Physical Science

Teacher's Guide

MESS®
Marvelous Explorations through Science and Stories

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Teacher Background Information

What is the focus of this guide?

The focus of this guide is on the physical world around us. Children begin exploring this world from the first months of life by observing and manipulating objects. This learning continues during early childhood as children bounce balls, build towers, and float boats. The study of nonliving materials is known formally as “Physical Science.” Children, of course, just think it is fun!

This guide focuses on four physical science topics that fascinate children and scientists alike. They are motion, magnets, sound, and light. With your guidance and support, these topics provide children with many opportunities to explore how the world around them works.

What science concepts are covered in this guide?

Motion

- Things move in many different ways.
- Objects need a push or pull to start, stop, or change their movement.
- Simple machines help move objects.
- Friction can change motion.

Magnets

- Magnets attract some objects, but not others.
- Magnets can attract through objects.

Sound

- Sound is produced by vibrating objects.
- Sound can travel through objects.

Light

- There are many sources of light.
- Light is reflected by objects.
- Shadows are made when light beams are blocked.

Motion

The world around us is always in **motion**. Motion occurs whenever something changes place or position. Movement can be in a straight line, crooked line, zig-zag, circular, or back and forth. Things can roll, bounce, slide, and fall.

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In order to make something move, **force** is required. Force can be most easily described as a push or a pull. People and other animals use their muscles to produce the force required to move themselves or other things.

The amount of force needed to move an object depends on the object's **mass**. More force is required to move objects with a larger mass than to move objects with a smaller mass.

Force can slow or stop objects as well. **Friction** is a force that is created when two objects come into contact with each other—such as a ball rolling on the ground. Eventually, friction will slow the ball to a complete stop. A bumpy surface will slow the ball more quickly than a smooth surface.

Wheels and ramps make work easier by changing the size or direction of a force. They are examples of **simple machines**.

Magnets

Magnets are pieces of iron or steel that have the special ability to **attract** other objects made from iron or steel, as well as nickel, cobalt, chromium, or materials that contain a small amount of any of these metals. Magnets do not attract objects made from wood, glass, plastic, paper, or fabric.

Magnets come in many shapes and sizes. The shape and size of a magnet influence its power. The stronger the magnet, the greater the distance from which it can attract objects. Magnets can even attract through another object.

Magnets can also be attracted to other magnets if properly positioned. Every magnet has two poles. One pole is positive and the other pole is negative. Opposite poles will attract each other whereas like poles will **repel** or move away from each other. **Note: Magnets should not come in contact with televisions, computer monitors, or other electrical devices. Many electronics use magnets to operate, and bringing another magnet into contact with them may cause damage.**

Sound

Sound is produced when objects **vibrate**. These vibrations create waves that travel to our ears. As the waves enter the ear, the eardrum vibrates. These vibrations signal special nerves in the ear that send messages to the brain where they are processed. This entire process occurs almost instantaneously.

Sound waves cannot be seen with the human eye. However, it is possible to see the effects of sound waves. Striking a **tuning fork** and placing it in a bowl of water will make the water ripple in waves. The water waves are a direct result of the sound waves.

Sound waves can be felt as well. Think back to when you have been sitting in a movie theater and your chair seems to hum. The loud deep sounds of the movie create many vibrations that in turn vibrate objects in the theater.

Sound waves vary depending on the vibrating object. Size, shape, and material all affect sound waves. These variations influence both the **volume** and **pitch** of sound.

The speed with which sound waves move determines pitch. The faster the waves move, the higher the pitch. The slower the waves move, the lower the pitch. Sound waves travel through air, water, and some solids. As sound waves travel, some vibrations are lost, or absorbed, as the waves pass through objects. As a result, the sound may seem softer or less clear.

Light

Light travels in waves as well. The majority of our light is natural, coming from the sun. However, we also get light from candles, campfires, flashlights, and electric appliances. Some organisms—such as fireflies—can even make their own light! Light travels in straight lines. Light will travel through **translucent** and **transparent** materials. If an **opaque** object is placed in the path of light, the light wave will be absorbed, reflected, or refracted.

Physical Science

Objects usually **absorb** light as heat. Remember feeling the warmth of the sun on your skin. Light also can bounce off or be **reflected** from objects. You see things as a result of light waves reflecting off them. Mirrors reflect light and enable you to see your own reflection. Light is **refracted**, or bent, as it passes through a translucent object. Think of how a pencil looks as it sits in a glass of water. Light may pass right through transparent materials like glass.

Shadows form when light waves are blocked. The size and shape of shadows vary with the position of the light source and the position of the object that is blocking the light.

Teacher Vocabulary

absorb – to take in or soak up

attract – to move closer towards

force – a push or pull that is applied to an object

friction – force created when two objects rub together

magnet – specific metal that is polarized and attracts iron or steel materials

mass – amount of material that makes up an object

motion – the process of changing position or place

opaque – does not allow any light to pass through; solid

pitch – attribute of sound dependent on wave frequency, can range from high to low

reflect – to bounce off, bend back

refract – to bend

repel – to push away from

shadow – the shape formed when an object blocks the path of light

simple machine – basic device that helps make work easier

translucent – allows some, but not all, light to pass through

transparent – allows light to pass through completely; clear or see-through

tuning fork – a two-pronged metal object that gives a fixed tone when struck

vibrate – to move back and forth in a rhythm

volume – attribute of sound that indicates loudness

Materials for Core and Center Experiences

Materials	Books
Experience 1: Introduction to Motion variety of objects to demonstrate motion	*Go, Go, Go!: Kids On the Move* by Stephen R. Swinburne *Wiggle* by Doreen Cronin *Move!* by Steve Jenkins and Robin Page *Choo Choo, Clickety-Clack!* by Margaret Mayo
Experience 2: Push and Pull large item to move such as a block or toy truck ball variety of objects that can be pushed or pulled, or have parts to push or pull	*Push and Pull* by Marcia Freeman *The Gigantic Turnip* by Aleksei Tolstoy *And Everyone Shouted, "Pull!"* by Claire Llewellyn
Experience 3: Wheels blocks container for blocks 3 dowels 1 peg board toy wagon variety of wheels	*What Do Wheels Do All Day?* by April Jones Prince *One Wheel Wobbles* by Carole Lexa Schaefer *The Red Racer* by Audrey Wood *What Is a Wheel and Axle?* by Lloyd G. Douglas
Experience 4: Gears gear set	*What Do Wheels Do All Day?* by April Jones Prince *Wheels Around* by Shelley Rotner *Alphabeep! A Zipping, Zooming ABC* by Debora Pearson
Experience 5: Ramps 2 smooth-sided boards 2 different-size blocks to support ramps balls or toy cars	*Roll, Slope, and Slide: A Book About Ramps* by Michael Dahl *Simple Machines* by Allan Fowler *The Tall, Tall Slide* by Michael Dahl

Materials	Books
Experience 6: Friction	
1 smooth-sided board 1 rough-sided board 2 same-size blocks to support ramps 2 same-size small blocks	*What Is a Scientist?* by Barbara Lehn
Experience 7: Introduction to Magnets	
wand magnets magnet test objects chart	*The Mystery of Magnets* by Melvin Berger
Experience 8: Magnets Can Repel	
bar magnets ring magnets dowel stand floating magnets illustration	*The Mystery of Magnets* by Melvin Berger *Magnets: Pulling Together, Pushing Apart* by Natalie Rosinsky *What Magnets Can Do* by Allan Fowler
Experience 9: Experiment with Magnets	
wand magnets bar magnets horseshoe magnets magnet test objects book or table	*What Is a Scientist?* by Barbara Lehn *The Mystery of Magnets* by Melvin Berger *Magnets: Pulling Together, Pushing Apart* by Natalie Rosinsky *What Magnets Can Do* by Allan Fowler
Experience 10: Introduction to Sound	
assortment of objects to make sounds such as wooden blocks, sticks, and spoons; metal cans, bowls, and utensils; plastic bottles and bowls; cardboard sound canisters materials for sound canisters	*The Listening Walk* by Paul Showers *Max Found Two Sticks* by Brian Pinkney *Sing-Along Song* by JoAnn Early Macken *Tick-Tock, Drip-Drop!* by Nicola Moon *The Very Noisy Night* by Diana Hendry
Experience 11: Sound Waves	
tuning fork container of water sound canisters materials for sound canisters	*All Sorts of Noises* by Hannah Reidy *Choo Choo, Clickety-Clack* by Margaret Mayo *The Listening Walk* by Paul Showers *Tick-Tock, Drip-Drop!* by Nicola Moon

Materials for Core and Center Experiences

Materials	Books
Experience 12: String Telephones two or more plastic or paper cups cotton string paper clips	*All Sorts of Noises* by Hannah Reidy *Polar Bear, Polar Bear, What Do You Hear?* by Bill Martin, Jr. *Sounds All Around* by Wendy Pfeffer *Tick-Tock, Drip-Drop*! by Nicola Moon *Zin! Zin! Zin! A Violin* by Lloyd Moss
Experience 13: Introduction to Light flashlights	*Oscar and the Moth* by Geoff Waring *Very Lonely Firefly* by Eric Carle *Flicker Flash* by Joan Bransfield Graham *Light and Dark* by Angela Royston
Experience 14: Introduction to Shadows flashlight lamp or other light source	*Guess Whose Shadow?* by Stephen R. Swinburne *Bear Shadow* by Frank Asch *My Shadow* by Robert Louis Stevenson *Flashlight* by Betsy James *Shadows and Reflections* by Tana Hoban *Shadows Are About* by Ann Whitford Paul *Oscar and the Moth* by Geoff Waring
Experience 15: Further Exploration of Shadows flashlight small shadow theater made from cardboard box, wax or white paper, and tape small objects bag or box	*Guess Whose Shadow?* by Stephen R. Swinburne *Bear Shadow* by Frank Asch *My Shadow* by Robert Louis Stevenson *Flashlight* by Betsy James *Shadows and Reflections* by Tana Hoban *Shadows Are About* by Ann Whitford Paul *Oscar and the Moth* by Geoff Waring
Experience 16: Reflections mirrors flashlight	*I See Myself* by Vicki Cobb *Light: Shadows, Mirrors, and Rainbows* by Natalie Rosinsky *Shadows and Reflections* by Tana Hoban

Experience 1

Introduction to Motion

Science Concept
Things move in many different ways.

Aim
Children will describe and demonstrate ways in which people and objects can move.

Materials
variety of objects to demonstrate motion

Books
Go, Go, Go!: Kids On the Move by Stephen R. Swinburne
Wiggle by Doreen Cronin
Move! by Steve Jenkins and Robin Page
Choo Choo, Clickety-Clack! by Margaret Mayo

Vocabulary
bounce, down, fast, motion, move, roll, slide, slow, still, up

Approach
- Ask the children to show you what it means to "be still." Play a game like "Simon Says" and direct the children to move in certain ways or to be still.
- Ask the children to describe and demonstrate how they can move. Introduce words that can be used to describe how they are moving, such as "hopping," "dancing," "fast," and "slow."
- Encourage the children to find some objects in the classroom that can be moved such as a chair, door, or a toy: *Can we see anything in the classroom that can move? How does it move? Does it roll? Can it bounce? Can it move on its own or does it need our help?*

- Compare how different objects move. Talk about how people and objects can move in similar and different ways.

Extension

Go outdoors and have the children compare how living (e.g., birds) and nonliving things (e.g., vehicles) move.

Science Center

Gather a variety of objects that move in different ways or have moving parts. Place in the Center and encourage exploration.

Integrated Experiences

Literacy 1: Have the children draw a picture of themselves moving in some way they enjoy such as dancing, running, or riding a tricycle. Help them describe their drawing.

Literacy 2: Place words that describe motion on the word wall.

Math 1: Ask the children to repeat a movement (e.g., “sit down and stand up”) a specific number of times. Have the children count aloud as they move.

Math 2: Perform a set of motions in a pattern (e.g., wave hands, wiggle hips, jump up and down, wave hands, wiggle hips, jump up and down) and have the children repeat your pattern.

