

**Hands On! Discovery Center**  
**List of Tennessee Science Curriculum Standards Met**

Curriculum standards are organized by Grade Level. Exhibits that meet each standard are listed in red.

(Updated January 2021)

**KINDERGARTEN: ACADEMIC STANDARDS**

**K.PS1: Matter and Its Interactions**

1) Plan and conduct an investigation to describe and classify different kinds of materials including wood, plastic, metal, cloth, and paper by their observable properties and whether they are natural or human-made.

Art Studio  
EverBlocks  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Rigamajig

2) Conduct investigations to understand that matter can exist in different states and has properties that can be observed and tested.

Air Cars  
Air Rockets  
Bernoulli Table  
Ring Launcher  
Sail Cars  
Topobox  
Tesla Experience  
Vertical Flyer

3) Construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.

Air Cars  
Air Rockets  
Circuit Bench  
EverBlocks  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table

**K.LS1: From Molecules to Organisms: Structures and Processes**

1) Use information from observations to identify differences between plants and animals.

Miocene Exhibit Hall  
Saltville Paleontology Hall  
Wentzscope

2) Recognize differences between living organisms and non-living materials and sort them into groups by observable physical attributes.

Miocene Exhibit Hall  
Saltville Paleontology Hall  
Wentzscope

3) Explain how humans use their five senses in making scientific findings.

Art Studio  
Brush and Floss  
Infinity Mirror  
Make It. Take It.  
Pin Wall  
PVC Pipe Organ  
Quantum Space  
Sail Cars  
Shake Table

**K.LS3.1: Heredity: Inheritance and Variation of Traits**

1) Make observations to describe that young plants and animals resemble their parents.

Miocene Exhibit Hall  
Saltville Paleontology Hall

**K.ESS2: Earth's Systems**

1) Analyze and interpret weather data to describe weather patterns that occur over time using simple graphs, pictorial weather symbols, and tools.

Miocene Exhibit Hall  
Topobox

2) Develop and use models to predict weather and identify patterns in spring, summer, autumn, and winter.

Topobox

**K.ESS3: Earth and Human Activity**

1) Use a model to represent the relationship between the basic needs of different plants and animals and the places they live.

Miocene Exhibit Hall

2) Explain the purpose of weather forecasting to prepare for, and respond to, severe weather in Tennessee.

Shake Table  
Topobox

3) Communicate solutions that will reduce the impact from humans on land, water, air, and other living things in the local environment.

Sail Cars  
Shake Table  
Topobox

**K.ETS1: Engineering Design**

1) Ask and answer questions about the scientific world and gather information using the senses.

Air Cars  
Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Miocene Exhibit Hall  
Pin Wall  
PVC Pipe Organ  
Quantum Space  
Rigamajig

Ring Launcher  
Sail Cars  
Saltville Paleontology Hall  
Shake Table  
Tesla Experience  
Topobox  
Vertical Flyer

**K.ETS2: Links Among Engineering, Technology, Science, and Society**

1) Use appropriate tools to make observations and answer testable scientific questions.

Air Cars  
Air Rockets  
Art Studio  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Miocene Exhibit Hall  
Pin Wall  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Saltville Paleontology Hall  
Shake Table  
Tesla Experience  
Topobox  
Vertical Flyer  
Wentzscope

## **FIRST GRADE: ACADEMIC STANDARDS**

### **1.PS3: Energy**

1) Make observations to determine how sunlight warms Earth's surfaces.

Miocene Exhibit Hall

Topobox

### **1.PS4: Waves and Their Application in Technologies for Information Transfer**

1) Use a model to describe how light is required to make objects visible. Summarize how illumination could be from an external light source or by an object giving off its own light.

Art Studio

Colorful Shadows

Everbright

Infinity Mirror

Quantum Space

Tesla Experience

2) Determine the effect of placing objects made with different materials (transparent, translucent, opaque, and reflective) in the path of a beam of light.

Art Studio

Colorful Shadows

Everbright

Infinity Mirror

Quantum Space

Tesla Experience

### **1.LS2: Ecosystems: Interactions, Energy, and Dynamics**

2) Obtain and communicate information to classify plants by where they grow and the plant's physical characteristics.

Miocene Exhibit Hall

3) Recognize how plants depend on their surroundings and other living things to meet their needs in the places they live.

