| Readorium Alignment to FOSS Kit: Planetary Science | | |
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| **Readorium Books By Standard** | **Magazine Articles (A) and Science Alive Videos (V) By Standard** | **Teacher Resource Center Classroom Strategy Lessons (CL) with Articles (A) by Standard** |
| **NGSS: MS-PS2: Motion and Stability: Forces and Interactions—How can one explain and predict interactions between objects and within systems of objects?** | | |
| **PS2.B: Types of interactions:** What underlying forces explain the variety of interactions observed? [Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.<br>Forces that act at a distance (gravitational, electric, and magnetic) can be explained by force fields that extend through space and can be mapped by their effect on a test object (a ball, a charged object, or a magnet, respectively).] | | |
| • Lives of Stars<br>• Scientists who Changed the World<br>• Total Lunacy | • Gravity- The Evil Basketball Player (A) | • |
| **NGSS: MS-PS2-4:** Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. | | |
| • Lives of Stars<br>• Scientists who Changed the World<br>• Total Lunacy | • Gravity- The Evil Basketball Player (A) | • |
| **NGSS: MS-PS4: Waves and their applications in technologies for information transfer-How are waves used to transfer energy and information?** | | |
| **NGSS: MS-PS4.B:** Electromagnetic radiation<br>What is light? How can we explain the varied effects that involve light? What other forms of electromagnetic radiation are there? [When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light. A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media (prisms) How<br>ever, because light can travel through space, it cannot be a matter wave, like sound or water waves. ] | | |
| • Lights Sound Action<br>• Space Rocks! | • Look, A Rainbow! Where Did That Come From (A)<br>• Cool Beams (A) | • |
| **NGSS: MS-PS4-2:** Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. | | |
| • Lights Sound Action<br>• Space Rocks! | • Look, A Rainbow! Where Did That Come From (A)<br>• Cool Beams (A) | • |
| **NGSS: MS-ESS1:** Earth's place in the universe-What is the universe, and what is Earth's place in it? | | |
| **NGSS: MS-ESS1.A:** The universe and its stars<br>What is the universe, and what goes on in stars? [Patterns of the apparent motion of the Sun, the Moon, and stars in the sky can be observed, described, predicted, and explained with models. The universe began with a period of extreme and rapid expansion known as the Big Bang. Earth and its solar system are part of the Milky Way galaxy, which is one of the many galaxies in the universe.] | | |
| • Total Lunacy<br>• Earth in Motion<br>• Inner and Outer Planets | • The Surface and Eclipses of the Moon (A) | • |
| **NGSS: MS-ESS1.B:** Earth and the solar system | | |

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| What are the predictable patters caused by Earth's movement in the solar system? [The solar system consists of the Sun and a collection of objects, including planets, their moons, and asteroids the are held in orbit around the Sun by its gravitational pull on them. This model of the solar system can explain tides, eclipses of the Sun and the Moon, and the motion of the planets in the sky relative to the stars.] | | |
| • Total Lunacy<br>• Lives of Stars<br>• Space Rocks! | • Deep Mystery of Black Holes (A)<br>• Gaps in the Galaxies(V)Space Junk: Are We Trashing our Solar System?(A)<br>• Sparkling Sunspots(V) | • |
| **NGSS: MS-ESS1.C:** The history of planet Earth<br>How do people reconstruct and date events in Earth's planetary history? [The geological time scale interpreted from rock strata provides a way to organize Earth's history. Major historical events include the formation of mountain chains and ocean basins, the evolution and extinction of particular living organisms, volcanic eruptions, periods of massive glaciation, and development of watersheds and rivers through glaciation and water erosion. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. ] | | |
| • Inner and Outer Planets | • Let's Save Our Planet!(A) | • Context Clues (CL-2, A-2, The Search for Life on Mars) |
| **NGSS: MS-ESS1-1** Develop and use a model of the Earth-Sun-Moon system to describe the cycleic patterns of lunar phases, eclipses of the Sun and Moon, and seasons. | | |
| • Total Lunacy<br>• Earth in Motion<br>• Inner and Outer Planets | • The Surface and Eclipses of the Moon (A) | • |
| **NGSS: MS-ESS1-2:**<br>Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. | | |
| • Total Lunacy<br>• Lives of Stars<br>• Space Rocks! | • Deep Mystery of Black Holes (A)<br>• Gaps in the Galaxies(V)Space Junk: Are We Trashing our Solar System?(A)<br>• Sparkling Sunspots(V) | • |
| **NGSS: MS-ESS1-3:** Analyze and interpret data to determine scale properties of objects in the solar system. | | |
| • Inner and Outer Planets | • Let's Save Our Planet!(A) | • Context Clues (CL-2, A-2, The Search for Life on Mars) |
| **NGSS: MS-ESS1-4:** Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6 billion-year-old history. | | |
| • Big Delicious Earth | • | • |
| **NGSS: MS-ESS2:** Earth's systems-How and why is Earth constantly changing? | | |
| **NGSS: MS-ESS2.A:** Earth's materials and systems<br>How do Earth's systems interact? [All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.] | | |
| • Big Delicious Earth<br>• Caves<br>• Continental Drift<br>• Earthquakes<br>• Formation of Mountains and Deserts<br>• Plate Tectonics<br>• Sea Floor Spreading | • Crystals(A)<br>• River of Ice (A)<br>• Icy Evidence in the Core (V)<br>• Science on Ice (V)<br>• Hurricane Hunting (V)<br>• Twist and Shout: Tornado Trouble (V) | • Determining Importance (CL-3, A-2 Crystals) |
| **NGSS: MS-ESS2.C:** The roles of water in Earth's surface processes | | |

