

The Asian International School
 Unit Backward Design
 General Science, Starter, 2018-2019
 Unit 1: Living Things

Stage 1 - Desired Results

Established Goal(s):	
<p>In this unit students will learn to identify different cells and be able to recall the importance of different cell structures. Furthermore, students will be able to understand and recall the various differences between the living things classified into the five kingdoms. Furthermore, through various class discussions and group work, the students will understand the difference between various living things.</p>	
<p>Understandings: <i>Students will understand ...</i></p> <ul style="list-style-type: none"> ✓ Different organisms have mechanisms that work in a coordinated way to obtain energy, grow, move, respond, provide defense, enable reproduction, or maintain internal balance (e.g., cells, tissues, organs and systems). ✓ Which factors are affecting biodiversity? ✓ How climate zone influence biodiversity. ✓ About Eukaryotic and prokaryotic cell. ✓ About multicellular and unicellular organism. ✓ How to classify living things into five kingdoms. ✓ The importance of sexual dimorphism. ✓ The importance of biomolecules. ✓ The difference between mitosis and meiosis. ✓ How cell division relates to the growth of the cell. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ✓ What is Biodiversity? ✓ What do all living things have in common? ✓ What are living things made up of? ✓ What does it mean if animals show 'sexual dimorphism'? ✓ What are cells? ✓ How do animal and plant cells differ? ✓ How do living things differ? ✓ What are the five kingdoms? ✓ How are living things classified? ✓ What is a species? ✓ What factors can reduce biodiversity? ✓ Why does biodiversity vary throughout the world? ✓ Define evolution. ✓ What is mitosis and meiosis? ✓ What are the similarities and difference between mitosis and meiosis?
<p>Knowledge: <i>Students will know ...</i></p> <ul style="list-style-type: none"> ✓ The characteristics of living things and different important cell structures and their functions ✓ How to identify and classify various living things into different kingdoms. ✓ How to differentiate between the animal and plant cells ✓ The basics of cell division ✓ How to distinguish between heterotrophic and autotrophic nutrition. ✓ The difference between sexual and asexual reproduction 	<p>Skills: <i>Student will be able to:</i></p> <ul style="list-style-type: none"> ✓ Compare and contrast the two basic types of cells with the help of a diagram ✓ Distinguish meiosis from mitosis ✓ Recognize and describe the characteristics of living organisms. ✓ Define the characteristic of living things. ✓ Compare organic and inorganic matter. ✓ Discuss about interaction of living things with environment ✓ Discuss about mule. ✓ Provide examples of each type of biodiversity.

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<ul style="list-style-type: none">✓ Basic difference between vertebrates and invertebrates.✓ The importance of biodiversity.✓ Why Spain has more biological diversity than other European country?	<ul style="list-style-type: none">✓ Discuss about the introduction of biodiversity.✓ Analyze why rain forest have the greatest biodiversity?✓ Illustrate the factors that can reduce biodiversity.✓ Correlate biodiversity and evolution. ✓ Visualize and diagrammatically represent animal and plant cells✓ Share views and work in groups✓ Clearly communicate and expression of ideas, both written and oral.✓ Interpret and understand class room discussions and teachings and apply it outside the school learning environment.
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Stage 2 - Assessment Evidence

<p>Performance tasks:</p> <ul style="list-style-type: none">• Research assignments regarding top interesting facts of cellular evolution from single cell organisms to multicellular organisms.• <u>Homework:</u> Draw a diagram of a plant and animal cells highlighting the similarities and differences between these and the reason for these differences.• <u>Compare and Contrast</u> the two basic types of cell division with the help of a diagram.	<p>Other Evidence:</p> <ul style="list-style-type: none">✓ Two individual assessments (Mid-Term/Final) accounting for the assigned percentage of the overall course grade.✓ Homework, participation, behavior, and attendance.✓ Grades based on presentation of knowledge and ideas.
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Stage 3 – Learning Plan

