

The Creative Curriculum

# Study Starters

A Step-by-Step Guide to Project-Based Investigations in Science and Social Studies

# Balls

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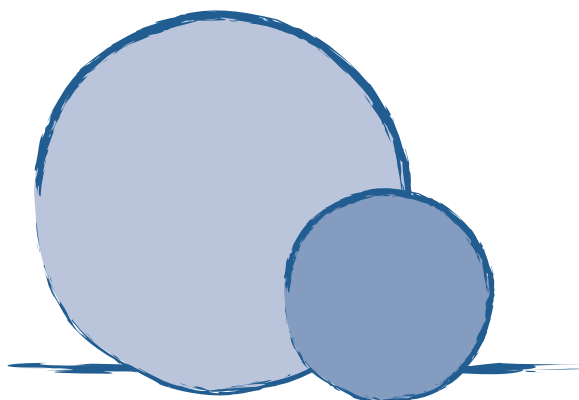
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# Balls



Children love balls. They play with them in many different ways: throwing, catching, kicking, and rolling them. Children make balls, marbles, and other rolling objects change speed and direction. They see how natural forces such as gravity and friction affect the movement of balls. Children play traditional games with balls and often invent their own games.

This study shows how to use children’s interest in balls to explore important science and social studies concepts and use skills in literacy, math, technology, and the arts.



*What have you noticed children and adults doing with balls?*

# 1

## Begin the Study

Your ideas



### Exploratory Investigations

Gather balls of different sizes, materials, and weights. Ask families and friends to help you build the collection. A sample letter to families is included at the end of this *Study Starter*. Here are some suggestions of balls to collect:

baseball	golf ball	racquet ball
basketball	kick ball	soccer ball
beach ball	koosh ball	volleyball
bowling ball	marble	whiffle ball
dog ball	ping-pong ball	
football	pool ball	

In addition to the types of balls that usually come to mind, think about balls that are not used for play such as:

cotton ball	popcorn ball	silly putty ball
crystal ball	ball bearing	Magic 8 ball
globe	beads	ball of yarn

Think about how to store and display the collection of balls. You may want to add to the excitement by collecting the balls in a large laundry or garbage bag until they all arrive. Large, clear plastic bags give children a sneak preview of the balls and encourage curiosity and wonder.

Allow several days for children to bring the balls to school. Start talking about the balls as they arrive. You can introduce vocabulary to describe them. You can also begin to introduce math concepts related to measurement and number.

Share the collection with the children at group time. Have children sit in a circle around the balls and make sure they can be seen. Place the balls in a plastic wading pool or build a short wall out of blocks to contain them. The purpose of this initial discussion is to encourage children to talk about the balls. Use open-ended questions and prompts and write children's responses on chart paper to encourage discussion:

*Did any of you have something interesting happen while you were collecting your balls?*


*Tell me what you notice about these balls.*

*How are some of these balls the same? How are they different from each other?*

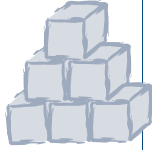
*What could we do with these balls?*

*How could we organize these balls into groups?*

Children need time to explore the properties of the balls and other materials before they engage in any formal investigations. As they explore, observe and talk with them about what they are noticing and doing.



*What other open-ended questions or prompts could you use to stimulate discussion with children?*



## Background Knowledge for Teachers

Physical science explores the energy of objects and the way they move. Because balls bounce, spin, roll in all directions, and store and transfer energy, exploring balls is a way to learn physical science concepts. A ball is a *sphere*. This means that a ball looks like a circle from every angle.

**Mass** is the amount of matter an object contains. For example, a piece of foil has the same mass whether it is flat or rolled into a ball.

**Momentum** is the strength of an object's motion. The amount of strength depends on the ball's mass and speed. A ball has more momentum the faster it is thrown. A ball with more mass, rolling at the same speed as a ball with less mass, also has more momentum.

**Gravity** is the earth's force that attracts all things to its center. That is why a ball falls to the ground when you drop it.

- Objects fall faster and faster as they drop.
- Galileo discovered that objects fall at the same rate of speed regardless of size. He dropped two cannon balls of different sizes from the Tower of Pisa and they landed on the ground at the same time.
- Small falling objects, such as a feather or a ping-pong ball, are slowed by air and do not fall at the same rate of speed.

**Weight** is gravity pulling on an object. There is more gravity pulling on a bowling ball than on a ping-pong ball.

**Energy** is needed to move a ball. For a ball to fall, it first must be lifted up. For a ball to move, it has to be thrown, pushed, or dropped.

**Friction** is a force that resists motion when two things touch each other. A moving ball is slowed by friction whenever the ball touches something else like grass, sand, water, or air.

- When you drop a ball onto a perfectly hard floor it will rebound, but, because friction slowed it down, it will not bounce back to its starting position.