Miocene Exhibit Hall

Saltville Paleontology Hall

### **1.ESS1: Earth's Place in the Universe**

1) Use observations or models of the sun, moon, and stars to describe patterns that can be predicted.

Gravity Dish

### **1.ETS1: Engineering Design**

1) Solve scientific problems by asking testable questions, making short-term and long-term observations, and gathering information.

Air Cars

Air Rockets

Bernoulli Table

Circuit Bench

Colorful Shadows

EverBlocks

Everbright

Gravity Dish

Imagination Playground

Infinity Mirror

Keva Planks

Kinetic Wall

Make It. Take It.

PVC Pipe Organ

Quantum Space

Rigamajig

Ring Launcher

Sail Cars  
Shake Table  
Tesla Experience  
Topobox  
Vertical Flyer

**1.ETS2: Links Among Engineering, Technology, Science, and Society**

1) Use appropriate tools to make observations and answer testable scientific questions.

Air Cars  
Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Miocene Exhibit Hall  
Pin Wall  
PVC Pipe Organ  
Quantum Space  
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Ring Launcher  
Sail Cars  
Saltville Paleontology Hall  
Shake Table  
Topobox  
Vertical Flyer  
Wentzscope

## **SECOND GRADE: ACADEMIC STANDARDS**

### **2.PS2: Motion and Stability: Forces and Interactions**

1) Analyze the push or the pull that occurs when objects collide or are connected.

Air Cars  
Air Rockets  
Circuit Bench  
Gravity Dish  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Pin Wall  
Rigamajig  
Ring Launcher  
Shake Table  
Vertical Flyer

2) Evaluate the effects of different strengths and directions of a push or a pull on the motion of an object.

Air Cars  
Air Rockets  
Circuit Bench  
EverBlocks  
Gravity Dish  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Pin Wall  
Rigamajig  
Ring Launcher  
Shake Table  
Vertical Flyer

3) Recognize the effect of multiple pushes and pulls on an object's movement or non-movement.

Air Cars  
Air Rockets  
Circuit Bench  
EverBlocks  
Gravity Dish  
Kinetic Wall  
Imagination Playground  
Keva Planks  
Make It. Take It.  
Pin Wall  
Rigamajig  
Ring Launcher  
Shake Table  
Vertical Flyer

### **2.PS3: Energy**

1) Demonstrate how a stronger push or pull makes things go faster and how faster speeds during a collision can cause a bigger change in the shape of the colliding objects.

Air Cars  
Air Rockets  
Gravity Dish  
Kinetic Wall

Imagination Playground  
Keva Planks  
Pin Wall  
Rigamajig  
Ring Launcher  
Shake Table  
Vertical Flyer

2) Make observations and conduct experiments to provide evidence that friction produces heat and reduces or increases the motion of an object.

Air Cars  
Air Rockets  
Circuit Bench  
EverBlocks  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Vertical Flyer

#### **2.PS4: Waves and Their Applications in Technologies for Information Transfer**

1) Plan and conduct investigations to demonstrate the cause and effect relationship between vibrating materials and sound.

PVC Pipe Organ  
Shake Table

2) Use tools and materials to design and build a device to understand that light and sound travel in waves and can send signals over a distance.

Art Studio  
Colorful Shadows  
Everbright  
PVC Pipe Organ  
Quantum Space

3) Observe and demonstrate that waves move in regular patterns of motion by disturbing the surface of shallow and deep water.

Topobox

#### **2.LS1: From Molecules to Organisms: Structures and Processes**

1) Use evidence and observations to explain that many animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air.

Brush and Floss  
Miocene Exhibit Hall  
Saltville Paleontology Hall  
Wentzscope

2) Obtain and communicate information to classify animals based on their physical characteristics.

Miocene Exhibit Hall  
Saltville Paleontology Hall  
Wentzscope

3) Use simple graphical representations to show that species have unique and diverse life cycles.

Miocene Exhibit Hall

#### **2.LS2: Ecosystems: Interactions, Energy, and Dynamics**

1) Develop and use models to compare how animals depend on their surroundings and other living things to meet their needs in the places they live.

Miocene Exhibit Hall  
Saltville Paleontology Hall

2) Predict what happens to animals when the environment changes.

Miocene Exhibit Hall  
Saltville Paleontology Hall

### **2.LS3: Heredity: Inheritance and Variation of Traits**

1) Use evidence to explain that living things have physical traits inherited from parents and that variations of these traits exist in groups of similar organisms.

