MATTER

(6.6A) Compare solids, liquids, and gases in terms of structure, shape, volume, and kinetic energy of atoms and molecules.

Question Stems

- Why is air matter but light is not?
- What are some examples of solids, liquids or gasses?
- How can matter change state?
- Give an example of the same substance in a different state of matter.
- What form does water take in each of its three forms?
- How do particles move in solids, liquids and gases?
- How does kinetic energy relate to particle movement?

Learning Target Statements

- Understand what the atoms/molecules look like in a solid, liquid and gas
- Describe how the molecules movement relates to kinetic energy.
- Compare how the structure, shape, and volume determines if it is a solid, liquid or gas.

What do we want all students to know and be able to do?

- Compare solids liquids and gasses based on their properties

Specific Skills

- Identify states of matter using particle diagrams.
- Students should be given multiple opportunities to differentiate between solids, liquids, and gasses based on structure, kinetic energy, mass, and volume.

Academic Vocabulary

- **solid** → state of matter with definite shape and volume
- **liquid** → state of matter with definite volume but not a definite shape
- **gas** → state of matter with definite volume or shape
- **kinetic energy** → moving particles
- **atom** → smallest building blocks of matter
- **molecule** → two or more atoms chemically combined
- **volume** → the amount of space matter takes up
- **mass** → takes up space and has volume

MATTER

(6.6B) Investigate the properties of matter to distinguish between pure substances, homogeneous mixtures (solutions), and heterogeneous mixtures.

Question Stems

- What is a homogeneous and heterogeneous mixture?
- What is a pure substance?
- How can you tell the difference between the two types of mixtures?
- How can you tell the difference between a pure substance and a homogeneous mixture?

Learning Target Statements

- understand the difference between a pure substance and a mixture
- further understand the classification of mixtures into homogeneous and heterogeneous.
- Describe/draw/identify the particles that represent a homogeneous and heterogeneous mixture.

What do we want all students to know and be able to do?

- Distinguish between pure substances, and both types of mixtures – homogeneous and heterogeneous

Specific Skills

- Identify the differences between a pure substance and mixture
- Distinguish between the two types of mixtures (homogeneous and heterogeneous.
- Students will be given opportunities to identity pure substances, and the two types of mixtures.

Academic Vocabulary

- homogeneous → “same”; particles evenly spread out (i.e. cheese slice, milk, lemonade, soda)
- heterogeneous → “different”; particles NOT evenly spread out (i.e. cereal + milk, oil + vinegar, salad dressing
- pure substance → sme atoms joined in the same combination
- mixture → blend of two or more substances

MATTER

(6.6C) Identify elements on the periodic table as metals, nonmetals, metalloids, and rare Earth elements based on their physical properties and importance to modern life.

Question Stems

- How are phys props used to classify elements into 3 main groups?
- How are phys props such as luster, malleability, and conductivity used to compare metals, nonmetals, and metalloids?
- How does the position of a substance suspended in a fluid determine the relative density?
- How is density used to describe matter?
- How are the rare Earth elements used in modern day life?

Learning Target Statements

- Categorize/sort/classify/match/determine the physical properties of the types of elements and their uses in modern day life

What do we want all students to know and be able to do?

- identify the 4 types of elements based on their physical properties
- identify the importance of the elements in modern life

Specific Skills

- identifying an element using its specific properties
- identifying the location on the periodic table
- identify and discuss the relevance of all elements in modern day life
- compare and contrast the 4 types of elements

Academic Vocabulary

- **metals** → category on the P. Table
- **nonmetal** → category on the P. Table
- **metalloid** → category on the P. Table
- **conductivity** → allows heat and electricity to easily flow through
- **ductility** → pulled into thin wires
- **malleability** → able to be hammered thin + rolled into sheets
- **metallic luster (lustrous)** → shiny or dull
- **relative density** → solids + liquids have differences in density, ability to sink/float on one another
- **viscosity** → semi-fluid, state of being thick/sticky (viscus)
- **physical properties** → traits that belong to a substance
- **rare Earth elements** → uses and relevance to modern life
- **suspended** → where an object is located within a liquid.

MATTER

(6.6E) Identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, productions of a precipitate, and color change.