<p>Learning Activities</p> <p><u>What is Biodiversity?</u></p> <ul style="list-style-type: none">• Divide the class into four groups. Each group will pick a topic and prepare a short presentation on how these factors reduce biodiversity –<ul style="list-style-type: none">→ Pollution→ Destruction of habitats→ Uncontrolled hunting <p>Activity 1: Draw the diagram of cell in their notebook.</p> <p>Activity 2: Create a board game where students read off the functions of the parts of their cells, and then place those parts on the cell diagram.</p> <p><u>What are living things made up of?</u></p> <ul style="list-style-type: none">• Discuss the main differences between Inorganic and organic substances and create a chart within one minute
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with these differences and compare with your partner.

What are cells?

- Compare and contrast the two basic types of cells with the help of a diagram. Compare your work with your partner.
- See parts of the cell under the microscope using slides, coverslip, stain(methyl blue or similar dye)

How do living things differ?

- Describe one of the specialized cells and your partner has to identify it. Ex: It has no nucleus. Answer – Red Blood Cells.
- Discuss the difference between tissues, organs and systems.

Cell Division

- Introduce the activity to the entire class, then, have students view the web pages, play the videos, and complete the student pages independently.
(www.exploratorium.edu/imaging_station/students/Characteristics_Student.doc)

Experiment 1: onion cell

Hands on activity

- **Cell foldable**
- **Natural events Vs Human activity**

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 Unit 2: Plants and Fungi Kingdom

Stage 1 - Desired Results

Established Goal(s):

In this unit students will learn to recognize the functions and shapes of the plant and fungi kingdoms. Furthermore, students will be able to understand the reproduction and nutrition processes of this kingdom. Students will learn to make classifications using information discussed in class.

Understandings:
Students will understand ...

- ✓ How to use a model, classification system, or dichotomous key to illustrate, compare, or interpret possible relationships among groups of organisms (e.g., internal and external structures, anatomical features)
- ✓ How to explain relationships between or among the structure and function of the cells, tissues, organs, and organ systems in an organism.
- ✓ The causes and effects of soil erosion.
- ✓ The importance of Plants.
- ✓ The importance of vascular and nonvascular vessel in plant classification.
- ✓ The life cycle of moss.
- ✓ How to analyze the characteristic of fungi
- ✓ How to identify the different groups of fungi.

Essential Questions:

- ✓ What living things make up the plant kingdom?
- ✓ What are flowering and non flowering plants?
- ✓ What are the functions of leaves, stems and roots?
- ✓ How do plants reproduce?
- ✓ Can plant react?
- ✓ What is plant nutrition?
- ✓ What are fungi like? Compare plants and fungi?
- ✓ What is soil and water conservation?
- ✓ How can erosion be managed?

Knowledge:
Students will know ...

- ✓ How to recognize the main characteristics of the plant and fungi kingdoms.
- ✓ How to differentiate between flowering and non flowering plants.
- ✓ How to diagrammatically represent the various parts of a plant and understand their functions.
- ✓ Different types of fruits and seeds and ways they are dispersed.
- ✓ How to differentiate between permanent and temporary reactions.
- ✓ How to illustrate life cycle of plants.
- ✓ To describe the phases of nutrition.

Skills:
Student will be able to:

- ✓ Examine do plants breathe and carry out photosynthesis all day.
- ✓ Define the characteristics of living things.
- ✓ Classify unicellular and multi cellular living things.
- ✓ Compare the characteristic of mosses and ferns.
- ✓ Describe the reproductive stages of plants.
- ✓ Classify living things into five kingdoms.
- ✓ Able to relate single cells to tissues to organs to organ systems to an organism by creating an analogy using a model train.
- ✓ Recognize the benefits of plants.
- ✓ Understand the importance of soil conservation.
- ✓ Identify the variety of root, stem and leaf modifications and explain the adaptive significance

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- of each.
- ✓ Visualize diagrammatically represent the plant and fungi kingdoms.
- ✓ Share views and work in groups
- ✓ Make classifications using the knowledge provided in class.