Creative Arts (Music and Movement): Play different styles of music and have the children create their own dances.

Physical Health and Development 1 (Gross Motor): Play a game of “Red Light, Green Light” to reinforce the concept of “staying still.”

Physical Health and Development 2 (Health): Discuss how important it is to look around before you move to make sure that no person or object is in the way.

Experience 2

Push and Pull

Science Concept
Objects need a push or pull to start, stop, or change their movement.

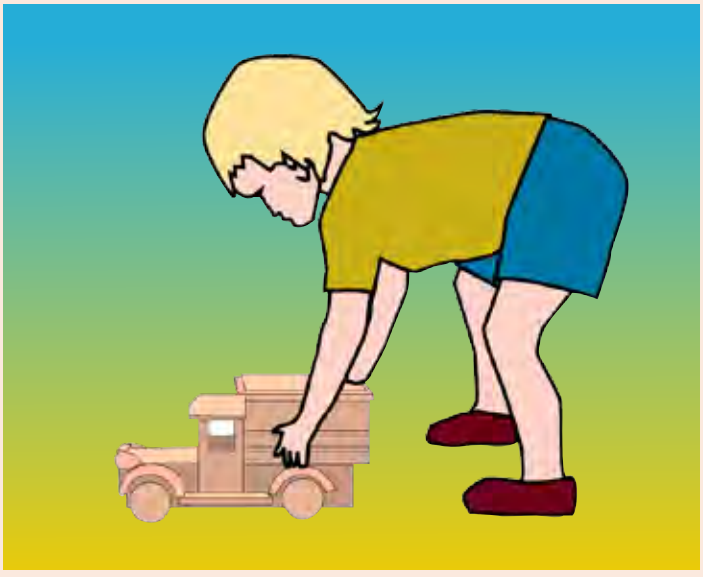
Aim
Children will distinguish between “push” and “pull.”

Materials
large item to move such as a block or toy truck
ball
variety of objects that can be pushed or pulled, or have parts to push or pull

Books
Push and Pull by Marcia Freeman
The Gigantic Turnip by Aleksei Tolstoy
And Everyone Shouted, “Pull!” by Claire Llewellyn

Vocabulary
away
pull
push
towards

Approach
- In large group, show the children an object such as a block or toy truck. Encourage the children to talk about what it takes for the object to move: *Is this moving? Can it move? What can we do to make it move?*
- Demonstrate how to make the object move. Introduce the terms “push” and “pull.” Talk about how pushing moves the object away from you and that pulling moves the object towards you.
- Ask the children to think of other objects that they move by pushing and pulling. Go around the classroom and look for objects that you push and pull such as doors and windows, drawers, computer mouse, and toys.
- Arrange the children in a circle on the floor and review the concepts of pushing and pulling by rolling a ball back and forth.



Extension

Go for a walk around the school and look for other examples of things that we push and pull such as doors, wagons, mops, and swings.

Science Center

Place in the Center objects that require pushing and pulling to operate (e.g., cash register, wagon, phone).

Integrated Experiences

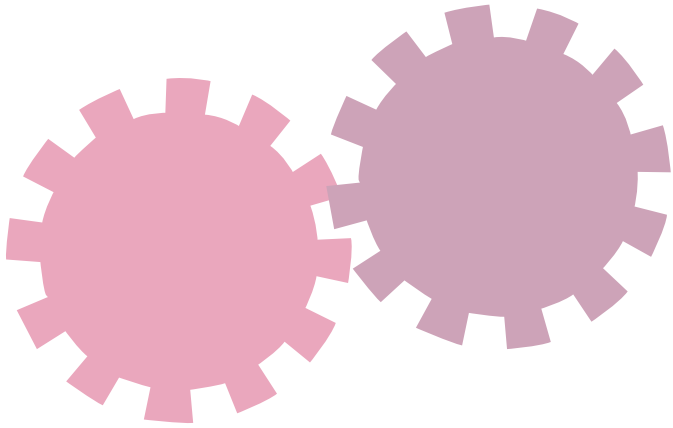
Literacy 1: Have the children draw a picture of something familiar that requires a “push” or a “pull” (or both) to move. Help them write a description of their drawing.

Literacy 2: Label the doors in the classroom with “push” and “pull” signs.

Literacy 3: Place the words “push” and “pull” on the word wall along with the names for objects that begin with the letter “P” that can be pushed/pulled (e.g., plate, puppy, pants).

Physical Health and Development 1 (Gross Motor): Have the children pair up and sit on the floor facing one another with their arms extended, holding hands. Have the children alternate between pushing towards and pulling away from each other.

Physical Health and Development 2 (Gross Motor): Encourage the children to participate in a variety of activities that involve pushing and pulling (e.g., pull-ups, push-ups, pushing a friend on the swings).



Experience 3

Wheels

Science Concept
Simple machines help move objects.

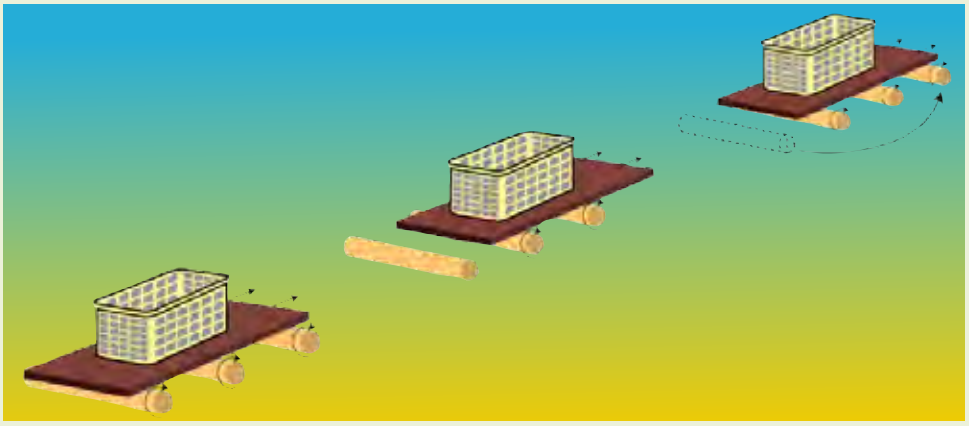
Aim
Children will learn how wheels help move objects.

Materials
blocks
container for blocks
3 dowels
1 peg board
toy wagon
variety of wheels

Books
What Do Wheels Do All Day? by April Jones Prince
One Wheel Wobbles by Carole Lexa Schaefer
The Red Racer by Audrey Wood
What Is a Wheel and Axle? by Lloyd G. Douglas

Vocabulary
axle
dowel
wagon
wheel

Approach
- In advance, fill a small container with blocks. Make sure that it is too heavy for a child to push with one finger.
- Show the children the container of blocks. Ask a volunteer to try and move it forward several feet just by pushing with one finger. Ask: *Did you have to push a lot or a little to move the blocks?*
- Show them the dowels and board and ask: *How can we use these tools to help us move the blocks?* Explore their suggestions. Allow the children time to explore how the board and dowels make things easier to move. If needed, guide the children towards using the dowels and board as illustrated.
- Show the children the toy wagon and focus the children's attention on its wheels. Explore how the dowels and the wheels and axles are alike and different.



Science Center

Place wheels of various types in the Center for children to explore.

Integrated Experiences

Literacy: Make a list of objects that have wheels. Have the children illustrate the objects or search for drawings or photographs of objects with wheels in magazines.

Math 1: Walk around the classroom (or school) and count the number of wheels you find.

Math 2: Collect wheels from discarded toys and tools and have the children sort them by size.

Creative Arts 1 (Art): Paint with small rollers. Draw the children's attention to the fact that the rollers operate like wheels.

Creative Arts 2 (Music): Sing "The Wheels on the Bus."

Creative Arts 3 (Dramatic Play): Provide several large cardboard boxes for children to use as cars, buses, or trains.

Physical Health and Development 1 (Fine Motor): Have the children play with clay using rolling cutters and rolling pins. Help the children understand how the cutters and rolling pins resemble wheels.

Physical Health and Development 2 (Health): Discuss how to be safe around vehicles with wheels.

Experience 4

Gears

Science Concept
Simple machines help move objects.

Aim
Children will explore gears.

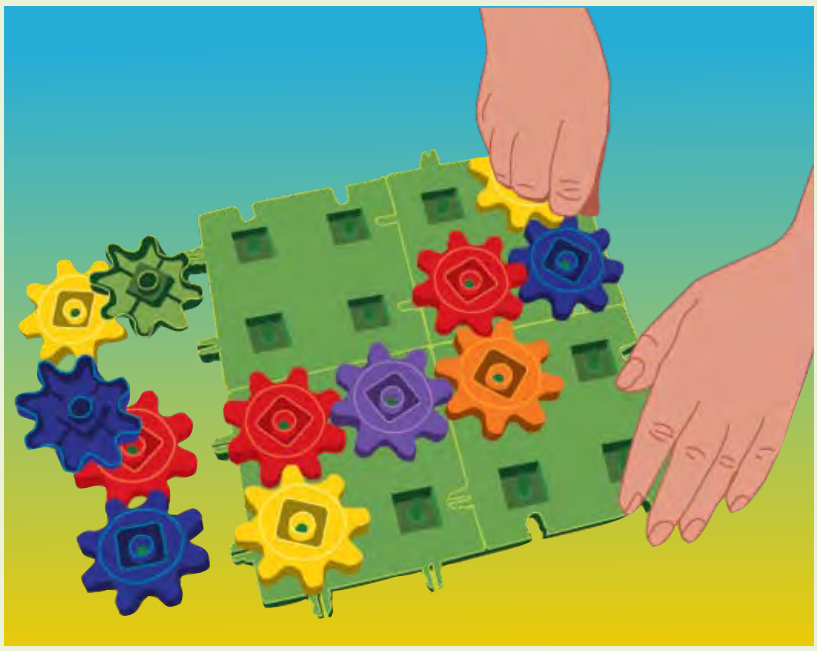
Materials
gear set

Books
What Do Wheels Do All Day? by April Jones Prince
Wheels Around by Shelley Rotner
Alphabeep! A Zipping, Zooming ABC by Debora Pearson

Vocabulary
gear
turn

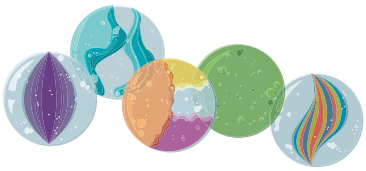
Approach

- In advance, make a simple gear system using 2 - 4 base pieces and 2 - 6 gears.
- Begin by reviewing what the children have already learned about wheels.
- Show the children some gears. Introduce the term “gear” and encourage the children to describe how the gear is similar to a wheel: *What shape is a wheel? What shape is this gear? How are they different?*
- Show the children your simple gear construction. Demonstrate that turning one gear can make other gears move.
- In small group, distribute a base piece and several gears to each child. Encourage the children to explore how to position the gears so that turning one gear will make other gears move.



Extension

Create a complex construction involving many gears and multiple levels for the children to explore.



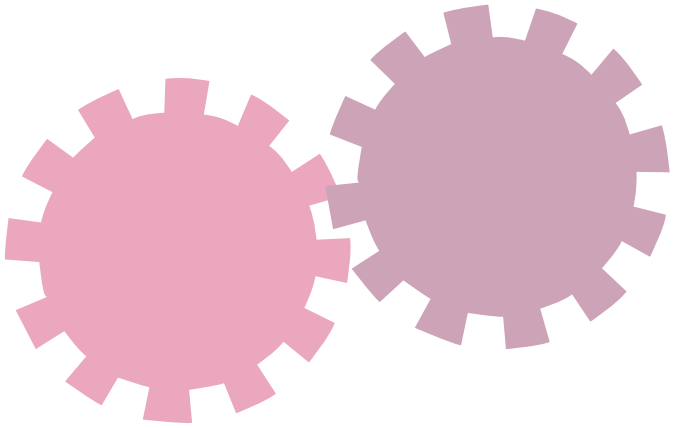
Science Center

Place the gear set in the Center for the children to explore. Encourage the children to observe how the gears move.