Question Stems

- What are the 5 signs of a chemical change?
- How do you know a chemical change has occurred? A NEW SUBSTANCE FORMED
- What are the 5 signs of a physical change?
- How do you know a physical change has occurred? NO NEW SUBSTANCE FORMED

Learning Target Statements

- Understand the difference between and physical and chemical change.
- Identify chemical change based on the formation of a new substance
- Identify a physical change based on no new substance being formed

What do we want all students to know and be able to do?

- Identify a chemical change based on a new substance being formed
- Identify that a physical change does not create a new substance

Specific Skills

- Physical Change = NO NEW SUBSTANCE FORMED; change in size, shape, form, or state of matter, making a mixture
- Chemical Change = NEW SUBSTANCE FORMED; formation of a gas, formation of a precipitate, color change, temperature change, or release of light energy

Academic Vocabulary

-
Physical change
Chemical change
Precipitate
Exothermic
Endothermic
Combustion
Oxidation
Sublimation
Tarnishing
ripening

FORCE, MOTION, and ENERGY

(6.7A) Identify and explain how forces act on objects, including gravity, friction, magnesium,applied forces, and normal forces; using real-world applications.

Question Stems

- What is a force?
- What units are used to measure force?
- What determines the direction of an object?
- What real-world examples are there of gravity, friction, magnetism, applied forces,
  and normal forces?

Learning Target Statements

- Explain how gravity, friction, magnetism, normal forces and applied forces act on an object in the real world.
-

What do we want all students to know and be able to do?

- Identify and explain forces on objects (push/pull)

Specific Skills

- Identify each type of force
- Explain the movement of the force
- Describe real world examples of each force

Academic Vocabulary

- Force
- Motion
- Position
- Gravity
- Friction
- Magnetism
- Applied Force
- Normal Force
- Movement
- Newtons

FORCE, MOTION, AND ENERGY

(6.7B) Calculate the net force on an object in a horizontal or vertical direction using diagrams and determine if the forces are balanced or unbalanced.

Question Stems

- How is net force calculated?
- What changes occur to position as a result of an unbalanced force applied to a motionless object?
- What changes occur to direction as a result of an unbalanced force applied to an object in motion?

Learning Target Statements

- Identify balanced and unbalanced forces based on diagrams
- Calculate net force
- Distinguish between horizontal and vertical force pairs
-

What do we want all students to know and be able to do?

-Calculate horizontal and vertical net force using diagrams
- Identify forces as balanced or unbalanced

Specific Skills

- Calculate net force
- Determine if forces are balanced or unbalanced
- Distinguish between horizontal and vertical

Academic Vocabulary

- Balanced
- Unbalanced
- Net Force
- Magnitude
- Horizontal
- Vertical

FORCE, MOTION, AND ENERGY

(6.7C) Identify simultaneous force pairs that are equal in magnitude and opposite in direction that result from the interactions between objects using Newton's Third Law of Motion.

Question Stems

- What is an action reaction pair and give an example.
- Who discovered action reaction pairs?

Learning Target Statements

- Identify action and reaction examples and who discovered them

What do we want all students to know and be able to do?

- Identify action/reaction force pairs
- Compare and contrast applied and normal forces

Specific Skills

- Identify that every action has a reaction
- Understand who Sir Isaac Newton is

Academic Vocabulary

- Action / Reaction
- Newton's 3rd Law

FORCE, MOTION, AND ENERGY

(6.8A) Compare and contrast gravitational, elastic, and chemical potential energies with kinetic energy.

Question Stems

- What are the forms of potential energy?
- What are the forms of kinetic energy?
- What are some real world examples of energy?

Learning Target Statements

- We will identify the different forms of potential and kinetic energy.
- We will compare and contrast potential and kinetic energy forms.

What do we want all students to know and be able to do?

- Identify, compare and contrast potential and kinetic energy forms

Specific Skills

-**Identify** forms of Kinetic energy (mechanical, electrical, thermal, radiant, sound)
- **Identify** forms of Potential energy (gravitational, elastic, chemical)
- **Recognize** the factors that affect the types of energies (height, compression, matter)
- **Recognize** the forms present in energy systems in the real world.

