 8th grade science for 15 years at Fairmont Bementary, K-8 in Sanger Unified; Science Fair Coach, former Science Gympiad coach, also teach Project Lead the Way Medical Detectives elective

Diane Loflin - Teaches 7th and 8th grade science at Quail Lake Environmental for 10 years at Science Charter School, Science Fair coach, former Science Clympiad coach, Science Bowl, teaches Project Lead the Way Energy and the Environment elective

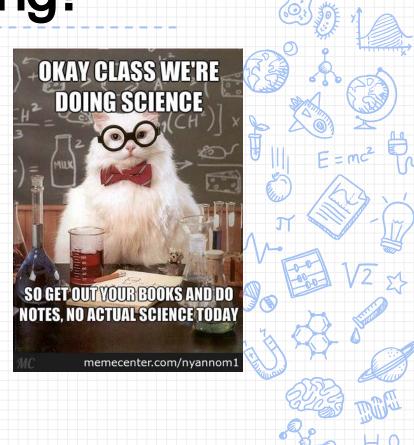
Have been implementing preferred integrated curriculum for NGSS for the past 2 years and we are the CNLY middle school science teachers at our separate school sites.



First Time Notebooking?

Who's Here Today?

- *Science Teachers?
- *Administrators?
- *New to Interactive Notebooking?
- *Tried it and "failed"?
- *Skeptic?
- *NGSS comfortability?



Defining Interactive Notebooks Interactive Notebooks...

- Are Organizational Thinking Tools
- Support Differentiated Instruction
- Enhance Literacy Skills
- Illuminate the Thinking Process
- Quide Teacher Instruction

Research Behind Notebooks

- Linguistic and nonlinguistic methods for recall and thinking
- Authentic assessment tool allowing to see how students arrived at an answer and made connections
- Information is used creatively to make it into long-term memory
- Information can be accessed and put in working memory to acquire new information



Organizational Thinking Tools

 Work for every student to construct conceptual understandings

Let students plan and establish their thinking

Focuses students with a design template



Notebook Basics

- Supplies
- Ownership
- Organization
- Setting Up A Unit
- Grading





Supplies

- Notebook- College Ruled, 8.5x11
- Gue Sticks/ Tape
- Colored Pencils/ Gel Pens
- Highlighters







- Front Cover
- Inside Cover
 - Ex. All About Me Page
- Title Page pg. 1
 - Ex. Scientist Drawing
 - Theme for the School Year

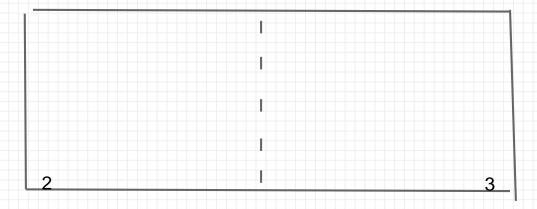
Organization

- X Page Numbers
- X Table of Contents
 - X Resource Pages





outside bottom corners



X Number the pages in the notebook that was provided



Table of Contents Example - pgs. 2-3

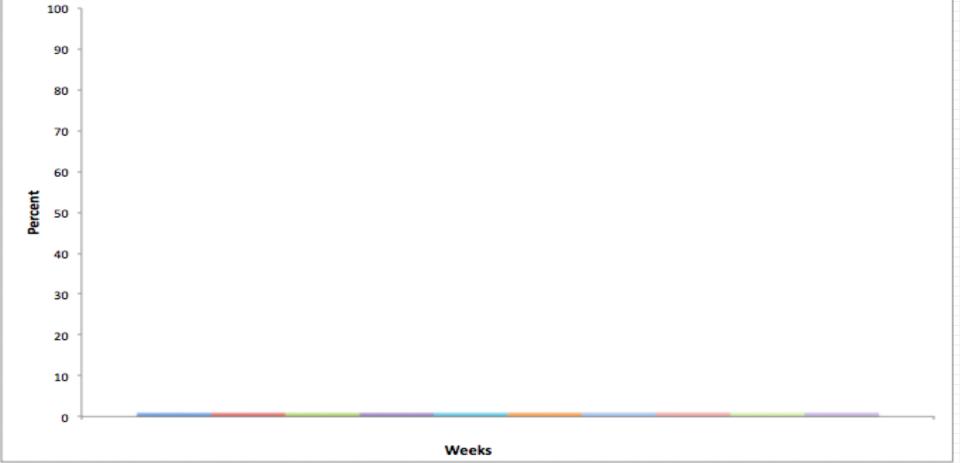
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Resource Pages

- X Weekly Grade Graphs
 - Grading Rubric
 - Class Syllabus
 - School Calendar
- Parent Communication Page
- Lab Safety Contract



Trimester Grade Graph



Grading

	10	8	6	5
TABLE OF CONTENTS - Date - Title - Page	I am VERY CAREFUL to record neatly and accurately (title, date, page) on all required activities	I am MOSTLY CAREFUL and neat when recording_activities	I am NOT CAREFUL when recording activities, and I need to improve in my neatness and completion	There is NO EVIDENCE of recording activities
SCIENCE CONTENT	My responses demonstrate: - I understand ALL science concepts - I can accurately use ALL the vocabulary	My responses demonstrate: - I understand SOME of the science concepts - I can accurately use SOME of the vocabulary	My responses demonstrate: - I understand very LITTLE of the science concepts - I understand very LITTLE of the vocabulary	There is VERY LITTLE or NO EVIDENCE of responses - NO EVIDENCE of understanding science concepts - NO EVIDENCE of understanding the vocabulary
SCIENTIFIC DRAWINGS	Student includes DETAILED, COLORFUL, LABELED, and THOUGHTFUL scientific drawings	Student includes SOME scientific drawings with COLOR and LABELING	Student drawings show LITTLE effort and detail	NO EVIDENCE of student drawings
ACADEMIC WRITING	My writing ALWAYS includes complete, detailed sentences or paragraphs	My writing SOMETIMES includes complete, detailed sentences	My writing RARELY includes complete detailed sentences	My writing shows NO EVIDENCE of including complete detailed sentences.

