

OCEANOGRAPHY:

Alabama Course of Study – SCIENCE:

5th:

6.) Compare effects of gravitational force on Earth, on the moon, and within space.

Alabama Course of Study – MATH:

5th:

9.) Identify components of the Cartesian plane, including the x-axis, y-axis, origin, and quadrants.

14.) Analyze data collected from a survey or experiment to distinguish between what the data show and what might account for the results.

- Evaluating different representations of the same data to determine how well each representation shows important aspects of the data
- Using given measures of central tendency (mean, median, and mode) to analyze data

Alabama Course of Study – SCIENCE:

6th:

1.) Identify global patterns of atmospheric movement, including El Niño, the Gulf Stream, the jet stream, the Coriolis effect, and global winds that influence local weather.

- Describing the function of instruments and technology used to investigate Earth's weather, including barometers, thermometers, wind socks, weather vanes, satellites, radar, weather balloons, and rain gauges
- Using lines of latitude and longitude to locate areas of specific weather events

2.) Describe factors that cause changes to Earth's surface over time.

Examples: earthquakes, volcanoes, weathering, erosion, glacial erosion or scouring, deposition, water flow, tornadoes, hurricanes, farming and conservation, mining and reclamation, deforestation and reforestation, waste disposal, global climate changes, greenhouse gases

3.) Describe water and carbon biogeochemical cycles and their effects on Earth.

5.) Describe layers of the oceanic hydrosphere, including the pelagic zone, benthic zone, abyssal zone, and intertidal zone.

9.) Identify the moon's phases.

Alabama Course of Study – MATH:

6th:

5.) Plot coordinates on grids, graphs, and maps.

- Identifying the coordinates of a point on the Cartesian plane

10.) Interpret information from bar graphs, line graphs, and circle graphs.

Alabama Course of Study – SCIENCE:

7th:

7.) Describe biotic and abiotic factors in the environment.

Examples:

- biotic-plants, animals;
- abiotic-climate, water, soil

Alabama Course of Study – MATH:

7th:

12.) Determine measures of central tendency (mean, median, and mode) and the range using a given set of data or graphs, including histograms, frequency tables, and stem-and-leaf plots.

Alabama Course of Study – SCIENCE:

8th:

1.) Identify steps within the scientific process.

- Applying process skills to interpret data from graphs, tables, and charts

12.) Classify waves as mechanical or electromagnetic.

Examples:

- mechanical-earthquake waves;
- electromagnetic-ultraviolet light waves, visible light waves
- Describing how earthquake waves, sound waves, water waves, and electromagnetic waves can be destructive or beneficial due to the transfer of energy
- Describing longitudinal and transverse waves
- Describing how waves travel through different media
- Relating wavelength, frequency, and amplitude to energy

9-12th:

Marine Biology:

1.) Select appropriate equipment for scientific field investigations in marine environments.

- Identifying patterns and relationships determined from collected data

2.) Differentiate among freshwater, brackish water, and saltwater.

3.) Describe physical characteristics of oceans, including topography of the ocean floor, plate tectonics, wave motion, depth, and pressure.

4.) Recognize interactions between the atmosphere and the ocean.

- Describing how waves, ocean currents, and tides are generated

5.) Discuss physical and chemical properties of saltwater.

Examples:

- physical-turbidity, temperature, density;
- chemical-salinity, pH, dissolved gases

11.) Describe positive and negative effects of human influence on marine environments.

12.) Identify various careers related to marine science.

Geology:

3.) Explain natural phenomena that shape the surface of Earth, including rock cycles, plate motions and interactions, erosion and deposition, volcanism, earthquakes, weathering, and tides.

4.) Describe the topography of the sea floor and the continents.

- Describing the formation of continental shelves
- Explaining changes of continental topography caused by erosion and uplift

14.) Explain the interaction of the continuous processes of waves, tides, and winds with the coastal environment.

- Identifying the impact of periodic weather phenomena on coastal regions
Examples: hurricanes destroying sand dunes, El Niño or La Niña redefining shorelines

- Identifying the positive and negative impact of humans on coastal regions

Examples:

- positive-shoreline protection,
- negative-buildings replacing protective dunes and barriers

OCEAN LITERACY: ESSENTIAL PRINCIPLES AND FUNDAMENTAL CONCEPTS:

1 The Earth has one big ocean with many features.

a The ocean is the dominant physical feature on our planet Earth – covering approximately 70% of the planet’s surface.

e Most of Earth’s water (97%) is in the ocean.

f The ocean is an integral part of the water cycle and is connected to all of the earth’s water reservoirs via evaporation and precipitation processes.

2 The ocean and life in the ocean shape the features of the Earth.

c Erosion—the wearing away of rock, soil and other biotic and abiotic earth materials—occurs in coastal areas as wind, waves, and currents in rivers and the ocean move sediments.

3 The ocean is a major influence on weather and climate.

a The ocean controls weather and climate by dominating the Earth’s energy, water and carbon systems.

b The ocean absorbs much of the solar radiation reaching Earth. The ocean loses heat by evaporation. This heat loss drives atmospheric circulation when, after it is released into the atmosphere as water vapor, it condenses and forms rain.

Condensation of water evaporated from warm seas provides the energy for hurricanes and cyclones.

6 The ocean and humans are inextricably interconnected.

a The ocean affects every human life. It supplies freshwater (most rain comes from the ocean) and nearly all Earth's oxygen. It moderated the Earth's climate, influences our weather, and affects human health.

f Coastal regions are susceptible to natural hazards (tsunamis, hurricanes, cyclones, sea level change, and storm surges).