Academic Vocabulary

- **Potential energy** - stored energy
- **Gravitational** = height
- **Elastic** = tension or compression
- **Chemical** = inside matter (in the chemical bonds)
- **Kinetic energy** = energy of motion
- **Mechanical** = movement
- **Electrical** = electricity
- **Light/Radiant** = light
- **Thermal** = heat
- **Sound** = noise

FORCE, MOTION, AND ENERGY

(6.8B) Describe how energy is conserved through transfers and transformations in systems such as electrical circuits, food webs, amusement park rides, or photosynthesis.

Question Stems

- How do energy transformations demonstrate the law of conservation of energy?
- If energy increases in one part of a transformation, what happens to the energy at the other end of the transformation?
- How can energy transformations be demonstrated in photosynthesis, an ecosystem, an amusement park, or an electrical circuit?

Learning Target Statements

- We describe how energy is conserved through transformations.
- We will describe how the total amount of energy remains the same through all energy transformations.
- We will identify different types of energy as it transfers from one form to another.

What do we want all students to know and be able to do?

-Identify energy transformations through examples such as circuits, food webs, amusement parks and photosynthesis.

Specific Skills

-Identify forms of potential and kinetic energy in different transformations such as photosynthesis and food webs.
- Describe how energy is conserved through the law of conservation of energy

Academic Vocabulary

- Photosynthesis
- Food Webs
- Electrical Circuits
- Law of Conservation of Energy
- Energy Transformation

FORCE, MOTION, AND ENERGY

(6.8C) Explain how energy is transferred through transverse and longitudinal waves.

Question Stems

- What is the difference between the movement of a transverse wave and a longitudinal wave?
- How is energy transferred through longitudinal waves?
- How is energy transferred through transverse waves?
- What are some real world examples of transverse and longitudinal waves?

Learning Target Statements

- We will explain how energy is transferred through transverse waves.
- We will explain how energy is transferred through longitudinal waves.
- We will identify transverse and longitudinal waves in the real world.

What do we want all students to know and be able to do?

- Identify the two types of waves & the movement of energy through those waves.

Specific Skills

- Compare and contrast transverse and longitudinal waves.
- Identify the way energy is transferred through each type of wave.
-

Academic Vocabulary

- Transverse Waves
- Longitudinal Waves
- Crest & trough (optional vocab for support)
- Perpendicular
- Parallel

EARTH SCIENCE

(6.9A) Model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons.

Question Stems

- What is a rotation?
- What is a revolution?
- What 4 seasons do we experience on Earth and in what order?
- How do rotations and revolutions cause day and night on Earth?

Learning Target Statements

- We will explain how the rotation of the Earth gives us day/night.
- We will explain how the revolution of the Earth and the tilt on the axis gives us seasons.

What do we want all students to know and be able to do?

Identify how the the Earth's tilt on the axis and revolution creates seasons.

Specific Skills

- Compare and contrast a rotation and a revolution.
- Identify what causes the Earth to have day and night?
- Understand the daylight hours (most/least/equal)
- Identify the Earth's hemispheres
- Understand the 4 seasons in the correct order

Academic Vocabulary

- Rotation
- Revolution
- Axis
- Tilt
- Equator
- Hemisphere
- Seasons (Spring, Summer, Fall/Autumn, Winter)
- Solstice
- Equinox

EARTH SCIENCE

(6.9B) Describe and predict how the positions of the Earth, Sun and Moon cause daily, Spring, and Neap cycles of ocean tides due to gravitational forces.

Question Stems

- What are tides?
- What causes the Earth's ocean tides?
- What are the two different types of tides?
- What type has the strongest gravitational pull?
- What type of tide has the weakest gravitational pull?

Learning Target Statements

- We will describe how the Earth's position causes daily tides.
- We will compare and contrast spring and neap tides.
- We will predict how the Moon will cause a daily tide.

What do we want all students to know and be able to do?

Describe and predict how the Earth, Sun, and moon's position causes daily Spring and Neap tides.

Specific Skills

- Explain what an ocean tide is.
- Identify the 4 main moon phases that determine tides (new/first quarter/full/third quarter)
- Identify the greatest difference between high and low tides

Academic Vocabulary

- Tides
- Neap
- Spring
- Gravity
- Full Moon
- New Moon
- First Quarter
- Third/Last Quarter

EARTH SCIENCE

(6.10A) Differentiate between the biosphere, hydrosphere, atmosphere, and geosphere and identify components of each system.