*What do you want to research to help you understand this topic?*



## Pause and Reflect

At this stage, stop and think about whether this topic is worthy of becoming a long-term study with **your** group of children. You may wish to use the Pause and Reflect questions in the *Teacher's Guide* to focus your thinking.

Think about your exploratory investigations:

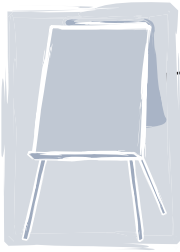
- Have the children really become **engaged** in the explorations thus far?
- Did the children talk about and share their **experiences**?
- Do you have **sufficient balls** so that children can explore and investigate in many different ways over time?
- Do you have the **resources** (people, places, books and other publications) you need?
- Will the study of balls enable you to **teach required skills and content** in the various subject matter areas?

Balls are often a good study topic because children can explore them easily by using their senses and because balls are usually easy to collect. Family members can help their children with investigations because the materials are so accessible.

Balls also provide an interesting way to explore **science** concepts. As children throw, kick, bounce, push, drop, and roll balls, they experiment with the position and movement of objects. They use positional language: *up, down, behind, in front of*. They discover different kinds of motion and the force required to stop or control a ball. Children can also explore **social studies** concepts about how balls are also used in transportation, jobs, and games.

## What Children Already Know

Observe children as they explore the collection of balls. Record your observations of what children do and say. Gather information about what children already know about balls and record their ideas on a chart. Do not correct mistaken ideas at this time. As children conduct investigations you can help them think about their misconceptions. Here is an example of what children might say about balls.



### What We Know About Balls

Most balls are round.

Balls come in many different sizes.

Balls come in different colors.

Balls bounce.

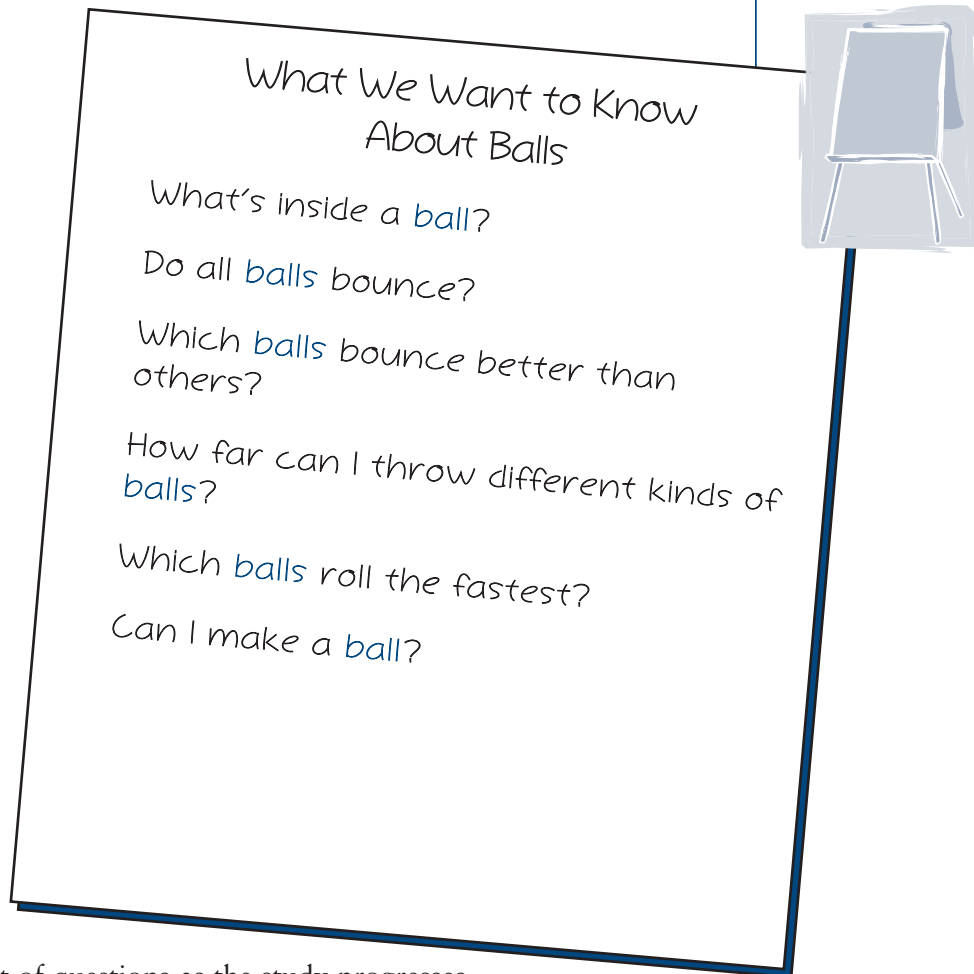
Balls are made of different things.

