EVIDENCE OF UNDERSTANDING

CHEMISTRY

OKLAHOMA
LIBRARY OF DIGITAL RESOURCES

The Oklahoma Library of Digital Resources is an innovative initiative to provide Oklahoma educators with high-quality, interactive teaching resources.

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Thank you to the following educators for their work in curating digital resources:

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GETTING TO KNOW OKLDR

WHO IS OSSBA?

The Oklahoma State School Boards Association (OSSBA) works to promote quality public education for the children of Oklahoma through training and information services to school board members. The Association is a leader among leaders in Oklahoma education and a visible presence in the local school districts and throughout the state.

The OSSBA was created in 1944 to provide support for local school board members with a variety of information, assistance, and representation services. OSSBA reaches every school board member through training opportunities. It creates and encouraged effective leaders to promote public education and cultivates productive alliances with governing bodies. OSSBA trains school board members to participate in an effective and supportive manner to provide direction for educational innovation and improves public perception of education in Oklahoma by sharing strategies and tools with our member school districts to focus on the success of Oklahoma public education.

OSSBA works with school boards to demonstrate the impact they have on student achievement. We work to provide meaningful two-way communication of advocacy, services, and training activities to local boards of education and their stakeholders. Other services we provide that have a direct impact on student achievement include strategic planning and superintendent searches. Our legal team provides free legal information to the school districts.

WHY OKLDR?

In the summer of 2016, OSSBA set out on a journey assist teachers in the integration of technology into their classrooms. The Oklahoma Library of Digital Resources (OKLDR) became a collection of digital content resources selected by Oklahoma educators to support the Oklahoma Academic Standards. The resources were curated by teachers from school districts across Oklahoma. Each collection contained a variety of learning resources, such as videos, apps, pdf documents, and websites, and are designed so that teachers can then build their lesson plans. The resources helped bridge the digital equity gap among students while helping schools make the most of limited resources.

After collaborating with educators, school and district leaders for a couple of years, OKLDR has been enhanced in the following ways:

- Resources are now an Open Education Resource (OER) "book" format, making it easier to use and accessible on multiple devices.
- Resources map to ESSA expectations for evidence of student understanding and students' mastery of the academic standards.
- Tools are now agnostic and can be used on multiple devices.
- Lessons are now focused on student engagement through the use of technology. The first OKLDR version focused on teacher resources. **This is a major change**.
- To prioritize student learning, teacher resources are now located at the back of each book.

HOW TO USE THIS BOOK

The Oklahoma Academic Standards for this lesson are grouped together by key topics. Sometimes you will see only one standard, but other times you will see a grouping of standards.

Evidence of Understanding is the key. This is the concept you want your students to master that reinforces the standards. Mastery means deeper understanding, not just "skim the surface" learning.

Digital Tools are the recommended applications and/or tools for the lesson. Think of this element as the "supplies box."

In Practice is a suggested activity to engage the students to demonstrate mastery of the standard. You will notice that this is just one suggested lesson, and sometimes there might be a second lesson. The suggested lesson, developed by Oklahoma teachers, is meant to give you a starting point. You might decide to use the lesson or it might give you an idea of something else you could do to teach the concept.

MOVING FORWARD

As you can see the OKLDR book has been designed to inspire educators to have students demonstrate their understanding of the Oklahoma Academic Standards through the use of technology as a productivity tool. While educators have limited time in the day to plan and research high quality content, this book is a jumping off point, with suggested peer-reviewed activities and resources.

While you might encounter extra white space in the book, it is intentional for growth. As you integrate the activities into your lessons, you are encouraged to send us student work samples that might be included in the book, as well as additional activities and resources that could be included in future revisions.

Next Steps:

- We would love to add samples of student work to the activities, so please send the work to: okldr@ossba.org.
- If you would like to be involved in future course creation, or know teachers who would like to be involved, please contact us at: okldr@ossba.org.
- See anything that needs to be changed or enhanced? Contact us at: okldr@ossba.org.

CHEMISTRY BASICS

LAB SAFETY AND LAB EQUIPMENT

As of June 1, 2015, the Hazard Communication Standard (HCS) will require pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification. Proper lab safety protocol is important in all science classes. Before performing any labs, teachers should review lab safety and the students must demonstrate understanding of protocol.

Evidence of Understanding

Students will demonstrate mastery of the Chemical Safety Data Sheets (SDS-GHS) system by using appropriate safety precautions when working in the laboratory environment.
Students will create a video showing appropriate lab safety behaviors.

