

General Science 3 (Saturday Class)

UNIT 1—Investigation via The Scientific Method

Stage 1- Desired Results

Established Goals: This unit will help encourage students to become interested in science and problem solving by learning the scientific method and applying it create solutions to various problems.

Standards

- MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Understandings:

Students will understand that...

- Science is around them everywhere
- The scientific method can be used to solve any problem.

Essential Questions:

- How is science important to our everyday life?
- How can the scientific method be used to solve problems?

Students will know...

- Steps to the scientific method
- How to use the scientific method to solve problems in their own lives.

Students will be able to...

- Apply the scientific method to solve different cross science problems.
- Apply the scientific method to write a lab report.

Stage 2- Assessment Evidence

Performance Tasks:

- Students will be given a real world problem and information and in groups they will use the scientific method to solve the problem
- End unit test of application of the scientific method

Key Criteria:

- Do now
- Homework
- Test
- Group work

Other Evidence

- Fist of five and quick assessments will be used to check understanding

Stage 3- Learning Plan

- The unit will take 4 Saturday classes to complete with a test on the 4th Saturday
- Each Saturday the students will be presented with a problem and they will have to use to scientific method to solve the problem
- Sat 1- Apply the scientific method to build the strongest and tallest spaghetti tower
- Sat 2- [The Martian and the Car](#)
- Sat 3/4- [Experiments](#)
- Lab Report

PERFORMANCE ASSESSMENT

General Science 3

UNIT 1 Investigation Using the Scientific Method

Unit 1 Investigation Using Critical Thinking Assessment

Goal: This unit will help to form an interest in science and problem solving by using the scientific method.

Role: The teacher will guide students as they work in groups to solve different problems.

Audience: Middle school

Situation: Teacher introduces the scientific method and then the students design a model and solve the problem.

Product Performance and Purpose:

- Students will become familiarized with the scientific method of problem solving.

Standards and Criteria for Success:

Your assessment will include the following:

- Fist of Five
- Written design of how to solve to problem using the scientific method
- Test

General Science 3

UNIT 2—Structure and Properties of Matter

Length 4 Saturday Classes

Stage 1- Desired Results

Established Goals: To help students develop understanding of atoms and molecules to help them understand different forms of matter around them.

Standards

- MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures
- MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
- MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

Understandings:

Students will understand that...

- How atoms form molecules
- Different types of substances
- Properties of water

Essential Questions:

- How can we describe matter?
- How do atoms form molecules
- How can substances change form?
- How is water important to life?

Students will know...

- How to use the period table
- Solids, liquids, and gases.
- Importance of water

Students will be able to...

- Read the period table
- Evaluate text to come to a solve a problem
- Write responses

Stage 2- Assessment Evidence

Performance Tasks:

- 4 Saturday classes duration
- Evaluation of atomic structure
- Create a model of a molecule
- Matrix/chart of different substances
- Water investigation
- Students investigate and hypothesize how distillation works

Key Criteria:

- Do now
- Homework
- Quiz
- Test

Other Evidence

- Fist of five and on spot checks

Stage 3- Learning Plan

- Sat 5- Atoms and molecules (history and structure)
- Sat 6- Forms of matter
- Sat 7- Changes in matter
- Sat 8- Water
- Create a working model of an atom

PERFORMANCE ASSESSMENT

General Science 3

UNIT 2– Structure and Properties of Matter

Chemistry Assessment

Goal: Introduce the atomic structure, molecules, simple reactions, and water.

Role: Teacher will guide students as they investigate the atomic structure and how they combine to form different substances including water.

Audience: Middle School

Situation: Students will be given information that they will apply to creating models, matrix, and simple experiments.

Product Performance and Purpose:

- Students will understand that the world around them is made from atoms

Standards and Criteria for Success:

Your assessment will include the following:

- Self checks
- Fists of Five
- Written assessment
- Test

General Science 3

UNIT 3- Interactions Around Us (Physics)

Length: 5 Saturday Classes

Stage 1- Desired Results

Established Goals: To help students understand fundamental ideas of how forces interact around them in real-life.

Standards

- 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 depends on the sum of the forces on the object and the mass of the object.
- MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces
- MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
- MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects

Understandings:

Students will understand that...

- How to apply Newton’s 3rd law
- How magnets work
- How interactions and forces impact a moving object

Essential Questions:

- How is motion impacted when an object is moving?
- How do you find the speed and velocity of an object and graph it?
- How can you find the acceleration and graph it?
- How to forces impact objects?
- How do magnets work?

Students will know...

- For every action there is an equal and opposite reaction (Newton’s 3rd law)
- How to describe motion?
- Speed vs. Velocity

Students will be able to...

