Bridge Builder 6th Grade Science	**Code**	**ACTIVITY 1: STRUCTURAL CONCEPTS**	**BRIDGE BUILDER ACTIVITIES 2A, 2B, AND 2C: BEAM ME UP**	**ACTIVITY 3: COMPUTER-BASED BRIDGE MODELING**	**ACTIVITY 4: BASIC BOX BRIDGE STRUCTURE**	**ACTIVITY 5: IMPROVED BOX BRIDGE STRUCTURE**
Physical Science						
Inquiry Process (IP)	**IP**					
Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.	**S.IP.M.1**					
Generate scientific questions based on observations, investigations, and research.	**S.IP.06.11**					
Design and conduct scientific investigations.	**S.IP.06.12**					
Use tools and equipment (spring scales, stop watches, meter sticks and tapes, models, hand lens, thermometer, models, sieves, microscopes) appropriate to scientific investigations.	**S.IP.06.13**					
Use metric measurement devices in an investigation.	**S.IP.06.14**					
Construct charts and graphs from data and observations.	**S.IP.06.15**					
Identify patterns in data.	**S.IP.06.16**					
Inquiry Analysis and Communication(IA)	**IA**					
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Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.	**S.IA.M.1**					
Analyze information from data tables and graphs to answer scientific questions.	**S.IA.06.11**					
Evaluate data, claims, and personal knowledge through collaborative science discourse.	**S.IA.06.12**					
Communicate and defend findings of observations and investigations using evidence.	**S.IA.06.13**					
Draw conclusions from sets of data from multiple trials of a scientific investigation.	**S.IA.06.14**					
Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision-making and the application of science throughout history and within society.	**S.RS.M.1**					
Evaluate the strengths and weaknesses of claims, arguments, and data.	**S.RS.06.11**					
Describe limitations in personal and scientific knowledge.	**S.RS.06.12**					
Identify the need for evidence in making scientific decisions.	**S.RS.06.13**					
Evaluate scientific explanations based on current evidence and scientific principles.	**S.RS.06.14**					
Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.	**S.RS.06.15**					
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Design solutions to problems using technology.	**S.RS.06.16**					
Describe the effect humans and other organisms have on the balance of the natural world.	**S.RS.06.17**					
Describe what science and technology can and cannot reasonably contribute to society.	**S.RS.06.18**					
Describe how science and technology have advanced because of the contributions of many people throughout history and across cultures.	**S.RS.06.19**					
Energy	**EN**					

Develop an understanding that there are many forms of energy (such as heat, light, sound, and electrical) and that energy is transferable by convection, conduction, or radiation. Understand energy can be in motion, called kinetic; or it can be stored, called potential. Develop an understanding that as temperature increases, more energy is added to a system. Understand nuclear reactions in the sun produce light and heat for the Earth.	**PEN**					
Kinetic and Potential Energy- Objects and substances in motion have kinetic energy. Objects and substances may have potential energy due to their relative positions in a system. Gravitational, elastic, and chemical energy are all forms of potential energy.	**P.EN.M.1**					
Identify kinetic or potential energy in everyday situations (for example: stretched rubber band	**P.EN.06.11**					
Demonstrate the transformation between potential and kinetic energy in simple mechanical systems (for example: roller coasters)	**P.EN.06.12**					
Energy Transfer- Energy is transferred from a source to a receiver by radiation, conduction, and convection. When energy is transferred from a source to a receiver, the quantity of energy before the transfer is equal to the quantity of energy after the transfer.	**P.EN.M.4**					
Explain how different forms of energy can be transferred from one place to another by radiation, conduction, or convection.	**P.EN.06.41**					
Illustrate how energy can be transferred while no energy is lost or gained in the transfer.	**P.EN.06.42**					
Changes in Matter	**CM**					
Develop an understanding of changes in the state of matter in terms of heating and cooling, and in terms of arrangement and relative motion of atoms and molecules. Understand the differences between physical and chemical changes. Develop an understanding of the conservation of mass. Develop an understanding of products and reactants in a chemical change.	**P.CM**					

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Changes in State- Matter changing from state to state can be explained by using models which show that matter is composed of tiny particles in motion. When changes of state occur, the atoms and/or molecules are not changed in structure. When the changes in state occur, mass is conserved because matter is not created or destroyed.	**P.CM.M.1**					
Describe and illustrate changes in state, in terms of the arrangement and relative motion of the atoms or molecules.	**P.CM.06.11**					
Explain how mass is conserved as it changes from state to state in a closed system.	**P.CM.06.12**					

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Organization of Living Things	**OL**					
Producers, Consumers, and Decomposers- All animals, including humans, are consumers that meet their energy by eating other organisms or their products. Consumers break down the structures of the organisms they eat to make the materials they need to grow and function. Decomposers, including bacteria and fungi, use dead organisms or their products to meet their energy needs.	**L.OL.M.5**					
Classify organisms (producers, consumers, and decomposers) based on their source of energy for growth and development.	**L.OL.06.51**					
Distinguish between the ways in which consumers and decomposers obtain energy.	**L.OL.06.52**					
Ecosystems	**EC**					
Interactions of Organisms- Organisms of one species form a population. Populations of different organisms interact and form communities. Living communities and nonliving factors that interact with them form ecosystems.	**L.EC.M.1**					
List examples of populations, communities, and ecosystems including the Great Lakes region.	**L.EC.06.11**					