Question Stems

- What are the identifying characteristics of the biosphere, hydrosphere, atmosphere, and geosphere?
- What are the greek roots of each prefix?
- What are some examples within each sphere?
- How do the spheres interact with each other?

Learning Target Statements

- We will identify the 4 spheres of the Earth.
- We will describe the relationships and interactions between the different Earths spheres.

What do we want all students to know and be able to do?

Identify the 4 spheres of the Earth.

Specific Skills

- Give multiple examples of things that belong to each sphere.
- Give examples of two spheres interacting with one another.
- Identify the different spheres of Earth within a picture.

Academic Vocabulary

- Biosphere
- Hydrosphere
- Atmosphere
- Geosphere
- “Hydro”
- “Atmo”
- “Geo”
- “Bio”

EARTH SCIENCE

(6.10B) Model and describe the layers of Earth, including the inner core, outer core, mantle, and crust.

Question Stems

- What are the 4 main layers of the Earth from the outermost to innermost?
- Which layer of the Earth contains convection currents?
- Which layer of Earth has the greatest pressure, density, and temperature?
- What state of matter is the inner core? Outer core?

Learning Target Statements

- We will **identify** the different layers of the Earth.
- We will **describe** the composition of each Earth Layer.
- We will **sort** the Earth Layers based on their densities.

What do we want all students to know and be able to do?

Model and describe the layers of the Earth.

Specific Skills

- Identify the layers of the Earth.
- Compare and contrast the thickness, density, temperature, and pressure of each Earth layer.
- Sort the Earth layers based on density.
- Model the layers of the Earth using lab materials.
- Build a model to represent the different layers.
- Identify the layer of Earth that contains convection currents.

Academic Vocabulary

- Inner Core
- Outer Core
- Mantle
- Crust
- Lithosphere
- Mesosphere (Upper Mantle + Lower Mantle)
- Convection Current
- Density
- Semi-Solid
- State of Matter

EARTH SCIENCE

(6.10C) Describe how metamorphic, igneous, and sedimentary rocks form and change through the geological process in the rock cycle.

Question Stems

- What are the 5 processes and 5 products of the rock cycle?
- What criteria/characteristics classifies the 3 main types of rocks?
- What location would each type of rock be found in?
- Can you describe how a rock can move forwards and backwards through the rock cycle?

What do we want all students to know and be able to do?

Classify and describe the 3 types of rocks including their processes and products within the rock cycle.

Learning Target Statements

- We will **investigate/describe/analyze** the physical characteristics of each type of rock.
- We will **group/classify/categorize** rock samples and descriptions.
- We will **construct** the rock cycle including processes and products.

Specific Skills

- Classify by certain criteria such as process of formation and location found.
- Know the specific characteristics that belong to each rock type.
- Understand all parts of the rock cycle.

Academic Vocabulary

Sedimentary
-Compaction
-Cementation
- layers
- fossils

Metamorphic
-Heat
-Pressure
- Folded layers/bands
- Striations

Igneous
-Cooling
-Solidification
-Intrusive
- Large crystals
-Air holes
-Extrusive
-Glassy

Sediments
-Weathering
-Erosion
-Deposition

Magma
-melting

Process

Product

ORGANISMS + ENVIRONMENTS

(6.13A) Describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function.

Question Stems

- What is the basic unit of life?
- What is the definition of an organism?
- What are the 3 parts of the cell theory?

Learning Target Statements

- I can describe the history of the cell theory.
- I can explain how organisms are composed of one or more cells which are the basic unit of life.
- I can understand that all living things come from pre-existing cells.

What do we want all students to know and be able to do?

Understand and describe the history of the cell theory.

Specific Skills

- Recognize that cells are the basic unit of life.
- Describe the history of the cell theory.
- Identify the 3 parts of the cell theory.

Academic Vocabulary

- Cell
- Cell Theory
- Organism
- Atom
- Robert Hooke
- Matthies Schleiden
- Anton Van Leeuwenhoek
- Microscope

ORGANISMS + ENVIRONMENTS

(6.13B) Identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic.

Question Stems

- What is the difference between unicellular and multicellular?
- What are the basic characteristics of organisms?
-

Learning Target Statements

- I can identify, compare, and contrast the characteristics of life.

What do we want all students to know and be able to do?

Identify and compare the differences between basic characteristics of life.

Specific Skills

- Identify the basic characteristics of organisms.
- Compare and contrast the different characteristics of life.