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	Week #7 & 8 Grade Entered Colored	
	Grade Graph Total Score	
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	Page #31: Rubric Score:	
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How to Implement NGSS with Notebooking...

Before we even began working with students, we first sat down as a Professional Learning Community (PLC) to plan what and how we were going to teach the Next Generation Science Standards.

The following slides will describe:

- 1 How we planned our year
- 1 How we use Interactive Notebooks to teach NGSS and have students "do science"



Step 1: Scope and Sequence

We collaborated as a PLCto determine our Scope and Sequence for the year.

We started by sorting the Performance Expectations (PE) by common themes.

Then we also included the Science and Engineering Practices (SEP) and Disciplinary Core Ideas (DO) that align with each PE.





Sanger Unified School District Science Scope & Sequence Map Course: 8th Grade Science

Unit Unit		Unit 1 Unit 2		Unit 3		Unit 4	Unit 5
Title	1A Energy	1B Waves	Forces	Earth and Space (Cosmos)	Gravity	History of Life & Human Impact on Earth	Genetics and Natural Selection
Duratio n	4-5 weeks	4-5 weeks	3 weeks	weeks	Weeks	3 weeks	3 weeks
Perform ance Expecta tion (PE)	MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.	MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit	MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion	MS-ESS1-1. Develop and use a model of the Earth-sun-m oon system to describe the cyclic patterns of lunar phases, eclipses of the sun and	MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. MS-PS2-4 Construct and	MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. MS-LS4-1. Analyze and	MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

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MS-PS3-2.

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model to

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MS-LS4-4.

Construct an

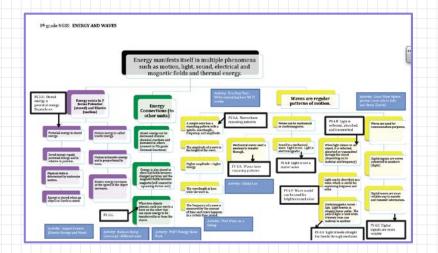


Step 2: Unit Design

Using the Scope and Sequence we previously made, we then worked on developing specific units.

The first step we did was to create a Conceptual Flow Map for each unit.

Here is the final product for our 8th grade Unit on Waves.



Step 3: PQP

Once the Conceptual Flow Map is complete, we then create our Phenomena, Question, Practices (PQP) Chart. This chart provides a map of what the students will learn and how.

Performance Expectation (Match to DCI) MS-PS3-1; MS-PS3-2 MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.

MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials

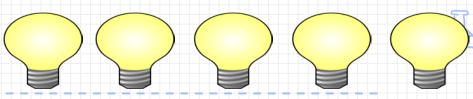
MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized

MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that dig signals are a more reliable way to encode and transmit information than analog signals.

DCI	Phenomena	Guiding Questions	Practices	Cross Cutting Concepts
PS4-A: Wave Properties: A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude(MS-PS 4-1) A sound wave needs a medium through which it is transmitted (MS-PS4-2) PS4-B: Electromagnetic Radiation When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending	Seismic waves Tsunami Light Absorption and Sea Water (Algae Growth) Oscilliscope App Digital/Analog Signal: How does your voice go from you to your friend across town?	Wave Lightbulb Questions "Why is lightning seen much earlier than thunder is heard? Why does flying a supersonic aircraft cause the glass to shatter in a window panel? "Why is there no sound in space? "How does your voice go from you to your friend across town on the phone? "Why do different colored algaes grow at different depths in the ocean? "What are the characteristic properties	SEP: 5 Using Mathematics and Computational Thinking (PS4-1) SEP 2: Developing and Using Models (PS4-2) SEP 8: Obtaining, Evaluating, and Communicating Information (PS4-3)	Patterns (PS4-1) Structure and Function (PS4-2 and PS 4-3)