Miocene Exhibit Hall  
Saltville Paleontology Hall

### **2.ESS1: Earth's Place in the Universe**

1) Recognize that some of Earth's natural processes are cyclical, while others have a beginning and an end. Some events happen quickly, while others occur slowly over time.

Miocene Exhibit Hall  
Saltville Paleontology Hall  
Shake Table  
Topobox

### **2.ESS2: Earth's Systems**

1) Compare the effectiveness of multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

Topobox

2) Observe and analyze how blowing wind and flowing water can move Earth materials from one place to another, changing the shape of a landform and affecting the habitats of living things.

Miocene Exhibit Hall  
Topobox

### **2.ETS1: Engineering Design**

1) Define a simple problem that can be solved through the development of a new or improved object or tool by asking questions, making observations, and gather accurate information about a situation people want to change.

Air Cars  
Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Kinetic Wall  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Make It. Take It.  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Vertical Flyer

2) Develop a simple sketch, drawing, or physical model that communicates solutions to others.

Air Cars  
Air Rockets



Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Vertical Flyer

3) Recognize that to solve a problem, one may need to break the problem into parts, address each part, and then bring the parts back together

Air Cars  
Air Rockets  
Circuit Bench  
EverBlocks  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Rigamajig  
Sail Cars  
Shake Table  
Vertical Flyer

4) Compare and contrast solutions to a design problem by using evidence to point out strengths and weaknesses of the design.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Vertical Flyer

## **2.ETS2: Links Among Engineering, Technology, Science, and Society**

1) Use appropriate tools to make observations, record data, and refine design ideas.

Air Cars

Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Miocene Exhibit Hall  
Pin Wall  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Saltville Paleontology Hall  
Shake Table  
Tesla Experience  
Topobox  
Vertical Flyer

2) Predict and explain how human life and the natural world would be different without current technologies.

Air Cars  
Air Rockets  
Brush and Floss  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Topobox  
Vertical Flyer

### **THIRD GRADE: ACADEMIC STANDARDS**

#### **3.PS1: Matter and Its Interactions**

1) Describe the properties of solids, liquids, and gases and identify that matter is made up of particles too small to be seen.

Bernoulli Table

Circuit Bench

Tesla Experience

Topobox

2) Differentiate between changes caused by heating or cooling that can be reversed and that cannot.

Circuit Bench

Tesla Experience

Topobox

3) Describe and compare the physical properties of matter including color, texture, shape, length, mass, temperature, volume, state, hardness, and flexibility.

Art Studio

Bernoulli Table

Circuit Bench

Colorful Shadows

EverBlocks

Everbright

Imagination Playground

Infinity Mirror

Keva Planks

Kinetic Wall

Make It. Take It.

Pin Wall

Quantum Space

Rigamajig

Tesla Experience

Topobox

#### **3.PS2: Motion and Stability: Forces and Interactions**

1) Explain the cause and effect relationship of magnets.

Circuit Bench

Ring Launcher

Tesla Experience

#### **3.PS3: Energy**

1) Recognize that energy is present when objects move; describe the effects of energy transfer from one object to another.

Air Cars

Air Rockets

Bernoulli Table

Circuit Bench

Gravity Dish

Imagination Playground

Keva Planks

Kinetic Wall

Make It. Take It.

Pin Wall

Quantum Space

Rigamajig

Ring Launcher

Sail Cars

Shake Table

Tesla Experience

Vertical Flyer

2) Apply scientific ideas to design, test, and refine a device that converts electrical energy to another form of energy, using open or closed simple circuits.

Circuit Bench

Tesla Experience

3) Evaluate how magnets cause changes in the motion and position of objects, even when the objects are not touching the magnet.

Circuit Bench

Ring Launcher

Tesla Experience

### **3.LS1: From Molecules to Organisms: Structures and Processes**

1) Analyze the internal and external structures that aquatic and land animals and plants have to support survival, growth, behavior, and reproduction

Miocene Exhibit Hall

Saltville Paleontology Hall

Wentzscope

### **3.LS2: Ecosystems: Interactions, Energy, and Dynamics**

1) Construct an argument to explain why some animals benefit from forming groups.

Miocene Exhibit Hall

Saltville Paleontology Hall

### **3.LS4: Biological Change: Unity and Diversity**

1) Explain the cause and effect relationship between a naturally changing environment and an organism's ability to survive.