Academic Vocabulary

- Unicellular
- Multicellular
- Organization of Life (tissue, organ, organ system, organism)
- Autotroph (producer)
- Heterotroph (consumer)
- Cell
- Tissue
- Organ
- Organ System
- Organism
- Carnivore
- Herbivore
- Omnivore
- Prokaryote
- Eukaryote
- Prokaryotic cells
- Eukaryotic cells

ORGANISMS + ENVIRONMENTS

(6.12C) Describe the hierarchical organization of organism, population, and community within an ecosystem.

Question Stems

- What is the difference between biotic and abiotic factors in an ecosystem?
- What are the 4 parts of an ecosystem?
- How can biotic and abiotic factors interact with each other?
- What is the difference between a population, community, and ecosystem?

Learning Target Statements

- We will identify the 4 sections of an ecosystem
- We will identify biotic and abiotic components of an ecosystem.
- We will describe the differences between an organism, population, community, and ecosystem.

What do we want all students to know and be able to do?

Describe the levels of organization within an ecosystem.

Specific Skills

- Describe an organism.
- Describe a community.
- Describe a population.
- Identify the interactions between the abiotic and biotic factors of an ecosystem.

Academic Vocabulary

- Hierarchical
- Organism
- Population
- Community
- Ecosystem
- Organism
- Biotic
- Abiotic

ORGANISMS + ENVIRONMENTS

(6.12B) Describe and give examples of predatory, competitive, and symbiotic relationships between organisms including, mutualism, parasitism, and commensalism.

Question Stems

-

Learning Target Statements

- We will identity the different relationships that exist in an ecosystem.
- We will understand that limiting factors determine a population growth.
- We will describe the transfer of energy in an ecosystem through a food web.

What do we want all students to know and be able to do?

Describe the different types of relationships that exist in an ecosystem.

Specific Skills

Academic Vocabulary

- Predator
- Prey
- Competition
- Symbiosis
- Mutualism
- Parasitism
- Commensalism
- Food webs
- Organism
- Energy Transformation
- Limiting Factors
- Herbivores
- Omnivores
- Carnivores

ORGANISMS + ENVIRONMENTS

(6.12A) Investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food, and abiotic factors such as availability of light and water, range and temperatures, or soil composition.

Question Stems

-

Learning Target Statements

-

What do we want all students to know and be able to do?

Specific Skills

Academic Vocabulary

-

ENERGY TRANSFORMATIONS

(6.9C) Demonstrate energy transformations such as energy in a flashlight battery changes from chemical energy to electrical energy to light energy.

Question Stems

How can energy transformations be demonstrated within a system? (various systems)

Learning Target Statements

- demonstrate energy transformations
- justify energy transformations

What do we want all students to know and be able to do?

Demonstrate energy transformations

Specific Skills

- recognize forms of energy is a system
- explain how energy can change from one form to another

Academic Vocabulary

- energy
- transformation
- chemical
- nuclear
- elastic
- gravitational
- mechanical
- radiant
- thermal
- electrical
- sound

CHARACTERISTICS OF LIVING THINGS

(6.12D) Identify the basic characteristics of organisms including prokaryotic or eukaryotic, unicellular or multicellular, autotrophic or heterotrophic, and mode or reproduction that further classify them into currently recognized kingdoms.

Question Stems

-

Learning Target Statements

- Students will compare and contrast prokaryotic and eukaryotic cells.
-

What do we want all students to know and be able to do?

- Identify the basic characteristics of organisms

Specific Skills

-Be able to apply the academic vocabulary to the three domains (Archaea, Bacteria, Eukarya) and six kingdoms (Archaebacteria, Eubacteria, Protista, Fungi, Plantae, Animalia) to be able to identify which kingdom an organism is classified in.

Academic Vocabulary

- Prokaryotic cells
  - No nucleus, asexual repro, smaller
- Eukaryotic cells
  - Nucleus, sexual repro, larger
- Unicellular
  - Smaller, grow by getting bigger in size
- Multicellular
  - Larger, levels of organization, specialized cells
- Asexual Reproduction
  - Not genetically varied, one parent
- Sexual Reproduction
  - Genetically varied, two parents
- Autotrophic
  - Chloroplast, inorganic matter
- Heterotrophic
  - Consume or absorb