



# EDUCATOR'S GUIDE

## THE FLOOR IS LAVA AND MOVE IT!

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EDUCATOR RESOURCES

FIELD TRIP ACTIVITIES:  
BEFORE AND DURING

CURRICULUM  
STANDARDS





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## About

This guide is a resource to enrich your and your students' experience before and during your visit to Discovery Lab.

## Main Hall: *The Floor is Lava*

The Floor is Lava will create seven engaging exhibit components that encourage critical thinking, communication, and problem-solving in students as they learn about friction, force, angles, and physical activity.

Occupying 2,000 square feet of the museum's Main Exhibit Hall, the design, development, and fabrication of this exhibit's experiences are designed to engage children ages 2-12 and their caregivers in concepts of physics and engineering as they relate to physical movement.

## Featured Hall: *Move It!*

*Move It!* is an active and surprising exhibition that is always in motion. The space is inspired by fun kinesthetic experiences and classic physics concepts that come together in ways that delight visitors of all ages. Families add their energy to the space, transforming the hall as they explore. Kids feel physics through full-body activities and see math and science in their own bodies as they play. The *Move It!* exhibits will help visitors build processing skills critical to today's world—creativity, innovation, critical thinking, problem-solving, communication, and collaboration.



## Process Skills Framework

These process skills are adapted from Institute of Museum & Library Services 21st Century Skills. Discovery Lab's original exhibits and educational curriculum are based on these six areas—giving children skills for life-long learning in addition to content knowledge.

### CRITICAL THINKING and PROBLEM SOLVING

- Ask questions
- Reason effectively
- Test ideas and hunches
- Gather more precise information
- Link actions and effects
- Work out possible solutions
- Draw conclusions

### COLLABORATION and COMMUNICATION

- Share objects and ideas
- Work toward a common goal
- Stay on task
- Listen and talk
- Build on the work of others

### CREATIVITY and INNOVATION

- Imagine
- Generate ideas
- Make unusual connections
- Try another approach
- Apply information to new situations
- Experience materials/objects in varied ways

## Connecting with the Classroom

Build background knowledge with your students before your trip to Discovery Lab.

### PRE-TRIP ACTIVITIES

Activate your students' prior knowledge by asking them the following questions and reviewing the vocabulary words.

#### *The Floor is Lava*

##### DISCUSSION QUESTIONS

- Can you show me what it means to be "in motion" or "at rest?"
- How do bowling pins react before/after being hit by a ball? How does the ball react?
- Do you know who Isaac Newton is? What was he famous for discovering?
- What takes more energy, rolling down a hill or jumping into the air? Why?

##### VOCABULARY

Low	Medium	High
Equal	Friction	Collision
Force	Gravity	Inertia
Opposite	Mass	Momentum

##### HELPFUL LINKS

###### Force and Motion Montage

Sesame Street discovers more on forces and motion.  
<https://oeta.pbslearningmedia.org/resource/sesame-force-motion-montage/force-and-motion-montage-sesame-street/#.XhNgyGRKjIU>  
*Grades Pre-K - 1st*

###### Science of Football

NFL and NCAA players and coaches illustrate the three laws in football.  
<https://www.youtube.com/watch?v=08BFCZJDn9w>  
*Grades 3rd - 6th*

###### Little Bins for Little Hands

Rolling, bouncing, racing, zipping, squishing, and more! Physics is fun, and these simple physics experiments are perfectly fun physics for kids! Varied experiments that explore a range of physics properties.  
<https://littlebinsforlittlehands.com/simple-physics-activities-for-kids/>  
*Grades Pre-K - 6th.*

#### *Move It!*

##### DISCUSSION QUESTIONS

- What is physics?
- How does physics affect your everyday life?
- If you throw a ball, can you predict where it is going to land?
- How can you see the effects of gravity?
- Do you see images with your eyes or with your brain?

##### VOCABULARY

Low	Medium	High
Motion	Perception	Kinesthetic
Balance	Pendulum	Trajectory
Strength	Gravity	Amplitude
Illusion	Wavelength	Zoetrope

##### HELPFUL LINKS

###### Nico & Nor Coconut Star App

Solve each puzzle using pushes, pulls, and textures. With fireworks, water traps, and just-in-time feedback, Coconut Star is a joyful romp through the science of force and motion.  
*Grades Pre-K - 1st*



###### Simple Machines

Simple Machines tasks students with helping a cute dancing blob named Twitch retrieve robot parts by building simple machines out of everyday objects. Four simple machines are introduced: an inclined plane, a level, a wheel and axle, and a pulley.  
*Grades 3rd - 8th*  
<https://www.msichicago.org/play/simplemachines/>

###### CERNland

A great interactive site all about CERN and the LHC. Explore the world's biggest particle accelerator, play games, and watch videos. *Grades 2nd - 6th.*  
<http://www.cernland.net/>

## *The Floor is Lava* Content Knowledge

*The Floor is Lava* design, development, and fabrication of exhibit experiences is designed to engage children ages 2-12 and their caregivers in concepts of physics and engineering as they relate to physical movement. It will provide opportunities for children to practice the process skills of collaboration, critical thinking, communication, and problem solving through strategies integrated into the exhibit experiences.