Big Idea Questions

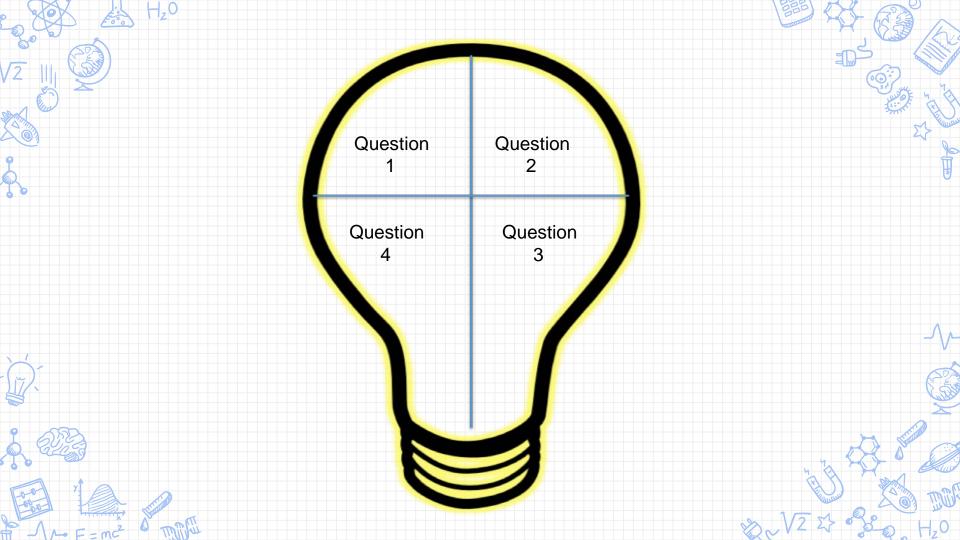


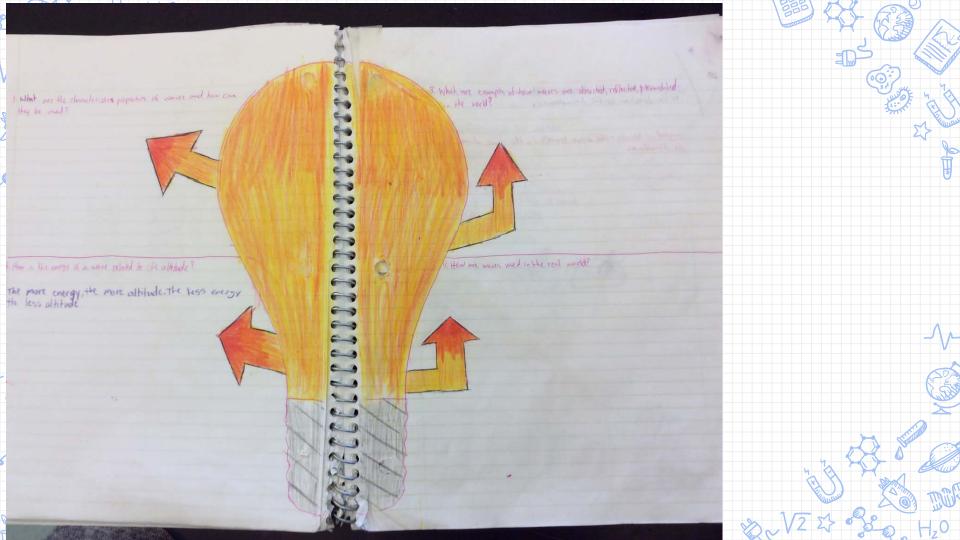
*Engaging students in science starts with asking questions and generating curiosity. Questions on everyday occurrences in life intrigue students, encourage students to learn at a deeper level. A roadmap is a must-have when planning a unit, both for the teacher and the student.

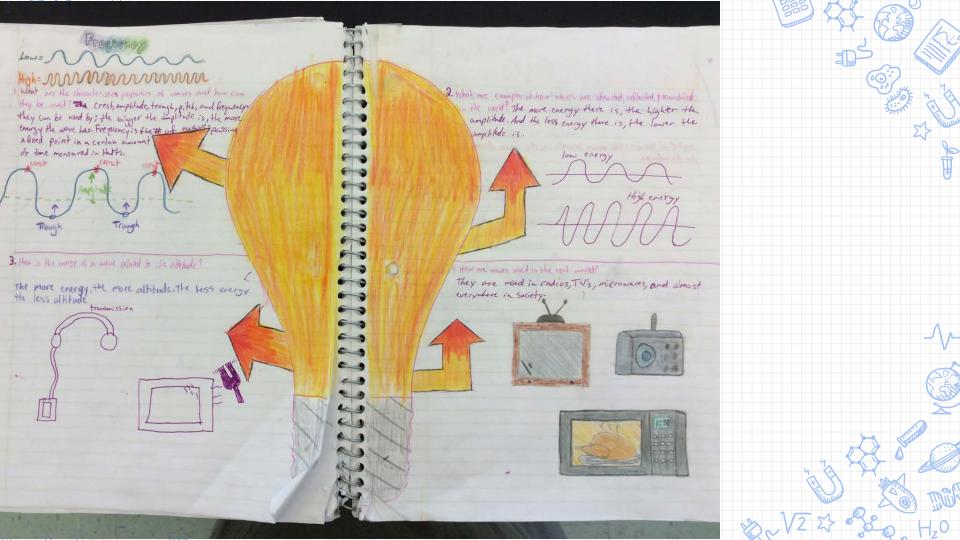
*The Big Idea Page is a dynamic tool that students use to process scientific information as they advance through a unit. It is a two-page spread, composed of a central icon representing the topic of the unit, with four real-life, phenomena-based questions that direct student learning. These teacher-generated questions are drawn from the DCIs, CCCs, and PEs. After an initial discussion of the questions, students collect evidence from classroom lessons and activities to answer each question. This evidence is recorded adjacent to the question being addressed. Observations from teachers indicate a high correlation of a well-done Big Idea Pages to how well a student performs on a test. This is due to students having to go through all work and pull out evidence that supports a guiding question.

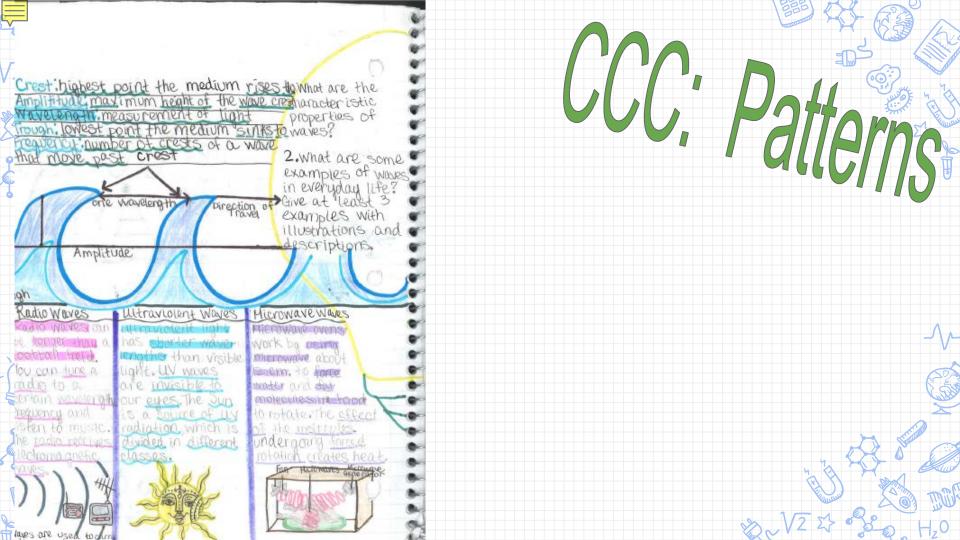
Defined from Jennifer Weibert, Science Coordinator, Fresno County Office of Education We develop the questions and add them to our PQP chart as we develop the lesson.

