



BAKER COLLEGE
STUDENT LEARNING OUTCOMES

**EDU2520 Science Foundations II: Astronomy, Earth
Science, and Physics**
3 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Apply the scientific method to an investigation of natural phenomenon.
 - a. Define Scientific Method terminology with examples.
 - b. Demonstrate steps of scientific investigation.
 - c. Correctly interpret data and evidence.
 - d. Identify aspects of the nature of science, including:
 - i. Science is tentative.
 - ii. Science is subjective.
 - iii. Science is social.
 - iv. Science is empirical.
 - v. Science involves observation and inference.
2. Express the motion of an object in terms of distance, time and direction, velocity and acceleration.
 - a. Define motion related terminology with examples.
 - b. Define gravitation and other forces as agents of change.
 - c. Illustrate how motion can be measured and represented on a graph.
 - d. Use Newton's three laws to explain the motion of objects.
3. Explore various forms of energy.
 - a. Define energy related terminology with examples.
 - b. Define different forms of potential energy with examples.
 - c. Recognize the characteristics of kinetic energy.
 - d. Compare kinetic energy and potential energy.
 - e. Create models of energy transfer from light, sound, heat, electricity and solar energy.
4. Apply the laws of thermodynamics to energy flow, phases of matter and the kinetic theory.
 - a. Define energy related terminology with examples.
 - b. Differentiate heat and temperature.
 - c. Illustrate the law of conservation (the first law of thermodynamics).
 - d. Model the kinetic theory of matter in three phases of matter.
 - e. Illustrate that energy flow must proceed from high to low in order to satisfy the second law of thermodynamics.
 - f. Illustrate energy flow via radiation, conduction and convection.

- g. Classify simple machines and explore their advantages in altering input and output forces.
5. Explore waves of sound as transmitted through various mediums.
 - a. Define wave related terminology with examples such as sound, pitch, amplitude, and Doppler effect.
 - b. Construct models of mechanical waves.
 - c. Compare transverse and longitudinal waves.
6. Explain electricity as an interaction between electric and magnetic fields.
 - a. Define electrical and magnetic related terminology with examples.
 - b. Define the term of electric charge.
 - c. Model attraction and repulsion of simple electric charges.
 - d. Differentiate voltage from current.
 - e. Describe the difference between magnetic fields and electric fields.
7. Explore the properties of light such as reflection, refraction and optics.
 - a. Define light related terminology with examples.
 - b. Define light as electromagnetic radiation.
 - c. Explore and model the law of reflection.
 - d. Illustrate light refraction.
 - e. Explore the effects of concave and convex lenses.
 - f. Use the electromagnetic spectrum to explain the occurrence of visible light.
8. Explore major features and components of the universe.
 - a. Define universe and star related terminology with examples.
 - b. Identify general features of the Milky Way Galaxy.
 - c. Classify stars based on their position of the Hertzsprung-Russell diagram.
 - d. Recognize the life cycle of a star and its formation is based on available fuel (mass).
 - e. Explore the evidence of the big bang theory.
9. Explore the earth to other members of the solar system.
 - a. Define solar system related terminology with examples.
 - b. Classify the planets as terrestrial and gas giants.
 - c. Compare the order of the planets and their densities.
 - d. Compare revolution and rotation times of the planets.
 - e. Define and locate asteroids, meteors, meteorites and comets within our solar system.
 - f. Evaluate common theories of the origin of the solar system.
10. Explore the way earth moves relative to the sun and moon.
 - a. Define sun and moon related terminology with examples.
 - b. Illustrate the phenomena of sun, earth and moon's orbit.
 - c. Explain how earth's tilt, rotation and revolution are responsible for days and nights, seasons and climates.
 - d. Use the Earth-Moon system to explain lunar and solar eclipses, the moon phases and tides.
11. Explore the distribution on earth resources.
 - a. Define earth resource terminology and give examples.

- b. Illustrate the rock cycle.
 - c. Compare the formation of igneous, sedimentary and metamorphic rocks.
 - d. Classify common minerals and rocks.
 - e. Illustrate the layers of the earth's crust, mantle and core.
 - f. Describe plate tectonic theory and evaluate evidence of the theory based on plate movement and earth's magnetic system.
 - g. Recognize rock formation as interactions of the convergent, divergent and transform plate boundaries.
 - h. Explain how the motion of the plates cause geologic features such as earthquakes, volcanoes, mountains, hot spots and ocean trenches.
 - i. Describe the process of fossilization.
12. Describe processes that destroy the earth's surface.
- a. Define earth's surface changing terminology with examples.
 - b. Describe the process and effects of glaciation with focus on Michigan.
 - c. Describe physical and chemical weathering.
 - d. Explain how soil is created.
13. Explore the factors which influence earth's weather, climate, seasons and ocean movements.
- a. Define weather related terminology and give examples.
 - b. Illustrate earth's atmosphere and the importance of each layer.
 - c. Explore the human impacts on the troposphere, stratosphere and the ozone layer.
 - d. Summarize how water and air masses circulate through the earth.
 - e. Explain how solar radiation and the atmosphere are responsible for earth's weather, climate, seasons and ocean movements.
14. Explain how the hydrologic cycle moves water around the earth.
- a. Define hydrology terminology and give examples.
 - b. Recognize that much of the freshwater is locked up in ice caps and glaciers.
 - c. Describe earth's reservoirs, their location, and relative amounts of water.

These SLOs are not approved for experiential credit.

Effective: Summer 2018