Students will be able to identify key lab equipment that is commonly used in the chemistry lab.

Digital Tools

- *Video Editor - Clips, WeVideo, iMovie*
- *Content Video - (Cringeworthy lab Safety - Flinn Scientific) (Importance of Safety in School labs - Flinn Scientific)*
- *Content Application - Chemical Safety Data Sheets App*
- *Student Response - Flipgrid*
- *Sketch Application* - Sketches School, ibis, Absolute Board, Google Draw,

In Practice

- Students will observe and practice proper lab safety skills to ensure safety in the lab during all activities.
- Student groups will create videos using a video editor demonstrating both proper and improper practice of lab safety guidelines. Students will then post on a student response application to give feedback on what type of practice the videos represent (Students may also indicate the safety rule number the videos depict)
- Students can also create digital notes using a sketch application or interactive whiteboard application to sketch lab equipment and write their uses for further reference.

MEASUREMENT & CALCULATIONS

Students will learn how to perform basic measurements and calculations associated with Chemistry. Tools used should include, but are not limited to triple beam balances, electronic balances, metric rulers and meter sticks, thermometers, graduated cylinders, and beakers. Students should be able to make measurements using both traditional and digital methods.

Evidence of Understanding

Student will be able to accurately measure mass, length, temperature, and volume using common laboratory tools, and will be able to convert between empirical and metric units.

Digital Tools

- *Data collection application* - Easy Measure or Smart Measure , Measure
- *Video Editors* - Clips, WeVideo, iMovie

In Practice

- Students will use a video app to record a how to video for each type of measurement in the lab (ie. mass with a triple beam balance and an electronic balance, volume with a graduated cylinder and displacement method for irregular shaped items, length with a meter stick, tape measure and/or ruler, temperature using graduated and digital thermometer).
- To extend learning, students will then convert measurements from metric to empirical measurements.

MATTER & INTERACTIONS

STRUCTURES & PROPERTIES

HS-PS1-1: Students who demonstrate understanding can:

Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

Evidence of Understanding

Students should identify and describe components of the atomic model to help them understand the relationships between elements in the periodic table. Students should use this information to make connections and predict the patterns of specific properties such as the number and types of bonds formed, number and charge of stable ions, element reactivity, and the attraction/repulsion between charged particles.

Digital Tools

- *Application - Nuclear App*
- *Simulation Website - PHET Simulation Build an Atom,*
- *Website - Ptable.com*
- *Online Graphing Tool - Create a graph*
- *Podcast Application - Opinion, Anchor , Voice Record Pro App*

In Practice

- Students will explore atoms using an application or simulation through 3D visualization. Students will explore the effects of manipulating matter at the atomic level.
- Students will look up the electronegativities of elements in the first two periods and use an online graphing tool to identify periodic trends.
- Students will develop explanations for how the structure of the atom is connected to periodic trends and use a podcasting application to share their thoughts and opinions regarding the connections they make between the two concepts.

PERIODIC TABLE AND TRENDS

HS-PS1-2: Students who demonstrate understanding can:

Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, knowledge of the patterns of chemical properties, and formation of compounds.

Evidence of Understanding

Students should be able to construct an explanation for how the pattern of outermost electrons can be used to predict the outcomes of a chemical reaction. This includes identifying the types of bonds involved (ionic, covalent, etc.), the idea that matter is conserved in a chemical reaction, and the ability to predict the products based on the type of reaction.

Digital Tools

- *Simulation website -* *PHET Balancing Chemical Reactions*
- *Website -* *Ptable.com*
- *Video Editor* - Clips, Do-Ink, iMovie
- *Sketch Application* - Sketches School, Notes, ibis, Absolute Board, Google Draw

In Practice

- Students will use a simulation website to discover how matter is conserved in a chemical reaction.
- Students will investigate a phenomena (airbag-decomposition of sodium azide, car engine- hydrocarbon combustion, synthesis of water, etc..) and develop questions on how the outcome of those reactions are dependent on the outermost states of atoms and periodic trends.
- Students will design a solution to a real world problem by identifying the chemical reactions involved and investigating how changing parts of the reaction may impact the solution.
- Students will use a video editing application to explain their solution and use a sketching application to visualize the parts of their reaction.