Miocene Exhibit Hall

Saltville Paleontology Hall

2) Infer that plant and animal adaptations help them survive in land and aquatic biomes.

Miocene Exhibit Hall

Saltville Paleontology Hall

### **3.ESS2: Earth's Systems**

1) Explain the cycle of water on Earth.

Topobox

### **3.ESS3: Earth and Human Activity**

1) Explain how natural hazards impact humans and the environment.

Topobox

Shake Table

2) Design solutions to reduce the impact of natural hazards on the environment.

Topobox

Shake Table

### **3.ETS1: Engineering Design**

1) Design a solution to a real-world problem that includes specified criteria for constraints.

Air Cars

Air Rockets

Circuit Bench

Colorful Shadows

EverBlocks

Everbright

Gravity Dish

Kinetic Wall

Imagination Playground

Infinity Mirror

Keva Planks

Make It. Take It.

PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Vertical Flyer

**3.ETS2: Links Among Engineering, Technology, Science, and Society**

1) Identify and demonstrate how technology can be used for different purposes.

Air Cars  
Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Pin Wall  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

## **FOURTH GRADE: ACADEMIC STANDARDS**

### **4.PS3: Energy**

1) Use evidence to explain the cause and effect relationship between the speed of an object and the energy of an object.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
Gravity Dish  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

2) Observe and explain the relationship between potential energy and kinetic energy.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
EverBlocks  
Gravity Dish  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

3) Describe how stored energy can be converted into another form for practical use.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
Ring Launcher  
Sail Cars  
Tesla Experience  
Vertical Flyer

### **4.PS4: Waves and their Application in Technologies for Information Transfer**

1) Use a model of a simple wave to explain regular patterns of amplitude, wavelength, and direction.

Gravity Dish  
PVC Pipe Organ  
Shake Table  
Tesla Experience

2) Describe how the colors of available light sources and the bending of light waves determine what we see.

Colorful Shadows  
Everbright

Infinity Mirror  
Quantum Space  
Tesla Experience

3) Investigate how lenses and digital devices like computers or cell phones use waves to enhance human senses.

Infinity Mirror  
Quantum Space  
Tesla Experience

#### **4.LS2: Ecosystems: Interactions, Energy, and Dynamics**

3) Using information about the roles of organisms, evaluate how those roles in food chains are interconnected in a food web, and communicate how the organisms are continuously able to meet their needs in a food web.

Miocene Exhibit Hall  
Saltville Paleontology Hall

4) Develop and use models to determine the effects of introducing a species to, or removing a species from, an ecosystem and how either one can damage the balance of an ecosystem.

Miocene Exhibit Hall  
Saltville Paleontology Hall

5) Analyze and interpret data about changes in the environment and describe what mechanisms organisms can use to affect their ability to survive and reproduce.

Miocene Exhibit Hall  
Saltville Paleontology Hall

#### **4.LS4: Biological Change: Unity and Diversity**

1) Obtain information about what a fossil is and ways a fossil can provide information about the past.

Miocene Exhibit Hall  
Saltville Paleontology Hall

#### **4.ESS1: Earth's Place in the Universe**

1) Generate and support a claim with evidence that over long periods of time, erosion and deposition have changed landscapes and created new landforms.

Miocene Exhibit Hall  
Shake Table  
Topobox

2) Use a model to explain how the orbit of the Earth and sun cause observable patterns: a. day and night; b. changes in length and direction of shadows over a day.

Gravity Dish

#### **4.ESS2: Earth's Systems**

1) Collect and analyze data from observations to provide evidence that rocks, soils, and sediments are broken into smaller pieces through mechanical weathering and are transported by water, ice, wind, gravity, and vegetation.

Miocene Exhibit Hall  
Shake Table

2) Interpret maps to determine that the location of mountain ranges, deep ocean trenches, volcanoes, and earthquakes occur in patterns.

Shake Table

3) Provide examples to support the claim that organisms affect the physical characteristics of their regions.

Miocene Exhibit Hall  
Saltville Paleontology Hall

#### **4.ETS1: Engineering Design**

1) Categorize the effectiveness of design solutions by comparing them to specified criteria for constraints.

Air Cars  
Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
Colorful Shadows

EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

#### **4.ETS2: Links Among Engineering, Technology, Science, and Society**

1) Use appropriate tools and measurements to build a model.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Vertical Flyer

2) Determine the effectiveness of multiple solutions to a design problem given the criteria and the constraints.