Stage 2 - Assessment Evidence

<p>Performance tasks:</p> <ul style="list-style-type: none"> • <u>Homework:</u> Research the plants where you live. Classify them into the four main groups in a chart. Discuss their reproduction and identify stem as vascular or non-vascular, with cones or with fruits. • Project Budbust: Root Round Up (students make observations of roots and learn about root functions/comparing fibrous and tap root systems) • Create a poster about benefits of plants. • Discuss and draw a diagram of plant indicating the phases of nutrition for each part of the plant. • Observation and classification of leaves. • <u>Project:</u> Helicopter-Seed Dispersal by Building your own helicopter seed. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> ✓ Two individual assessments (Mid-Term/Final) accounting for the assigned percentage of the overall course grade. ✓ Homework, participation, behavior, and attendance. ✓ Grades based on presentation of knowledge and ideas.
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Stage 3 – Learning Plan

<p>Learning Activities</p> <p><u>Flowering and nonflowering plants</u></p> <ul style="list-style-type: none"> • Create a chart with your partner to distinguish between the main characteristics of flowering and non flowering plants. Further distinguish the differences in Mosses and ferns AND Gymnosperms and Angiosperms. • Studying Germination of seeds by using bean seeds, cotton wool, beaker or plastic cup. <p><u>Roots, Stems and Leaves</u></p> <ul style="list-style-type: none"> • Draw the complete diagrams of the three parts of a plant. Label and mention the function of each part. • Where do vegetables come from? Make a poster showing the vegetables you eat. Classify them as leaf, stem, root, rhizome etc <p><u>Seeds and fruits</u></p> <ul style="list-style-type: none"> • Draw and label parts of seeds and fruits • Discuss with a partner the different modes of dispersal of seeds. <p><u>Reproduction</u></p> <ul style="list-style-type: none"> • Discuss the differences between sexual and asexual reproduction. • Clearly draw and label the various reproductive stages. Remember to show the various parts of a flower and mention the functions of each.
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- Detail study of the parts of the flower by dissecting the flower using fresh China rose, dissecting needles, forceps and blade.

Nutrition

- Discuss and draw a diagram of a plant indicating the phases of nutrition for each part of the plant.

Fungi

- Compare fungi and plants. Discuss as a class the various differences between the two.

Soil Erosion

- Create a chart with a partner explaining methods of controlling soil and water erosion.

- **Experiment 2: Leaf chromatography**
- **Experiment 3: Plant creating oxygen**
- **Hands on activity 2: what do plants need**
- **Hands on activity 3: flowering plants life cycle**

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 Unit 3: Living Things

Stage 1 - Desired Results

Established Goal(s):

In this unit students will learn the characteristics of bacteria and viruses and their functions. Furthermore, students will be able to understand that all microorganisms are not harmful and will also learn about infectious diseases. Students will receive an opportunity to perform experiments and note down their results.

<p>Understandings: <i>Students will understand ...</i></p> <ul style="list-style-type: none"> ✓ Viruses are extremely small and they aren't cells. ✓ Unicellular and multicellular living things are all eukaryotes. ✓ Bacteria are classified according to shape. ✓ The main characteristics of microorganisms The chemical composition of all living things. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ✓ What is the Monera Kingdom? ✓ What is the Protocist Kingdom? ✓ What are viruses and infectious diseases? ✓ How can we fight infectious diseases? ✓ Are all microorganisms harmful?
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<p>Knowledge: <i>Students will know ...</i></p> <ul style="list-style-type: none"> ✓ How to recognize the main characteristics of microorganisms and viruses. ✓ How to examine the structure and vital functions of bacteria. ✓ What infectious diseases are and how to fight them. ✓ What is cell, tissue, organ and organ system. 	<p>Skills: <i>Student will be able to:</i></p> <ul style="list-style-type: none"> ✓ Define the characteristics of living things. ✓ Classify unicellular and multi cellular living things. ✓ Classify living things into five kingdoms. ✓ Able to relate single cells to tissues to organs to organ systems to an organism by creating an analogy using a model train. ✓ Visualize diagrammatically represent microorganisms ✓ Share views and work in groups ✓ Perform experiments and scientifically record their findings.
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Stage 2 - Assessment Evidence