You can play with balls.

Keep this chart available so that you can add to it as children make new discoveries.

## What Children Want to Know

Children's questions will help you decide what kinds of experiences to offer children. At a group time ask, *What should we try to learn about balls during our study?* Record their questions. They may be curious about questions such as these.



Add to this list of questions as the study progresses.

Model your own curiosity by wondering aloud. *I wonder how far this heavy ball will roll.*

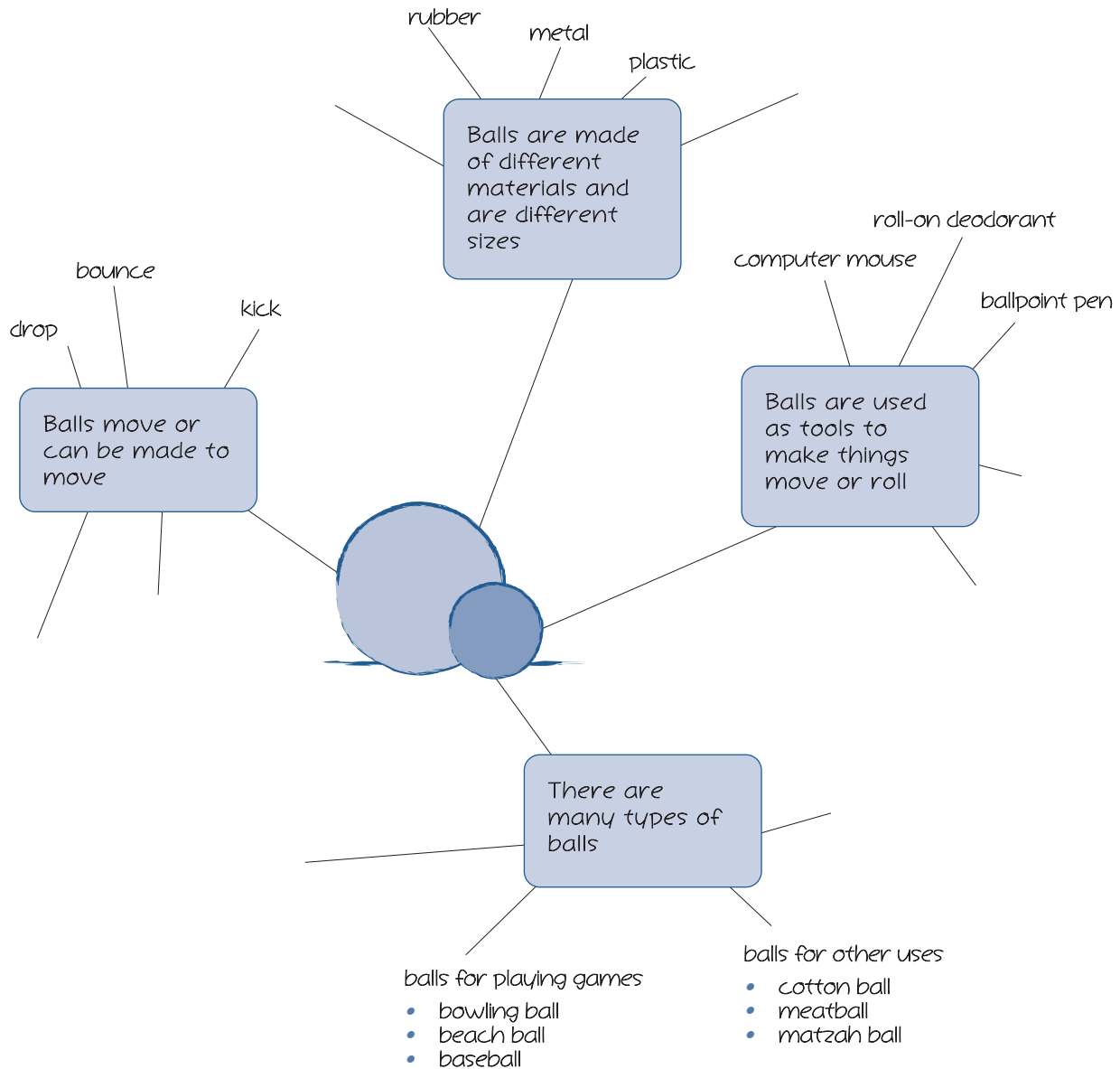
Verbalize other questions children may be thinking about. *It looks like you're trying to figure out which balls bounce higher than others. Let's add that to our list of questions.*

More questions will emerge during investigations. Help children learn the meaning of the word *question*. *That's a good question, Sarah. Let's write it on our chart and we'll try to figure out the answer.*