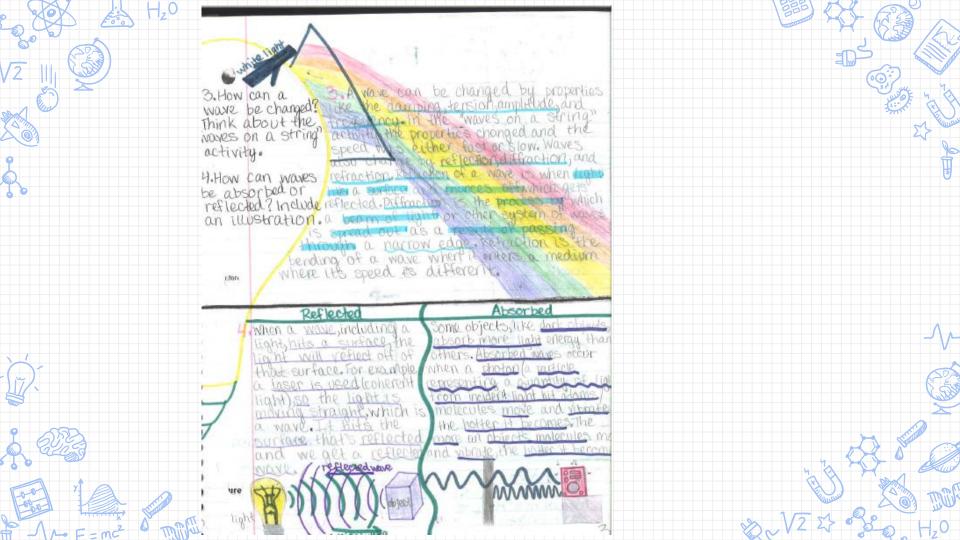
* Great Big Idea questions take time to develop with your colleagues as they should ensure Higher Order student learning.





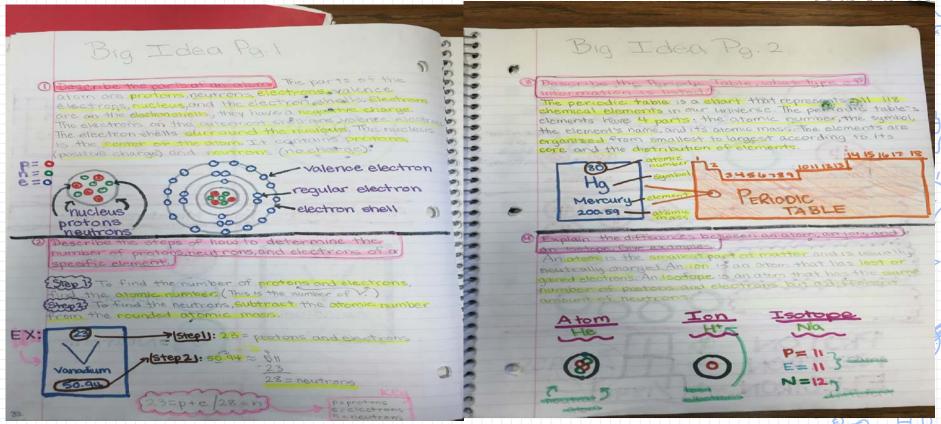






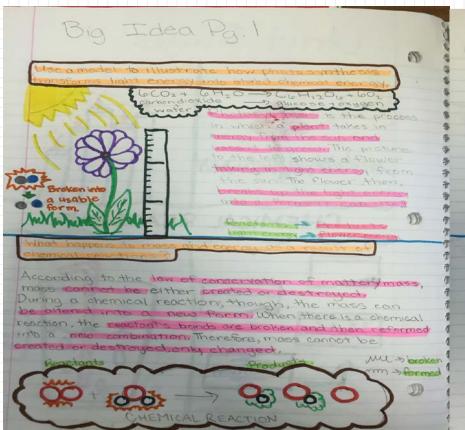
Big Idea page examples:

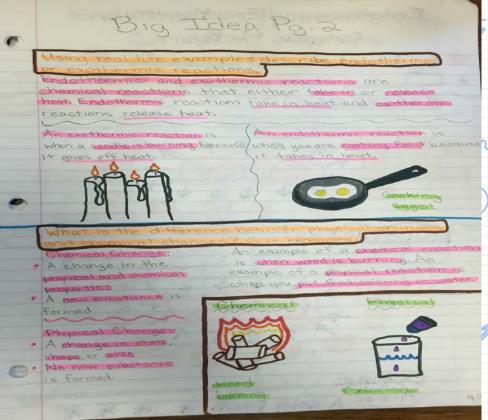




Big Idea page examples







NGSS Standards

MS-PS1-6.

Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

Cross-Outting Concepts: Energy and Matter

Science and Engineering Practices: Constructing Explanations and Designing Solutions

Disciplinary Core Ideas: PS.1B: Chemical Reactions: Some chemical reactions release energy, others store energy





Question: Which solution would be best used as an ice pack?