<p>Performance tasks:</p> <ul style="list-style-type: none"> • Making Venn Diagram: Compare vaccines and antibiotics. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> ✓ Two individual assessments (Mid-Term/Final) accounting for the assigned percentage of the overall course grade. ✓ Homework, participation, behavior, and attendance. ✓ Grades based on presentation of knowledge and ideas.
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Stage 3 – Learning Plan

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Learning Activities

Monera Kingdom

- Draw a bacteria cell and clearly label each part.
- Compare the various types of bacteria using a chart – Parasites, Saprophytes, Symbionts.

Protoctist Kingdom

- In groups, compare protoctists and monera.
- Describe how each group of protozoa move.
- Compare algae and plants
- Using a Venn diagram, compare protozoa and algae.

Viruses

- Draw and label a virus.
- Discuss with your partner -Which vital function do viruses share with other living things.

Infectious diseases

- Choose five infectious diseases and complete the table. Information should include – Illness, microorganism, transmitted through and symptoms
- Discuss the benefits and differences between vaccines and antibiotics.

Experiment.

- **Experiment 4: Yogurt bacteria**
- **Hands on activity 4: 1986 flu**

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 Unit 4: The Universe

Stage 1 - Desired Results

Established Goal(s):

In this unit students will learn to interpret data and themselves create charts that depict the solar system. These charts will be drawn to scale ensuring the understanding of astronomical units. Furthermore, through various chart exercises, students will be able to understand and map various orbital planes and irregular bodies. They will also learn what matter is and their different states.

Understandings:

Students will understand ...

- ✓ That the universe contains many billions of galaxies, and each galaxy contains many billions of stars.
- ✓ Planets based on data provided about size, composition, location, orbital movement, atmosphere, or surface features (including moons).
- ✓ The theories to explain what the universe was like.
- ✓ Why is a day on Venus longer than its year?
- ✓ That earth is the only planet that has life.
- ✓ Why Pluto is not considered as a planet any more

Essential Questions:

- ✓ What is the Universe like?
- ✓ How big is the universe like?
- ✓ What makes up the Solar System?
- ✓ What are the outer and inner Planets?
- ✓ What are smaller solar system bodies?
- ✓ How does a telescope work? What are its various parts?

Knowledge:

Students will know ...

- ✓ How to identify irregular bodies and rocky objects.
- ✓ How to measure astronomical distances and sizes.
- ✓ The characteristics of the Universe.
- ✓ How to compare sizes of the Sun and the planets.
- ✓ What makes up universe?
- ✓ About the Movement of the planet.
- ✓ Why outer planets are known as gas giants?

Skills:

Student will be able to:

- ✓ Understand how a telescope works and its various parts.
- ✓ Calculate astronomical sizes of the Sun and the Planets.
- ✓ Illustrate geocentric and heliocentric theory'
- ✓ Discuss about light year
- ✓ Discuss about the imaginary plane of the earth's orbit?
- ✓ Compare main characteristic of outer and inner planets.
- ✓ Differentiate between Asteroids and Comets.
- ✓ Create a constellation poster.
- ✓ Analyze the components of the Universe.
- ✓ Visualize and diagrammatically represent data.
- ✓ Share views and work in groups.
- ✓ Clearly communicate and expression of ideas, both written and oral.

Stage 2 - Assessment Evidence

Performance tasks: <ul style="list-style-type: none">• Research assignments regarding top interesting facts about the solar system.• <u>Homework:</u> Creation of a poster including planets and the sun drawn to scale using the skills obtained through studying the calculation involving astronomical sizes and distances.	Other Evidence: <ul style="list-style-type: none">✓ Two individual assessments (Mid-Term/Final) accounting for the assigned percentage of the overall course grade.✓ Homework, participation, behavior and attendance.✓ Grades based on presentation of knowledge and ideas.
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Stage 3 – Learning Plan

Learning Activities

- Lecture/Discussion/Overhead Presentation.
- Small-group work/Cooperative Learning.
- Videos related to the subject.
- Explanation about revolution and rotation using globe, light source and a football.