Guests will enjoy learning through play while engaging in experiences designed to promote safe risk, encouraging critical thinking, and problem solving. They will also have opportunities to engage in full body movement as they experience momentum, friction, and gravity, as well as jumping, swinging, and climbing.

*The Floor is Lava* experience will encourage critical thinking, communication, and problem solving in students as they learn about friction, force, angles, and physical activity. *The Floor is Lava* will include: vault boxes, warp wall, one-footed wedge walk, climber into tape tunnel, rope jungle, S-ramp, and Imagination Playground.

*The Floor is Lava* will have a focus on the following principles:

**Static Friction** acts on objects when they are resting on a surface. When you are climbing, static friction keeps your hands and feet from slipping.

**Momentum** is mass in motion. Everything has mass—even people. If you are moving, running, jumping, climbing, you have momentum because you are "mass in motion." The equation to determine how much momentum an object has is:

$$\text{Momentum} = \text{mass} \times \text{velocity (how fast the object is moving)}$$

**Motion** is the action or process of moving or being moved.

## ***Move It! Content Knowledge***

Physical science meets physical activity in Move it! From the Oklahoma Museum Network (OMN), Move it! offers a fully immersive, interactive exhibit where visitors explore physics concepts with their whole body. Experience weightlessness with pulley chairs, explore the properties of gravity, motion, and trajectory with orbital tables, and create beautiful mathematical works of art with pendulums.

### **Physics**

Physics is a branch of science that focuses on the study of matter and energy in space and time, and the interactions between matter and energy. The main goal of physics is to understand how the universe behaves, because matter and energy are the basic constituents of the natural world. The studies of sciences that developed into physics have been around since antiquity. Galileo's experiments helped to shape the way we view classical physics today. Discoveries of physics bring advancements in the natural sciences and in technology. Other influential physicists include Isaac Newton, Albert Einstein, Marie Curie, Dr. Sandra Faber, Dr. Chien-Shiung Wu, Dr. Arthur B.C. Walker Jr, Dr. Lene Hau, and Dr. Shirley Jackson.

### **Kinesthetic Experiences**

Kinesthesia happens when the brain gets feedback from muscles and ligaments about how the body is moving. Proprioceptors are nerves located in your joints, tendons, and muscles that are working with the brain to let a person unconsciously know where your body parts are. The sensory perception of movement helps you explore the world around you. Experiencing kinesthesia can be as simple as closing your eyes and touching your nose, or as challenging as using your strength, balance, and trajectory while trying to stay suspended in a rope jungle!

### **Optical Illusions**

Optical illusions happen when our brain tries to interpret what we see in order to make sense of the world around us. Illusions mislead us for various reasons; sometimes shortcomings in the normal anatomy of our eyes are to blame, and other times how our brain interprets images from our eyes causes illusions. Perception is controlled by our brains; each neuron in the brain is responsible for a specific detail in the visual image. Neurons compete with one another to see light and dark spots, and the winning neurons influence the message your brain gets and what you perceive. Scientists still aren't 100% sure about how our brain processes information from our eyes; maybe you can be inspired make that discovery!



## Curriculum Standards

### *The Floor is Lava*

Grade	Science	Mathematics	ELA	Health
Pre-K	2-3	PK.A.1.2	PK 1.R.4	S1.E6
Kinder	K-PS2-1 & 2	K.N.1.2	K.1.R.4	S1.E6
1st		1.N.1.1	1.1.R.4	S1.E6
2nd		2.A.1.2	2.1.R.4	S1.E6
3rd	3-PS2-1 & 2		3.1.R.1	S1.E6
4th	4-PS3-1 & 2		4.1.R.1	S1.E6
5th	5-PS2-1		5.1.R.2	S1.E6
6th	MS-PS3-1		6.1.R.2	S2.M1

### **Move It!**

Grade	Science	Mathematics	ELA	Physical Activity
Pre-K	PK 2.3	PK.GM.2	PK 4.R.1	S1.E7
Kinder	K-PS2-1	K.D.1.1	K.4.R.1	S5.E3
1st	1-PS4-1	1.A.1.1	1.1.R.3	S2.E2
2nd	2-PS1-2	2.A.1.2	2.1.R.3	S1.E8
3rd	3-PS2-2	3.A.1	3.6.R.1	S2.E4
4th	4-PS3-3	4.GM.2	4.1.R.3	S1.E7
5th	5-PS2-1	5.GM.3	5.4.R.1	S1.E3
6th	MS-PS3-2	6.D.2.1	6.1.R.3	S3.M2