Integrated Experiences

Literacy: Take photos of the children's gear constructions. Add arrows and words to describe how the gears turn.

Math: During the experience, have the children count the number of gears used in their constructions.



Experience 5

Ramps

Science Concept
Simple machines help move objects.

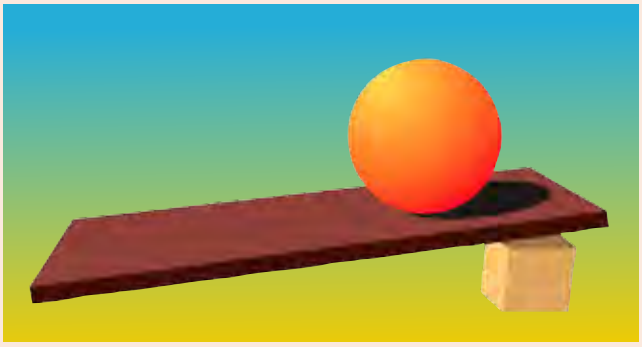
Aim
Children will compare how objects move on ramps with different slopes.

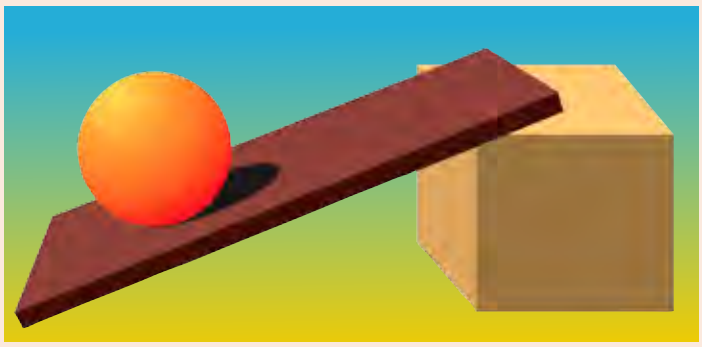
Materials
2 smooth-sided boards
2 different-size blocks to support ramps
balls or toy cars

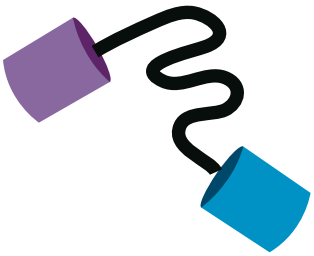
Books
Roll, Slope, and Slide: A Book About Ramps by Michael Dahl
Simple Machines by Allan Fowler
The Tall, Tall Slide by Michael Dahl

Vocabulary
fast
high
low
ramp
roll
slide
slow
steep

Approach
- Place a ball or toy car on a flat surface. Review what the children have already learned about how objects move.
- Place one end of a board on top of a small block (so it looks like a slide). Ask the children to think about what will happen if you put the ball/truck on the ramp: W*hat will happen if I put it on here? Will it stay still or will it move? Why?*
- Ask a child to demonstrate what happens. Introduce the term “ramp” and explain that ramps help move things.
- Make a steeper ramp using another board and a larger block. Encourage the children to think about how the steepness of the ramp will change how things move: *Do you think it will go farther if the ramp is steep like this or more flat like this?* Have the children explore how the steepness of the ramp affects how far the objects will go before stopping.







Extension

Using the ramp, explore how far round objects such as wheels or balls travel compared to flat objects such as blocks.

Science Center

Place the ramps and toy cars in the block area to encourage further exploration.

Integrated Experiences

Literacy: Help the children record their observations about ramps in their journals using drawings and words, or create a class science log. Supplement with photographs.

Math: Mark and measure how far cars travel as the height of the ramp changes.

Creative Arts (Art): Place a piece of paper at the bottom of a box lid. Dip a ping pong ball in paint and let the children turn the lid into an inclined plane by tilting the lid in different directions. Focus their attention on the path the ball takes as the incline changes.

Social and Emotional 1: Go for a walk around the school to see how ramps are used.

Social and Emotional 2: Talk about how ramps are useful for people in wheelchairs.

Physical Health and Development 1 (Gross Motor): Go to a playground or park and have the children experience going down a ramp (e.g., a slide).

Physical Health and Development 2 (Gross Motor): Create an obstacle course with one or more low ramps that children can navigate on tricycles.

Experience 6

Friction

Science Concept
Friction can change motion.

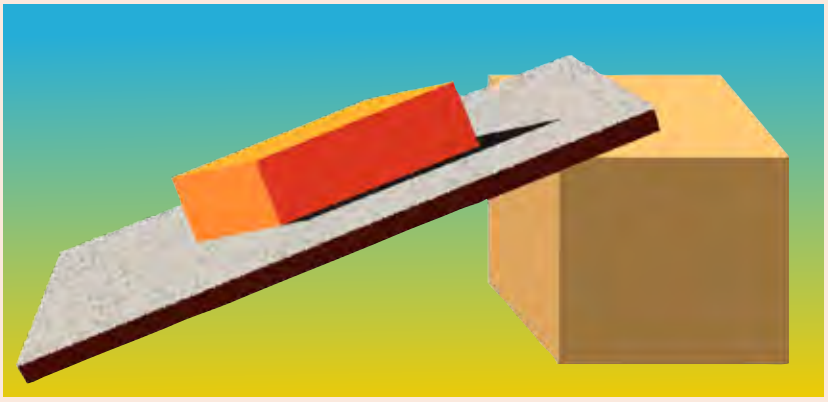
Aim
Children will observe that friction can change how fast an object moves.

Materials
1 smooth-sided board
1 rough-sided board
2 same-size blocks to support ramps
2 same-size small blocks

Book
What Is a Scientist?
by Barbara Lehn

Vocabulary
friction
ramp
rough
slide
slope
smooth

Approach
- In advance, experiment with the ramps to determine the slope required to show the effects of friction. To be effective, a gentle slope is usually required.
- Begin by reviewing what the children already have learned about ramps.
- Draw the children's attention to the rough side of a board. Allow the children to touch both the rough and smooth sides of the boards. Encourage the children to describe how each feels.
- Create two ramps—one with a smooth surface and one with a rough surface—with equal slope.



Extension 1

Compare how fast children with bare legs versus those wearing pants travel down the slide.

Science Center

Place the ramps and toy cars in the block area for further exploration.

Extension 2

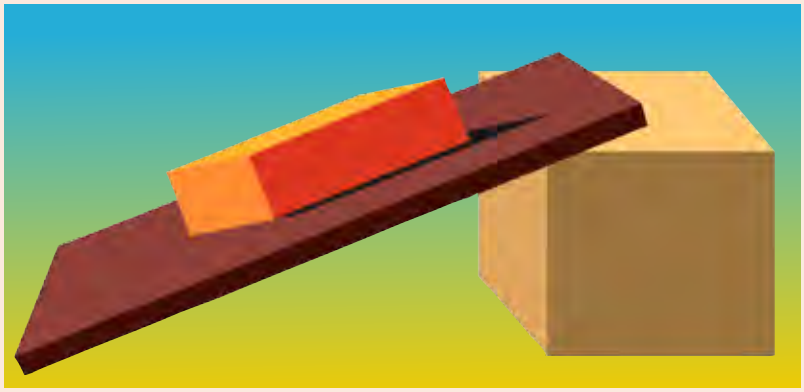
Explore friction further by having the children ride tricycles on pavement and on sand or grass.

Integrated Experiences

Math: Collect a variety of smooth and rough objects for the children to sort.

Creative Arts (Art): Mix salt or sand in finger paint and have children create a painting with rough and smooth parts.

- Explain that you are going to compare how the blocks move on the different surfaces.
- Ask: *Do you think the blocks will get to the bottom of the ramp at the same time, or do you think one will get to the bottom first? Why?*
- Put the blocks on the ramps, release at the same time, and see what happens. Explain that the rough surface slows the block down.
- Repeat the experiment several times to confirm the results.



Experience 7

Introduction to Magnets

Science Concept
Magnets attract some objects, but not others.

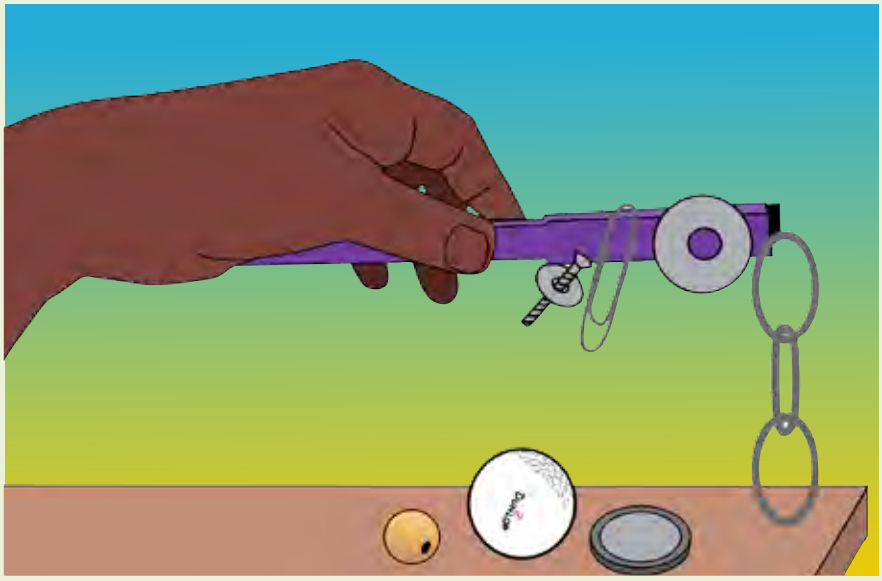
Aim
Children will explore magnets.

Materials
wand magnets
magnet test objects
chart

Book
The Mystery of Magnets
by Melvin Berger

Vocabulary
alike
attract
different
iron
magnet
metal
steel

Approach
- In advance, prepare a chart labeled “yes” or “no” to record the results of your investigation.
- Introduce the wand magnets. Encourage the children to describe what they already know about magnets. Explain that some things stick to magnets, but others do not.



- Show the children the magnet test objects. Explain that you are going to investigate whether each item will or will not stick to the magnet. Introduce the term “attract.”
- Help the children name each item before you test it. Record what happens to each on the chart.

Extension

Have the children gather additional objects to test with the wand magnets.

Science Center

Place the magnets and objects in the Center for the children to explore further. Before the children test each object, encourage them to predict whether or not the magnet will attract it and to explain why.

Integrated Experiences

See page 25 for suggestions.

- When you have finished testing all of the items, have the children sort them based on whether they were attracted to the magnet or not. Examine the two groups of objects and talk about how the objects in each group are alike and different.
- Talk about how magnets only attract objects that are made of certain kinds of metal, like iron or steel.

Experience 8

Magnets Can Repel

Science Concept

Magnets attract some objects, but not others.

Aim

Children will demonstrate two magnets attracting or repelling each other.

Materials

bar magnets
ring magnets
dowel stand
floating magnets illustration

Books

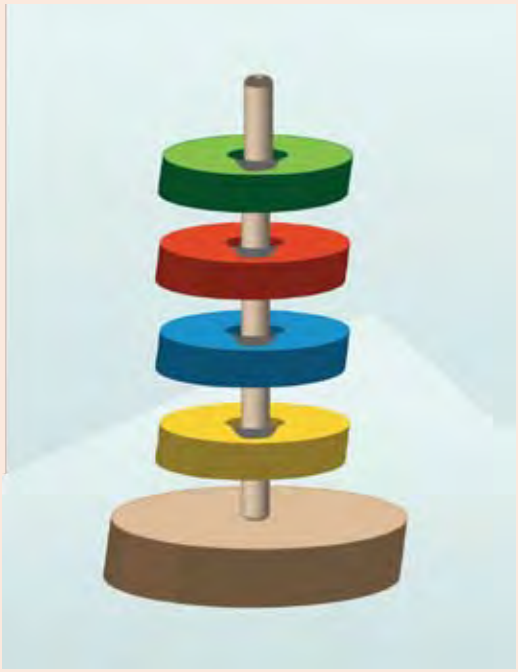
The Mystery of Magnets by Melvin Berger
Magnets: Pulling Together, Pushing Apart by Natalie Rosinsky
What Magnets Can Do by Allan Fowler

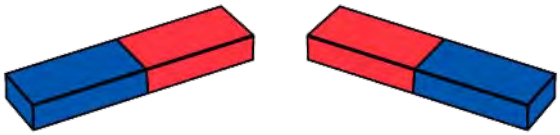
Vocabulary

attract
blue
green
pole
red
repel
yellow

Approach

- In advance, make an illustration of floating magnets like that shown below.
- Review with the children what they already know about magnets. Ask the children to list some of the objects that magnets attract and some that they do not attract. Ask: *Do you think a magnet could attract another magnet?*
- Show how to hold the two bar magnets so that they stick together (red to blue). Then demonstrate what happens when you try to hold the two red sides or two blue sides together.
- Pass the pair of magnets among the children and encourage them to manipulate the magnets so they can feel the magnets pushing away from each other.
- Explain that all magnets have two different ends or poles. Opposite poles attract, whereas like poles repel or push away from each other. Encourage the children to continue investigating and manipulating the magnets to experience the magnets' attraction or repulsion.
- To further demonstrate how magnets can repel, set up the ring magnets on the dowel stand as shown.





