

SAN DIEGO CHILDREN'S DISCOVERY MUSEUM

BALL WALL

Children discover the fundamentals of physics by learning through play with this custom built magnetic Ball Wall. By arranging magnetic tracks into patterns, children must experiment with gravity, inertia, and slope to help a ball travel from one end of the wall to the other.

Create a path from one side of the wall to the other.

Create two paths for the ball and compare them.

Pre-K—Kindergarten

1st Grade — 5th Grade

2.0 Changes in Nonliving Objects and Materials (continued) 2.2
Observe and describe the motion of objects (in terms of speed, direction, the ways things move), and explore the effect of own actions (e.g., pushing pulling, rolling, dropping) on making objects move.
K-PS2-1 Motion and Stability: Forces and Interactions
Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
K-PS2-2 Motion and Stability: Forces and Interactions
Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.*
K-2-ETS1-3 Engineering Design
Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

K-2-ETS1-3 Engineering Design
Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
2-PS1-3 Matter and Its Interactions
Make observations to 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.
3-PS2-1 Motion and Stability: Forces and Interactions
Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
3-PS2-2 Motion and Stability: Forces and Interactions
Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
4-PS3-1 Energy
Use evidence to construct an explanation relating the speed of an object to the energy of that object.
4-PS3-3 Energy
Ask questions and predict outcomes about the changes in energy that occur when objects collide.
5-PS2-1 Motion and Stability: Forces and Interactions
Support an argument that the gravitational force exerted by Earth on objects is directed down.

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CIRCUITS

Snap Circuits is a kit with pieces that snap together to create complete circuits. Children can easily follow projects to turn on a light bulb, make a fan spin, and even create sounds! This exhibit is a great way for children to learn about electricity, engineering, and circuits.

Complete a closed circuit.
(Try challenges 1 and 2)

Complete a closed circuit.
(Try challenges 19 and 20)

Kindergarten—1st Grade

2nd Grade – 5th Grade

K-2-ETS1-1 Engineering Design

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

2-PS1-3 Matter and Its Interactions

Make observations to 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.

3-PS2-3 Motion and Stability: Forces and Interactions

Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

4-PS3-2 Energy

Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

4-PS3-4 Energy

Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

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CODING

With colored markers, paper and real robots called Ozobots, children discover the magic of coding, computer engineering, robotics, and the importance of testing and improving their designs.

Design a path for your Ozobot using 3 codes.

Who can design a path for their Ozobot with the widest variety of codes?

1st Grade—2nd Grade

3rd Grade – 5th Grade

K-2-ETS1-1 Engineering Design

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-3 Engineering Design

Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

K-2-ETS1-2 Engineering Design

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

4-PS4-3 Waves and Their Applications in Technologies for Information Transfer

Generate and compare multiple solutions that use patterns to transfer information.*

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IMAGINATION PLAYGROUND

With these unique foam blocks, children discover the fundamentals of architecture and energy. They put their collaboration skills to the test as they work together to complete a challenge. They must use their imaginations to build a structure big enough to fit one person inside!

Build the highest tower.	Build a fort that protects the person inside.	Who can build the highest tower using the least amount of pieces?
Pre-K—Kindergarten	1st Grade — 2nd Grade	3rd Grade — 5th Grade
<p>K-2-ETS1-1 Engineering Design Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <p>K-2-ETS1-2 Engineering Design Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <p>K-2-ETS1-3 Engineering Design Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p>	<p>2-PS1-2 Matter and Its Interactions Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.</p> <p>2-PS1-3 Matter and Its Interactions Make observations to 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.</p> <p>K-2-ETS1-1 Engineering Design Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <p>K-2-ETS1-2 Engineering Design Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p>	<p>3-5-ETS1-3 Engineering Design Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p> <p>3-5-ETS1-2 Engineering Design Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p>

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KEVA PLANK

These small wooden planks provide children the opportunity to experience gravity and the principals of civil engineering in action. Children are challenged to use their imagination and attention to detail to create a sturdy structure!

Build a house that will not fall down.

In one minute, build a house using 20 Keva Planks that will not fall down.

Kindergarten—1st Grade

2nd Grade — 5th Grade

K-PS2-1 Motion and Stability: Forces and Interactions

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

K-2-ETS1-2 Engineering Design

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

2-PS1-3 Matter and Its Interactions

Make observations to 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.

K-2-ETS1-2 Engineering Design

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

3-5-ETS1-3 Engineering Design

Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

3-5-ETS1-1 Engineering Design

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

5-PS2-1 Motion and Stability: Forces and Interactions

Support an argument that the gravitational force exerted by Earth on objects is directed down.

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LEPAO BLOCKS

Lepao Blocks are an exciting and engaging way for even the youngest child to build, test and improve their original designs. Children use their curiosity to discover the basics of engineering through tinkering and play!

Build something new.

Pre-K—Kindergarten

2.0 Changes in Nonliving Objects and Materials

2.1 Demonstrate awareness that objects and materials can change; explore and describe changes in objects and materials (rearrangement of parts; change in color, shape, texture, temperature).

2.0 Changes in Nonliving Objects and Materials (continued)

2.2 Observe and describe the motion of objects (in terms of speed, direction, the ways things move), and explore the effect of own actions (e.g., pushing pulling, rolling, dropping) on making objects move.

K-2-ETS1-1 Engineering Design

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 Engineering Design

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

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RAMPS

Playing with ramp systems helps children explore and discover how structure affects elevation, speed, distance, and motion. This collection of loose parts can be combined in many different ways, making the construction possibilities endless!