Air Cars  
Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.



PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

3) Explain how engineers have improved existing technologies to increase their benefits, to decrease known risks, and to meet societal demands.

Air Cars  
Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

## **FIFTH GRADE: ACADEMIC STANDARDS**

### **5.PS1: Matter and Its Interactions**

1) Analyze and interpret data from observations and measurements of the physical properties of matter to explain phase changes between a solid, liquid, or gas.

Bernoulli Table

Circuit Bench

Tesla Experience

Topobox

### **5.PS2: Motion and Stability: Forces and Interactions**

1) Test the effects of balanced and unbalanced forces on the speed and direction of motion of objects.

Air Cars

Air Rockets

Bernoulli Table

Brush and Floss

Circuit Bench

EverBlocks

Gravity Dish

Imagination Playground

Keva Planks

Kinetic Wall

Make It. Take It.

Rigamajig

Ring Launcher

Sail Cars

Shake Table

Tesla Experience

Vertical Flyer

2) Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Air Cars

Air Rockets

Bernoulli Table

Circuit Bench

EverBlocks

Gravity Dish

Imagination Playground

Keva Planks

Kinetic Wall

Quantum Space

Rigamajig

Ring Launcher

Sail Cars

Shake Table

Tesla Experience

Vertical Flyer

3) Use evidence to support that the gravitational force exerted by Earth on objects is directed toward the Earth's center.

Gravity Dish

4) Explain the cause and effect relationship of two factors that affect gravity.

Air Cars

Air Rockets

Bernoulli Table

Gravity Dish

Kinetic Wall  
Ring Launcher  
Vertical Flyer

5) Explain how forces can create patterns within a system and describe conditions that affect how fast or slowly these patterns occur.

Air Cars  
Air Rockets  
Circuit Bench  
Gravity Dish  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

#### **5.LS3: Heredity: Inheritance and Variation of Traits**

1) Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment. Apply this concept by giving examples of characteristics of living organisms that are influenced by both inheritance and the environment.

Miocene Exhibit Hall  
Saltville Paleontology Hall

2) Provide evidence and analyze data that plants and animals have traits inherited from parents and that variations of these traits exist in a group of similar organisms.

Miocene Exhibit Hall  
Saltville Paleontology Hall

#### **5.LS4: Biological Change: Unity and Diversity**

1) Analyze and interpret data from fossils to describe types of organisms and their environments that existed long ago. Compare similarities and differences of those to living organisms and their environments. Recognize that most kinds of animals (and plants) that once lived on Earth are now extinct.

Miocene Exhibit Hall  
Saltville Paleontology Hall

2) Use evidence to construct an explanation for how variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.

Miocene Exhibit Hall  
Saltville Paleontology Hall

#### **5.ESS1: Earth's Place in the Universe**

2) Research and explain the position of the Earth and the solar system within the Milky Way galaxy, and compare the size and shape of the Milky Way to other galaxies in the universe.

Gravity Dish

4) Explain the cause and effect relationship between the positions of the sun, earth, and moon and resulting eclipses, position of constellations, and appearance of the moon.

Gravity Dish

6) Use tools to describe how stars and constellations appear to move from the Earth's perspective throughout the seasons.

Gravity Dish

7) Use evidence from the presence and location of fossils to determine the order in which rock strata were formed.

Miocene Exhibit Hall  
Saltville Paleontology Hall

#### **5.ETS1: Engineering Design**

1) Research, test, re-test, and communicate a design to solve a problem.

Air Cars  
Air Rockets  
Bernoulli Table

Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Vertical Flyer

2) Plan and carry out tests on one or more elements of a prototype in which variables are controlled and failure points are considered to identify which elements need to be improved. Apply the results of tests to redesign the prototype.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Vertical Flyer

3) Describe how failure provides valuable information toward finding a solution.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
Colorful Shadows  
EverBlocks  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall

Make It. Take It.  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

#### 5.ETS2: Links Among Engineering, Technology, Science, and Society

1) Use appropriate measuring tools, simple hand tools, and fasteners to construct a prototype of a new or improved technology.

Air Cars  
Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
EverBlocks  
Gravity Dish  
Kinetic Wall  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Make It. Take It.  
PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Vertical Flyer

2) Describe how human beings have made tools and machines to observe and do things that they could not otherwise sense or do at all, or as quickly or efficiently.