What is the Universe like?

- Word search;
- “Imagine an alien friend from another galaxy wants to write to you. Write your galactic address and share with your partner. “

How Big is the universe?

- Expressing the distances between planets and from the respective planets to the sun in kilometers.
- Researching the term light years and converting the aforementioned distances in terms of light years

What makes up the Solar System

Clay model of the planets -

The students will be creating a model of the solar system using clay to represent different planets and other objects in the solar system (asteroids, moons, etc.).

- Discuss in groups -
 - Which planet takes the longest to orbit the sun?
 - Which planet is the fastest to orbit the sun?
 - Which planet has the longest days?
 - Which planet has the shortest days?
 - Why is a “day” on Venus longer than its “year”?
 - What is an orbit?
 - What do you call the imaginary plane of the earth’s orbit?

What are the outer and inner Planets?

- Discuss in groups
 - Which planets ...
 - has the most satellites.

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- is the closest to the sun
- support life
- is the largest in the solar system
- spins on its axis in opposite direction

- **Experiment 5: Build a Solar Viewer**
- **Hands on activity5: Making Solar System**

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 Unit 5: The Planet Earth

Stage 1 - Desired Results

Established Goal(s):

In this unit students will learn to interpret data and themselves create experiments to depict various eclipses using day to day items. Furthermore, through various class discussions and group work, the students will understand the difference between Earth and other planets and the conditions that make it habitable.

Understandings:

Students will understand ...

- ✓ That the universe contains many billions of galaxies, and each galaxy contains many billions of stars.
- ✓ That the motions of the Earth-sun-moon system create eclipses and the seasons.
- ✓ How earth events (abruptly and over time) can bring about changes in Earth's surface: landforms, ocean floor, rock features, or climate.
- ✓ Geological evidence to support the idea that the Earth's crust/lithosphere is composed of plates that move
- ✓ About the intense geological activity on the earth
- ✓ That rotation of the earth causes day and night.
- ✓ The distribution of materials that makes up the Earth's crust form the different type of relief.
- ✓ How to identify summer solstice and winter solstice?

Essential Questions:

- ✓ What is Earth like? Mention its characteristics. Identify the lunar phases.
- ✓ What are the three systems of the Earth?
- ✓ How does a solar/lunar eclipse happen?
- ✓ How does the Earth move?
- ✓ How does moon moves?
- ✓ How many spheres make up the earth?
- ✓ What is the surface of earth like?
- ✓ What are other three Earth 'spheres'?

Knowledge:

Students will know ...

- ✓ The components and characteristics of Earth and specifically the geosphere.
- ✓ How to identify of various lunar phases and eclipses
- ✓ How to reproduce the conditions for the solar and lunar eclipses.
- ✓ About lunar day and lunar month.
- ✓ The three layers of the geosphere.
- ✓ Which continental feature is under the sea?
- ✓ How continental crust is different from ocean

Skills:

Student will be able to:

- ✓ **Discuss about the characteristic that makes earth as unique planet.**
- ✓ **Discuss about two factors that combine to cause seasons**
- ✓ **Illustrate the phases of the moon**
- ✓ **Discuss about main component, temperature and state of the geosphere.**
- ✓ **Discuss about continental and ocean relief features**
- ✓ **Illustrate the cross-section of the earth's surface**
- ✓ **Describe the four sphere that make up the earth**

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<p>crust?</p> <ul style="list-style-type: none">✓ About water cycle.	<ul style="list-style-type: none">✓ Visualize and diagrammatically represent data✓ Share views and work in groups✓ Clearly communicate and expression of ideas, both written and oral.✓ Understand the concepts in order to successfully reproduce the conditions using day to day objects.
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Stage 2 - Assessment Evidence