NUCLEAR PROCESSES

HS-PS1-8: Students who demonstrate understanding can:

Develop models to illustrate the changes can the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

Evidence of Understanding

Students should identify the relevant components of the five nuclear models (fission, fusion, alpha, beta, and gamma) including the number of subatomic particles (protons and neutrons) in the nucleus before and after decay, the types of emitted particles, and the scale of energy changes associated with nuclear processes versus other chemical processes.

Digital Tools

- Content Video - Nuclear Chemistry, Nuclear Chemistry Part 2, Fukishima, Star Fusion
- Website - Ptable.com
- Story Telling Application - Book Creator, Canva Comic Strip Maker, 30 Hands

In Practice

- Students will explore different phenomena related to nuclear reactions such as nuclear powerplants (Fukishima incident), Formation of stars (fusion), birth of superheroes (Gamma radiation- Hulk), etc.
- Students will explore nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involving the release or absorption of energy by watching the videos “Nuclear Chemistry” and “Nuclear Chemistry Part 2: Fission and Fusion”
- Students will create a storyline (origin story) based on a how a superhero may have received their powers through exposure to a nuclear process using a story telling application.

TYPES OF INTERACTIONS

IONIC BONDS

HS-PS1-3: Students who demonstrate understanding can plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

HS-PS2-6: Students who demonstrate understanding can communicate scientific and technical information about why the molecular- level structure is important in the functioning of designed materials.

Evidence of Understanding

Students will understand the relationship between measurable properties (boiling point, melting point, surface tension,etc.) of a substance and the strength of electrical forces between particles of the substance. Students should also be able to design an investigation plan around a phenomenon that connects bulk scale observations with molecular level interactions.

Digital Tools

- *Interactive Video* - *Ionic Bonding Tutorial*
- *Sketch Application* - Sketches School, Notes, ibis, Absolute Board, Google Draw
- *Video Editor* - Clips, WeVideo, iMovie, Explain Everything

In Practice

- Students will follow this tutorial on ionic bonding to learn about ions, ionic forces and ionic bonding.
- Students will investigate the relationship between charged particles and electricity by designing an investigation where different substances (ionic and covalent) are dissolved in water and then tested with a conductivity apparatus.
- Students will create a sketch consisting of a model detailing the molecular level interactions occurring in each of their dissolved substances.
- Students will then create a video explaining the reasoning behind their results using a video editing application that incorporates their sketch.

COVALENT BONDS

HS-PS1-3: Students who demonstrate understanding can plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

HS-PS2-6: Students who demonstrate understanding can communicate scientific and technical information about why the molecular- level structure is important in the functioning of designed materials.

Evidence of Understanding

Students will be able to describe the relationship between the molecular structure of a designed material and its function. They should also be able to make connections between the material's function and its macroscopic properties (conductivity, reactivity, intermolecular forces, etc.)

Digital Tools

- *Interactive Video -* *Covalent Bonding*
- *Sketch Application -* *Sketches School*, *Notes*, *ibis*, *Absolute Board*, *Google Draw*
- *Presentation* - Keynote, Google Slides, Microsoft PowerPoint, Haiku Deck

In Practice

- Students will follow this tutorial from OETA's PBS Learning Media to learn about covalent bonding.
- Students will investigate how a change in structure can result in a change in function (i.e. chemical structures of methamphetamine and adderall, THC vs CBD)
- Students will use a sketching application to draw the structures they are investigating and then present their findings to their classmates using a presentation application.

OTHER BONDS

HS-PSI-3 Students who demonstrate understanding can plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

HS-PS2-6: Students who demonstrate understanding can communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

Evidence of Understanding

Students will be able to understand the relationship between measurable properties (melting point, surface tension, strength of material, etc) of a substance and the strength of the electrical forces between the particles of the substance. Students should be able to explain and model the differences between different bond types and interactions.