Air Cars  
Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
Colorful Shadows  
EverBlock  
Everbright  
Gravity Dish  
Imagination Playground  
Infinity Mirror  
Keva Planks  
Kinetic Wall  
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PVC Pipe Organ  
Quantum Space  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table

Tesla Experience

Vertical Flyer

3) Identify how scientific discoveries lead to new and improved technologies.

Air Cars

Air Rockets

Bernoulli Table

Brush and Floss

Circuit Bench

Colorful Shadows

EverBlocks

Everbright

Gravity Dish

Imagination Playground

Infinity Mirror

Keva Planks

Kinetic Wall

Make It. Take It.

PVC Pipe Organ

Quantum Space

Rigamajig

Ring Launcher

Sail Cars

Shake Table

Tesla Experience

Vertical Flyer

## SIXTH GRADE: ACADEMIC STANDARDS

### 6.PS3: Energy

1) Analyze the properties and compare sources of kinetic, elastic potential, gravitational potential, electric potential, chemical, and thermal energy.

Air Cars  
Air Rockets  
Bernoulli Table  
Brush and Floss  
Circuit Bench  
EverBlocks  
Gravity Dish  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

2) Construct a scientific explanation of the transformations between potential and kinetic energy.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
EverBlocks  
Gravity Dish  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

3) Analyze and interpret data to show the relationship between kinetic energy and the mass of an object in motion and its speed.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
EverBlocks  
Gravity Dish  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Rigamajig  
Sail Cars  
Vertical Flyer

4) Conduct an investigation to demonstrate the way that heat moves among objects through radiation, conduction, or convection.

Circuit Bench

Ring Launcher  
Sail Cars  
Tesla Experience  
Topobox

#### **6.LS2: Ecosystems: Interactions, Energy, and Dynamics**

1) Evaluate and communicate the impact of environmental variables on population size.

Miocene Exhibit Hall  
Saltville Paleontology Hall

2) Determine the impact of competitive, symbiotic, and predatory interactions in an ecosystem.

Miocene Exhibit Hall  
Saltville Paleontology Hall

4) Using evidence from climate data, draw conclusions about the patterns of abiotic and biotic factors in different biomes, specifically the tundra, taiga, deciduous forest, desert, grasslands, rainforest, marine, and freshwater ecosystems.

Miocene Exhibit Hall  
Saltville Paleontology Hall  
Tornado Vortex

6) Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.

Miocene Exhibit Hall  
Saltville Paleontology Hall

#### **6.LS4: Biological Change: Unity and Diversity**

1) Explain how changes in biodiversity would impact ecosystem stability and natural resources.

Miocene Exhibit Hall  
Saltville Paleontology Hall

#### **6.ESS2: Earth's Systems**

5) Analyze and interpret data from weather conditions, weather maps, satellites, and radar to predict probable local weather patterns and conditions.

Topobox  
Shake Table

6) Explain how relationships between the movement and interactions of air masses, high and low pressure systems, and frontal boundaries result in weather conditions and severe storms.

Topobox

#### **6.ESS3: Earth and Human Activity**

2) Investigate and compare existing and developing technologies that utilize renewable and alternative energy resources.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
Ring Launcher  
Sail Cars  
Vertical Flyer

#### **6.ETS1: Engineering Design**

2) Design and test different solutions that impact energy transfer.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
Gravity Dish  
EverBlocks  
Imagination Playground



Keva Planks  
Kinetic Wall  
Make It. Take It.  
Pin Wall  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Vertical Flyer

## **SEVENTH GRADE: ACADEMIC STANDARDS**

### **7.PS1: Matter and Its Interactions**

3) Classify matter as pure substances or mixtures based on composition.

[Tesla Experience](#)

5) Use the periodic table as a model to analyze and interpret evidence relating to physical and chemical properties to identify a sample of matter.

[Tesla Experience](#)

6) Create and interpret models of substances whose atoms represent the states of matter with respect to temperature and pressure.

[Tesla Experience](#)

### **7.ESS3: Earth and Human Activity**

1) Graphically represent the composition of the atmosphere as a mixture of gases and discuss the potential for atmospheric change.

[Topobox](#)

2) Engage in a scientific argument through graphing and translating data regarding human activity and climate.