Build a roller-coaster.

Build a roller-coaster with a loop that ends in the crate.

Pre-K—2nd Grade

3rd Grade — 5th Grade

2.0 Changes in Nonliving Objects and Materials (continued)

2.2 Observe and describe the motion of objects (in terms of speed, direction, the ways things move), and explore the effect of own actions (e.g., pushing pulling, rolling, dropping) on making objects move.

K-PS2-1 Motion and Stability: Forces and Interactions

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

K-PS2-2 Motion and Stability: Forces and Interactions

Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.*

K-2-ETS1-2 Engineering Design

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

2-PS1-3 Matter and Its Interactions

Make observations to 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.

3-PS2-1 Motion and Stability: Forces and Interactions

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

3-PS2-2 Motion and Stability: Forces and Interactions

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

4-PS3-1 Energy

Use evidence to construct an explanation relating the speed of an object to the energy of that object.

4-PS3-3 Energy

Ask questions and predict outcomes about the changes in energy that occur when objects collide.

5-PS2-1 Motion and Stability: Forces and Interactions

Support an argument that the gravitational force exerted by Earth on objects is directed down.

3-5-ETS1-2 Engineering Design

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3 Engineering Design

Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

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RIGAMAJIG

This set of wooden planks, wheels, pulleys, nuts, bolts and rope allows children to learn about engineering and craftsmanship through tinkering and play. Children get hands-on experience problem solving and building whatever they can imagine!

Build a machine that does a job.

Build a machine that moves.

2nd Grade

3rd Grade – 5th Grade

K-2-ETS1-1 Engineering Design

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

2-PS1-3 Matter and Its Interactions

Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made

3-PS2-1 Motion and Stability: Forces and Interactions

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

4-PS3-3 Energy

Ask questions and predict outcomes about the changes in energy that occur when objects collide.

5-PS2-1 Motion and Stability: Forces and Interactions

Support an argument that the gravitational force exerted by Earth on objects is directed down.

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ROKENBOK

These unique blocks come in many shapes and sizes, can be attached at all angles, and move to allow children to imagine and create anything they can think of! Children learn about simple machines, mechanical engineering, physics, and much more!

Build a town.

Build a community with vehicles.

1st Grade—2nd Grade

3rd Grade — 5th Grade

K-2-ETS1-1 Engineering Design

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 Engineering Design

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

2-PS1-1 Matter and Its Interactions

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

2-PS1-2 Matter and Its Interactions

Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

2-PS1-3 Matter and Its Interactions

Make observations to 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.

K-2-ETS1-1 Engineering Design

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 Engineering Design

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3 Engineering Design

Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

3-PS2-1 Motion and Stability: Forces and Interactions

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

3-5-ETS1-2 Engineering Design

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

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WATER TABLE

This SDCDM designed and built exhibit gives children the sensory experience of playing with water while designing and building their own structures. Children learn firsthand about buoyancy and water flow and put their problem solving skills to the test!

Build a bridge.	Build the fastest path for the boat.	Build a city with the fastest path for the boat.
Pre-K—Kindergarten	1st Grade — 2nd Grade	3rd Grade — 5th Grade
<p>K-2-ETS1-3 Engineering Design Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p> <p>K-2-ETS1-2 Engineering Design Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p>	<p>2-PS1-3 Matter and Its Interactions Make observations to 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.</p> <p>K-2-ETS1-3 Engineering Design Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p>	<p>3-PS2-1 Matter and Its Interactions Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.</p> <p>3-PS2-2 Matter and Its Interactions Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. meet the criteria and constraints of the problem.</p> <p>4-ESS2-2 Engineering Design Analyze and interpret data from maps to describe patterns on Earth's features.</p> <p>5-PS2-1 Motion and Stability: Forces and Interactions Support an argument that the gravitational force exerted by Earth on objects is directed down.</p>

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WIND TUNNEL

This SDCDM designed and built exhibit allows children to experiment with aerodynamics by exploring how lift, drag, and air pressure affect a flying object. Children launch a scarf or handmade object into the wind tunnel and watch as it floats to the top or gets stuck at the bottom!

<p>Launch your scarf and try to catch it as it floats down.</p>	<p>Build a flying machine and help it take off.</p>	<p>Design the fastest flying machine.</p>
<p>Pre-K</p>	<p>Kindergarten – 3rd Grade</p>	<p>4th Grade – 5th Grade</p>
<p>1.0 Observation and Investigation 1.1 Demonstrate curiosity and raise simple questions about objects and events in their environment. 1.0 Properties and Characteristics of Nonliving Objects and Materials 1.1 Observe, investigate, and identify the characteristics and physical properties of objects and of solid and non-solid materials (size, weight, shape, color, texture, and sound) 2.0 Changes in Nonliving Objects and Materials (continued) 2.2 Observe and describe the motion of objects (in terms of speed, direction, the ways things move), and explore the effect of own actions (e.g., pushing pulling, rolling, dropping) on making objects move.</p>	<p>K-2-ETS1-3 Engineering Design Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. 3-5-ETS1-3 Engineering Design Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. 2-PS1-2 Structure and Properties of Matter Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.* 3-PS2-1 Motion and Stability: Forces and Interactions Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. 3-PS2-2 Motion and Stability: Forces and Interactions Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.</p>	<p>5-PS2-1 Motion and Stability: Forces and Interactions Support an argument that the gravitational force exerted by Earth on objects is directed down. 3-5-ETS1-2 Engineering Design Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3 Engineering Design Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p>