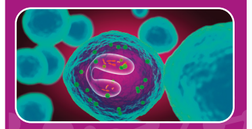
twig SCIENCE Grade 6 Scope and Sequence

ASSESSMENT All modules include: Pre-Exploration, Formative Assessment, Performance Task, Multiple Choice Assessment, and Benchmark Assessment

MODULES	MODULE ANCHOR PHENOMENON	STORYLINE	PERFORMANCE EXPECTATIONS (*PEs that integrate traditional science content with engineering through SEPs or DCIs)	NGSS		CROSS-CURRICULAR CONNECTIONS	
1: BioTech Systems Worldwide **NGSS Topic Arrangements: Structure, Function, and Information Processing; Engineering Design** 	How do human body systems and subsystems work together?	Students become interns at BioTech Systems Worldwide, a bioengineering company working at the interface between human body systems and technology. As part of their training, students explore the relationship between cells, organs, and organ systems, and how they all work together. They apply what they learn from modeling activities, videos, articles, and their own research to produce informational posters and reports, and discover some of the ways technology can be used to repair or replace body parts. Students are then given their first engineering assignment: to design and build a prototype prosthetic hand!	**MS-LS1-1** Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells **MS-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. **MS-LS1-8** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. **MS-ETS1-1** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. **MS-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	**Crosscutting Concepts** **CCC-2** Cause and Effect **CCC-3** Scale, Proportion, and Quantity **CCC-4** System and System Models **CCC-6** Structure and Function **Disciplinary Core Ideas** **LS1.A** Structure and Function **LS1.D** Information Processing **Engineering, Technology, and Applications of Science** **ETS1.A** Defining Engineering Problems **ETS1.B** Developing Possible Solutions	**Science and Engineering Practices** **SEP-1** Asking Questions and Defining Problems **SEP-2** Developing and Using Models **SEP-3** Planning and Carrying Out Investigations **SEP-6** Constructing Explanations and Designing Solutions **SEP-7** Engaging in Argument from Evidence **SEP-8** Obtaining, Evaluating, and Communicating Information	**Common Core English Language Arts** **RI.6.1–3** Key Ideas and Details **RI.6.4, 6** Craft and Structure **RI.6.7–9** Integration of Knowledge and Ideas **RI.6.10** Range of Reading and Level of Text Complexity **L.6.6** Vocabulary Acquisition and Use **SL.6.1–2** Comprehension and Collaboration **SL.6.4–6** Presentation of Knowledge and Ideas **W.6.1–2** Text Types and Purposes **W.6.4–5** Production and Distribution of Writing **W.6.7–8** Research to Build and Present Knowledge **W.6.10** Range of Writing **English Language Proficiency Domains** Speaking, Listening, Reading, Writing	**WIDA English Language Development** **Standard 1:** Social and Instructional Language **Standard 2:** The Language of Language Arts **Standard 3:** The Language of Mathematics **Standard 4:** The Language of Science **Common Core Math** **6.SP.B** Summarize and describe distributions **6.NS.B** Compute fluently with multi-digit numbers and find common factors and multiples **6.RP.A** Understand ratio concepts and use ratio reasoning to solve problems
2: Destination Everywhere! **NGSS Topic Arrangements: Weather and Climate; Energy; Engineering Design** 	Weather and climate vary around the world, but we can use science and past trends to predict them.	Travel to some of the most extreme locations on the planet, with Destination Everywhere! Students visit the coldest places, the driest places, and the wettest places—then, they pick a place anywhere in the world, and put together a destination guide all about it. As they travel, students investigate weather and climate around the world. They discover how ocean currents influence global temperatures, why it's cold at the top of mountains, and what causes weather systems. Students also take a tour of the world's climate zones and analyze data to draw conclusions about weather and climate patterns. Happy travels!	**MS-ESS2-4** Develop a model to describe the cycling of water through Earth's systems driven by energy from the Sun and the force of gravity **MS-ESS2-5** Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. **MS-ESS2-6** Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. **MS-PS3-3** Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.* **MS-PS3-4** Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. **MS-PS3-5** Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. **MS-ETS1-1** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution. **MS-ETS1-3** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution.	