[Topobox](#)

## **EIGHTH GRADE: ACADEMIC STANDARDS**

### **8.PS2: Motion and Stability: Forces and Interactions**

1) Design and conduct investigations depicting the relationship between magnetism and electricity in electromagnets, generators, and electrical motors, emphasizing the factors that increase or diminish the electric current and the magnetic field strength.

Circuit Bench

Gravity Dish

Ring Launcher

Tesla Experience

2) Conduct an investigation to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

Circuit Bench

Gravity Dish

Ring Launcher

Tesla Experience

3) Create a demonstration of an object in motion and describe the position, force, and direction of the object.

Air Cars

Air Rockets

Bernoulli Table

Brush and Floss

Circuit Bench

EverBlocks

Gravity Dish

Imagination Playground

Keva Planks

Kinetic Wall

Make It. Take It.

Pin Wall

Quantum Space

Rigamajig

Ring Launcher

Sail Cars

Shake Table

Tesla Experience

Vertical Flyer

4) Plan and conduct an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

Air Cars

Air Rockets

Bernoulli Table

Circuit Bench

EverBlocks

Gravity Dish

Kinetic Wall

Pin Wall

Quantum Space

Rigamajig

Ring Launcher

Sail Cars

Shake Table

Tesla Experience

Vertical Flyer

5) Evaluate and interpret that for every force exerted on an object there is an equal force exerted in the opposite direction.

Air Cars  
Air Rockets  
Bernoulli Table  
Circuit Bench  
EverBlocks  
Gravity Dish  
Imagination Playground  
Keva Planks  
Kinetic Wall  
Make It. Take It.  
Pin Wall  
Rigamajig  
Ring Launcher  
Sail Cars  
Shake Table  
Tesla Experience  
Vertical Flyer

#### **8.PS4: Waves and Their Applications in Technologies for Information Transfer**

1) Develop and use models to represent the basic properties of waves including frequency, amplitude, wavelength, and speed.

PVC Pipe Organ  
Sail Cars  
Shake Table

2) Compare and contrast mechanical waves and electromagnetic waves based on refraction, reflection, transmission, absorption, and their behavior through a vacuum and/or various media.

Tesla Experience

3) Evaluate the role that waves play in different communication systems.

PVC Pipe Organ  
Shake Table  
Tesla Experience

#### **8.LS4: Biological Change: Unity and Diversity**

1) Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change in life forms throughout Earth's history.

Miocene Exhibit Hall

3) Analyze evidence from geology, paleontology, and comparative anatomy to support that specific phenotypes within a population can increase the probability of survival of that species and lead to adaptation.

Miocene Exhibit Hall  
Saltville Paleontology Hall

4) Develop a scientific explanation of how natural selection plays a role in determining the survival of a species in a changing environment.

Miocene Exhibit Hall  
Saltville Paleontology Hall

#### **8.ESS1: Earth's Place in the Universe**

1) Research, analyze, and communicate that the universe began with a period of rapid expansion using evidence from the motion of galaxies and composition of stars.

Gravity Dish

2) Explain the role of gravity in the formation of our sun and planets. Extend this explanation to address gravity's effect on the motion of celestial objects in our solar system and Earth's ocean tides.

Gravity Dish

#### **8.ESS2: Earth's Systems**

2) Evaluate data collected from seismographs to create a model of Earth's structure.

[Shake Table](#)

4) Gather and evaluate evidence that energy from the earth's interior drives convection cycles within the asthenosphere which creates changes within the lithosphere including plate movements, plate boundaries, and sea-floor spreading.

[Shake Table](#)

5) Construct a scientific explanation using data that explains the gradual process of plate tectonics accounting for A) the distribution of fossils on different continents, B) the occurrence of earthquakes, and C) continental and ocean floor features (including mountains, volcanoes, faults, and trenches).

[Miocene Exhibit Hall](#)

[Shake Table](#)

### **8.ESS3: Earth and Human Activity**

1) Interpret data to explain that earth's mineral, fossil fuel, and groundwater resources are unevenly distributed as a result of geologic processes.

[Miocene Exhibit Hall](#)

2) Collect data, map, and describe patterns in the locations of volcanoes and earthquakes related to tectonic plate boundaries, interactions, and hotspots.

[Shake Table](#)

### **8.ETS1: Engineering Design**

2) Research and communicate information to describe how data from technologies provide information about objects in the solar system and universe.

[Air Rockets](#)

[Bernoulli Table](#)

[Topobox](#)