Digital Tools

- *Content Video -* *Intermolecular Forces with Dipoles*, *Metallic Bonds-Boseman Science*, *Types of Chemical Bonds*, *Science of Avengers*
- *Simulation Website -* *PHET Molecule Polarity*
- *Video Recording application - Device Camera*
- *Sketch Application*- Sketches School, Notes, ibis, Absolute Board, Google Draw

In Practice

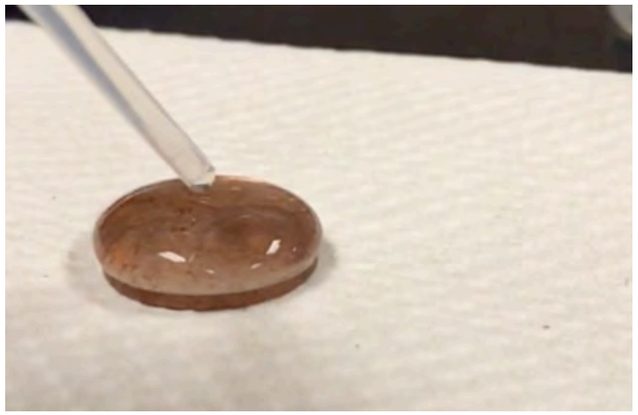
- Students will explore intermolecular forces and dipoles as it relates to polarity using a simulation website.
- Students may also explore intermolecular forces in polar substances (i.e. water) and use a video recording application to observe those forces in action. Utilizing a slow motion feature is useful for student impact.
- Students can utilize video tutorials to explore further types of bonding including, hydrogen bonds, metallic bonds, Van Der Waals forces, and dipole attractions.
- Students can explore strength of metallic bonds in superhero applications.
- Students will create doodle notes using a sketching application to show the difference between bond types.

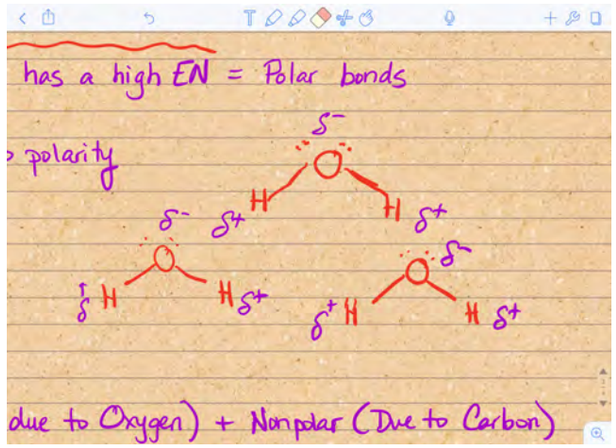
ENERGY & CHEMICAL PROCESSES

BOND ENERGY

HS-PS1-4 Students who demonstrate understanding can:

Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.





Evidence of Understanding

Students will be able to use evidence to develop a model that describes the chemical reaction, the system, and the surroundings. They will also be able to label and identify the bonds that are broken, bonds that are formed, and the energy transfer between the systems and surroundings.

Students will understand that breaking bonds requires an input of energy and that forming bonds releases energy to the system and surroundings.

Digital Tools

- *Video recording application - Device Camera*
- *Interactive Whiteboard Application - Educreations , Absolute Board, Show Me, Google Jamboard, Explain Everything*
- *Sketch Application - Sketches School, Notes, ibis, Absolute Board, Google Draw*

In Practice

- Students will observe a demonstration of the combustion of methane bubbles using a video recording application (Utilizing a slow motion feature is useful for student impact), develop questions they would like to investigate regarding the heat they experience during the demo, and then work in groups using an interactive whiteboard or sketch application to create a model and explanation of the phenomena.
- Students will investigate the transfer of energy occurring in other real world phenomena like cold ice packs, hand warmers, combustion reactions, etc..
- Students will use a sketching application to illustrate the energy released and absorbed in the phenomena they choose to investigate as well as calculate the bond energies involved in the reaction to help elaborate and support their reasoning.

RATE OF REACTIONS

HS-PS1-5 Students who demonstrate understanding can: apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

Evidence of Understanding

Students will be able to construct an explanation that includes the idea that the kinetic energy of colliding particles and the number of collisions increases as the reaction rate increases.
Students will be able to use evidence (qualitative or quantitative) to identify patterns that an increase in concentration and/pr temperature increases the reaction rate.