Science Center

Place the bar magnets, ring magnets, dowel stand, and diagram in the Center. Encourage the children to explore how magnets repel and attract.

Integrated Experiences

Literacy: Help the children describe what they learned about magnets in their journals using illustrations and words, or create a class science log.

Math: Attach magnets to the ends of fishing poles and paper clips to cardboard “fish” or other objects. Prepare numbered cards. Have the children pick a card and catch the number of fish the card shows.

Creative Arts (Dramatic Play): Make a “metal detector” out of a broom or similar object and encourage children to pretend to search for “buried treasure” using the magnetic device.

Physical Health and Development (Fine Motor): Hide small objects that are attracted to magnets in the sand table. Have the children go on a “treasure hunt” with small magnets to find the objects.

Creative Arts (Art): Using magnetic tape and cardstock, have the children make and decorate refrigerator magnets.

Physical Health and Development (Health): Magnets can harm certain electronics. Explain that when exploring with magnets, it is important that the magnets do not touch things that use electricity. Explain that looking for an electric plug or cord is one way to tell if something uses electricity.

Experience 9

Experiment with Magnets

Science Concept
Magnets can attract through objects.

Aim
Children will explore how magnets can attract through materials.

Materials
wand magnets
bar magnets
horseshoe magnets
magnet test objects
book or table

Books
What Is a Scientist? by Barbara Lehn
The Mystery of Magnets by Melvin Berger
Magnets: Pulling Together, Pushing Apart by Natalie Rosinsky
What Magnets Can Do by Allan Fowler

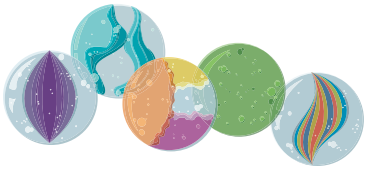
Vocabulary
magnet
strong

Approach

- Begin by reviewing what the children have already learned about magnets.
- Explain that today they are going to explore how magnets can attract objects through other materials. To demonstrate, place a magnetic object on top of a book or table. Using one of the magnets, show the children how the magnet can move the object, even through a solid object.
- Next, distribute the magnets and magnet test objects. Encourage the children to explore how to make the objects move without making direct contact. Explain that we cannot see the power of magnets, but that it is strong enough to go through wood and other materials.

Extension

Explore magnet strength through other materials (paper, fabric, foam) or try experimenting with different thicknesses (e.g., a table, a stack of books).

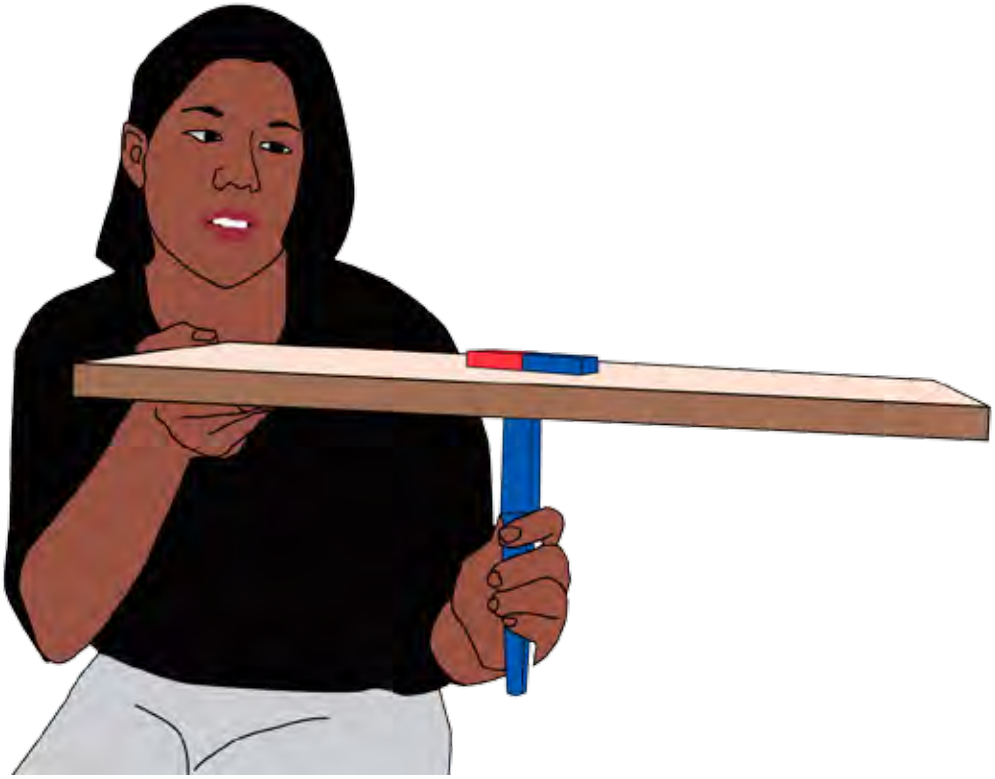


Science Center

Place the magnets and a variety of objects in the Center for children to explore further.

Integrated Experiences

Creative Arts (Art): Line small box lids with paper. Dip magnetic balls in tempura paint and place them in the box. Have the children use magnetic wands underneath the box to slide the balls around on the paper to make designs.



Experience 10

Introduction to Sound

Science Concept
Sound is produced by vibrating objects.

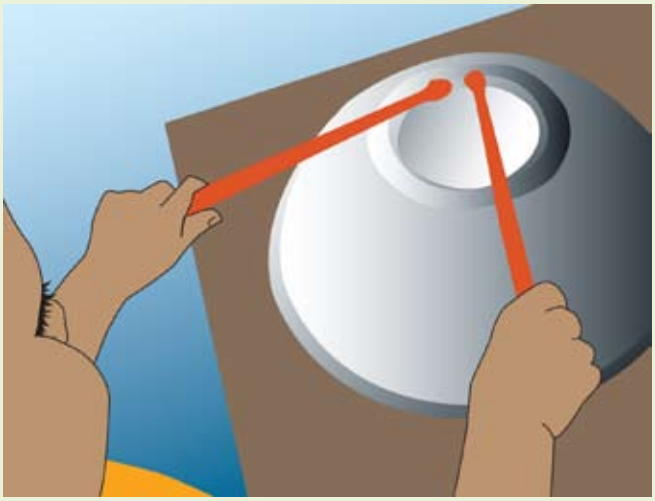
Aim
Children will explore different ways to make sound.

Materials
assortment of objects to make sounds such as wooden blocks, sticks, and spoons; metal cans, bowls, and utensils; plastic bottles and bowls; and cardboard
sound canisters
materials for sound canisters

Books
The Listening Walk by Paul Showers
Max Found Two Sticks by Brian Pinkney
Sing-Along Song by JoAnn Early Macken
Tick-Tock, Drip-Drop! by Nicola Moon
The Very Noisy Night by Diana Hendry

Vocabulary
ear
hear
listen
sound

Approach
- Begin by asking the children to close their eyes and listen to sounds in the classroom. Encourage them to name the sounds they hear. Help them identify what makes the sounds by asking questions such as: *Can you hear the clock? Who is talking outside? Is that a lawn mower that I hear?*
- Ask the children if they can make any sounds. Encourage the children to make a variety of sounds: *Can anyone make a sound using their hands? Can you make a sound using your feet? What kind of sounds can you make using your mouth?*



- Distribute the objects among the children. One by one, ask the children to make a sound using their object(s). When possible, use words to describe the sounds (e.g., thud, sharp, musical). Help the children compare the sounds. Talk about how different objects make different kinds of sounds.
- Conclude by playing all the objects together as if the children were a band.

Extension 1

Collect an assortment of sounds on tape or CD. Encourage the children to identify each sound. Show the actual items that made the sound, or provide photographs.

Science Center

Make two matching sets of sound canisters. Have the children find the containers that make the same sound. Change the items in the canisters throughout the unit.

Extension 2

Explore how different kinds of materials make different kinds of sounds by comparing objects made of plastic, metal, wood, and—under adult supervision—glass.

Integrated Experiences

Literacy 1: Have the children draw pictures of themselves making sounds. Help them write words for the sounds (e.g, clap, bang, sing).

Literacy 2: As a class, create a list of sounds that begin with different letters of the alphabet (e.g, a=achoo! b=boo!)

Math: Produce a pattern of sounds using body movements (e.g., clapping hands, stomping feet) for the children to replicate.

Physical Health and Development (Safety): Discuss how certain sounds indicate danger. For example, a fire alarm means “leave the building,” while fire truck, ambulance, and police sirens mean “get out of the way.”

Experience 11

Sound Waves

Science Concept
Sound is produced by vibrating objects.

Aim
Children will see that sound makes waves.

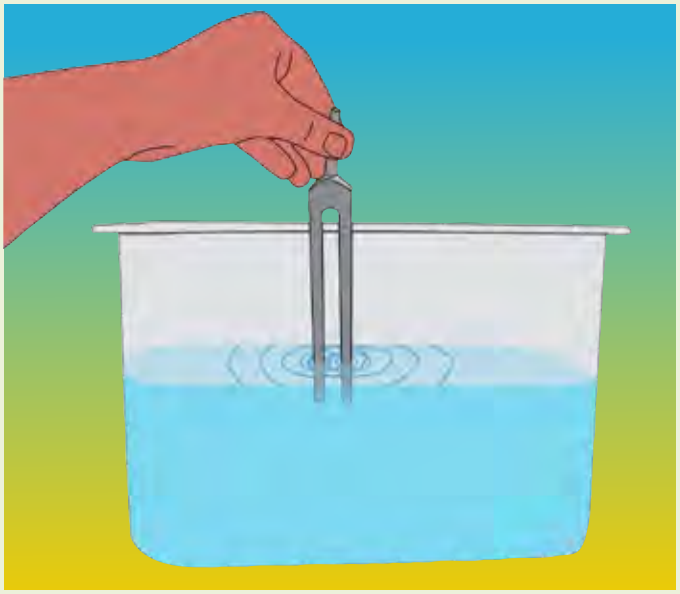
Materials
tuning fork
container of water
sound canisters
materials for sound canisters

Books
All Sorts of Noises by Hannah Reidy
Choo Choo, Clickety-Clack by Margaret Mayo
The Listening Walk by Paul Showers
Tick-Tock, Drip-Drop! by Nicola Moon

Vocabulary
tuning fork
vibration
wave

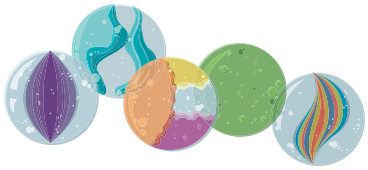
Approach

- In advance, fill a bowl with water.
- Begin by reviewing what the children have already learned about sound.
- Have the children place two fingers on their throat and feel the movement as they speak. Explain that all sound is made of vibrations.
- Show the children the tuning fork and explain that you are going to use it to explore sound. Strike the tuning fork on the edge of a table and place the ends in the bowl of water. Focus the children's attention on the waves in the water. Explain that the vibrations make sound move outwards in waves.
- Conclude by having the children close their eyes again and focus on the different sounds that they hear.