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Relationships of Organisms- Two types of organisms may interact with one another in several ways: They may be in producer/consumer, predator/ prey, or parasite/host relationship. Some organisms may scavenge or decompose another. Relationships may be competitive or mutually beneficial. Some species have become so adapted to each other that neither could survive without the other.	**L.EC.M.2**					
Describe common patterns of relationships between and among populations (competition parasitism, symbiosis, predator/prey).	**L.EC.06.21**					
Explain how two populations of organisms can be mutually beneficial and how that can lead to interdependency.	**L.EC.06.22**					
Predict how changes in one population might affect other populations based upon their relationships in the food web.	**L.EC.06.23**					
Biotic and Abiotic Factors- The number of organisms and populations an ecosystem can support depends on the biotic (living) resources available and abiotic (nonliving) factors, such as quality of light and water, range of temperatures and soil composition.	**L.EC.M.3**					
Identify the living (biotic) and nonliving (abiotic) components of an ecosystem.	**L.EC.06.31**					
Identify the factors in an ecosystem that influence changes in population size.	**L.EC.06.32**					

Environmental Impact of Organisms- All organisms (including humans) cause change in the environment where they live. Some of the changes are harmful to the organism or other organisms, whereas others are helpful.	**L.EC.M.4**					
Describe how human beings are part of the ecosystem of the Earth and that human activity can purposefully, or accidentally, alter the balance in ecosystems.	**L.EC.06.41**					
Predict possible consequences of overpopulation of organisms, including humans, (for example: species extinction, resource depletion, climate change, pollution).	**L.EC.06.42**					
EARTH SCIENCE	**E**					
Solid Earth	**SE**					
Soil- Soils consist of weathered rocks and decomposed organic materials from dead plants, animals, and bacteria. Soils are often found in layers with each having a different chemical composition and texture.	**E.SE.M.1**					
Explain how physical and chemical weathering lead to erosion and the formation of soils and sediments.	**E.SE.06.11**					
Explain how waves, wind, water, and glacier movement, shape and reshape the land surface of the Earth by eroding rock in	**E.SE.06.12**					
some areas and depositing sediments in other areas.						
Describe how soil is a mixture, made up of weather eroded rock and decomposed organic material.	**E.SE.06.13**					
Compare different soil samples based on particle size and texture.	**E.SE.06.14**					
Rock Formation- Rocks and rock formations bear evidence of the minerals, materials, temperature/pressure conditions, and forces that created them.	**E.SE.M.4**					
Compare and contrast the formation of rock types (igneous, metamorphic, and sedimentary) and demonstrate the similarities and differences using the rock cycle model.	**E.SE.06.41**					
Plate Tectonics- The lithospheric plates of the Earth constantly move, resulting in major geological events, such as earthquakes, volcanic eruptions, and mountain building.	**E.SE.M.5**					

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Rock Formation- Rocks and rock formations bear evidence of the minerals, materials, temperature/pressure conditions, and forces that created them.	**E.SE.M.4**					
Explain plate tectonic movement and how the lithospheric plates move centimeters each year.	**E.SE.06.51**					
Demonstrate how major geological events (earthquakes, volcanic eruptions, mountain building) result from these plate motions.	**E.SE.06.52**					
Describe layers of the Earth as a lithosphere (crust and upper mantle), convecting mantle, and dense metallic core.	**E.SE.06.53**					
Magnetic Field of Earth- Earth as a whole has a magnetic field that is detectable at the surface with a compass.	**E.SE.M.6**					
Describe the Earth as a magnet and compare the magnetic properties of the Earth to that of a natural or man-made magnet.	**E.SE.06.61**					
Explain how a compass works using the magnetic field of the Earth, and how a compass is used for navigation on	**E.SE.06.62**					
Earth in Space and Time	**ST**					
E.ST.M.3 Fossils- Fossils provide important evidence of how	**S3.2***					
E.ST.06.31 Explain how rocks and fossils are used to understand the age and geological history of the earth (timelines and relative dating, rock layers	**S4**					
Magnetic Field of Earth- Earth as a whole has a magnetic field that is detectable at the surface with a compass.	**E.SE.M.6**					
Describe the Earth as a magnet and compare the magnetic properties of the Earth to that of a natural or man-made magnet.	**E.SE.06.61**					
Explain how a compass works using the magnetic field of the Earth, and how a compass is used for navigation on	**E.SE.06.62**					
Earth in Space and Time	**ST**					

Develop an understanding that the sun is the central and largest body in the solar system and that Earth and other objects in the sky move in a regular and predictable motion around the sun. Understand that those motions explain the day, year, moon phases, eclipses and the appearance of motion of objects across the sky. Understand that gravity is the force that keeps the planets in orbit around the sun and governs motion in the solar system. Develop an understanding that fossils and layers of Earth provide evidence of the history of Earth's life forms, changes over long periods of time, and theories regarding Earth's history and continental drift.	**E.ST**					
Fossils- Fossils provide important evidence of how life and environmental conditions have changed in a given location.	**E.ST.M.3**					
Explain how rocks and fossils are used to understand the age and geological history of the earth (timelines and relative dating, rock layers).	**E.ST.06.31**					
Geologic Time- Earth processes seen today (erosion, mountain building, and glacier movement) make possible the measurement of geologic time through methods such as observing rock sequences and using fossils to correlate the sequences at various locations.	**E.ST.M.4**					
Explain how Earth processes (erosion, mountain building, and glacier movement) are used for the measurement of geologic time through observing rock layers.	**E.ST.06.41**					
Describe how fossils provide important evidence of how life and environmental conditions have changed.	**E.ST.06.42**					