**Crosscutting Concepts** **CCC-1** Patterns **CCC-2** Cause and Effect **CCC-3** Scale, Proportion, and Quantity **CCC-4** System and System Models **CCC-5** Energy and Matter **CCC-6** Structure and Function **CCC-7** Stability and Change **Disciplinary Core Ideas** **ESS2.C** The Roles of Water in Earth's Surface Processes **ESS2.D** Weather and Climate **PS3.A** Definitions of Energy **PS3.B** Conservation of Energy and Energy Transfer **Engineering, Technology, and Applications of Science** **ETS1.A** Defining Engineering Problems **ETS1.B** Developing Possible Solutions **ETS1.C** Optimizing the Design Solution	**Science and Engineering Practices** **SEP-1** Asking Questions and Defining Problems **SEP-2** Developing and Using Models **SEP-3** Planning and Carrying Out Investigations **SEP-4** Analyzing and Interpreting Data **SEP-5** Using Mathematics and Computational Thinking **SEP-6** Constructing Explanations and Designing Solutions **SEP-7** Engaging in Argument from Evidence **SEP-8** Obtaining, Evaluating, and Communicating Information **Environmental Principles and Concepts** **Principle I** People depend on natural systems **Principle III** Natural systems change in ways that people benefit from and can influence **Principle IV** There are no permanent or impermeable boundaries that prevent matter from flowing between systems	**Common Core English Language Arts** **RI.6.1–3** Key Ideas and Details **RI.6.5** Craft and Structure **RI.6.7** Integration of Knowledge and Ideas **L.6.6** Vocabulary Acquisition and Use **SL.6.1–3** Comprehension and Collaboration **SL.6.4–6** Presentation of Knowledge and Ideas **W.6.1–2** Text Types and Purposes **W.6.4–6** Production and Distribution of Writing **W.6.7–9** Research to Build and Present Knowledge **W.6.10** Range of Writing **WIDA English Language Development** **Standard 1:** Social and Instructional Language **Standard 2:** The Language of Language Arts **Standard 3:** The Language of Mathematics **Standard 4:** The Language of Science **English Language Proficiency Domains** Speaking, Listening, Reading, Writing	**Common Core Math** **6.EE.C** Represent and analyze quantitative relationships between dependent and independent variables **6.G.A** Solve real-world and mathematical problems involving area, surface area, and volume **6.NS.A** Compute fluently with multi-digit numbers **6.NS.C** Apply and extend previous understandings of numbers to the system of rational numbers **6.RP.A** Understand ratio concepts and use ratio reasoning to solve problems **6.SP.B** Summarize and describe distributions
3: The Red List **NGSS Topic Arrangements: Growth, Development, and Reproduction of Organisms** 	How do the environment and genetics affect animals and plants?	Students become ecologists, on a mission to save endangered or threatened species from extinction. Through research and investigations, students build their awareness and knowledge of their chosen species and the threats they face. Students study plant and animal reproduction, including courtship behaviors, sexual and asexual methods of reproduction, and the inheritance and variation of traits. They also discover how some animal species look after their offspring to help ensure their survival, and explore how conservationists around the world try to ensure the survival of entire species. Then, it's their turn to come up with a conservation plan of their own.	**MS-LS1-4** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. **MS-LS3-2** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	**Crosscutting Concepts** **CCC-1** Patterns **CCC-2** Cause and Effect **CCC-3** Scale, Proportion, and Quantity **CCC-4** System and System Models **CCC-6** Structure and Function **Disciplinary Core Ideas** **LS1.B** Growth and Development of Organisms **LS3.A** Inheritance of Traits **LS3.B** Variation of Traits **Science and Engineering Practices** **SEP-1** Asking Questions and Defining Problems **SEP-2** Developing and Using Models **SEP-4** Analyzing and Interpreting Data **SEP-5** Using Math and Computational Thinking **SEP-6** Constructing Explanations and Designing Solutions	**Science and Engineering Practices (continued)** **SEP-7** Engaging in Argument from Evidence **SEP-8** Obtaining, Evaluating, and Communicating Information **Environmental Principles and Concepts** **Principle II** People influence natural systems **Principle III** Natural systems change in ways that people benefit from and can influence **Principle IV** There are no permanent or impermeable boundaries that prevent matter from flowing between systems **Principle V** Decisions affecting resources and natural systems are complex and involve many factors	**Common Core English Language Arts** **RI.6.1–2** Key Ideas and Details **RI.6.4–6** Craft and Structure **RI.6.7–8** Integration of Knowledge and Ideas **L.6.6** Vocabulary Acquisition and