Science 6 Course Overview

Unit	Major Concepts	Skills & Practices	Summative Assessments
Variables	The scientific method is a process for asking and answering scientific questions. The scientific method consists of asking a question, gathering information and observations, formulating a hypothesis, designing and conducting an experiment, analyzing the data and experimental design, reporting the results. A variable is anything you can change in an experiment that might affect the outcome. In a controlled experiment, only one variable is changed and the results are compared to a standard. The experimental variable is changed incrementally to determine its effect on the outcome. Multiple trials improve experimental accuracy. Models allow us to study processes that cannot be studied directly.	Ask questions that arise from careful observations of a phenomena, models, or unexpected results, to clarify results Ask questions to determine the relationships between independent and dependent variables. Develop and use models to describe unobservable mechanisms Design and conduct a scientific investigation Collect, analyze, and interpret data from investigations Use data to make predictions Apply mathematics and computational thinking in the context of science Communicate ideas to peers Work in a collaborative scientific manner Construct a scientific explanation based on evidence	Digital interactive notebooks Claim, evidence, reasoning paragraphs explaining observed scientific phenomena Controlled experiment using catapult system Controlled experiment using a self-selected system

Science 6 Course Overview

Diversity of Life	All organisms exhibit common characteristics and have certain requirements Some organisms can become dormant to survive an unsuitable environment As the power of a microscope increases, its field of view decreases The cell is the basic unit of life All living things are made up of one or more cells Every cell has structures that enable it to carry out life's functions Both single-celled and multicellular organisms exhibit all characteristics of life Cells are made of cell structures, which are made of molecules, which are made of atoms Life is classified into three domains and six kingdoms Cell s are the building blocks of tissues, which are the building blocks of organs, which are the building blocks of organ systems, which are the building blocks of multicellular organisms Environmental and genetic factors affect the germination and growth of plants	Differentiate between living and nonliving Demonstrate proper use of the microscope Prepare dry and wet mount slides Calculate the optical power of a microscope Estimate the size of objects based on the field of view Use a microscope to observe and compare structures of cells in multicellular and single-celled organisms Draw scale representations of images seen through a microscope Identify structures within cells Relate the structure and function of cells, tissues, organs, systems, and organisms Dissect and classify plant reproductive parts Classify organisms by domains and kingdoms Collect, analyze, and interpret data from investigations Construct explanations and arguments based on observational data	Digital interactive notebooks Output pages Lab practical - Creating slides Lab practical - Microscope Field of view response sheet Multicellular vs single-celled organism response sheet Creature project Cell organelle project Plant structures response sheet Flowering-plant reproduction response sheet Field notebook from Watson Homestead

Science 6 Course Overview

Earth History	Earth's surface has a variety of landforms and water features Every place on Earth's surface has a unique geologic story Most landforms are shaped by slow, persistent processes that proceed over the course of millions of years: weathering, erosion, and deposition The relative ages of sedimentary rock can be determined by the sequence of layers The processes we observe today, such as weathering, erosion, and deposition, acted, in the same way, millions of years ago Geologic time extends from Earth's origin to the present Earth is composed of layers of earth materials, from its hard crust of rock to its hot core Plate movements result in plate-boundary interactions that produce volcanoes, earthquakes, continental drift, and several landforms The rock cycle describes how rock is constantly being recycled and how each type of rock can be transformed into other rock types	Design and conduct an experiment Analyze data for patterns Analyze rock samples to construct correlations Develop and use models to explain and describe phenomena Infer change in environments through interpretations of rock layers Construct a timeline of geologic events and ancient life Infer ancient environments, based on rock and fossil evidence Assign a relative age to rocks, based on their relationship to other rocks Present and communicate findings Predict areas for earthquakes and volcanoes based on tectonic plate movement	Digital interactive notebooks Earth timeline project Plate tectonics Webquest Earth model project Taughannock Falls field notebook Geoscenario project

Science 6 Course Overview

Individual Science Project - Controlled Experiment	Scientific investigations are systematic and require clarifying what counts as data and identifying variables Scientific investigations produce data that must be analyzed in order to derive meaning Scientists identify sources of error in their experiments Controlled experiments change only one variable Multiple trials increase validity of the data gathered Data tables and graphs organize results in easy to understand ways Science experiments don't always go as planned Scientists communicate information and ideas in multiple ways: using tables, diagrams, graphs, models, and equations as well as orally, in writing, and through extended discussions In science, reasoning and argument based on evidence are essential to identifying the best explanation	Ask a question that can be investigated within the scope of the classroom, home, or other facilities with available resources Plan an investigation individually and in the design: identity independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many pieces of data are needed to support a claim Formulate a hypothesis Construct, analyze, and/or interpret graphical displays of data Research and apply an understanding of information related to the identified question Construct an explanation that includes qualitative or quantitative relationships between variables Effectively collaborate with teachers, peers, and test subjects Evaluate the design and implementation of the experiment Construct a visual representation of the experiment Communicate design, procedure, and results of a controlled experiment to peers, teachers, and professionals	Controlled experiment project Science forum presentation

Science 6 Course Overview

Engineering Design	Engineering questions clarify problems to help determine criteria for successful solutions Engineering investigations identify the effectiveness, efficiency, and durability of designs under different conditions An optimal design depends on how well the proposed solutions meet criteria and constraints Engineers engage in argumentation when testing a design solution	Define a design problem that can be solved through the development of an object, tool, or process Identify constraints associated with the design problem Identify the criteria for success Brainstorm solutions Select a solution Prototype your solution Collect data about the performance of a proposed object, tool, process, or system under a range of conditions Test and evaluate the object, tool, process, or system Improve solution Communicate solution	Spaghetti tower challenge Unsinkable boat challenge Paddleboat challenge Build a satellite challenge Launch your satellite challenge