Digital Tools

- *Simulation website - PHET Simulation.*
- *Data Collection Application - Science Journal*
- *Interactive Whiteboard Application - Educreations , Absolute Board, Show Me, Google Jamboard, Explain Everything*

In Practice

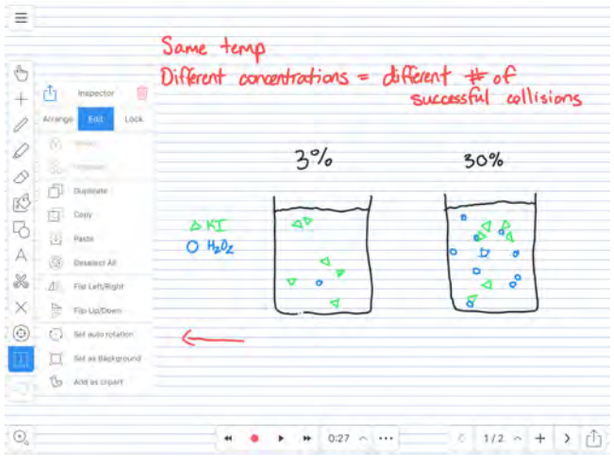
- Students will explore reaction rates with a simulation website.
- Students plan and design an investigation where temperature and/or concentration is varied. (i.e. glowsticks in different temperatures, chicken liver in hydrogen peroxide, Magnesium in different concentrations of HCl, etc.).
- Students can use a data collection application to collect their evidence for analysis.
- Students will identify what influences speed and direction of reactions and create an animation using an interactive whiteboard application showing how reaction rates can be affected based on the phenomena they investigated.

CHEMICAL REACTIONS

EQUILIBRIUM

HS-PS1-6 Students who demonstrate understanding can:

Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.



Evidence of Understanding

Students will use evidence to describe the relative quantities of a product before and after changes to a given chemical reaction system using Le Chatelier's principle. Students should understand how (at a molecular level) a stress involving a change to one component of a system affects other components. Students should understand that changing the concentration of one component will change the rate of the reaction (forward or backward).

Digital Tools

- *Mind Mapping Application - Popplet, lino, Padlet*
- *Video Editor* - Clips, Do-Ink, iMovie

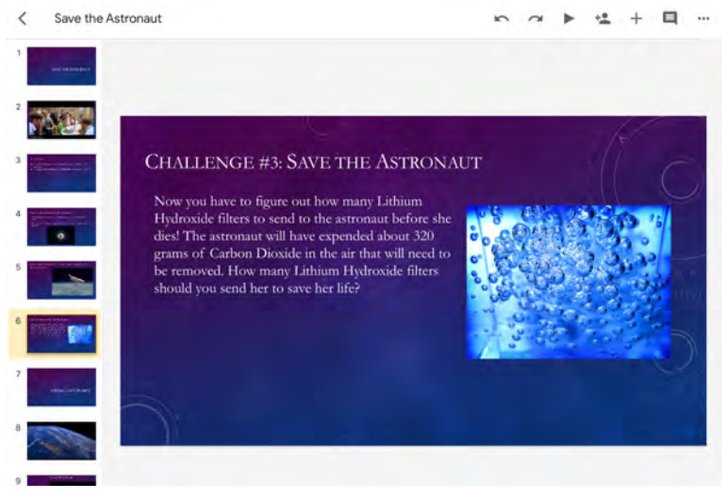
In Practice

- Students should examine world phenomena where chemical equilibrium is involved. (An example is how increased carbon dioxide in the air disrupts the aqueous chemistry balance in the ocean causing the disintegration of calcium carbonate exoskeletons) and design solutions based on removing/adding stress to an equilibrium equation.
- Students collaborate with each other using a mind-mapping application on finding a solution to their equilibrium problem.
- Students will create a video presenting their solution using a video editor application.

STOICHIOMETRY

HS-PS1-7 Students who demonstrate understanding can:

Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.



Evidence of Understanding

Students will be able to identify the quantities of reactants and products of a chemical reaction in terms of atoms, moles, and mass. Students should know how to use and balance a chemical equation and identify that both matter and mass are conserved. Given a chemical reaction, students should be able to demonstrate and predict

Digital Tools

- *Mind Mapping Application - Popplet, Padlet*
- *Collaboration board - Google Keep, lino*
- *Interactive Whiteboard Application* - Educreations , Whiteboard: Absolute Board, Show Me, Google Jamboard, Explain Everything
- *Presentation* - Keynote, Google Slides, Microsoft Powerpoint, Haiku Deck

