

Middle School

SCIENCE ZONE

FIELD TRIPS

Theme: Visual Arts
Topic: Bird Adaptations

DESCRIPTION: Students working on a bird sculpture project will learn about the variations in bird anatomy that make them well adapted to their environments and then practice making detailed observations through naturalist drawing skills.

OBJECTIVES:

- Students will be able to identify and explain a variety of bird adaptations and their function for survival in specific niches.

NGSS & WY Science Standards:

LIFE SCIENCE

- MS-LS2-1
- MS-LS2-4
- MS-LS4-4
- MS-LS4-6

Theme: Visual Arts
Topic: Chemistry Color

DESCRIPTION: Students working on ceramics projects will use LED lights and a flame test to explore the properties of light and pigment as they relate to the creation of the vibrant colors visible in ceramic glazes.

OBJECTIVES:

- Students will be able to explain how color is created by the interaction between light and pigment.
- Students will be able to identify the relative wavelengths of light of different colors.
- Students will understand that pigment is a chemical compound that reflects light and varies based on the structure of matter.

NGSS & WY Science Standards:

PHYSICAL SCIENCE

- MS-PS4-2

Theme: Visual Arts
Topic: Anatomy of a Hand

DESCRIPTION: The body is a complex system with unique, interconnected functions. In this lesson, students explore the skeletal, muscular, and tendon systems that comprise the hand by drawing the systems on their hand.

OBJECTIVES:

- Students will show an understanding of the primary structural systems that make up the body by drawing them on their hands and demonstrating through motion how the systems interact.

NGSS & WY Science Standards:

LIFE SCIENCE:

- MS-LS1-3

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FIELD TRIPS

Theme: Language Arts
Topic: Pros & Cons of Fracking

DESCRIPTION: To prepare students for writing an argument essay for or against hydraulic fracturing, they watched a non-biased presentation on the technology and asked questions regarding what they learned.

OBJECTIVES:

- Students will be able to describe the hydraulic fracturing process after watching a presentation and asking questions.
- Students will be able to identify stakeholders and use media literacy and critical thinking skills to differentiate between opinion and scientific data.

NGSS & WY Science Standards:
LIFE SCIENCE

- MS-ESS3-1
- MS-ESS3-4

Theme: Music
Topic: Vibrations & Sound

DESCRIPTION: Students in choir and piano classes explored properties of sound energy and vibrations through hands-on stations highlighting properties like how sound travels through different materials.

OBJECTIVES:

- Students will be able to describe sound as a form of energy that travels as a wave through a variety of materials.
- Students will be able to describe the qualities of sound that are created by the amplitude and frequency of sound waves.

NGSS & WY Science Standards:
PHYSICAL SCIENCE

- MS-PS4-1

Theme: Social Studies
Topic: Artificial Selection of Corn

DESCRIPTION: Social Studies students learning about Native American groups discuss the natural and artificial selection that has driven the evolution of modern corn, then they extract DNA from wheat germ to simulate how scientists have used genetic manipulation to continue the rapid advances in food production.

OBJECTIVES:

- Students will be able to describe the difference between natural and artificial selection.
- Students will follow a technical procedure to extract DNA from wheat germ.
- Students will speculate on the impact of humans on the genetic future of plants and animals.

NGSS & WY Science Standards:
LIFE SCIENCE:

- MS-LS4-4
- MS-LS4-5

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SCIENCE ZONE

FIELD TRIPS

Theme: Social Studies
Topic: Paleoclimate

DESCRIPTION: Students will examine “pollen” samples to understand how scientists can use core samples and historical pollen counts to understand changes in local and regional climate throughout history.

OBJECTIVES:

- Students will be able to describe one of the methods scientists use to study changes on Earth through time.
- Students will make observations to help them identify characteristics of a sample and make inferences about what the observations represent.

NGSS & WY Science Standards:
LIFE SCIENCE

- MS-LS4-1

Theme: Social Studies
Topic: Epidemics & Epidemiology

DESCRIPTION: While studying the Columbian exchange, students will participate in a game to understand how epidemics can spread without direct contact with infected persons and will also discuss the signs and symptoms of four of the major diseases that spread through North America in the 1500s.

OBJECTIVES:

- Students will describe the pattern of rapid spread of epidemics through populations.
- Students will predict the impacts of epidemics on populations.

