4TH GRADE SCIENCE

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.
We appreciate our sponsors:

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." An asterisk is found next to tools which can be used on multiple platforms where as no asterisk will indicate applications requiring Apple devices.

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.

CONVERTING ENERGY

ENERGY TRANSFER (ELECTRICITY, SOUND, HEAT, AND LIGHT)

4.PS3.2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

CCC: Energy can be transferred in various ways and between objects. DCI: Light, heat, sound, and electric currents transfer energy. Energy is present whenever there are moving objects, sound, light, or heat.

Evidence of Understanding

Students will make observations to collect data to serve as the explanation of a phenomena or test a system virtually. The students' observations will be described in a story telling application and will describe how energy is transferred.

Digital Tools

- *Content Application -* <u>Energy Forms Virtual Activity</u>

- *Content Application -* <u>Simple Circuits,</u> <u>Circuit Construction Kit</u>

- *Story Telling Application -* <u>ChatterPix Kids, Shadow Puppets EDU, Book Creator, Seesaw, Pages, Write About This, Google Docs</u>

In Practice

- Students will explore how heating and cooling iron, brick, and water transfers energy.

- They will build their own system within the Energy Forms Virtual Activity, tracking how the energy flows through the system.

- Students will use the "Simple Circuits" app to make virtual circuits to explore the flow/transfer of electricity and identify why some circuits work and others do not.

- Students will conclude these activities by relating their findings in a presentation through a story telling application.

PROPERTIES OF WAVES (AMPLITUDE & WAVELENGTH)

4.PS4.1 Develop and use a model of waves to describe patterns in terms of amplitude and wavelength, and to show that waves can cause objects to move.

CCC: Similarities and differences in patterns can be used to sort and classify natural phenomena to move.

Evidence of Understanding

Student will correctly draw and identify longitudinal and transverse waves with a sketch application. They will then be able correctly identify the amplitude and wavelength of various waves. Examples of wave patterns that cause objects to move up and down or side to side could include the vibrating patterns associated with sound, or seismic waves.

Digital Tools

- *Sketch Application-* Drawing Pad, Sketches School, Notes, ibis, Absolute Board, Google Draw, Auto Draw, Do-Ink, Paper by 53

- Content Resources - Make Some Waves, Simon Says Big Amplitude Small Wavelengths*

In Practice

- Students will complete the activities "Make Some Waves" and "Simon Says Big Amplitude, Small Wavelength" to understand types and properties of waves.

- Students will then use a sketch application to draw waves differentiating between transverse and longitudinal waves as well as amplitude and wavelength.

ENERGY WHEN OBJECTS COLLIDE

4.PS3.3 Ask questions and predict outcomes about the changes in energy that occur when objects collide.

CCC: Energy can be transferred in various ways and between objects.

Evidence of Understanding

Students will be able to explain within their presentation application how energy is transferred through collision, using key vocabulary terms.

Digital Tools

- *Presentation -*<u>Keynote</u>, <u>Google Slides*</u>, *<u>Microsoft PowerPoint *</u>

- Content Resource - <u>Better Lesson: Moving Pennies*</u>, <u>Laws of Collisions*</u>

- Video - <u>Collisions for Kids</u>, <u>Sliding Pennies</u>

In Practice

- The teacher will introduce this activity using the <u>Moving Pennies</u> lesson.

- Students will have several pennies where they will demonstrate how energy is used to create motion.

- Students will try to get their penny to go the furthest after the collision using their knowledge of energy transfer and forces.

- Using a presentation application, they will record themselves sliding the penny from different distances, with different amounts of force applied.

ENERGY CONVERSION

4.PS3.4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

CCC: Energy can be transferred in various ways and between objects. Examples include mousetrap cars, rubber band-powered cars, electric circuits that convert electrical energy into light, sound, or motion energy of a vehicle, and a passive solar heater that converts light into heat.

Evidence of Understanding

Students will be able to create a presentation showing how their set-up transferred energy from the rubber band or balloon to the motion of the car.