Use **SL.6.1–2** Comprehension and Collaboration **SL.6.4** Presentation of Knowledge and Ideas **W.6.1–2** Text Types and Purposes **W.6.4–5** Production and Distribution of Writing **W.6.6–8** Research to Build and Present Knowledge **WIDA English Language Development** **Standard 1:** Social and Instructional Language **Standard 2:** The Language of Language Arts **Standard 3:** The Language of Mathematics **Standard 4:** The Language of Science	**English Language Proficiency Domains** Speaking, Listening, Reading, Writing **Common Core Math** **6.EE.C** Represent and analyze quantitative relationships between dependent and independent variables **6.NS.C** Apply and extend previous understandings of numbers to the system of rational numbers **6.RP.A** Understand ratio concepts and use ratio reasoning to solve problems **6.SP.A** Develop understanding of statistical variability **6.SP.B** Summarize and describe distributions
4: Cities of the Future **NGSS Topic Arrangements: Weather and Climate; Human Impacts; Engineering Design** 	How can we reduce harmful impacts on the environment in the places where people live?	Students are tasked with designing an environmentally friendly city of the future. To better understand the need for sustainable cities, they investigate various human impacts on the environment, and the ways these can be minimized. Using three fictionalized case studies, students explore the challenge of balancing the needs of a population with the protection of the natural environment. Students also analyze data to make claims about the causes of climate change and its effects on living things. They explore real-life examples of cities that are trying to make changes for the better.	**MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.* **MS-ESS3-5** Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. **MS-LS1-4** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. **MS-LS1-5** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. **MS-ETS1-1** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution. **MS-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **MS-ETS1-4** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	**Crosscutting Concepts** **CCC-1** Patterns **CCC-2** Cause and Effect **CCC-3** Scale, Proportion, and Quantity **CCC-4** System and System Models **CCC-5** Energy and Matter **CCC-7** Stability and Change **Disciplinary Core Ideas** **ESS2.D** Weather and Climate **ESS3.C** Human Impacts on Earth Systems **ESS3.D** Global Climate Change **LS1.B** Growth and Development of Organisms **Engineering, Technology, and Applications of Science** **ETS1.A** Defining Engineering Problems **ETS1.B** Developing Possible Solutions **ETS1.C** Optimizing the Design Solution **Science and Engineering Practices** **SEP-1** Asking Questions and Defining Problems **SEP-2** Developing and Using Models	**Science and Engineering Practices (continued)** **SEP-3** Planning and Carrying Out Investigations **SEP-4** Analyzing and Interpreting Data **SEP-5** Using Math and Computational Thinking **SEP-6** Constructing Explanations and Designing Solutions **SEP-7** Engaging in Argument from Evidence **SEP-8** Obtaining, Evaluating, and Communicating Information **Environmental Principles and Concepts** **Principle I** People depend on natural systems **Principle II** People influence natural systems **Principle III** Natural systems change in ways that people benefit from and can influence **Principle IV** There are no permanent or impermeable boundaries that prevent matter from flowing between systems **Principle V** Decisions affecting resources and natural systems are complex and involve many factors	**Common Core English Language Arts** **RI.6.1–2** Key Ideas and Details **RI.6.4–5** Craft and Structure **RI.6.7–9** Integration of Knowledge and Ideas **L.6.1** Conventions of Standard English **L.6.6** Vocabulary Acquisition and Use **SL.6.1–2** Comprehension and Collaboration **SL.6.4–5** Presentation of Knowledge and Ideas **W.6.1–2** Text Types and Purposes **W.6.4–5** Production and Distribution of Writing **W.6.7** Research to Build and Present Knowledge **W.6.10** Range of Writing **WIDA English Language Development** **Standard 1:** Social and Instructional Language **Standard 2:** The Language of Language Arts **Standard 3:** The Language of Mathematics **Standard 4:** The Language of Science	**English Language Proficiency Domains** Speaking, Listening, Reading, Writing **Common Core Math** **6.EE.C** Represent and analyze quantitative relationships between dependent and independent variables **6.NS.B** Compute fluently with multi-digit numbers and find common factors and multiples **6.NS.C** Apply and extend previous understandings of numbers to the system of rational numbers **6.SP.B** Summarize and describe distributions