Potassium Chloride (KCI) and Water (H₂O)

Q.

Calcium Chloride



Interactive Notebook

Directions:

1 Set up your notebook

Right Side Page - pg. 5



Data collection:

- 1 Add 20 mL of water to the plastic baggie. Record the initial temperature of the water in your notebook in the before section.

 Draw and write what you see before you combine the 2 reactants.
- 2. Add the solid (potassium chloride) to the water in the bag. Make qualitative observations about the reaction. Record initial temperature when the solid is added to the water. Make sure to label all parts of your drawing (visible and invisible parts).
- 3.Once the temperature has leveled off record this as your final temperature. Make final qualitative observations.
- 4. Repeat steps 13 using water and Calcium Chloride, record your results in the second column of your notebook page.

Informational Text

Read article to help you completely answer the question,

"Which solution would be best used as an ice pack?"

As you read the article, focus on the following and write in the margins as you are reading.

- **X** Ask questions
- X Make connections to real life
- X Make connections to reaction that just happened
- X Underline/ circle any words you don't know

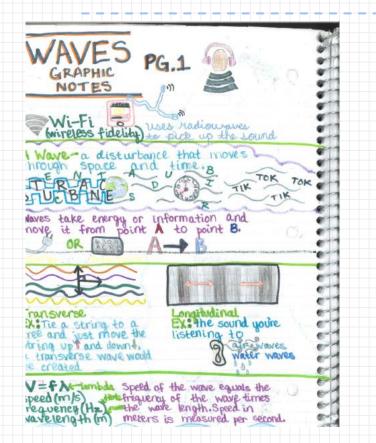
Graphic Notes

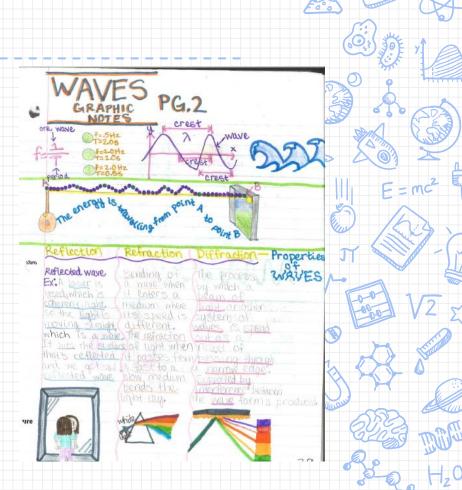
This is where students individually process and make sense of scientific knowledge they have gained.

Students are encouraged to use gel pens and colored pencils on all output pages. Notes are a common output, recorded in many different styles, with graphic notes (color, picture, text), being the most commonly used form.

Graphic Notes facilitate student understanding of the DOIs, OOCs, and PEs. As Graphic Note pages are individualized, they will be creative and different in appearance, but should contain all significant information.

Examples of Graphic Notes









as you read

Mat You'll Learn

xplain how waves transport Histinguish among transverse, pmpressional, and electromagetic waves. lescribe the properties of escribe reflection, refraction, and diffraction of waves.

the It's Important

ices such as televisions, radios, cell phones receive and transinformation by waves.

Review Vocabulary nsity: the mass per cubic meter a substance

ew Vocabulary

wave transverse wave compressional wave wavelength frequency law of reflection refraction diffraction

What are waves?

When you float in the pool on a warm summer day, the upand-down movement of the water tells you waves are moving HOW AO past. Sometimes the waves are so strong they almost push you the wine's over. Other times, the waves just gently rock you. You know form? about water waves because you can see and feel their movement, but there are other types of waves, also. Different types of waves carry signals to televisions and radios. Sound and light waves move all around you and enable you to hear and see. Waves are even responsible for the damage caused by earthquakes

Waves Carry Energy, not Matter A wave is a dis that moves through matter or space. Wayes carry energy from willyal one place to another. You can see that the waves in Figure 1 carry Kind of energy by the way they crash against the rocks. In water waves disturbance the energy is transferred by water molecules. When a wave moves, it may seem that the wave carries matter from place to place as the wave moves.

But that's not what really happens. When waves travel when the through solids, liquids, and gases, matter is not carried along Model with the waves. The movement of the fishing bob in Figure 1 CARRIED WITH THE WAVES transfers energy to nearby water molecules. The energy is then passed from molecule to molecule as the wave spreads out. The wave disturbance moves outward, but the locations of the water molecules hardly change at all.

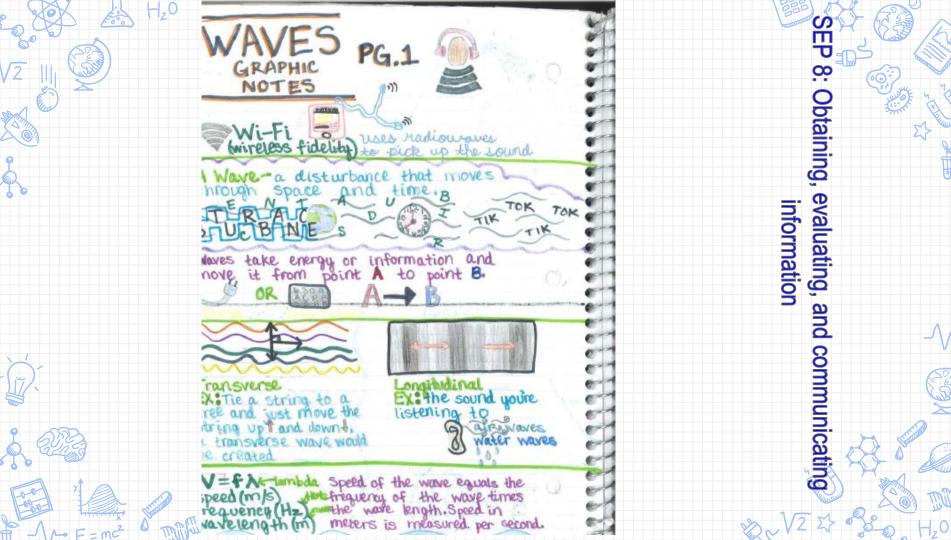
The energy carried by ocean waves can break rocks. (7) 3