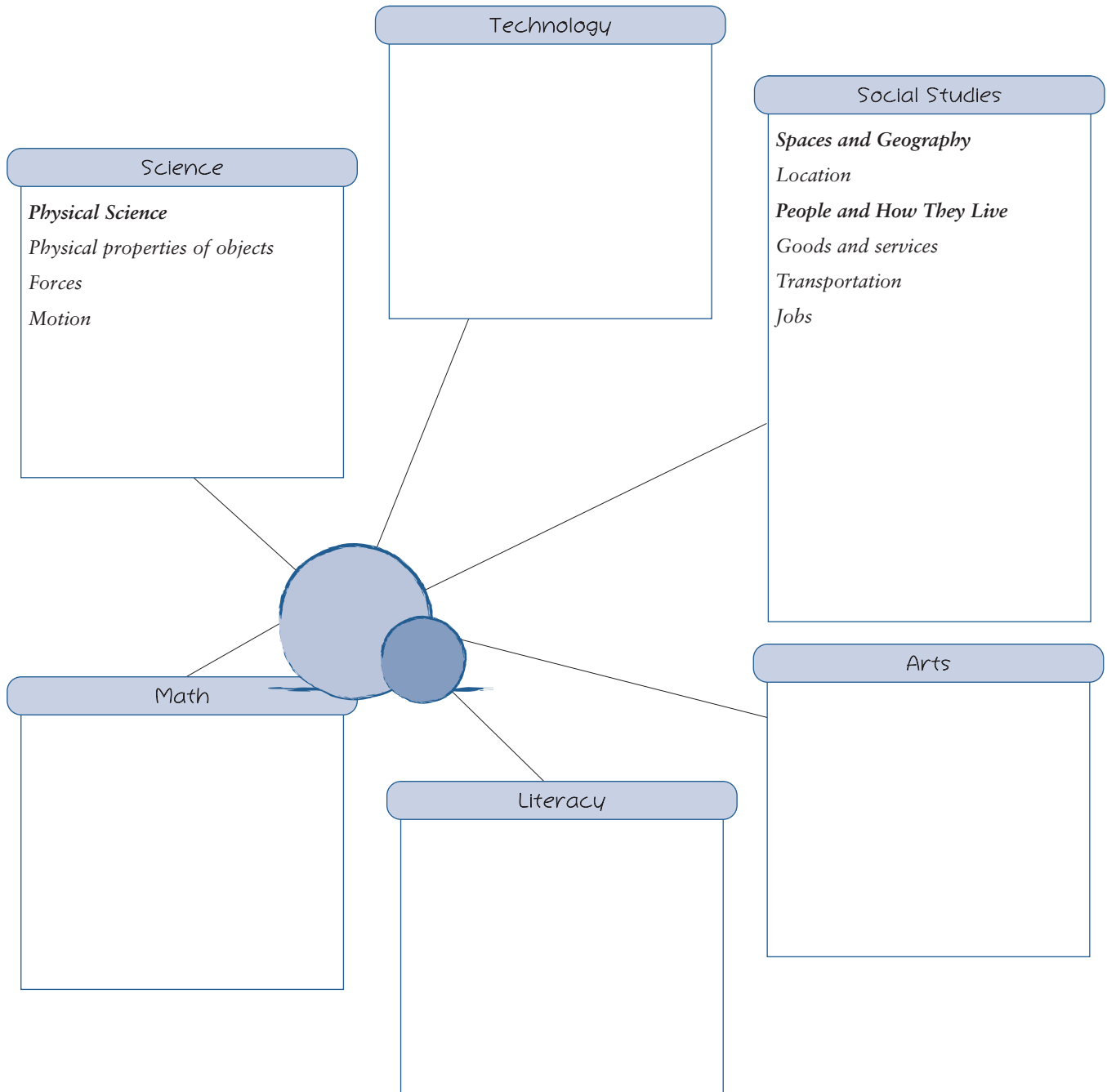


## Create Webs of Important Ideas and Content

The **idea web** below is a visual map to help you brainstorm and organize your thinking about a particular topic. Use this as a tool to show relationships among ideas. Expand this web by adding your own ideas, particularly those unique to your community.



This **content web** lists some important science and social studies concepts related to this study. Review the standards or content that you are required to address in your program. Then modify this web and add additional concepts.





## Integrate Content Area Learning

Now that you have explored the big ideas and concepts related to the topic and linked them to the content areas you are required to teach, think about some of the experiences you want to offer children. How might you integrate learning into your classroom activities? There are five sample investigations in this booklet. Consider what you might do in interest areas, during routines, and in focused small-group activities.