- Apply Newton’s 3rd law in order to solve a critical thinking problem.
- Collect evidence on how other forces interact.
- Measure motion

Stage 2- Assessment Evidence

Performance Tasks:

- 4 Saturday classes
- Lab on motion
- Lab on forces
- Lab on magnetism
- Problem: Give iron shavings, plastic beads, salt, filter paper, and a magnet.

Key Criteria:

- Lab and graphing
- Quiz
- Test

Other Evidence

- Students will be assessed throughout the class for understanding

Stage 3- Learning Plan

- Lab on motion
- Lab on forces
- Lab on magnetism

PERFORMANCE ASSESSMENT

General Science 3

UNIT 4– Physical Science Physics Assessment

Goal: Students should know how the world around them is connected and the types of interactions. Students will be know how motion, forces, and magnetism play a role on earth.

Role: Teacher will assist students as they perform activities to investigate physical science components via labs and interactive activities.

Audience: Middle School

Situation: Teacher guides students by engaging them in various problem solving questions.

Product Performance and Purpose:

- Students will understand how different forces influence motion

Standards and Criteria for Success:

Your assessment will include the following:

- MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
- MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
- MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells
- MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories

General Science 3

UNIT 4—Living organisms

Length: 4 Saturday classes

Stage 1- Desired Results

Established Goals: To help students plan for future education and career choices, as well as staying abreast of the latest employment trends. Preparation of all students in developing career planning and workplace readiness skills.

Standards

- MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells
- MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
- MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Understandings:

Students will understand that...

- The basic unit of structure and function of life forms is the cell.
- All cells come from pre-existing cells.
- Cells with specialized functions will have specialized sub-structure and genetic expression.

Essential Questions:

- How did the work of scientists lead to the cell theory?
- How does the cell membrane allow for the flow of substances in and out?
- How do the organelles maintain homeostasis?

Students will know...

- Works of scientists that led to the cell theory.
- Cell membrane
- Organelles

Students will be able to...

- Create diagrams and evaluate evidence from articles.

Stage 2- Assessment Evidence

Performance Tasks:

- 4 Saturday classes
- Works of scientists
- Cell Membrane
- Organelles
- Organelle Project:

Key Criteria:

- Lab and graphing
- Quiz
- Test

Other Evidence

- Fist of Five

Stage 3- Learning Plan

- Use articles on Hooke and the cell theory to come up with a class definition of a cell.
- Create a matrix on prokaryotic and eukaryotic cells.
- Cell membrane and diffusion
- Project create a cell with organelles

PERFORMANCE ASSESSMENT

Name of Course

UNIT-4 Living Organism

Cell Assessment

Goal: Students should gain an understanding of how scientific theories led to the cell theory and how diffusion occurs in the cell membrane and how the organelles maintain homeostasis.

Role: Teacher will guide students through investigation activities.

Audience: Middle School

Situation: Students investigate and think critically

Product Performance and Purpose:

- Students will know how the cell maintains homeostasis

Standards and Criteria for Success:

Your assessment will include the following:

- Open ended questions
- Fist of five

Saturday Science Class

UNIT 5— Photosynthesis and Energy
Length 5 Weeks

Stage 1- Desired Results

Established Goals: To help students plan for future education and career choices, as well as staying abreast of the latest employment trends. Preparation of all students in developing career planning and workplace readiness skills.

Standards

- MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- MS-LS1-7. Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
- MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

Understandings:

Students will understand that...

- Photosynthesis
- Macromolecules

Essential Questions:

- How does energy flow and converted during photosynthesis?
- How are macromolecules storage for raw materials

Students will know...

- Reactions that convert light energy to sugars
- The 4 macromolecules and how they are used in the body.

Students will be able to...

- Diagram the flow of energy
- Appreciate roles of producers
- Make better dietary decisions.

Stage 2- Assessment Evidence

Performance Tasks:

- Producers and sunlight
- Light reaction Calvin cycle
- Chloroplast
- Fermentation glycolysis
- Yeast and balloon experiment with lab report

Key Criteria:

- Quiz
- Test
- Critical thinking activities
- Lab

Other Evidence

- Fist of Five
- Self-checks

Stage 3- Learning Plan

- Discussion on autotrophs and heterotrophs
- Sunlight, green plants, and photosynthesis
- Macromolecules
- Food and energy transfer

PERFORMANCE ASSESSMENT

Saturday Science Class

UNIT– Photosynthesis and Energy

Photosynthesis and Energy

Goal: To familiarize student with the process of energy flow from the sun to different trophic levels and how essentially the energy in macromolecules we eat come from the sun.

Role: Teacher will guide students and help understand activities and labs.

Audience: Middle School

Situation: 4 Saturday Classes

Product Performance and Purpose:

- Students should understand how energy changes and be able to read information and graphs and interpret them.

Standards and Criteria for Success:

Your assessment will include the following:

- Test
- Quiz
- Lab
- Graph