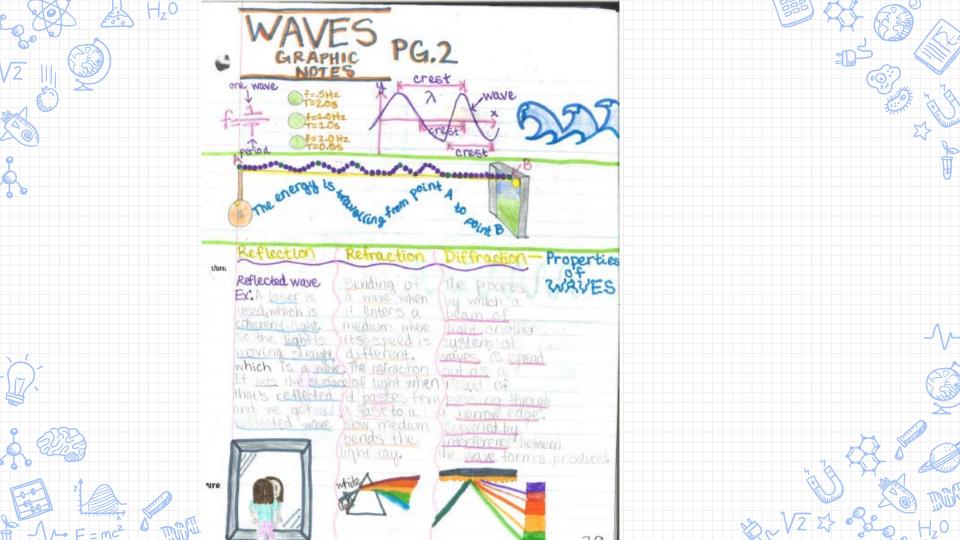
The movement of the fishing bob pro-

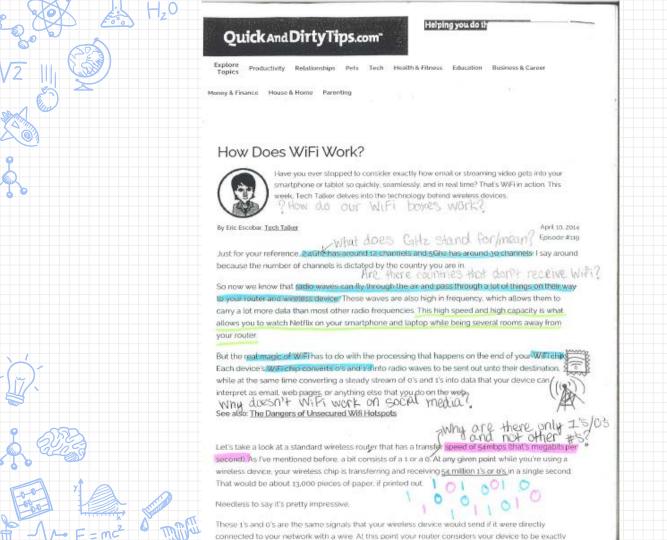
gure 1 Waves carry energy

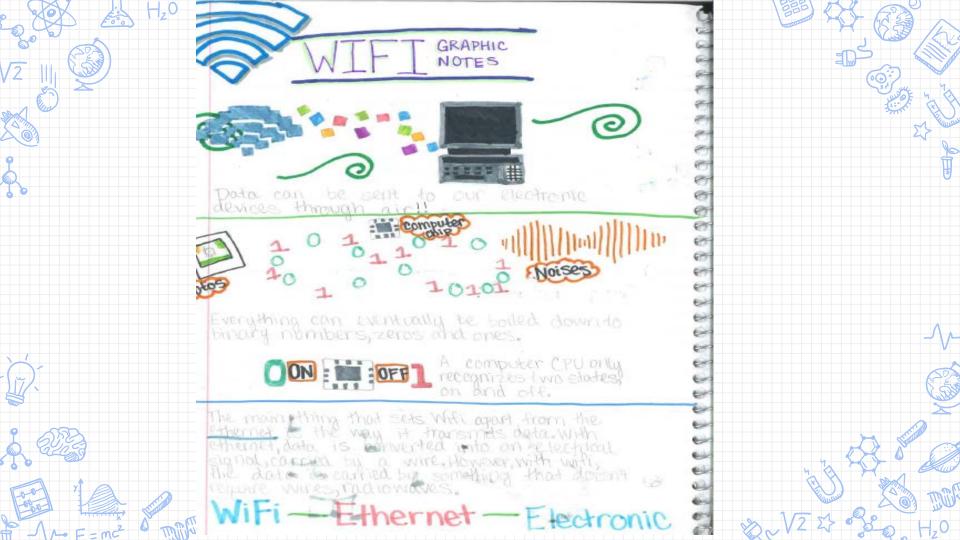


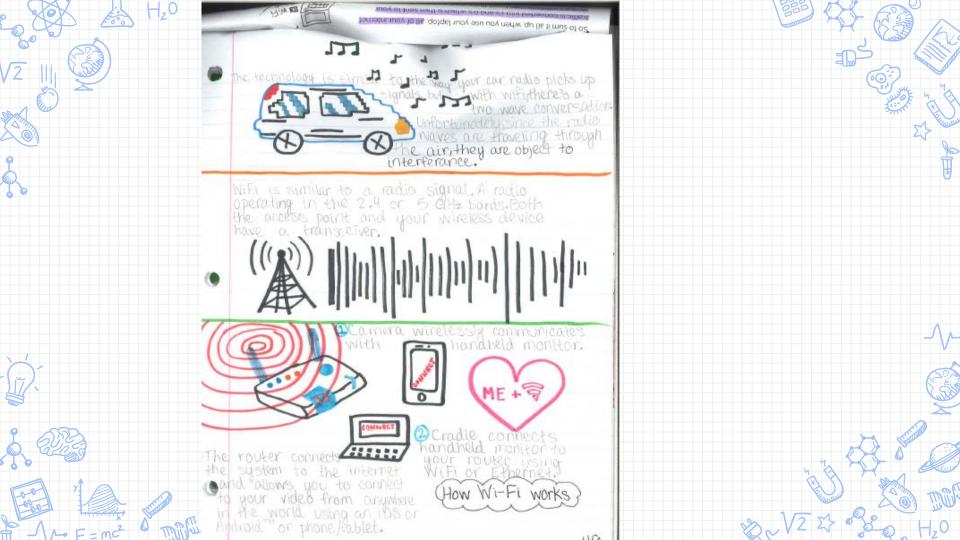


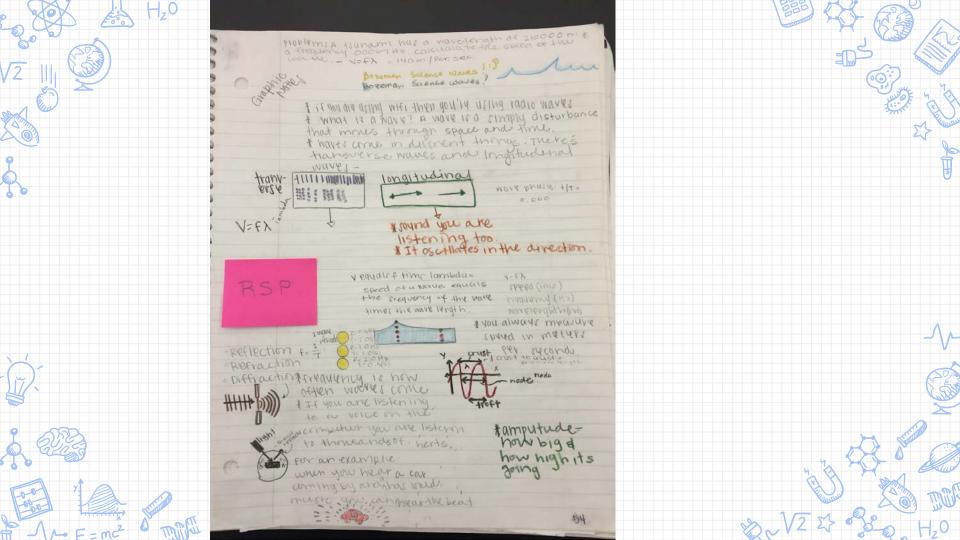












Interactive Notebook

Graphic Note Directions - pg. 6-7

- X Write or draw the main idea or topic in the middle of the page.
- X Use text, color, and pictures to fill a 2 page spread
- X Include big ideas and details learned
- X Be creative and doodle

Set up your notebook <u>Left Side Page</u> - pg. 4



Activity/CER