In Practice

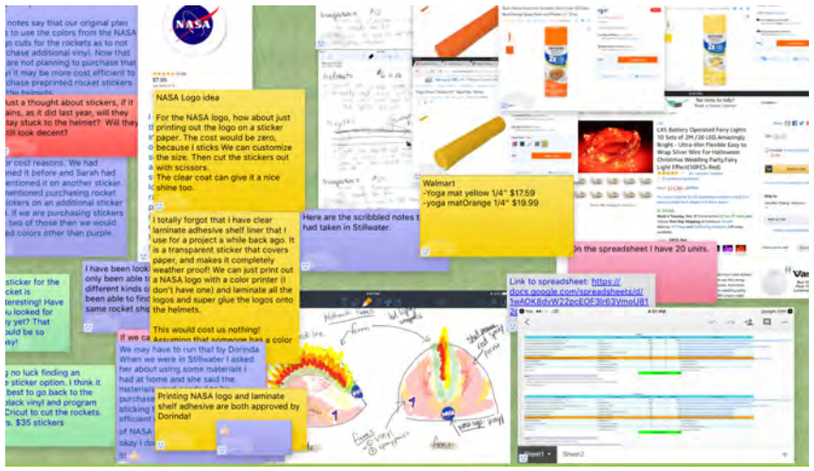
- Students will investigate a phenomena that involves a chemical reaction such as the decomposition of sodium azide in airbags or the use of carbon dioxide scrubbers on spacecraft.
- Students can be given a challenge (save the astronaut by calculating how many LiOH filters they need to survive or a murder mystery!) and then they can brainstorm solutions using a mind-mapping or collaboration board application.
- Students can then present their storyline (of the solution to their murder mystery or how they would save the astronaut, etc...) using a presentation or interactive whiteboard application.

CONSERVATION OF ENERGY

ENTHALPY

HS-PS3-3 Students who demonstrate understanding can:

Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.



Evidence of Understanding

Students will be able to develop a plan that includes identifying the scientific principles used in their energy conversion design, forms of energy converted, loss/gain of energy from system to surroundings, and the criteria/constraints used in the design of their device. Students should also be able to build, test, and refine their device keeping in mind the efficiency of their energy conversion.

Digital Tools

- Polling Application - Plickers, Poll Everywhere
- *Mind Mapping Application - Popplet, Padlet*
- *Collaboration board - Google Keep, lino*
- *Video Editor* - Clips, Do-Ink, iMovie
- *Interactive Whiteboard Application* - Educreations , Whiteboard: Absolute Board, Show Me, Google Jamboard, Explain Everything

In Practice

- Students will investigate different types of energy used in society and discuss real world examples in which energy is converted from one form to another. Sample reliable resources may be provided to students to help facilitate discussion.
- Students will use a polling application to identify groups that have similar interests in investigating a specific type of energy (i.e. wind energy, solar energy, rube goldberg, generators, etc)
- Student groups will then utilize a collaboration or mind mapping application to collaborate and design their device. (They can design a device that has already been invented or design a future device)
- Student groups will then create a proposal presentation for their product using a video editing, interactive whiteboard, or presentation application describing its effectiveness and efficiency, while incorporating scientific principles in their reasoning. Students could also model this as an advertisement keeping in mind their audience.

THERMODYNAMICS

HS-PS3-4 Students who demonstrate understanding can:

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).

Evidence of Understanding

Students will be able to describe the transfer of thermal energy when two components of different temperatures are combined within a closed system. Students should be able to develop an investigation plan and have the ability to calculate the heat capacity of system components as well as demonstrate that energy is conserved via thermal energy lost by hot object and thermal energy gained by cold objects.

Digital Tools

- *Content website -* *Physics Calorimetry Lab*
- *Student Response Application -* *Lino*, *Pages*, *Google Docs*
- *Sketch Application* - Sketches School, Notes, ibis, Absolute Board, Google Draw, Notability

In Practice

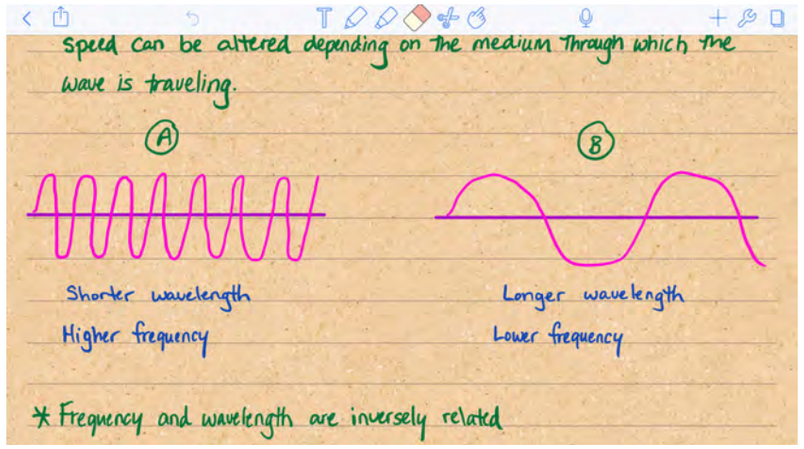
- Students will plan and carry out an investigation involving the transfer of thermal energy. An example is the Physics Calorimetry Minilabs.
- Student groups will use a student response application to brainstorm, plan and design their investigations. Groups can also use a video recording application or digital portfolio to document their results, explanations, and modifications.
- Students can create a model using a sketch application labeling the flow of energy between the system and surroundings.