Extension

Explore sound waves in other ways. Stretch a piece of plastic wrap across a bowl. Secure it with a rubber band. Place some rice on top. Strike the tuning fork near the rice and see what happens. The rice should move as a result of the sound. Experiment with other sounds such as clapping, music, and talking.



Science Center

Place a guitar, drum, or musical instruments in the Center for further exploration.

Integrated Experiences

Literacy 1: Have the children add a journal entry describing something they like to listen to.

Literacy 2: Create a display of photographs that show objects that make sounds (e.g,. whistle, musical instruments, hammer). Label the photographs.

Creative Arts 1 (Art): Play different types of music and have the children draw pictures of what the music reminds them of.

Creative Arts 2 (Music and Movement): Make musical instruments with empty boxes and rubber bands, or empty paper rolls filled with beans or rice.

Creative Arts 3 (Dramatic Play): Place a variety of musical instruments in the dramatic play area and encourage the children to pretend to be in a band.

Social and Emotional: Invite a musician or musical group to demonstrate how they make music.

Physical Health and Development (Health): Remind the children that loud sounds are not safe for our ears. They should not shout into each other's ears. Practice the difference between a shout and a whisper.

Experience 12

String Telephones

Science Concept
Sound can travel through objects.

Aim
Children will explore how sound travels along a string.

Materials
two or more plastic or paper cups
cotton string
paper clips

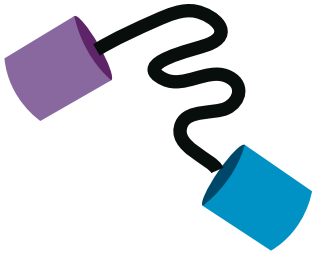
Books
All Sorts of Noises by Hannah Reidy
Polar Bear, Polar Bear, What Do You Hear? by Bill Martin, Jr.
Sounds All Around by Wendy Pfeffer
Tick-Tock, Drip-Drop! by Nicola Moon
Zin! Zin! Zin! A Violin by Lloyd Moss

Vocabulary
listen
speak
straight
stretch
telephone
tight

Approach
- Begin by reviewing what the children have already learned about sound vibrations and how vibrations travel.
- Show the children the string telephone and explain that you are going to use it to explore sound.
- Demonstrate how to use the telephone. Have a child hold one cup to his ear. Hold the other cup so that the string is stretched tight in a straight line. Make sure no one is touching the taut string. Speak into the cup.
- Allow the children to take turns using the string telephone. Ask the children to describe what happens when they speak into the cup. Review the concept of sound as vibrations and explain that the vibrations travel along the string from one cup to another.

Extension

Experiment with making phones out of other materials such as tin cans, boxes, dental floss, ribbon, and yarn.



Science Center

Place the string telephones in the Center for further exploration.

Integrated Experiences

Creative Play (Dramatic Play): Put play telephones in the dramatic play area and encourage the children to have conversations.

Social and Emotional: Discuss phone manners with the children.

Physical Health and Development (Health): Teach the children how to dial “911” in an emergency.

Experience 13

Introduction to Light

Science Concept
There are many sources of light.

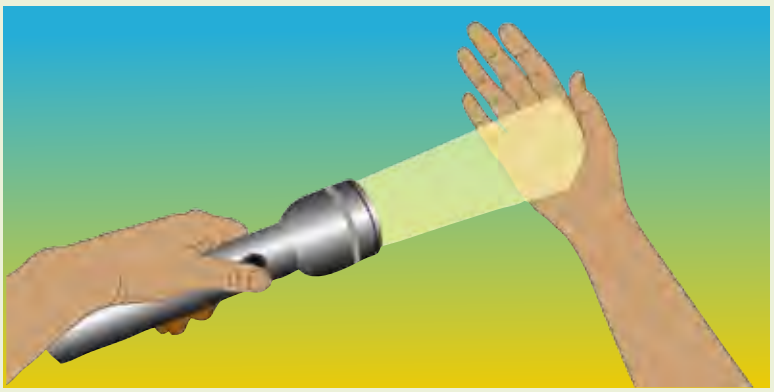
Aim
Children will explore different sources of light.

Materials
flashlights

Books
Oscar and the Moth by Geoff Waring
Very Lonely Firefly by Eric Carle
Flicker Flash by Joan Bransfield Graham
Light and Dark by Angela Royston

Vocabulary
battery
beam
block
dark
flashlight
light
shine
straight

Approach
- Begin by asking the children to share their ideas about light: *Is it light or dark today? How can you tell? Why is it light in the room? Why is it light outside? Where is the light coming from?* Help the children understand that light comes from many sources--some natural and some man-made.
- Ask someone to turn the classroom lights on and off. Encourage the children to look for other sources of light in the room such as the computers or clock. Explain that man-made lights usually need electricity. Note that sometimes we can easily see where the electricity comes from (draw the children's attention to the electric cords attached to the machines.), but sometimes the wires are hidden.



- Show the children a battery-operated flashlight. Encourage the children to share what they know about flashlights: *What is this?*

Extension

Explore making different colors with light by placing colored cellophane filters over the flashlights, or by shining light through plastic bottles filled with colored water.

Science Center

Place the flashlights in the Center for further exploration.

Integrated Experiences

Literacy: Make a class display depicting different light sources (e.g., sun, street lamp, candle). Illustrate with photographs or children's drawings. Make a chart of light sources and categorize those that are natural (e.g., sun, moon, lightning, fire) and those that are man-made (e.g., lamps, flashlights).

Creative Arts (Dramatic Play): Place flashlights in the Dramatic Play area so that the children can pretend they are on a camping trip or going on a night hike.

Physical Health and Development (Safety): Discuss safe practices when using objects that produce light (e.g., avoid electrical outlets, do not touch hot light bulbs).

What does it do? When might we use it? How does it work?

- Help a child demonstrate how to use the flashlight. Turn it off and remove the batteries. Explain that the batteries provide energy to the flashlight like the electrical cord does to other lights.
- Remind the children not to shine the flashlights in people's eyes. Then encourage them to explore casting light beams using the flashlights. Draw their attention to how the light beams travel in a straight line. Demonstrate what happens when the light beam is blocked.
- Review the sources of light you have discussed so far. Ask the children if they can think of any other objects that provide light. (If you are fortunate enough to live in an area with fireflies, talk about how some animals make their own light.) Talk about how all light needs energy. Conclude with a discussion of the importance of saving energy by turning off the flashlights and other lights when not in use.

Experience 14

Introduction to Shadows

Science Concept
Shadows are made when light is blocked.

Aim
Children will explore their own shadows.

Materials
flashlight
lamp or other light source

Books
Guess Whose Shadow? by Stephen R. Swinburne
Bear Shadow by Frank Asch
My Shadow by Robert Louis Stevenson
Flashlight by Betsy James
Shadows and Reflections by Tana Hoban
Shadows Are About by Ann Whitford Paul
Oscar and the Moth by Geoff Waring

Vocabulary
behind
front
outline
shadow

Approach

- In advance, practice making shadows indoors with a flashlight. Search your playground at different times of day for places to explore shadows outdoors.
- Begin by reviewing what the children have already learned about light. Remind the children what happens when you place your hand in front of the flashlight. Using the flashlight, create a shadow. Encourage the children to describe any experiences they have had with shadows: *Where have you seen a shadow? Can shadows move? What makes a shadow move?*
- Explain that a shadow forms when an object blocks light.
- Go outdoors and have the children look for their own shadows. Discuss how a shadow shows the shape of an object, but not colors or details (such as eyes). Outline one or more of the shadows with chalk, or with marker on a sheet of paper. Have the children compare the shadows. Encourage them to notice details such as hairstyles or clothing shapes that lets them know whose shadow they are seeing.
- Focus the children's attention on how their shadows change when they move. Ask: *How can you make your shadow small? Can you make it big?* Encourage the children to change location. Ask: *Where is your shadow now? Is it in front of you? Behind you? Can you make your shadow move to a different place? Can you chase your shadow?*
- Conclude by having the children report on what they discovered about shadows.

Extension 1

Search the outdoors for more shadows such as those made by tree branches, buildings, and playground equipment. Compare the different sizes and shapes of the shadows.

Extension 2

Go outdoors at different times of day and compare the size and shape of shadows made by the children or objects. Trace the shadows each time for ease of comparison.

Science Center

Place the flashlight, lamp, or other light source in the Center along with an assortment of objects. Encourage the children to explore making shadows with their hands or the objects.

Integrated Experiences

Literacy: Have the children describe their discoveries about shadows in their journals.

Math: During the experience, measure the lengths of the shadows and compare.

Creative Arts (Art): Trace children's silhouettes and cut them out of black paper. Have the children decorate a frame or background for the picture.

Physical Health and Development (Gross Motor): Have the children observe their shadows as they perform actions such as waving their arms or jumping up and down.

Experience 15

Further Exploration of Shadows

Science Concept
Shadows are made when light is blocked.

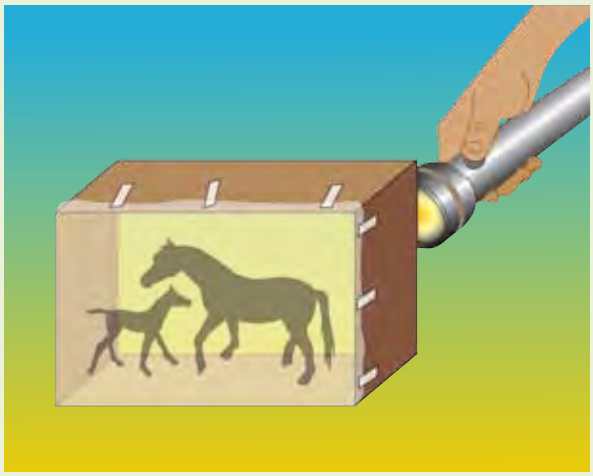
Aim
Children will use shadows to identify objects.

Materials
flashlight
small shadow theater made from cardboard box, wax or white paper, and tape
small objects
bag or box

Books
Guess Whose Shadow? by Stephen R. Swinburne
Bear Shadow by Frank Asch
My Shadow by Robert Louis Stevenson
Flashlight by Betsy James
Shadows and Reflections by Tana Hoban
Shadows Are About by Ann Whitford Paul
Oscar and the Moth by Geoff Waring

Vocabulary
block
light
outline
shadow

Approach
- In advance, create a small shadow theater: Cut off the top and bottom of a box. Tape white or wax paper over one opening. Practice using the flashlight with the objects to ensure that the objects cast distinctly different shadows.
- Begin by reviewing what the children have already learned about shadows. Remind the children that they could tell which shadow belonged to whom by comparing features.
- Show the children the shadow theater and explain how it works. Ask one child to select a "mystery object" (hidden from view in a bag or box) and hold it inside the theater. Shine the flashlight on the object, casting a shadow on the paper.
- Encourage the children to try to identify the "mystery object" and explain their reasoning: *What about the shadow makes you think it is a horse?*



Extension

Have the children explore shadows further using a large shadow theater and lamp or overhead projector. Hang a white sheet on two chairs using clips or tape. Provide a variety of stick puppets or have children create their own with paper, craft sticks, tape, etc.

Science Center

Place the small shadow theater, objects, and flashlight in the Center for further exploration.

Integrated Experiences

Math: During the experience, have the children change the orientation of the mystery object or the distance between the object and the light source and observe the changes in size and shape that result.

Creative Arts (Art): Make shadow puppets with paper and craft sticks and put on a puppet show.

Experience 16

Reflections

Science Concept
Light is reflected by objects.

Aim
Children will observe that mirrors reflect light.

