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K-5 Earth Science Overview with Activities

The earth science strand explores the components of our solar system and the major characteristics, processes, and resources of our planet: surface features, earth materials, weather, the water cycle, the atmosphere.

Kindergarten

Observing Earth's Major Features Observing and naming are a focus across all strands in K. This is an intro to ES: look up and down and at the things around us – landforms (identifying mountains, oceans, streams), weather changes and seasons, and connecting what we use every day to earth's products – simple conservation, don't waste.

The Earth is composed of land, air and water.
1) Earth has different landforms, **characteristics of landforms** (mountains, oceans, valleys, rivers, deserts, local landforms - ocean, Mt Tam)
2) **Weather changes** daily and seasonally affecting us all
3) Many of **Earth's resources are used every day and some resources can be conserved**

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Kindergarten Activities:

- *Sort pictures of landforms,*
- *Make landform models with clay/shaving cream*
- *Observe and record weather across the seasons to see major trends,*
- *Look at where our common materials come from*
- *Simple conservation activities like paper waste audits, water waste while brushing teeth.*

1st Grade

Measuring Weather and Sun's Heat - Developing observation skills with a focus on weather. Measuring and describing weather with tools and #; and then predicting seasonal weather trends. Observing heat from sun as it warms different surfaces. (can be connected to needs of plants in LS and heating section of PS) All prep for 5th weather – sun's heat drives weather.

Weather can be observed, measured, described.
1) You can **use simple tools to measure weather & record changes (**thermometer, wind vane)
2) **Weather changes day to day, but trends are predictable** during a season
3) **Sun warms** land, air and water

1st Activities:

- *Create simple weather station to measure temperature, rainfall, wind direction, pressure, and keeping numerical records.*
- *Literature connections to weather in different places in California or the world*
- *Start predicting seasonal trends in weather.*
- *Experiment with thermometers and sun/shade comparisons.*

2nd Grade

Earth's Surface Materials Look more closely at materials that make up the earth's surface (different rocks, turning into small rocks and sand, adding organic matl to make soil, evidence of past life -fossils) Look closer at resource use: what do we use from the earth to meet our need for food, fuel, shelter (builds on and reinforces idea of needs of LT from 1st grade LS).

> ***Earth is made of materials with distinct properties that provide resources for human activities.***
>
> 1) **Rocks** have different **physical properties** and are made of different combinations of **minerals**
>
> 2) **Breakage and weathering** create smaller rocks
>
> 3) **Soils**, created from rock & organic materials, differ in color, texture, water retention, ability to support growth
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> 4) **Fossils** provide evidence about ancient life, scientists study fossils to learn about history
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> 5) We get **resources from rock, water, plant, soil**, to meet our needs for food, fuel, shelter

2nd Grade Activities:

- *Rock collections and descriptive comparisons – Everybody Needs a Rock.*
- *Compare different soils, sand, gravel, rock in terms of color-weight - ability to hold water, support plants – organic content.*
- *Examine fossils as imprints and bones, petrified wood.*
- *Reinforce needs from Life Sciences by aligning resources with our basic needs.*

3rd Grade

Introducing Earth as a Planet Identifying regular, predictable patterns of movement in objects we see in the sky (moon, sun, stars). Shows what we can understand about the earth as a planet by observing the sky. All these things: changes in stars, position of sun, phases of the moon, differences between stars and planets with telescope, reveals nature of our planetary system: planets orbiting stars.

> ***Objects in the sky move in regular, predictable patterns.***
>
> 1) **Patterns of stars** stay the same although they appear to move across sky nightly and different stars are visible seasonally.
>
> 2) **Moon's appearance changes** in a predictable four-wk cycle
>
> 3) **Telescopes** magnify distant objects in sky, there are many more stars than can be seen with eye alone
>
> 4) Earth **orbits** sun with other planets, Moon orbits Earth

3rd Grade Activities:

- *Planetarium trip See telescopes at planetarium.*
- *Make constellation patterns, notice movement of patterns seasonally.*
- *Observe moon and model how phases are created from reflected sunlight.*
- *Physically model orbits of Earth, Moon. Model of solar system.*
- *Observe changing position of Sun and link with Physical Science lessons related to shadows and light.*

4th Grade

How the Earth's Surface is Shaped: Why are there different materials on earth's surface? Different ways basic material – rocks - are made. Connecting the properties of rocks to the processes that made them. **Using** diagnostic property table to identify rocks and common minerals. How fast processes (erosion, volcano, earthquake) and slow processes (root growth, weathering, deposition) are constantly changing earth's surface and materials.