<p>Performance tasks:</p> <ul style="list-style-type: none">• Research assignments regarding top interesting facts about planet Earth.• <u>Homework:</u> Prepare a diagrammatic representation of the layers of the geosphere. Label all the main components, temperature and state of each layer.	<p>Other Evidence:</p> <ul style="list-style-type: none">✓ Two individual assessments (Mid-Term/Final) accounting for the assigned percentage of the overall course grade.✓ Homework, participation, behavior, and attendance.✓ Grades based on presentation of knowledge and ideas.
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Stage 3 - Learning Plan

<p>Learning Activities</p> <p><u>What is Earth like?</u> Make posters of the following environmental problems.</p> <p>Environmental threats students will consider include:</p> <ul style="list-style-type: none">• vanishing species.• overflowing landfills.• air pollution.• rain forest destruction.• water pollution.• energy depletion.• other problems as desired. <p>These activities will help students recall what they already know about Earth, develop questions to answer throughout the unit, and express their feelings about the planet.</p> <p>Students will practice reading globes and learn how Earth moves in space in these activities.</p> <ul style="list-style-type: none">• Draw a diagram of the Earth, as seen from space. Draw two people: one at the North Pole and the other at the South Pole.
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- Find out the mixture of gases and the average temperatures of Venus and Mars. Why do you think life is only possible on Earth?

How does the Earth move?

- Discuss, in groups, the difference between rotation and revolution and its impact on Earth.

How does the Moon move?

- Draw a diagram to show the different phases of the moon in the Northern and Southern Hemisphere.
- Using a torch (sun), tennis ball (moon) and a football (earth) reproduce the solar and lunar eclipse.

Earth Systems

- Discuss the features of the three systems of Earth and quiz your partners on the relief features of each.

- **Experiment 6: Make craters with mini Meteors**
- **Hands on activity: Phases of the moon (oreo cookies)**

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 Unit 6: Matter and Its Properties

Stage 1 - Desired Results

Established Goal(s):

This unit addresses the properties of matter and investigate various ways to measure different states of matter-(solid, liquid and gas), and use appropriate tools to identify physical properties of matter. Create a graph to show the relationship between two variables.

Understandings:

Students will understand ...

- ✓ The properties of all matter and the units used to measure volume and mass.
- ✓ Mass and weight and explain the relationship between them.
- ✓ How to mathematically calculate the volume, mass, weight, and density of various objects.
- ✓ How to convert temperature in different scales.

Essential Questions:

- ✓ Define matter?
- ✓ What is the difference between general and specific properties of matter?
- ✓ How is surface area measured?
- ✓ How is the volume of solid, liquid and gas measured?
- ✓ Describe solids, liquids, and gases in terms of shape and volume. Why can the volume of gas change?
- ✓ How is the mass of a substance measured?
- ✓ How does heat flow from one system to another?

Knowledge:

Students will know ...

- ✓ Matter and its properties;
- ✓ The different densities of common substances;
- ✓ How to measure physical properties of matter;

Skills:

Student will be able to:

- ✓ Discuss about base and derived unit.
- ✓ Measure the surface area of regular and irregular objects.
- ✓ Create a graph to show the relationship between two variables.
- ✓ Analyze equivalences between volume and capacity.
- ✓ Measure the volume of irregular solids and gas.
- ✓ Compare multiples and submultiples of the units of measurement.
- ✓ Analyze the relationship between mass and volume.

Stage 2 - Assessment Evidence

Performance tasks:

- ✓ Research assignments regarding top interesting facts about the composition of matter
- ✓ Homework: Prepare a diagrammatic representation of classification of matter.

Other Evidence:

- ✓ Two individual assessments (Mid-Term/Final) accounting for the assigned percentage of the overall course grade.
- ✓ Homework, participation, behavior, and attendance.
- ✓ Grades based on presentation of knowledge and ideas.

Stage 3 – Learning Plan

Learning Activities

What is matter?