Content Area	Sample Experiences	Your Ideas
<b>Literacy</b>	<p>Refer to <i>Play Ball: The World's Best Ball Games</i> (Brallier, 2002) to learn new games to play with balls.</p> <p>Create a book about <i>If I Were a Ball I Would...</i></p> <p>Keep a list of words that describe balls.</p>	
<b>Math</b>	<p>Measure and weigh balls.</p> <p>Count how many times you can bounce a ball.</p> <p>Compare how far you can throw different kinds of balls.</p> <p>Notice and describe the patterns on balls.</p> <p>Learn the word <i>sphere</i>.</p> <p>Sort and categorize the ball collection in many ways.</p>	
<b>Science</b>	<p>Find out what is inside of balls.</p> <p>Experiment with balls and ramps.</p> <p>Explore bouncing different kinds of balls on different surfaces.</p>	

Content Area	Sample Experiences	Your Ideas
<b>Social Studies</b>	<p>Take a walk to find out where balls are used in the community.</p> <p>Interview parents and senior citizens to find out what kind of games they played with balls when they were children.</p>	
<b>The Arts</b>	<p>Create a marble painting to observe the paths of rolling balls.</p> <p>Use art materials such as clay, foil, or paper maché to create balls.</p> <p>Create dances that imitate different kinds of balls and ball movements.</p>	
<b>Technology</b>	<p>Investigate how a track ball or a computer mouse works.</p> <p>Try to find out about the machines used to make balls.</p> <p>Use a bike pump to inflate a ball.</p>	

# 2

## Investigate the Topic

You have already started a list of children’s ideas and questions about balls. As you implement the study, you will design investigations that help children expand their ideas, find answers to their questions, and learn important skills and concepts. In this section, you will find ideas for investigating questions that children might ask. Don’t be limited by these suggestions. Use them as inspiration to design experiences tailored to your own group of children and the resources in your school and community. While it is important to respond to children’s ideas and follow their leads as their thinking evolves, it is also important for you to organize the study and plan for possibilities.

### Weekly Planning

Use your weekly planning form to organize your study on a weekly basis. For example, children might wonder about the speed of balls. You have to think about where, when, and how children could investigate this question. You might choose to have children experiment in the Block Area using balls and block ramps. If so, on your weekly planning form, you would indicate that you are adding balls and ramps to the Block Area. You might also note that you are planning a small-group activity during which children would roll different kinds of balls and compare which ones rolled the fastest.

Remember, you don’t need to incorporate balls in every interest area. Other routine activities and experiences should continue in the classroom.

In the *Teacher’s Guide to Study Starters*, you will find a page to attach to your weekly planning form. Use this page to record your key ideas about what will happen next, how children will represent their learning, and how their experiences link to the objectives and content standards of your program.

## Enhancements to Interest Areas

Here are some suggestions of materials and resources for exploring your topic, along with space for you to list available resources.

Interest Area Materials for Exploration	Your Ideas
<b>Blocks</b> Small balls Ramps	
<b>Dramatic Play</b> Sports store selling different kinds of balls	
<b>Toys and Games</b> Collection of rubber bands to make rubber band balls Collection of small balls to sort Geometric solids (spheres) Marble maze construction toy	
<b>Art</b> Marble painting Print making with different balls Collage or structure made with ball-shaped materials	
<b>Library</b> Informational books about various games with balls	
<b>Discovery</b> Old balls that have been cut in half Magnetic marbles Gerbil/hamster ball	
<b>Sand and Water</b> Small balls for floating and sinking Ice cream scoop for molding sand balls	
<b>Music and Movement</b> Exercise balls	
<b>Cooking</b> Scoops to make melon balls Meatballs recipe	
<b>Computers</b> Computer track ball	
<b>Outdoors</b> Variety of balls Parachute or blanket to bounce balls Equipment to use with balls, e.g., Velcro mitts, hoops, foam bats	

## Notes



## Are bigger balls better for rolling, kicking, and throwing?

### Materials

Balls, yarn, or string (preferably two different colors)

### Where This Might Take Place

Discovery Area, Outdoors, Toys and Games Area, Small-Group Time Area

### What to Do

- Hold up a flat, circular object such as a CD, a Frisbee, or a circle cut from paper. Ask children to name the shape. Then hold up a ball and ask about its shape. *How are they the same and different?* Explain to children that a ball is a *sphere* and that no matter how you look at it, it still looks like a *circle*.
- Ask: *Do you think that bigger balls are better than smaller balls for rolling, kicking, and throwing?*
- Ask the children for ideas about how to measure a ball. Discuss their ideas.
- Show them how to wrap yarn around a ball. Then, by measuring the length of the yarn, they can find out about the size of the ball.
- Ask each child to choose a ball from the collection.
- Ask each child to predict (guess) how big around his/her ball is by cutting a piece of string or yarn. Use one color of yarn for these predictions.
- Invite the children to test their predictions by wrapping the pieces of yarn that they cut around the balls.
- Using a second color of yarn, encourage each child to wrap a new piece of yarn around the ball and cut it the appropriate length. Discuss the results.
- Ask the children to compare their yarn length to different objects in the room such as a block, table, window pane, foot, hand, etc.
- Have pairs of children take a large ball and a small ball and make predictions about which one they will be able roll, kick, or throw the fastest or farthest.
- Discuss findings.