Properties of rocks and minerals reflect the processes that formed them.

1) You can **tell igneous, sedimentary, metamorphic rocks apart** by their different properties and different methods of formation, **the rock cycle**

2) You can use a diagnostic property table to **identify common rock-forming minerals** (quartz, calcite, feldspar, mica, hornblende) **and ore minerals**.

Waves, wind, water, and ice shape and reshape the Earth's land surface.

1) There are **slow and rapid processes that change the Earth** (erosion, landslide, volcanoes, and earthquakes)

2) **Natural processes break down** r**ocks into smaller pieces** (freezing/thawing, root growth)

3) **Moving water erodes landforms**, rearranging rocks, pebbles, sand, and silt **(weathering, transport, deposition)**

4th Grade Activities:

- *Use diagnostic table to distinguish between different types of rocks*
- *Activities that show how different types of rocks are formed and models or projects that capture the rock cycle*
- *Sand tables to study wind and water erosion*
- *Volcano films and models*
- *Visit the Earthquake research station or other locations to see seismographs*

5th Grade

Introduction to Earth Science Systems Presents the "Why" behind earlier observations about water resources, weather, and objects in the sky and begins looking at systems. Where do we get our water? What is the relationship of water to the weather, the water cycle? What causes weather? Predicting and understanding the relation of atmosphere, ocean, wind. What causes our solar system? Why do planets orbit larger bodies? Sun, Gravitational attraction This unit also provides a fun math/scale connection between PS (atoms) and ES (solar systems)

Water on Earth moves between the oceans and land through the processes of evaporation and condensation.

1) **Most of Earth's water is salt water** in oceans which cover most of the Earth's surface

2) When liquid water evaporates it turns into **water vapor** and can reappear as liquid when cooled, or solid if cooled below **freezing point**

3) **Water vapor moves in air**, **can form clouds or fog** (tiny droplets of water or ice) and **can fall** to Earth as rain, hail, sleet, or snow

4) **Fresh water is limited** (located in rivers, lakes, underground sources and glaciers), and can be made more available to meet needs through **recycling and avoiding waste**.

5) Your water comes from particular surface and/or groundwater supplies (**local community water sources**)

Energy from the sun heats the Earth unevenly, causing air movements resulting in changing weather patterns.

1) **Wind, convection currents**, are air movements caused by uneven heating of the Earth
2) **The oceans influence the weather and the water cycle plays a role in weather patterns**
3) There are several **causes and effects of severe weather** (hurricanes, typhoons, tornadoes)
4) You can **use weather maps & data to predict weather, forecasts depend on** many variables
5) Earth's **atmosphere exerts a pressure**, decreasing with altitude, which is equal in all directions at any point.

5th Grade Water and Weather Activities:

- *Introduce recirculation of fixed amount of water and reinforce earlier weather and Physical Science water states vocabulary with making Water Cycle diagram.*
- *Use EBMUD maps to show where our drinkable water comes from.*
- *Visit a water treatment plant.*
- *Repeat weather observations (or link with a 1st grade class) to use measurements for weather predictions, look a newspaper and on-line weather maps, publish a school weather report.*
- *Heat and air experiments to show that heated material rises (less dense because molecules moving faster (3rd);*
- *Use flashlights and diagrams to show why globe is heated unevenly causing larger areas of colder and warmer air,*
- *Explore ocean's ability to moderate air/land heat changes by showing difference between sun-warmed water and soil.*
- *Weight of atmosphere with ruler and newspaper.*

The solar system consists of planets and other bodies that orbit the sun in predictable paths.

1) The **sun, an average star**, central and largest body in solar system, made of hydrogen and helium
2) **Solar system contains:** Earth, moon, sun, eight other planets & their satellites, smaller objects (comets, asteroids)
3) Path of a planet (orbit) is due to **gravitational attraction between** Sun and planet.

5th Grade Solar System Activities:

- *Pictures of sun's corona and spots,*
- *build a sun (star) model,*
- *refer to periodic table to show elemental make up.*
- *Explore relative size and spacing of Sun, Earth, Moon and other planets.*
- *Name and create model of other parts of solar system.*
- *Observe effects of gravity here and model relationship of gravity/size of objects/distance between objects/speed of orbits using string and ball, outdoor games – Bill Nye "Gravity".*