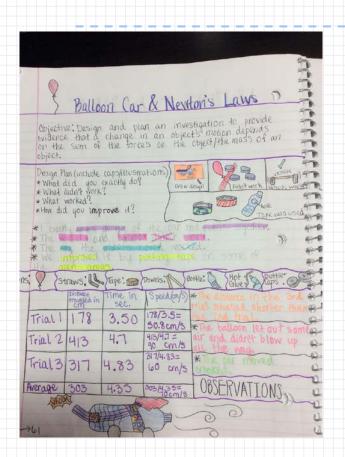
A writing strategy we use to further develop scientific inquiry and at the same time support our ELA teachers is using the Claim, Evidence, and Reasoning writing technique.

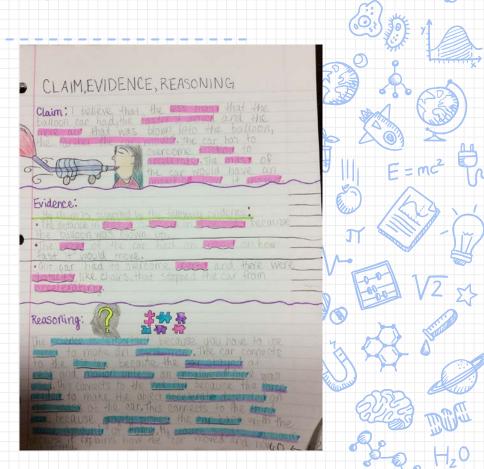
- *Claim: A statement or conclusion that answers the original question/ problem.
- *Evidence: Scientific data that supports the claim. The data needs to be appropriate and sufficient to support the claim.
- *Reasoning: A justification that connects the evidence to the claim. It shows why the data counts as evidence by using appropriate and sufficient scientific principles.