WAVES & THEIR APPLICATIONS

PROPERTY OF WAVES

HS-PS4-1: Students who demonstrate understanding can:

Use mathematical representations to describe relationships among the frequency, wavelength, and speed of waves.



Evidence of Understanding

Students will be able to identify and manipulate the mathematical values for frequency, wavelength, and speed of waves traveling through different media. Students should also be able to use the mathematical relationship $v = f\lambda$ to assess any claims about any of the three variables including cause and correlation.

Digital Tools

- *Interactive Whiteboard Application - Educreations , Whiteboard: Absolute Board, Show Me, Google Jamboard, Explain Everything*
- *Sketch Application* - Sketches School, Notes, ibis, Absolute Board, Google Draw, Notability, Sketchbook
- Simulation website - Physics Classroom Wave Simulator, Phet Simulation

In Practice

- Students will investigate a phenomena that involves waves such as shining a light through a prism or investigating rainbows and how they are formed. Students will develop questions, conduct research, and create models to explain the phenomena. They can use a sketching application or interactive whiteboard application to present their models to the class.
- Students can explore a simulation website to develop a deeper understanding of frequency, amplitude, wavelength and speed.
- After using the simulation, the students can create a lab activity to demonstrate the effect of altering a variable on other components of a wave.

ELECTROMAGNETIC RADIATION

HS-PS4-3: Students who demonstrate understanding can:

Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

Evidence of Understanding

Students will be able to evaluate the phenomenon of the photoelectric effect and interference behavior by electromagnetic radiation. Students should also be able to evaluate and model that electromagnetic radiation can be described by a wave model or particle model. The transfer of energy and information within and between

Digital Tools

- *Sketch Application* - Sketches School, Notes, ibis, Absolute Board, Google Draw, Notability, Sketchbook
- *Content Website* - NASA: Electromagnetic Spectrum
- *Interactive Whiteboard Application* - Educreations , Whiteboard: Absolute Board, Show Me, Google Jamboard, Explain Everything

In Practice

- Students will investigate a phenomena that involves the transfer of energy via Electromagnetic waves. An example could be as simple as getting a sunburn or a discussion of how specific UV rays can cause skin cancer. Students will conduct research and develop models using a sketch application.
- Students will then utilize the website "NASA: Electromagnetic Spectrum" to review terminology and to develop a deeper understanding of how EM waves are utilized in a different setting.
- Students will then create a solution to a real world problem that involves the EM spectrum and the transfer of energy using an interactive whiteboard application.

RESOURCES

TEACHER

- Chem Pro: Chemistry Tutor App by 101 Education, LLC
- Chemistry Crack by Jennica Day
- Lab Safety YouTube video
- Chemistry Lab by GenericDev
- The Physical Properties & Chemical Properties of Matter
- Kahn Academy: Electron Configurations
- Crash Course Chemistry: The Electron
- Royal Society of Chemistry: Periodic Table App
- Beaker by THIX
- Chemistry GCSE 9-1 AQA Science App
- K12 Periodic Table of the Elements
- The Elements in Action by Touch Press Inc App
- The Elements Flashcards by Touch Press Inc App
- TeachEngineering.org “Solar Water Heater” Activity
- Flinn Lab Safety Contract
- OSHA Quick Card Pictogram Reference
- Honors Chemistry: Measurement
- TeachEngineering.org Activity: “What is a Nanometer?”
- TeachEngineering.org Activity: How Dense Are You Lab
- K20 Center: Classifying Chemical Reactions
- K20 Center: Intro to Periodicity/Electron Configurations
- TeachEngineering.org Activity: Element, Mixture, Compound
- TeachEngineering.org Activity: Basically Acids

- TeachEngineering.org Activity: Capillarity - Measuring Surface Tension
- Safety Data Sheets: What is it?