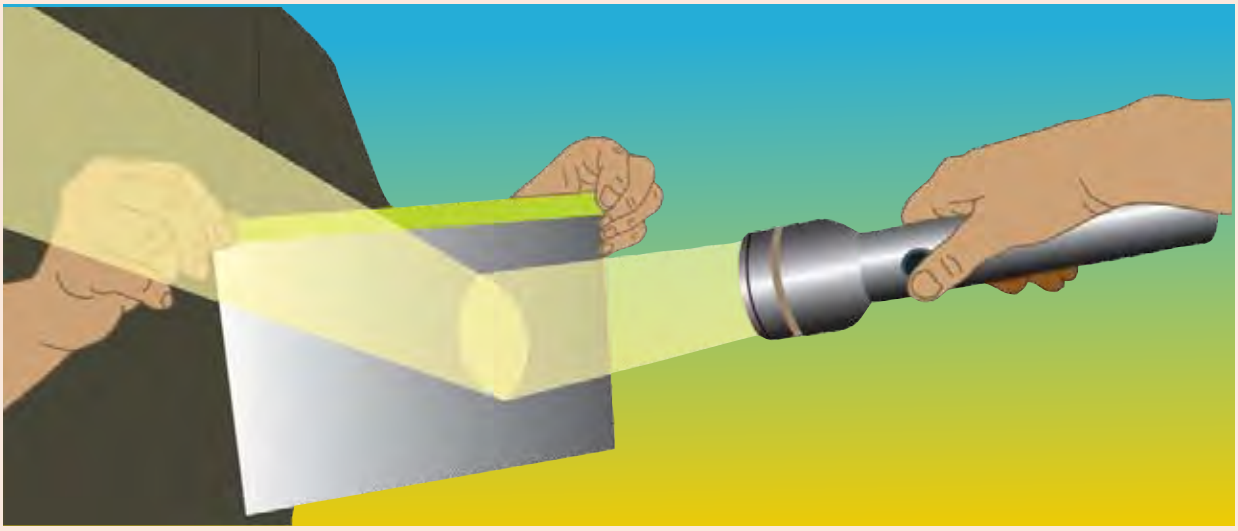
Materials
mirrors
flashlight

Books
I See Myself by Vicki Cobb
Shadows and Reflections by Tana Hoban
Mirror, Mirror by Allan Fowler

Vocabulary
bounce
flashlight
mirror
reflect

Approach

- Begin by reviewing what the children already have learned about light.
- Show the children a mirror and ask them to share what they know about mirrors: *What is this called? What do we use it for? Where do we find mirrors?*
- Ask for a volunteer to stand with his back to the group, facing the mirror. Ask the children: *What do you see in the mirror? Who is that?*
- Explain that we can see ourselves in mirrors because mirrors reflect light. To demonstrate, "bounce" light off the mirror as shown:



- Experiment with moving the flashlight and mirror. Try bouncing the light from one mirror to another. Ask the children to search for the light as it is projected on the floor, walls, ceiling, or objects around the classroom.

Extension

Look for reflections in the classroom (door knobs, shiny toys) and around the school (e.g., windows, puddles).

Science Center

Place safety mirrors in the Center for further exploration.

Integrated Experiences

Literacy: Have the children draw a picture of themselves performing a task such as brushing teeth, combing hair, or trying on clothes in front of a mirror.

Creative Arts (Art): Have the children make a collage out of different reflective materials such as sequins, foil, or glitter.

Physical Science

Welcome to the Physical Science *MESS*® Take-Home Kit. This page suggests ways to further explore what your child has been learning at school.

In this Kit you will find:

- *I See Myself* by Vicki Cobb

A girl explores light using a mirror and objects found around her house.

- A mirror

This month, your child is learning:

- We need light to see.
- Mirrors reflect light.

How to use this book:

- As you read, point to the words to encourage your child to follow along.
- Try some of the activities described in the book.

How to use the object:

- Use the mirror to do some of the experiments in the book. Try looking in the mirror in a dark space like a closet.
- Get a flashlight and try to "bounce" the light off the mirror.

To further support your child's learning:

- With your child, look for other reflective surfaces such as door knobs, the front of the stove, and spoons.

Recommended Books

Lehn, Barbara. *What Is a Scientist?* Brookfield, CT: Millbrook Press, 1998. Simple text and color photographs describe how scientists learn from their senses, observe details, ask questions, communicate their findings, and have fun as they experiment.

Motion

Cronin, Doreen. *Wiggle*. New York: Atheneum Books, 2005. Rhythmic text and cartoon-style illustrations highlighted with bits of photography encourage readers to join in as a dog wiggles through his day. Young children will laugh at his antics and be anxious to imitate his actions.

Dahl, Michael. *Roll, Slope, and Slide: A Book About Ramps*. Minneapolis, MN: Picture Window Books, 2006. Colorful realistic pictures, beginning with a familiar slide, show the many ways we use ramps in our daily lives. Text, while sometimes ample, is appropriate for the illustrations.

Dahl, Michael. *The Tall, Tall Slide*. Minneapolis, MN: Picture Window Books, 2005. Height can be intimidating, but the day is hot, nothing else has been sufficiently cooling, and there is a waterslide at the pool! With some help from friends, a young girl works up the courage to try it.

Douglas, Lloyd G. *What Is a Wheel and Axle?* New York: Children's Press, 2002. Simple photographs and text in this small-format title effectively introduce the wheel and axle via three examples—wheelbarrow, rolling pin, and wagon.

Fowler, Allan. *Simple Machines*. New York: Children's Press, 2001. Numerous books discuss individual simple machines, but this author provides the basics about levers, inclined planes, wheels, pulleys, wedges, and screws, all in a small-format book. Photographs of familiar objects and appropriately limited text show the machines in everyday use.

Freeman, Marcia. *Push and Pull*. New York: Newbridge, 1997. The large photographs and simple text in this big book show pushing and pulling by different forces (including magnets) and the impacts of the push/pull.

Jenkins, Steve and Robin Page. *Move!* Boston: Houghton Mifflin, 2005. Cut-paper collages and simple text describe thirteen different ways that animals move. Each of the action verbs is printed in large text and provides a great opportunity to teach about print. Additional information about each of the illustrated animals is included in the back.

Llewellyn, Claire. *And Everyone Shouted, "Pull!": A First Look at Forces and Motion*. Minneapolis, MN: Picture Window Books, 2005. The journey to the market requires going up a hill. How will the the farmer and his animals manage it? Their hard work, illustrated with colorful cartoon characters, serves as a simple introduction to some basic science.

Physical Science

Mayo, Margaret. *Choo Choo, Clickety-Clack!* Minneapolis, MN: Carolrhoda Books, 2005. While the title suggests this is a train book, each double-page spread features a different form of transportation. Colorful illustrations show the movements and noises made by planes, race cars, boats, and hot air balloons. Text is simple and rhythmic.

Pearson, Debora. *Alphabeep! A Zipping, Zooming ABC*. New York: Holiday House, 2003. A whole alphabet of vehicles and road signs, with active words and upper- and lower-case letters, probably ensures the success of this book with children and teachers. Vibrant geometic illustrations highlight the lively text.

Prince, April Jones. *What Do Wheels Do All Day?* Boston: Houghton Mifflin, 2006. You may think of wheels only as inanimate objects, but great descriptive words and paper-relief illustrations show that wheels are very active parts of our lives.

Rotner, Shelley. *Wheels Around*. New York: Houghton Mifflin, 1995. After establishing that "wheels help us to work and play," the simple text details numerous familiar ways that wheeled vehicles are useful to us. Colorful photographs range from strollers and wheelchairs to trucks and tractors. Lots of details invite close observation.

Schaefer, Carole Lexa. *One Wheel Wobbles*. Cambridge, MA: Candlewick Press, 2003. Parading to the "biggest wheel of all," a fun-loving family shows off their various vehicles—each with a different number of wheels. Brightly colored illustrations count off some strange-looking details that invite observation and laughter.

Swinburne, Stephen R. *Go, Go, Go! Kids On the Move*. Honesdale, PA: Boyds Mills Press, 2002. What's your favorite way to move? Twirling? Rolling? It is probably depicted in the colorful photographs and simple text. Comparative movements with monkeys and dolphins are suggested, too. Photos will not only stimulate imitation, but also serve as conversation starters.

Tolstoy, Aleksei.*The Gigantic Turnip*. Cambridge, MA: Barefoot Books, 2000. The folktale is a classic Russian one, illustrating "pulling" at its funniest. It is a cumulative tale (hence the text looks ample) that allows some counting, a plant life cycle discussion, multiple prediction and sequencing opportunities, and lots of detailed observation. The colorful illustrations in this version are just right for young children. Adaptations include Aubrey Davis's *Enormous Potato*, Cherie B. Stihler's *The Giant Cabbage: An Alaska Folktale*, Jan Peck's *Giant Carrot,* and Denia Lewis Hester's *Grandma Lena's Big Ol' Turnip*.

Wood, Audrey. *The Red Racer*. New York: Simon & Schuster Books for Young Readers, 1996. The chain on Nona's bicycle breaks. She concludes she needs a new bike, but her parents are not convinced. Wicked thoughts encourage her plots to "lose" her bike. Eventually her parents show her that the bike can be restored. Active illustrations in bold colors add to the drama.

Physical Science

Magnets

Berger, Melvin. *The Mystery of Magnets*. New York: Newbridge Educational Publishing, 1999. Large photographs and limited text in this big book provide basic facts about magnets. Questions to think about and fun facts are included.

Fowler, Allan. *What Magnets Can Do*. New York: Children's Press, 1995. This small-format book uses photographs and informative text to explain several basic concepts about magnets. Included are magnet shapes, magnetic/nonmagnetic differences, poles, and familiar-but-unseen uses for magnets. The few pages on compasses and electromagnets can be omitted.

Rosinsky, Natalie. *Magnets: Pulling Together, Pushing Apart* (also bilingual: *Imanes/ Magnets: Atraen y Rechazan/ Pulling Together, Pushing Apart).* Minneapolis, MN: Picture Window Books, 2003. The author introduces magnets and encourages children to experiment with them. Great illustrations, fun facts, experiments, and a glossary are included.

Sound

Hendry, Diana. *The Very Noisy Night.* New York: Dutton Children's Books, 1999. Sounds during the night keep Little Mouse awake. Most of the sounds are natural ones—an owl hooting, wind blowing—but Little Mouse's active imagination creates possibilities that Big Mouse's logical explanations will not satisfy. The familiar situation and fun drawings should stimulate conversation with young children.

Macken, JoAnn Early. *Sing-Along Song*. New York: Viking, 2004. From the chirping of the robin outside his window in the morning to a quiet "good night" to the moon and stars, a little boy responds to all the sounds he hears during one day. The rhyming text and enthusiastic illustrations make readers want to sing along too.

Martin, Bill, Jr. *Polar Bear, Polar Bear, What Do You Hear?* New York: Henry Holt, 1997. Bright cut-paper illustrations and repetitive text are used to ask different zoo animals what they hear. In the end, the zookeeper is asked what he hears and his reply involves children. But the answers throughout are so contagious that it is doubtful a reader gets that far without everyone imitating the animals!

Mayo, Margaret. *Choo Choo, Clickety-Clack!* Minneapolis, MN: Carolrhoda Books, 2005. While the title suggests this is a train book, each double-page spread features a different form of transportation. Colorful illustrations show various ways to travel and the noises made by planes, race cars, boats, and hot air balloons. Text is simple and rhythmic.

Physical Science

Moon, Nicola. *Tick-Tock, Drip-Drop*! New York: Bloomsbury, 2004. This bedtime story of Rabbit and his friend Mole suggest that it is the common noises in our world that can be both the most distracting and the most soothing. At least rabbit was a good listener! Busy pastel illustrations fit the simple but cumulative text.

Moss, Lloyd. *Zin! Zin! Zin! A Violin*. New York: Simon & Schuster Books for Young Readers, 1995. Jazzy, alliterative verse introduces orchestral instruments and their sounds. Opportunities for simple counting and observation of the busy detailed illustrations abound, but the group nouns that end each verse will be beyond young children's memories. This book is a great accompaniment to a visit to an orchestra concert or a musician's visit to a classroom—or both. 1996 Caldecott Honor Award

Pearson, Debora. *Alphabeep! A Zipping, Zooming ABC*. Hew York: Holiday House, 2003. A whole alphabet of vehicles and road signs, with active words and upper- and lower-case letters, probably ensures the success of this book with children and teachers. Vibrant geometic illustrations highlight the lively text.