**Document Findings**

Have the children create a display of the balls and the lengths of yarn.

Guide children in taping the yarn to the wall from the shortest to the longest piece. Place the matching ball underneath the yarn.

Tape the yarn used to make the predictions next to the actual lengths.

Encourage the children to talk about what they notice.

Indicate on the display which balls were best for rolling, kicking, and throwing.

**Learning Goals or Content Standards Addressed**

**Science:** Exploring the physical properties of objects and objects in motion; observing, organizing information, communicating and representing information

**Social studies:** Working collaboratively with others

**Literacy:** Engaging in conversations; asking and answering questions

**Math:** Measuring using non-standard units, estimating, making comparisons, graphing

**Additional Investigations Related to the Size of Balls**

- Weigh balls.
- Line balls up from smallest to largest.
- Find examples of very large or very heavy balls in your community (e.g., demolition or bowling balls) or find pictures on the Internet or in magazines.

**Your ideas**

## Notes



## Which balls bounce best?

### Materials

Variety of balls

### Where This Might Take Place

Discovery Area, Outdoors, Gym, Multipurpose Room

### What to Do

- Gather a collection of balls.
- Ask questions such as these:

*Which balls do you think will bounce well? Which ones do you think won't bounce well?*

- Sort the balls into two groups. Record predictions.
- Experiment with the balls. Record any changes in the groups.
- Try bouncing the balls on different surfaces such as grass or carpet.
- Continue with additional questions:

*What differences do you see between the balls that bounce well and those that don't?*

*Why do you think some balls bounce better than others?*

### Document Findings

Make a chart listing the balls that bounce well and those that do not. Invite children to illustrate.

As an alternative, take one photo of the predictions and another of the findings after the exploration. Display on a chart and have children dictate statements about the experience.

**Learning Goals or Standards Addressed**

**Science:** Exploring the physical properties of objects and objects in motion; solving problems; observing; making predictions, thinking logically

**Literacy:** Using print concepts and writing; understanding the purpose for writing, using expressive language

**Math:** Data representation, sorting, classifying

**Additional Investigations About Bouncing Balls**

- Bounce balls made of different materials.
- Bounce a small ball onto a big ball.

**Your ideas**

## Notes



## How can I make balls roll faster?

### Materials

Variety of balls  
Ramps such as boards, slides, rain gutters, cardboard tubes

### Where This Might Take Place

Blocks Area, Outdoors, Discovery Area

### What to Do

- Invite children to experiment with rolling balls of different sizes and shapes on a flat surface such as the floor.
- Ask questions such as these:

*Which balls rolled the fastest?*

*How can we make them roll faster?*

- Suggest that children predict which of two balls might roll faster down a slide. Wonder aloud:

*I wonder why this ball rolls faster.*

- Ask the children if they can think of other kinds of slides (ramps) that they can make for the balls. Offer boards, planks, rain gutters, PVC pipes, and cardboard tubes.

### Document Findings

Record children's predictions and findings on a chart.

**Learning Goals or Standards Addressed**

**Science:** Exploring the physical properties of objects and objects in motion; solving problems; observing; making predictions, thinking logically

**Literacy:** Using print concepts and writing; understanding the purpose for writing, using expressive language

**Math:** Data representation, sorting, classifying

**Additional Investigations About Rolling Balls**

- Compare rolling small balls and large balls.
- Compare rolling heavy balls and light balls.
- Compare rolling balls of similar sizes but made of different materials.
- Change the height of the ramp and find out what happens when the balls are rolled.



**Your ideas**

## Notes



## What is inside balls and does it make a difference?

### Materials:

Variety of old balls  
Tools for opening balls  
Safety goggles

### Where This Might Take Place:

Discovery Area, Outdoors, Small-Group Time Area

### What to Do:

- Pose the question, *What do you think is inside a ball?*
- Record children's responses on a chart.
- Introduce vocabulary words such as *hollow* and *solid*. Use objects that permit the children to see inside an object as you discuss these words.
- Ask the children to predict whether each ball is *hollow* or *solid* and sort the balls accordingly.
- Cut open the balls as children observe. Rearrange the balls into the correct categories. Create a third category titled, "Balls We Can't Open" for those balls that cannot be opened easily, such as a marble or a bowling ball.

**Note:** Do not cut open a golf ball with children around. The center of the golf ball contains a poisonous liquid.

- Ask questions such as these:

*Why do you think some balls are hollow and some balls are solid?*

*What would be different about how balls move if those that are hollow were solid?*

*How can we find out what's inside of the balls we can't open?*

- Have pairs of children compare rolling, kicking, and throwing hollow and solid balls. Try the experiment on different surfaces. Discuss findings.

