Science 6 Course Overview

Unit	Major Concepts	Skills & Practices	Summative Assessments
Models and design	The scientific method is a flexible process for asking and answering scientific questions. The scientific method begins with observing and questioning phenomena in the natural world. Scientists make careful, detailed, and systematic observations that can serve as data and evidence to support a claim. A scientific argument consists of a claim, supporting evidence, and logical reasoning. Scientists construct models to study phenomena and processes that are difficult to observe directly. Scientists use models to explain and test ideas and modify their models as they collect/discover more data.	Ask questions that arise from careful observations of phenomena, models, or unexpected results, to clarify results Develop and use models to describe unobservable mechanisms Collect, analyze, and interpret data from investigations 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

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Variables	Scientific methods involve asking questions, gathering information and observations, formulating hypotheses, designing and conducting investigations, analyzing data and experimental design, and reporting results to the greater community. 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.	Ask questions that arise from careful observations of phenomena, models, or unexpected results, to clarify results Ask questions to determine the relationships between independent and dependent variables. 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

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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: identify 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

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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	Build a satellite challenge Launch your satellite challenge

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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. The various kingdoms of life fit into these three domains. There are at least six different kingdoms Cells 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 and using the 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