Pfeffer, Wendy. *Sounds All Around.* New York: HarperTrophy, 1999. This easy-to-understand explanation of sound and hearing talks about how sounds are produced, types of sounds, and how sounds are important to different animals. If the text is too long, it can be read in sections. Several projects and ways to find out more about sound are added. Cartoon-like illustrations show both words for the sounds and children making sounds.

Pinkney, Brian. *Max Found Two Sticks*. New York: Simon & Schuster Books for Young Readers, 1994. Max proves to be a good listener as he uses two tree twigs to imitate the rhythms he hears as he does some unusual "talking." The oil illustrations and appropriately limited text should encourage close observation and conversation.

Reidy, Hannah. *All Sorts of Noises*. Minneapolis, MN: Picture Window Books, 2005. Colorful cartoon drawings show children and grown-ups as they make and hear noises throughout the day. Words for sounds are splashed across the pages. Ending pages ask children to imitate the noises made by many familiar objects

Robinson, Fay. *Sound All Around*. Chicago: Children's Press, 1994. Beginning with sounds people can make, photographs and limited text then explain the basics of sound in this small-format book. Topics include vibrations and waves, pitch and volume, and the value of various sounds.

Showers, Paul. *The Listening Walk*. New York: HarperTrophy, 1993. “On a Listening Walk I do not talk,” but that certainly does not mean there are no sounds in this book. A father and his young daughter walk to the park, but she advises in the end that you do not even have to take a walk to hear sounds. All you have to do is keep still and listen. Her observations along the way invite other observations and perhaps imitation.

Light

Asch, Frank. *Bear Shadow*. New York: Simon and Schuster, 1985. This bear obviously does not understand the concept of shadows! Bear’s shadow scares fish away so he tries—unsuccessfully, of course—to get rid of his shadow. Simple solid shapes and colors make the shadow easy to see in this silly story that subtly invites children to investigate their own shadows.

Carle, Eric, T*he Very Lonely Firefly.* New York: Philomel, 1995. At days end, a newborn firefly searches for other butterflies. It mistakes other sources of light—light bulb, candle, flashlight, lantern, animal eyes, headlights, and fireworks—for its own kind. The rewarding conclusion includes flashing lights powered by a replaceable battery.

Cobb, Vicki. *I See Myself*. New York: HarperCollins, 2002. Designed to assist children in making their own discoveries, this book first invites children to “look in the mirror.” From there, simple language/sentence structure and creative illustrations encourage children to experiment with mirrors on their own. Reading the book in pieces allows for participation.

Fowler, Allan. *Mirror, Mirror*. Chicago: Childrens Press, 1994. In this small-format book, photographs show a variety of reflections from still water to fun-house mirrors.

Graham, Joan Bransfield. *Flicker Flash*. Boston: Houghton Mifflin, 1999. Twenty-three short, creatively arranged poems about light describe objects from birthday candles to the sun. Using a variety of type sizes and styles and color strengths, illustrations support each poem’s topic.

Hoban, Tana. *Shadows and Reflections*. New York: Greenwillow Books, 1990. Without any words, the author’s photographs call our attention to the shadows and reflections of familiar objects all around us. Young children may need some clarification about the difference between a shadow and a reflection.

James, Betsy. *Flashlight*. New York: Alfred Knopf, 1997. While this is really a gentle story of how a grandfather gives his fearful young granddaughter control of the dark, it also provides a way for other children to explore dark and light using a flashlight. Nighttime can be difficult to illustrate, but these pictures artistically show the burst of light from the flashlight and the shadows produced in the dark room.

Physical Science

Paul, Ann Whitford. S*hadows Are About*. New York: Scholastic, 1992. Poetic text and gentle, muted illustrations show the many shadows in two young children's daily activities. The conclusion, that "shadows *never* stay . . . without a light," subtly invites children to test this by looking for shadows in their world.

Royston, Angela. *Light and Dark*. Chicago, IL: Heinemann Library, 2002. The author raises some basic ideas about light, although simplifying a complex topic like light is difficult. Particularly useful are the photographs illustrating the sources of light and concepts like reflected light and shadows.

Stevenson, Robert Louis. *My Shadow.* The wonder of a shadow from a child's point of view was expressed by Stevenson more than a hundred years ago. Today there are several versions, mostly true to the original poem, but now illustrated for children. Particularly useful with young children are these three:
—Illustrated by Penny Dale. Cambridge, MA: Candlewick Press, 1999. A young child, in soft colors, plays a bit mischievously with his shadow.
—Illustrated by Glenna Lang. Jaffray, NH: David R. Godine, 1989. A little girl discovers her shadow and plays dreamily with some animals and their shadows. All are in strong colors and soft lines.
—Illustrated by Ted Rand. New York: G.P. Putnam's Sons, 1990. This version shows an international cast of active children who all have shadows.

Swinburne, Stephen R. *Guess Whose Shadow?* Honesdale, PA: Boyds Mills Press, 1999. "Shadows are everywhere." The author's focused photographs and basic text make you want to be more observant! Simple information fills the book as it gives several shadow/object examples and then invites readers to guess what object makes each additional shadow.

Waring, Geoff. *Oscar and the Moth: A Book About Light and Dark.* Somerville, MA: Candlewick Press, 2008. Oscar is a curious kitten with lots of questions about light and dark. Moth shows Kitten many different sources of light, and explains how shadows are made and why darkness comes at night.

Other Recommended Books

Motion

Butler, Daphne. *What Happens When Wheels Turn?* Chicago, IL: Heinemann Library, 1995. Clear photographs of wheels illustrate wheel history and numerous ways we use wheels today. Although the book is small-format, the photos encourage close observation and conversation.

Physical Science

Cronin, Doreen. *Bounce*. New York: Atheneum Books, 2007. This successor to *Wiggle* invites readers to bounce—on their toes like a bunny or a frog, on poles—with helpful words of caution about potential problems with some jumping. Readers should be aware of the generic meaning of "bounce," however, since bees and bats do not actually bounce.

Day, Nancy Raines. *Double Those Wheels*. New York: Penguin Putnam Books, 2003. A monkey utilizes a variety of vehicles—mostly wheeled—and learns to multiply by twos as he tries to deliver pizza for a party. Rhyming text is very simple, but counting soon goes beyond young children's abilities. Watch for the information provided on labels, sign, and cap!
Dodds, Dayle Ann. *Wheel Away*. New York: Harper and Row, 1989. Oh no! The front wheel of a little boy's bicycle comes off and improbably rolls (bounces in the illustrations) through town and up a hill, until it eventually rolls back to him. Good descriptive and positional words and some good science about wheels and ramps make up for the wheel "bouncing" along on its journey—even through the water.

London, Jonathan. *A Truck Goes Rattley-Bumpa*. New York: Henry Holt, 2005. Boldly-colored illustrations and simple, rhythmic text describe some features of trucks and how they can differ. The illustrations lend themselves to counting wheels and making other comparisons.

Murphy, Patricia J. *Push and Pull*. New York: Children's Press, 2002. This limited-text, small-format book explains the forces of push and pull that are needed to start objects in motion. The photographs show familiar activities and encourage young children to find other examples.

Murphy, Stuart. *Beep Beep, Vroom Vroom*. New York: HarperCollins, 2000. Younger sister Molly cannot resist the appeal of moving around an older brother's colorful cars and learns pattern recognition in the process.

Rockwell, Anne. *Big Wheels*. New York: Walker & Company, 1986. Bright colors and simple text make the case that big wheels get the rough jobs done. Construction and farming equipment, plus snowplows and street sweepers, are all named and pictured.

Trumbauer, Lisa. *What Is Friction?* New York: Children's Press, 2004. A hard-to-understand concept is explained as simply as possible. The photographs of skaters and race cars make the point that friction is what slows down moving objects.

Magnets

Bryant-Mole, Karen. *Magnets*. Des Plaines, IL: Heinemann Interactive Library, 1998. Clear, focused photographs help explain a difficult subject to young children. Text at first appears to be substantial, but a standard format helps and the text can be abbreviated as needed. Following a two- or three-sentence explanation, the next page suggests a simple activity that demonstrates the concept. All materials are common ones that can be used by young children.

Physical Science

Sound

Carle, Eric. *The Very Quiet Cricket*/*El grillo silencioso.* New York: Philomel Books, 1990. A young male cricket finally learns how to chirp when he meets a beautiful female cricket. The principle of sound may be the same for everything, but it is exhibited in different ways. An author's note prior to the title page includes specific cricket information.

Coy, John. *Vroomaloom Zoom*. New York: Crown Publishers, 2000. An indulgent father takes his young daughter for a pre-bedtime ride, all with the intention of helping her fall asleep. However, the noisy situations they encounter instead provide wonderful sounds for children to listen to and probably imitate.

Evans, David, and Claudette Williams. *Sound and Music*. London: Dorling Kindersley, 1993. The first question is "Can you make sounds?" What follows are easy-to-do experiments about making different sounds and hearing them, all demonstrated in photographs of young children. The seven concepts that children can learn from the experiences are listed in an initial note to parents and teachers and an ending guide to experiments.

Feiffer, Jules. *Bark, George*. New York, HarperCollins, 1999. George is a dog with a problem. Although a visit to the vet seems to correct it, the trip home casts doubts again. The art and text are quite simple and repetitious, but the story is bound to be accompanied by the sound of hearty laughter.

Fleming, Denise. *Barnyard Banter*. New York: Henry Holt, 1994. The noise in the barnyard is loud (and rhymes) and the barnyard is busy and colorful. Children will recognize most of the animals, and the "pulp paintings" add to the fun. But where is goose?

Hewitt, Sally. *Hearing Sounds*. New York: Children's Press, 1998. Approaching the concept of sound from the hearing side, the author conveys the basic science: sound is produced by something vibrating, plus a number of attributes like high/low, and loud/quiet. What looks like lots of text can be selectively read. Photographs and activities or ideas to try out and think about add to the learning opportunities.

Hubbell, Patricia. *Trucks: Whiz! Zoom! Rumble*! Tarrytown, NY: Marshall Cavendish, 2003. Trucks (and truck drivers) of all types whiz and zoom through varied landscapes, creating wonderful sounds to imitate. Varying fonts are used to add visual clues.

Lewis, Kevin. *Chugga-Chugga Choo Choo*. New York: Hyperion Books for Children, 1999. A child's train set comes to life at night with all the whistle blowing/chugga-chugga/whoo whooing sounds that complete a train--and can be imitated, of course!

Physical Science

Llewellyn, Claire. *The Best Ears in the World; A First Look at Sound and Hearing*. North Mankato, MN: Smart Apple Media, 2003. A little rabbit who thinks his ears are silly looking instigates a conversation about sound and the value of ears with his father as they travel to their burrow. In addition to the conversation bubbles, another level of text tells about their journey. The gentle, cartoon-like illustrations demonstrate father rabbit's knowledge, too.

London, Jonathan. *Crunch, Munch*. Orlando: Silver Whistle, 2001. The emphasis in this book is not what animals eat, but instead the sounds they make when they eat. Some of the sounds may be different than imagined (e.g., peck, peck, peck for the woodpecker), but nevertheless will generate imitation and probably laughter. The final question even generates discussion about manners!

MacDonald, Ross. *Achoo! Bang! Crash! The Noisy Alphabet.* Brookfield, CT: Roaring Brook Press, 2003. The colors are muted, but the type is bold as this book illustrates the alphabet from achoo to zoom. The old-fashioned wood type requires careful observation to see all the variations in different letters. Children will enjoy imitating the sounds, but adults may be surprised at some of the spellings. Can you add sounds to the list?

Rosinsky, Natalie. *Sound: Loud, Soft, High, and Low.* Minneapolis, MN: Picture Window Books, 2003. This introduction to sound encourages children to explore. Great illustrations, fun facts, experiments, and a glossary are included.