**Document Findings:**

Create a display of balls that are solid and hollow on the inside. Invite children to make predictions for other balls.

Indicate on the display which balls are best for rolling, kicking, and throwing.

**Learning Goals or Standards Addressed:**

**Science:** Predicting, testing hypothesis, exploring the physical properties of objects; learning concepts about solids and air

**Social studies:** Working collaboratively

**Literacy:** Engaging in conversations; learning new vocabulary; asking and answering questions

**Math:** Sorting and classifying, representing data

**Technology:** Understanding how things work

**Additional Investigations About What Is Inside Balls**

- Create a hollow ball with paper maché. Cover a round balloon with paper maché. When dry, make a small opening, pop the balloon and remove it.
- Compare the weight of hollow and solid balls.

**Your ideas**

Notes



## How do people use balls in their work and play?

### Materials

none

### Where This Might Take Place

Site visit, Group Time Area

### What to Do

- Arrange for a site visit to a sporting goods store (or sporting goods section of a department store) to see different types of balls. Call ahead to make arrangements and explain to the manager that children will be asking questions and sitting on the floor making drawings. (As an alternative, invite a coach or an athlete to the classroom to share and discuss the many different kinds of balls used in sports.)
- Prepare children for the visit by planning and assigning questions to ask such as: *Why does a golf ball have dimples? Why is a bowling ball so heavy? What is the heaviest ball in the store? What is the lightest ball? Why is a football a ball? Which balls are solid and which are hollow? How do the balls get to the store? Does someone have to inflate the balls?*
- Have children sketch the balls they see. Take photos of the displays.
- Back in the classroom, create a sporting goods store in the Dramatic Play Area with the children. Refer to the photos and drawings. (You can create a backdrop for the store by converting a photo of the ball display into a transparency and projecting it onto the wall with an overhead projector.) Have the children create signs for their store along with price labels for their balls.

### Document Findings:

Have children dictate what they learned on an experience chart.

Document children's dramatic play experiences and create a display.

**Learning Goals or Standards Addressed:**

**Science:** Predicting, testing hypothesis, exploring the physical properties of objects; learning concepts about solids and air

**Social studies:** Working collaboratively

**Literacy:** Engaging in conversations; learning new vocabulary; asking and answering questions

**Math:** Sorting and classifying, representing data

**The Arts:** Creating visual displays

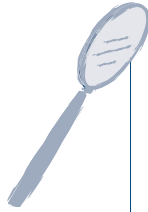
**Technology:** Understanding how things work

**Additional Investigations About Moving Balls**

Explore how many balls you can carry at one time without dropping them. Display the results on a graph.



**Your ideas**



## Further Questions to Investigate

You may notice that children are still engaged in the study and want to find out more. Here are some examples of additional questions you might investigate to extend the study further:

- What defines a ball as a ball?
- If a ball is placed in a freezer, will it bounce higher?
- How many ways can we make our own balls? Will they bounce?
- Which balls can I throw, kick, or roll the longest distance?
- What are the favorite games our families like to play that use balls? What are the favorite ball games our families like to watch?
- How do basketball players spin balls on their fingers?
- What kinds of balls do different kinds of pets like?
- Do all balls roll?
- What kind of ball games do children in other communities play?
- How many different kinds of balls can we make?
- How does a ballpoint pen work?
- Can balls be used in decorations? In artwork? In structures?
- How are bubbles the same as or different from other types of balls?

*Are there additional questions that will help you extend your study?*

# Celebrate Learning

As you notice your children's interest begin to diminish, it is time to bring the study to a close. Plan a special way to celebrate their learning and accomplishments. Allow children to assume as much responsibility as possible in planning the activities. Here are some suggestions:

- Set up stations for children to show visitors the various ways they investigated the balls.
- Host an Olympics featuring events for visitors and children to play using balls.
- Have the children plan a meal including only those foods shaped like balls: oranges, cheese balls, sherbet balls, olives, meatballs, matzah balls. Invite family members to participate.
- Invent a new ball game and teach it to the children in another class.
- Make a class book, photo album or documentation panel about the balls study.

## Reflections

*What were the most engaging parts of the study? Did you discover any new topics that might be worthy of investigation? If you had to change any part of the study, what would it be? Do you have other thoughts and ideas?*

# 3

Your ideas 

# Resources

## Children's Books

*Three Magic Balls* (Richard Egielski)

When Uncle Dinkleschmidt buys three rubber balls for his toy store, it is up to Rudy to take care of them. As soon as Rudy is left alone, he finds out these are no ordinary balls and the magic begins.

*Play Ball, Amelia Bedelia* (Peggy Parish)

Amelia Bedelia, who knows very little about playing baseball, fills in for a sick player on the Grizzlies' baseball team.