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| How do the properties and movements of water shape Earth's surface and affect its systems? [Water continually cycles among land, ocean and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation as well as downhill flows on land. Water's movements-both on the land and underground-cause weathering and erosion, which change the land's surface features and create underground formations.] | | |
| • Continental Drift<br>• Earthquakes<br>• Formation of Mountains and Deserts<br>• Plate Tectonics<br>• Sea Floor Spreading | • Getting DNA Out of Ancient Fossils | • |
| **NGSS: MS-ESS2-2:** Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. | | |
| • Big Delicious Earth<br>• Caves<br>• Continental Drift<br>• Earthquakes<br>• Formation of Mountains and Deserts<br>• Plate Tectonics<br>• Sea Floor Spreading | • Crystals(A)<br>• River of Ice (A)<br>• Icy Evidence in the Core (V)<br>• Science on Ice (V)<br>• Hurricane Hunting (V)<br>• Twist and Shout: Tornado Trouble (V) | • Determining Importance (CL-3, A-2 Crystals) |
| **NGSS: MS-ESS3:** Earth and human activity-How do Earth's surface processes and human activities affect each other? | | |
| **NGSS: MS-ESS3.A:** Natural resources<br>How do humand depend on Earth's resources? [Humans depend on Earth's land, ocean, atmosphere and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. Renewable energy resources, and the technologies to exploit them, are being rapidly developed.] | | |
| • Big Delicious Earth<br>• Formation of Volcanoes | • | • |
| **NGSS: MS-ESS3.C:** Human impacts on Earth systems<br>How do humans change the planet? [Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of many other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. Typically, as human populations and per capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.] | | |
| • Pollution<br>• Prairie Ecosystems<br>• Rainforests<br>• Scientific Method | • Bones Tell the Story (A)<br>• Greenhouse Gases (A)<br>• Global Temperatures (A)<br>• Let's Save Our Planet!(A) | • Graphic Features (CL-1, A-2 What Happened to the Blue Whale?) |
| **NGSS: MS-ESS3.D:** Global climate change<br>How do people model and predict the effect of human activities on Earth's climate? [Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing human vulnerability to whatever climate changes do occur depends on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior, and on applying that knowledge wisely in decisions and activities. ] | | |
| • Earth in Motion<br>• Weather<br>• Pollution<br>• Rainforests | • Global Temperatures (A)<br>• Chilling Facts about a Burning Issue: Climate Change Quiz- Pt. 1<br>• Chilling Facts about a Burning Issue: Climate Change Quiz- Pt. 2 | • |

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| | • It's Too Hot! (A) | |
| **NGSS: MS-ESS3-1:** Construct a scientific explanation based on evidence for who to uneven distributions of Earth's mineral, energy, and ground water resources are the result of past and current geoscience processes. | | |
| • Big Delicious Earth<br>• Formation of Volcanoes | • | • |
| **NGSS: MS-ESS3-2:** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. | | |
| • Coral Reefs<br>• Learning from Natural Disasters<br>• Weather | • Space Junk: Are We Trashing our Solar System? (A) | • Print Features CL-3 A-2 Flying Into a Hurricane) |
| **NGSS: MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. | | |
| • Pollution<br>• Prairie Ecosystems<br>• Rainforests<br>• Scientific Method | • Bones Tell the Story (A)<br>• Greenhouse Gases (A)<br>• Global Temperatures (A)<br>• Let's Save Our Planet!(A) | • Graphic Features (CL-1, A-2 What Happened to the Blue Whale?) |
| **NGSS: MS-ESS3-4:** Construct an argument supported by evidence for how increases in human population and per capita consumption of natural resources impact Earth's systems. | | |
| • Coral Reefs<br>• Pollution<br>• Prairie Ecosystems<br>• Rainforests | • Global Temperatures (A) | • |
| **NGSS: MS-ETS1:** Engineering design-how do engineers solve problems? | | |
| **NGSS: MS-ETS1.A: Defining and delimiting an engineering problem**<br>What is a design for? What are the criteria and constraints of a successful solution? [The more precisely and design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions (e.g., familiarity with the local climate may rule out certain plants for the school garden).] | | |
| • Artificial Satellites<br>• Character Traits of a Good Scientist<br>• Learning from Natural Disasters<br>• Pollution | • Inventor of the Toughest Stuff (A)<br>• Antlers, Beaks, Geckos and Us (V)<br>• Safe from Tsunamis (V)<br>• An Amazing Teen Scientist (A) | • Context Clues (CL-3 A-1 Things That Go Boom!)<br>• Determining Importance (CL-2, A-1. Dragonflies: Flying Aces) |
| **NGSS: MS-ETS1-1:**<br>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. | | |
| • Artificial Satellites<br>• Character Traits of a Good Scientist<br>• Learning from Natural Disasters<br>• Pollution | • Inventor of the Toughest Stuff (A)<br>• Antlers, Beaks, Geckos and Us (V)<br>• Safe from Tsunamis (V)<br>• An Amazing Teen Scientist (A) | • Context Clues (CL-3 A-1 Things That Go Boom!)<br>• Determining Importance (CL-2, A-1. Dragonflies: Flying Aces) |