Digital Tools

- *Presentation Application-* Keynote, Google Slides*, Microsoft PowerPoint

- Content Application - Energy Transfer Lesson*, Energy Forms and Changes simulation*, Legends of Learning Energy Transfer Game*, Instructables: Easy-Rubberband-Car*, Science Buddies: Balloon powered car*

- Videos - Energy Conversion: Electrical to Light and Heat, Energy: The Dr. Binocs Show,

In Practice

- Students will watch the video Energy Conversion to see an example of energy transfer from electrical to light and heat.

- Students will use the Phet simulation and Legends of Learning Game to learn about energy transfer.

- Students will design a way to convert energy from rubber bands of different sizes or balloons with different amounts of air to kinetic energy to move their car. See the Instructables guide for rubber band cars and the science buddies site for balloon cars.

- Students will then create a presentation using their data and observations.

MOTION (PS)

SPEED OF AN OBJECT

4.PS3.1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.

DCI: Patterns can be used as evidence to support an explanation.

Evidence of Understanding

Students will be able to explain that the faster the rate of travel, the more energy the object possesses by using a video editor.

Digital Tools

- *Measuring Application - Easy Measure, Measure-It**

- *Timer Application -Timer, Timer Website**

- *Video Editor- Clips, WeVideo*, Do-Ink*, iMovie*

In Practice

- Students can video themselves walking a path in the classroom, hallway, or outside.

- Based on the distance traveled measured by the measuring app and the time taken to travel the distance as measured by a timer app, students can calculate the speed at which they traveled.

- Students should trace the same path multiple times and be able to draw conclusions related to the amount of energy expended for each trial, related to the speed.

- Students can share their conclusions through a video editor application.

ORGANISMS (PS & LS)

INTERNAL & EXTERNAL STRUCTURES OF ANIMALS

4.LS1.1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

CCC: A system can be described in terms of its components and their interactions.

Evidence of Understanding

Student presentations will accurately reflect how the internal and external structures of an animal allow for survival, growth, behavior, and reproduction.

Digital Tools

- *Presentation -* <u>Keynote,</u> <u>Google Slides*,</u> <u>Microsoft PowerPoint</u>

- *Content Application -* <u>Frog Dissection, Froggipedia, ARFD, Biology Corner: Virtual Frog Dissection*</u>

In Practice

- Students will use content application to explore both the internal and external structures of an animal.

- Students will draw conclusions based on how the internal and external structures are related to the survival, growth, behavior, and reproduction of the frog.

- Students can use screen shots from the apps to create a presentation outlining their conclusions.

- Students will create a presentation using a presentation application in which they pick an animal to describe how the animal structures support survival, growth, behavior, and reproduction.

INTERNAL & EXTERNAL STRUCTURES OF PLANTS

4.LS1.1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Evidence of Understanding

Students will use a story telling application to accurately reflect the plants internal and external structures and how the plant is affected by them.

Digital Tools

- *Classifying Application* - Classify It App, iNaturalist, Picture This, iPlant

- *Story Telling Application* - ChatterPix Kids, Shadow Puppets EDU, Book Creator, Seesaw, Pages, Write About This, Google Docs

In Practice

- Students will use the classifying app to identify how various plant organisms can be sorted and grouped based on their characteristics.

- Students will use the story telling app to create a video to discuss how different parts of a plant contribute to the overall survival, growth, behavior, and/or reproduction of plants.

- Additional option and reference: K20 Center lesson: Why do plants lean towards a window?

SENSES

4.LS1.2 Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

CCC: A system can be described in terms of its components and their interactions.

Evidence of Understanding

Students will be able to explain what a sense is and name the five human senses. They will use a presentation to explain how animals use their sense to navigate the environment and show why adaptations are important to survival.

Digital Tools

- Camera

- *Word Processor -* Pages, Google Docs, Microsoft Word

- *Video Editor-* Clips, WeVideo, Do-Ink, iMovie

- Videos - Wild Kratt's, Human Sense Organs

In Practice

- Students will watch the "Wild Kratt's" videos about animal adaptations and senses.

- Students will learn what a sense is and all about the five human senses by watching the video "Human Sense Organs."