*Curious George Plays Baseball* (Margaret Rey)

Curious George's natural inclination to find out more about everything leads him to interfere with a baseball game.

*Stop That Ball* (Mike McClintock)

This book, told in a rhyming prose, tells of a boy's madcap adventures as he tries to retrieve his ball.

*Balls! Elmo's World* (John E. Barrett and Mary Beth Nelson)

In this boardbook, Elmo is having a ball! Peek underneath the big flaps to find bouncy balls of different sizes and shapes and watch Elmo dunk a basketball.

*Winnie Plays Ball* (Leda Schubert)

On her birthday, Winnie the dog receives several balls which she enjoys catching, hiding, and eating.

*T-Ball Trouble: Tomie DePaola's Barker Twins*

Moffie and Morgie are excited to play on the class T-ball team. But when Moffie goes to the plate, she can't even hit the ball off the tee.

*The Lost Ball, La pelota perdida* (Lynn Reiser)

In this book with English and Spanish translation, the reader discovers that children and dogs and ballplayers speak the same language (even when they don't).

## Children's Nonfiction

*Play Ball: The World's Best Ball Games* (Jess Barllier and Sammy Yuen)

This book, packaged with a ball, includes 25 games children can play such as Pickle and Dodge Hockey.

*My Football Book, My Basketball Book, My Baseball Book, My Soccer Book* (Gail Gibbons)

In each of these small paperbacks, Gibbons identifies the equipment, the court or field, the position of the players, and a few rules of the game.

*Baseball ABCs and Baseball 123* (James Buckley, Jr.)

Through photographs in these boardbooks, children pick up the basics of the games such as “H is for Home Plate” or “5 base runners.”

*Balls* (Melanie Davis Jones)

Rhyming text introduces the many types of balls and how they are used.

### **Teacher Resources**

*Bouncing Science: No Sweat Projects* (Jess Brallier)

This small paperback book explains, in simple-to-understand terms, the science of balls. Many of the experiments can be adapted for preschool-kindergarten use.

*Insights: Balls and Ramps K-1* (Education Development Center, Inc.)

Teacher’s guide and complete kits are available to build on children’s prior experiences with balls and how they move. While appropriate for kindergarten-age children, the activities may need to be adapted for use with younger preschoolers.

## Letter to Families

Send families a brief letter outlining the potential scope of the study. Use the letter as an opportunity to communicate with families and enlist their participation in the study.

### A Letter to Families About Our Study of Balls

We want to learn more about balls—the different kinds of balls, how people use balls, what they are made of, what is inside of them, how high they can bounce, and their uses. We need your help in finding as many different types of balls as we can. Here are just a few examples:

baseball	crystal ball	koosh ball	soccer ball
basketball	doggie ball	marble	volleyball
beach ball	football	ping-pong ball	whiffle ball
bowling ball	golf ball	pool ball	
cotton ball	kick ball	racquet ball	

Please contribute whatever balls you can to our study.

As we study balls, we will be learning many important concepts and skills in literacy, math, science, social studies, the arts, and technology. We'll also be using thinking skills to investigate, solve problems, and make predictions.

#### What You Can Do at Home

Play with balls of all shapes, types, and sizes: playground balls, tennis balls, ping-pong balls, koosh balls, volleyballs, baseballs, footballs, marbles. Talk about what the balls are made of, if they are heavy or light, or if they are big or little.

Wonder aloud with your child to encourage his or her thinking about balls. *I wonder what's inside of a tennis ball. I wonder how far you can throw a foil ball, a beach ball, or a tennis ball. How can we find out?*

Help your child use all of the senses when playing with balls. *What does it look like? Feel like? Sound like? Smell like?*

See how many types of balls you can find around the house and in your neighborhood.

While riding in the car, bus or train, play a game. Think of all the words that contain the word *ball* in them. Look for examples of balls around you.

At the end of our study, we'll have a special event to show you all that we've learned. Thank you for playing an important role in our learning.





Studies are one of the most effective ways for children to learn science and social studies content while developing skills in literacy, math, the arts, and technology. They support children's wonderful ability to become totally engaged in topics and activities that interest them, and they challenge children to extend their thinking to ever higher levels. Studies are meaningful to children because they provide opportunities to gain information through direct observation and experimentation and then to link new ideas to what children already know.

Are you ready to engage your children with in-depth studies? *The Creative Curriculum® Study Starters* are designed with you in mind. This valuable new science and social studies resource is a series of step-by-step guides that help you implement investigative, project-based learning in your classroom. *Study Starters* begin with topics that children want to explore and help you identify children's questions, learn background information and vocabulary, organize and plan the environment, facilitate investigations, incorporate content skills and knowledge, and involve families. Most important, *Study Starters* lead you to look at your own children and community to develop a study that is unique and customized for the children you teach.



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