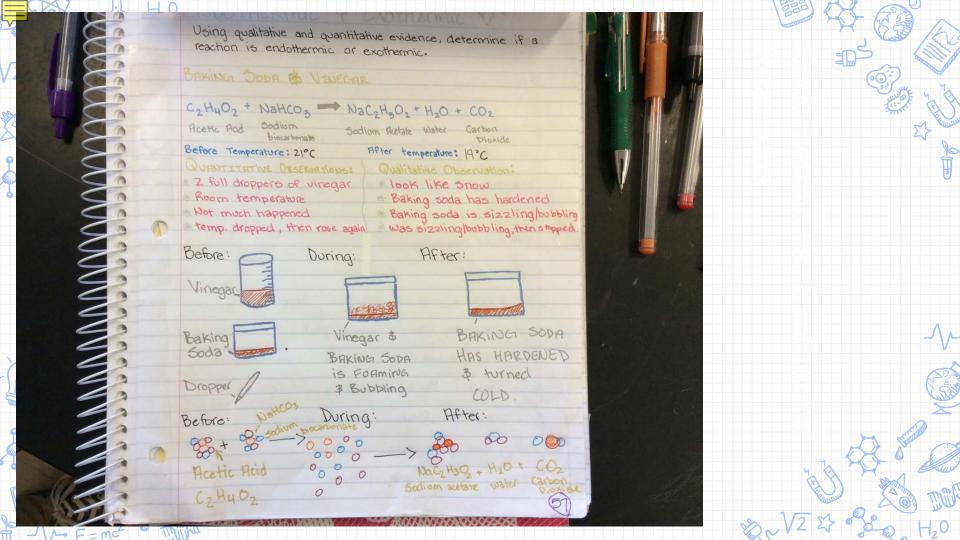
*Definitions from NSTA

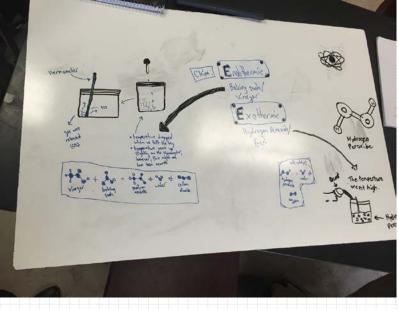


Claim, Evidence, and Reasoning Student examples

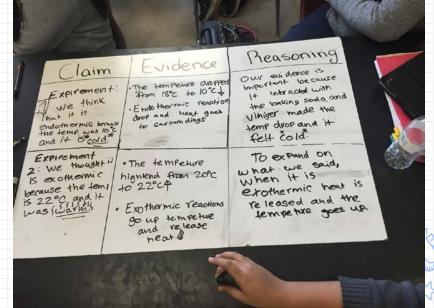


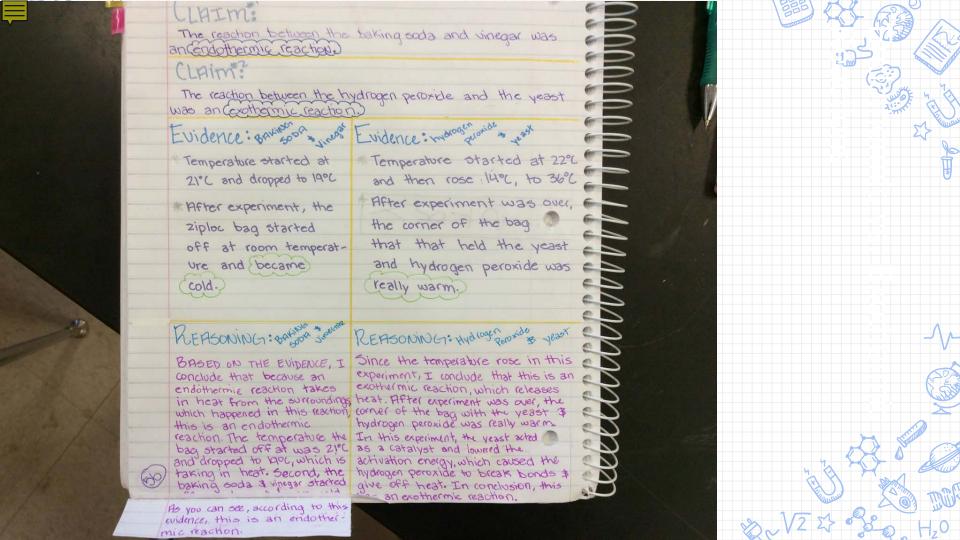






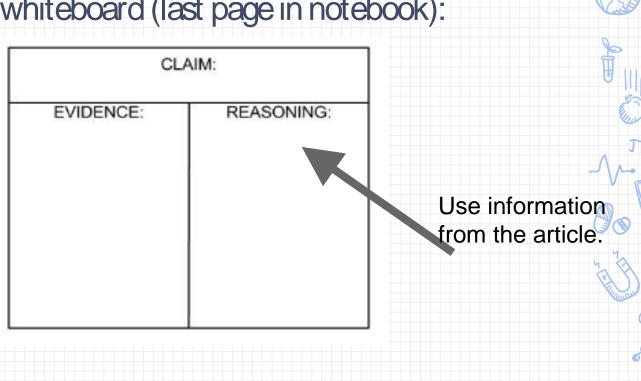
Endothermic/Exothermic Experiment: Group Academic Discourse





Write a group CERstatement

Set up whiteboard (last page in notebook):



Write a CERas a group on the whiteboard (last page in notebook)

When writing your Claim, Evidence, Reasoning make sure you include the following science vocabulary:

X Exothermic

X Endothermic

X Reaction

X Energy

X Temperature

Claim - the statement that answers the question
Evidence - the facts that support the claim
Reasoning - explanation of the logic why the facts support the claim



Whole group share? gallery walk? Post its with what you liked/what needs more explanation?

Write completed group ŒR on page 4 of "notebook", explaining which reaction would be best used as a cold pack.



Reflection

- X What did you find most useful?
- X What's one practice you would like to implement next week in your classroom?
- X Anything you would like to share with us from your experience with notebooking?
- X Any questions for us?



Questions???

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Diane Loflin @sanger.k12.ca.us