- Students will use the camera/word processor to document and journal their observations by making a short video about an animal.

- They will work with partner to act out how the animal uses their senses to navigate and thrive in its environment using video editor application.

LIGHT REFLECTION

4.PS4.2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

CCC: A system can be described in terms of its components and their interactions.

Evidence of Understanding

Students will be able to understand that light has to reflect off of objects to their eyes in order to be able to see the object, and they will document their investigation by using a video editor or presentation.

Digital Tools

- *Video Editor-* Clips, WeVideo, Do-Ink, iMovie

- *Presentation -* Keynote, Google Slides, Microsoft PowerPoint

- *Graphic Organizers Applications - Graphic Organizer, Inspiration Maps,* ReadWriteThink, Simple Mind+ Mind Mapping

In Practice

- Students will use a shoe box to make viewing apparatus with a cutout with a cover in one end for a light source entry, and a viewing cutout on the adjacent side.

- Teacher will place an object in the box, close it, and have the student view inside with no light source, and then draw what they see on a graphic organizer.

- Place a light source at the cutout, have the student view inside again, and then have them record what they saw.

- The students will then be able to explain what they saw using the video editor app to make a recording while explaining what their drawings from their investigation represent or illustrating it in a presentation application.

INFORMATION TRANSFER (PS)

PATTERNS TO TRANSFER INFORMATION

4.PS4.3 Generate and compare multiple solutions that use patterns to transfer information.

Examples could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, QR codes, barcodes, and using Morse code to send text.

Evidence of Understanding

Student will correctly create a message using morse code in a sketch application with the help of a content application.

Digital Tools

- Code *Application* - <u>Morse Code Reader and Decoder</u>, <u>Morse Code Reader</u>

- *Video* - <u>See and Hear Morse Code</u>

- *Sketch Application* -<u>Sketches School,</u> <u>Google Draw,</u> <u>Auto Draw,</u> <u>Do-Ink,</u> <u>Paper by 53</u>

In Practice

- Students will use the code application to practice creating messages. Students can use the video "See and Hear Morse Code" as resource.

- When they have created a message with a sketch application, their partner will try to decipher the message correctly.

EARTH FEATURES (ES)

ROCK FORMATION

4.ESS1.1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.

CCC: Patterns can be used as evidence to support an explanation.

Evidence of Understanding

Students will be able to identify the types of rocks and how they are formed. They will be able to explain what are some of the changes that occurred in the landscape based on the characteristics of the found rocks.

Digital Tools

- *Videos -* 3 Types of Rocks and the Rock Cycle: Igneous, Sedimentary, Metamorphic, Types of Rocks Dr. Binocs Show

- Story Telling Application - Book Creator, Pages

In Practice

- Teacher will display different types of rocks in the classroom for the students to take pictures of and then identify.

- Students will then create a geologist field book to record information collected on the rocks using a storytelling application.

FOSSILS

4.ESS1.1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.

CCC: Patterns can be used as evidence to support an explanation.

Evidence of Understanding

Students will use an Interactive Whiteboard Application to illustrate and explain fossil formation and patterns in rock that support changes over time.

Digital Tools

- *Interactive Whiteboard Application -* Realtimeboard, Simple Whiteboard, Explain EDU, Jamboard, ShowMe

- *Word Processor -* Pages, Google Docs, Microsoft Word

In Practice

- Students will use the internet to research fossil formation and record in word processor application. Then, the students will compare and contrast their findings to see if fossils collected from different areas have similarities.

- For the fossils with similarities, the students will then discuss what might have happened to the areas to make the them look different now.

- Finally, students will use interactive whiteboard app to illustrate and narrate how fossils are formed.

WEATHERING/EROSION

4.ESS2.1 Plan and conduct investigations on the effects of water, ice, wind, and vegetation on the relative rate of weathering and erosion.

CCC: Cause and effect relationships are routinely identified, tested, and used to explain changes.

Evidence of Understanding

Students will create a diagram that reflects the effects of water, ice, wind, and vegetation relating to weathering and erosion using a sketch application.