Rydell, Katy. *Wind Says Goodnight.* New York: Houghton Mifflin, 2000. The sounds of the night from the cricket, frog, etc. are keeping a little girl awake. Finally a helpful cloud and the wind solve the problem. Repetitive lyrical text and softly colored, humorous illustrations make this a great pre-naptime story.

Schulman, Janet. *Sergei Prokokiev's Peter and the Wolf.* New York: Knopf, 2004. This is an illustrated version of a musical story (CD included) frequently used to introduce children to classical music. The idea that different sounds (i.e., different instruments) represent different characters in the story should generate discussion, but may be beyond young children without multiple repetitions. Some readers/listeners may find the nontraditional, "kinder" ending unsatisfactory.

Wolff, Ferida. *It Is the Wind*. New York: HarperCollins, 2005. The opening question becomes the theme for all the possible answers: What is the noise I hear in the night? In the end, the title answer is the one accepted by the young narrator as he falls asleep. Almost musical text and shadowy, nighttime paintings set the mood for close observation and quiet conversation.

Physical Science

Light

Bulla, Clyde Robert. *What Makes a Shadow?* New York: HarperCollins, 1994. Simple text and colorful illustrations answer the title question and encourage children to make more shadows.

Freeman, Don. *A Rainbow of My Own*. New York: Penguin Books, 1978. An imaginative boy tries to capture a rainbow to keep for himself, and then sees the same effect in other places. The watercolor illustrations show some of the colors in the light spectrum, although the concept is not part of the story.

Jonas, Ann. *Reflections*. New York: Greenwillow Books, 1987 Pages of this remarkably illustrated story should be read twice: once as usual and once as you turn the book upside down to view the "reflected" illustrations.

Mallat, Kathy. *Just Ducky*. New York, Walker & Company, 2002. Although the cover gives a hint, it is not clear whether Ducky ever discovers who the friend is who has time to play in the water with him. However, the simple text and gentle illustrations add to the conclusion that it is fun "being just Ducky."

Michaels, William. *Clare and Her Shadow*. Hamden, CT: Shoe String Press, 1991. Black-and-white woodcut prints starkly illustrate the discovery Clare makes as she and her grandfather walk to the park: she has a shadow! In most cases, young children will be able to see the clues that indicate that only Clare's shadow—however tall, short, or active it is— is pictured.

Rosinsky, Natalie. *Light: Shadows, Mirrors, and Rainbows/La luz: sombras, espejos y arco iris*. Minneapolis, MN: Picture Window Books, 2003. A variety of "light" topics are presented in this informative book with colorful everyday illustrations. Different levels of text allow a reader to adjust to various comprehension levels.

Sayre, April Pulley. *Shadows*. New York: Henry Holt, 2002. Two friends spend their day searching for shadows and, in the process, discover their own shadows and shadows made by other things. Colors are brilliant but the murky shadows are sometimes hard to distinquish.

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
Language Development	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Demonstrates increasing ability to attend to and understand conversations, stories, songs, poems.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Shows progress in understanding and following simple and multi-step directions.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Understands an increasingly complex and varied vocabulary.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
For Non-English speaking children, progresses in listening to and understanding English.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops increasing abilities to understand and use language to communicate information, experiences, ideas, feelings, opinions, needs, questions, and for other varied purposes.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Progresses in abilities to imitate and respond appropriately in conversation and discussions with peers and adults.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Uses an increasingly complex and varied spoken vocabulary.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Progresses in clarity of pronunciation and towards speaking in sentences of increasing length and grammatical complexity.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
For Non-English speaking children, progresses in speaking English.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LITERACY																	
Shows increasing ability to discriminate and identify sounds in spoken language.																	
Shows growing awareness of the beginning and ending sounds of words.																	
Progresses in recognizing matching sounds and rhymes in familiar words, games, songs, stories and poems.																	
Shows growing ability to hear and discriminate separate syllables in words.																	

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
LITERACY CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Associates sounds with written words, such as awareness that different words begin with the same sound.																	
Shows growing interest and involvement in listening to and discussing a variety of fiction and nonfiction books and poetry.																	•
Shows a growing interest in reading-related activities, such as asking to have a favorite book read; choosing to look at books; drawing pictures based on stories; asking to take books home; going to the library; and engaging in pretend-reading with other children.																	•
Demonstrates progress in abilities to retell and dictate stories, to act out stories, and to predict what will happen next in a story.																	•
Progresses in learning how to handle and care for books; knowing to view one page at a time in sequence from front to back; and understanding that a book has a title, author and illustrator.																	•
Shows increasing awareness of print in classroom, home and community settings.							•										
Develops growing understanding of the different functions of forms or print such as signs, letters, newspapers, lists, messages, and menus.							•										
Demonstrates increasing awareness of concepts of print, such as that reading in English moves from top to bottom and from left to right, that speech can be written down, and that print conveys a message.							•										
Shows progress in recognizing the association between spoken and written words by following print as it is read aloud.							•										•
Recognizes a word as a unit of print, or awareness that letters are grouped to form words, and that words are separated by spaces.							•										•
Develops understanding that writing is a way of communicating for a variety of purposes.							•										•

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
LITERACY CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Begins to represent stories and experiences through pictures, dictation, and in play.																	
Experiments with a growing variety of writing tools and materials, such as pencils, crayons, and computers.																	
Progresses from using scribbles, shapes, or pictures to represent ideas, to using letter-like symbols, to copying or writing familiar words such as their own name.																	
Shows progress in associating the names of letters with their shapes and sounds.																	
Increases in ability to notice the beginning letters in familiar words.																	
Identifies at least 10 letters of the alphabet, especially those in their own name.																	
Knows the letters of the alphabet are a special category of visual graphics than can be individually named.																	
MATHEMATICS																	
Demonstrates increasing interest and awareness of numbers and counting as a means of solving problems and determining quantity.							•										
Begins to associate number concepts, vocabulary, quantities, and written numerals in meaningful ways.							•										
Develops increasing ability to count in sequence to 10 and beyond.							•										
Begins to make use of one-to-one correspondence in counting objects and in matching groups of objects.				•	•	•	•										
Begins to use language to compare numbers of objects with terms such as more, less, greater than, fewer, equal to.							•										
Develops increased abilities to combine, separate and name “how many” concrete objects.																	
Begins to recognize, describe, compare, and name common shapes, their parts and attributes.			•	•													

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
MATHEMATICS CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Progresses in ability to put together and take apart shapes.																	
Begins to be able to determine whether or not two shapes are the same size and shape.				•				•									
Shows growth in matching, sorting according to 1 or 2 attributes such as color, shape or size.				•													
Builds an increasing understanding of directionality, order and positions of objects, and words such as up, down, over, under, top, bottom, inside, outside, in front, and behind.		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Enhances abilities to recognize, duplicate and extend simple patterns using a variety of materials.				•													
Shows increasing abilities to match, sort, put in a series, and regroup objects according to one or two attributes such as shape or size.				•			•										
Begins to make comparisons between several objects based on a single attribute.				•			•								•		
Shows progress in using standard and non-standard measures for length and area of objects.																	
SCIENCE																	
Begins to use senses and a variety of tools and simple measuring devices to gather information, investigate materials, and observe processes and relationships.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops increased ability to observe and discuss common properties, differences and comparisons among objects and materials.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Begins to participate in simple investigations to test observations, discuss and draw conclusions and form generalizations.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops growing abilities to collect, describe and record information through a variety of means, including discussion, drawings, maps and charts.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
SCIENCE CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Begins to describe and discuss predictions, explanations, and generalizations based on past experiences.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Expands knowledge of and abilities to observe, describe and discuss the natural world, materials, living things, and natural processes.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Expands knowledge of and respect for their body and the environment.	•	•	•							•	•	•	•			•	•
Develops growing awareness of ideas and language related to attributes of time and temperature.																	
Shows increased awareness and beginning understanding of changes in materials and cause-effect relationships.		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CREATIVE ARTS																	
Participates with increasing interest and enjoyment in a variety of music activities, including listening, singing, finger plays, games, and performances.																	
Experiments with a variety of musical instruments.																	
Gains ability in using different art media and materials in a variety of ways for creative expression and representation.																	
Progresses in abilities to create drawings, paintings, models, and other art creations that are more detailed, creative or realistic.																	
Develops growing abilities to plan, work independently, and demonstrate care and persistence in a variety of art projects.																	
Begins to understand and share opinions about artistic products and experiences.																	
Expresses through movement and dancing what is felt and heard in various musical tempos and styles.																	
Shows growth in moving in time to different patterns of beat and rhythm in music.																	

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
CREATIVE ARTS CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Participates in a variety of dramatic play activities that become more extended and complex.																	
Shows growing creativity and imagination in using materials and in assuming different roles in dramatic play situations.																	
SOCIAL & EMOTIONAL DEVELOPMENT																	
Begins to develop and express awareness of self in terms of specific abilities, characteristics and preferences.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops growing capacity for independence in a range of activities, routines, and tasks.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Demonstrates growing confidence in a range of abilities and expresses pride in accomplishments.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Shows progress in expressing feelings, needs and opinions in difficult situations and conflicts without harming themselves, others, or property.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Develops growing understanding of how their actions affects others and begins to accept the consequences of their actions.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Demonstrates increasing capacity to follow rules and routines and use materials purposefully, safely, and respectfully.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Increases abilities to sustain interactions with peers by helping, sharing, and discussion.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Shows increasing abilities to use compromise and discussion in working, playing, and resolving conflicts with peers.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Develops increasing abilities to give and take in interactions; to take turns, and to interact without being overly submissive or directive.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Demonstrates increasing comfort in talking with and accepting guidance and directions from a range of familiar adults.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Shows progress in developing friendships with peers.																	

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
SOCIAL & EMOTIONAL CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Progresses in responding sympathetically to peers who are in need, upset, hurt, or angry; and in expressing empathy or caring for others.																	
Develops ability to identify personal characteristics including gender, and family composition.																	
Progress in understanding similarities and respecting differences among people, such as genders, race, special needs, culture, language, and family structures.																	
Develops growing awareness of jobs and what is required to perform them.																	
Begins to express and understand concepts and language of geography in the contexts of their classroom, home, and community.																	
APPROACHES TO LEARNING																	
Chooses to participate in an increasing variety of tasks and activities.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops increased ability to make independent choices.	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•
Approaches tasks and activities with increased flexibility, imagination, and inventiveness.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Grows in eagerness to learn about and discuss a growing range of topics, ideas and tasks.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Grows in abilities to persist in and complete a variety of tasks, activities, projects, and experiences.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Demonstrates increasing ability to set goals and develop and follow through on plans.		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Shows growing capacity to maintain concentration, despite distractions and interruptions.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops increasing ability to find more than one solution to a question, task or problem.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Grows in recognizing and solving problems through active exploration, including trial and error, and interactions and discussions with peers and adults.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
APPROACHES TO LEARNING CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Develops increasing abilities to classify, compare, and contrast objects, events, and experiences.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PHYSICAL HEALTH AND DEVELOPMENT																	
Develops growing strength, dexterity, and control needed to use tools such as scissors, paper punch, stapler, and hammer.																	
Grows in hand-eye coordination in building with blocks, putting together puzzles, reproducing shapes and patterns, stringing beads and using scissors.			•	•				•									
Progresses in abilities to use writing, drawing and art tools including pencils, markers, chalk, paint brushes, and various types of technology.																	
Shows increasing levels of proficiency, control and balance in walking, climbing, running, jumping, hopping, skipping, marching and galloping.																	
Demonstrates increasing abilities to coordinate movements in throwing, catching, kicking, bouncing balls, and using the slide and swing.																	
Progresses in physical growth, strength, stamina, and flexibility.																	
Participates actively in games, outdoor play and other forms of exercise that enhance physical fitness.																	
Shows growing independence in hygiene, nutrition and personal care when eating, dressing, washing hands, brushing teeth and tolieting.																	
Builds awareness and ability to follow basic health and safety rules such as fire safety, traffic and pedestrian safety, and responding appropriately to potentially harmful objects, substances and activities.			•								•	•	•	•			