NGSS & WY Science Standards:
LIFE SCIENCE

- MS-LS2-2

Theme: Life Science
Topic: Cell biology & Chlorophyll

DESCRIPTION: Students review the parts of cell, specifically chloroplasts in a plant cell, and try to answer the question, “Why do leaves change color?” by using chromatography to extract pigment from green leaves.

OBJECTIVES:

- Students will be able to describe where chlorophyll is located inside of a plant cell and its function.
- Students will be able to describe the roles of pigment in plant leaves.
- Students will follow steps of a technical procedure and evaluate the outcome.

NGSS & WY Science Standards:
LIFE SCIENCE

- MS-LS1-2

Middle School

SCIENCE ZONE

FIELD TRIPS

Theme: Science &
Technology
Topic: Digital Signals

DESCRIPTION: Students will explore how digital signals are created and travel through computers. Then they will design and use a switch that will interface with a computer to carry out a simple program.

OBJECTIVES:

- Students will be able to describe how high and low electrical current carry digital signals through computers.
- Students will complete a simple circuit project that interfaces with a circuit board and computer.

NGSS & WY Science Standards:
PHYSICAL SCIENCE

- MS-PS4-3

Theme: Space Science
Topic: Eclipses

DESCRIPTION: Students watched a presentation on the mythology behind eclipses and then used hand-held models to explore the conditions that are required to create a total solar eclipse (i.e. moon at new moon position and correct distance from Earth and tilt in orbit)

OBJECTIVES:

- Students will be able to identify how the moon's phases, axial tilt, and distance from Earth affect the type and likelihood of seeing an eclipse.
- Students will be able to explain the differences between annular, partial, and total lunar and solar eclipses.

NGSS & WY Science Standards:
EARTH & SPACE SCIENCE

- MS-ESS1-1

Theme: Earth Science
Topic: Glaciers

DESCRIPTION: Students will discuss the importance of glaciers and a landscaping feature by creating a model of a glacier and tracking changes in accumulation in the model over the class period.

OBJECTIVES:

- Students will create a model to explore the development and slow movement of glaciers over time.
- Students will use key vocabulary to identify the zones of accumulation and ablation.
- Students will understand the roles glaciers have played in the formation of Wyoming landscapes.

NGSS & WY Science Standards:
EARTH SCIENCE

- MS-ESS2-2

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FIELD TRIPS

Theme: Physical Science
Topic: Newton's Laws

DESCRIPTION: Students will use and adjust data collection equipment to use it as a tool for predicting and measuring how fast an object of known size and mass moves on ramps of varying slopes and surfaces.

OBJECTIVES:

- Students will plan and carry out an investigation to determine how variables affect the terminal velocity of an object.
- Students will use a simple computer program to help collect and analyze data.

NGSS & WY Science Standards:
PHYSICAL SCIENCE

- MS-PS2-2

Theme: Science & Technology
Topic: Remote Sensing & Data collection

DESCRIPTION: Students explore the role of advancing technology in science, and the ability scientists have to gather data on large or distant areas using satellites, infrared light, and remote sensing.

OBJECTIVES:

- Students will explore the visible, ultraviolet, and infrared light spectra using spectrometers and thermometers.
- Students will be able to describe how scientists take advantage of infrared light that is emitted and reabsorbed by matter.

NGSS & WY Science Standards:
PHYSICAL SCIENCE

- MS-PS4-2

Theme: Earth Science
Topic: Plate Tectonics & Earthquakes

DESCRIPTION: Students discuss the interaction of Earth's surface s that cause earthquakes as well as the characteristics of earthquakes including depth and magnitude. They then map earthquakes using latitude and longitude by hand on transparency paper to find patterns that identify major tectonic plate boundaries.

OBJECTIVES:

- Students will be able to identify and explain the geophysical processes that cause earthquakes of different depths and magnitudes.
- Students will use maps to help explain that certain geophysical processes are more isolated to specific areas.

NGSS & WY Science Standards:
EARTH SCIENCE

- MS-ESS2-2

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FIELD TRIPS

Theme: Engineering

Topic: Wind Turbine

Blade Design Lab

DESCRIPTION: Students discuss the design parameters of wind turbines and then follow the steps of the Engineering Design Process to build real life models of wind turbine blades that are tested for maximum voltage output.

OBJECTIVES:

- Students will design, build, test, evaluate, and redesign blades for model wind turbines.
- Students will evaluate a set of wind turbine blades for performance based on test results and recommend design improvements.

NGSS & WY Science Standards:

ENGINEERING

- MS-ETS1-2
- MS-ETS1-3