- You can't see air. Explain why is it matter?
- How long is this book? And how wide? Which unit of measurement would you use in the international System of Units?

What is volume?

- What is the capacity of a container with a volume of 3.4 cubic centimeter?
- How many 250 mL bottles do you need to fill a tank with a capacity of 10 L

What is mass?

- A gold chain was weighed using the following weights:
 - one 100 g weight
 - two 1 g weights
 - one 500 mg weightCan you calculate the mass of the chain in grams and milligrams?
- A box of biscuits weighing 1 Kg costs 3 euros.
A box weighing 250 g costs 1 euro.

What is density?

- Which of the substances (water, oil, petrol, lead, iron, mercury) float on water?
- Why do the others sink?

- **Experiment 7: Finding solubility**
- **Experiment 8: Density**
- **Hands on activity: The air catcher**
- **Hands on activity: The floating Egg**

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 Unit 7: Everything Is Matter

Stage 1 - Desired Results

Established Goal(s):

Students will describe the difference between the states of matter according to their mass, volume, density, shape, and particle arrangement. Furthermore, students when given graphic or written information will be able to classify matter as atom/molecule or element/compound (Not the structure of an atom). Then, students will demonstrate how substances can chemically react with each other to form new substances having properties different from those of the original substances. Students will collect data or use data provided to infer or predict that the total amount of mass in a closed system stays the same, regardless of how substances interact (conservation of matter)

Understandings:

Students will understand ...

- ✓ The different states of matter and how temperature affects each of it;
- ✓ The boiling and melting point of some common substances;
- ✓ Most common substances are mixtures;
- ✓ A pure substance has only one component;
- ✓ Pure substances can be either compounds or elements.

Essential Questions:

- ✓ Which are the states of matter?
- ✓ How can matter change its state?
- ✓ What are mixtures?
- ✓ What are pure substances?
- ✓ What are physical and chemical changes?

Knowledge:

Students will know ...

- ✓ The changes of state of matter.
- ✓ The conditions in which changes occur.
- ✓ Pure substances and mixtures.
- ✓ The need for recycling waste.
- ✓ The components of a mixture.

Skills:

Student will be able to:

- ✓ Differentiate between pure substances and mixture;
- ✓ Represent the characteristics of each state of matter according to volume, shape, fluidity, density and compressibility;
- ✓ Compare and contrast heterogeneous and homogeneous mixtures;
- ✓ Visualize and diagrammatically represent a solvent, solute and solution;
- ✓ Share views and work in groups;
- ✓ Clearly communicate and express ideas both written and oral.
- ✓ Interpret and understand classroom discussions and teachings and apply it outside the school learning environment.

Stage 2 - Assessment Evidence

Performance tasks:

Other Evidence:

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- Research assignment about how particles of air are organized inside a container. Represent the air particles with dots. Then draw the particles again after half the air has been removed.
- Research other methods for separating mixtures. Display the results in a poster. Use diagrams and explanations.
- Homework:
Find out about the fourth state of matter.

- ✓ Two individual assessments (Mid-Term/Final) accounting for the assigned percentage of the overall course grade.
- ✓ Homework, participation, behavior, and attendance.
- ✓ Grades based on presentation of knowledge and ideas.

Stage 3 – Learning Plan

Learning Activities

Which are the states of matter?

- In which of the states of matter are the particles closest together? Why is it very difficult to compress solids and liquids?
- Describe how the particles move in solids and liquids?
- Why do solids generally have a higher density than liquids, and liquids a higher density than gases?

How can matter change its state?

- Studying a diagram. Which arrows (red or blue) indicate changes of state produced by heating? Which arrows correspond to changes produced by cooling?
- 50 g of iron is melted. How much liquid iron is produced? Why is this?

What are mixtures?

- Look into your kitchen for mixtures and label them homogeneous or heterogeneous.

What are physical and chemical changes?

- Activity(Physical and chemical changes of some objects)

➤ **Experiment 9: Making solution**

➤ **Experiment 10: Separation of solid of different sizes**