Digital Tools

- *Mind Mapping Application -* Mindomo, iMindMap Kids

- *Website -* Weathering and Erosion Study Jam

- *Sketch Application-* Sketches School, Notes, ibis, Absolute Board, Google Draw, Auto Draw, Do-Ink, Paper by 53

In Practice

- Students will watch the Study Jam about weathering and erosion.

- Students will create a Venn diagram comparing and contrasting weathering and erosion using a mind mapping application.

- Students will then create a diagram showing the WED (Weathering, Erosion, Deposition) cycle using a sketch application.

TOPOGRAPHIC MAP

4.ESS2.2 Analyze and interpret data from maps to describe patterns of Earth's features.

CCC: Patterns can be used as evidence to support an explanation.

Evidence of Understanding

Students will use a geographic exploration tool and video editor to demonstrate correct conclusions regarding similarities and differences in ecosystems and living organisms.

Digital Tools

- *Geographic Exploration Tool -* Google Earth, Google Earth Website

- *Video Editor-* Clips, WeVideo, Do-Ink, iMovie

In Practice

- Students will use Google Earth or other map apps to explore different regions of the earth.

- Students can look for similarities in different ecosystems and living organisms and create a video using a video editor app describing what similarities and differences they have found.

HUMAN ENVIRONMENT INTERACTIONS (ES)

RENEWABLE & NONRENEWABLE RESOURCES

4.ESS3.1 Obtain and combine information to describe that energy and fuels are derived from renewable and non-renewable resources and how their uses affect the environment.

CCC: Cause and effect relationships are routinely identified and used to explain changes

Evidence of Understanding

Students will use a presentation to persuade someone to change their use of a non-renewable resource to a renewable resource to help the environment.

Digital Tools

- *Presentation - Keynote, Google Slides, Microsoft PowerPoint*

In Practice

- Students will create a presentation using a presentation application in which they are trying to persuade someone to change a non-renewable resource to a renewable resource to help the environment.

- They will need to state the pros and cons of both the non-renewable and renewable resources they choose.

EFFECTS OF NATURAL EARTH PROCESSES ON HUMANS

4.ESS3.2 Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. Examples of solutions could include designing an earthquake resistant building, improving monitoring of volcanic activity, and constructing waterways for flood waters.

Evidence of Understanding

Students will use a video editor app or presentation app to create a presentation on how to stay safe during a natural disaster such as an earthquake, flood, tsunami, tornado, or volcanic eruption.

Digital Tools

- *Video Editor-* Clips, WeVideo, Do-Ink, iMovie

- Presentation - Keynote, Google Slides, Microsoft PowerPoint

In Practice

- Students will choose a natural process to research. They can choose from an earthquake, flood, tsunami, tornado, or volcanic eruption.

- Students will research what causes these natural process and how to stay safe during these processes.

- Students will create a project using a video editor app or a presentation app which will include any ideas that they have found through research to improve predicting these processes as well as any engineering designs to improve the safety of structures that are in the path of these processes.

ADDITIONAL RESOURCES

TEACHER

- TeachEngineering.org "Clean Energy: Hydropower"* Lesson

- TeachEngineering.org "Falling Water*" Activity

- TeachEngineering.org "Get Charged! Introduction to Electrical Energy"* Lesson

- TeachEngineering.org "Conductivity*" Activity

- TeachEngineering.org "Cooking with the Sun: Comparing Yummy Solar Cooker Designs"* Activity

- TeachEngineering.org "Glaciers, Water and Wind, Oh My!*" Activity

- TeachEngineering.org "Acid Attack*" Activity

- TeachEngineering.org "Renewable Energy"* Lesson

- TeachEngineering.org "All About Landslides: Land on the Run"* Lesson

- TeachEngineering.org "Water, Water Everywhere"* Lesson

- TeachEngineering.org "Testing Model Structures: Jell-O Earthquake in the Classroom*" Activity

STUDENT

- [Seek by iNaturalist](#)
- [NAMOO - Wonders of Plant Life](#)
- [Star Walk Kids: Astronomy Game](#)
- [Grow Garden](#)
- [The Elements in Action](#)