### Course Description:
The 8th grade science course builds upon students working as scientists by asking testable questions, collecting and analyzing different types of evidence, and by providing rationale for interpretations through reasoning and/or argumentation. Learners will be studying all three “strands” of science standards: physical science, life science, and earth science.

#### Genetics
The key concepts of this unit include inheritance of traits and variation in traits. Learners will explore how organisms reproduce, either sexually or asexually, and transfer their genetic information to offspring. They will also determine the probability of a particular trait in future generations.

#### Evidence of Evolution
Learners will study how the process of evolution drives the diversity and unity of life. Learners will construct explanations to support fundamental understandings of natural selection and evolution, relate ideas of genetic variation in a population to make sense of organisms surviving, reproducing, and passing on the traits of the species, and use fossil records and anatomical similarities to support their understanding. They will also explore how the geologic time scale is used to organize Earth’s 4.6-billion-year-old history.

#### Physical and Chemical Changes
Learners will evaluate and question experimental data to determine whether a physical or chemical change has occurred and apply the law of conservation of mass to physical and chemical changes. They will create models of various types of chemical reactions and explain that chemical reactions involve regrouping of atoms to form new substances. Furthermore, they will extend their understanding of chemical properties by designing an experiment to investigate the pH of various substances.

#### Applications of Motion and Forces
Learners will deepen their understanding of Newton’s laws of motion by exploring the relationships between the net force, weight, acceleration, and mass using calculations and experimentation. They will also learn how to use free body diagrams to determine the net force and investigate how the gravity between two objects is affected by changing mass and/or distance between the objects.

#### Energy Transfer and Waves
Learners will develop understanding of important qualitative and quantitative ideas about the first and second laws of thermodynamics. Students will relate how all forms of energy are either kinetic or potential and that total mechanical energy is the combination of kinetic and potential energy. Students will explore thermal energy, heat, and temperature and make sense of how the total change of energy in any system is always equal to the total energy transferred into or out of the system. In addition, students will investigate properties of sound and light waves.

#### Our Place in Space
Learners will explore how gravity determines the Sun, Earth, and Moon relationships. There will be a strong emphasis on a systems approach and models will be used to explain the cyclical patterns of Moon phases, eclipses, tides, and seasons. There will also be a connection to engineering through the instruments and technologies that have allowed us to explore the objects in our solar system and obtain the data that support the theories explaining the formation and evolution of the universe.

If Time: Optional Capstone or Electricity and Magnetism (See The Change)