

Spheres All Year Teacher's Guide

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To be used with:

Spheres All Year

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Illustrations by Anuki López

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Introduction

Spheres are 3D objects that are round. Though they are similar to 2D circles, spheres have three dimensions, hence the name 3D. These dimensions are length, width, and height. These objects are in our everyday lives as balls, the planets, fruits, and many other things that we can hold and encounter. From the small objects like bubbles to larger, more distant ones like the Sun and moon, spheres surround us both in nature and our daily lives throughout the year.

The Earth is one of the largest spheres we know, and as the Earth revolves around the Sun, the seasons occur. The four seasons, winter, spring, summer, and fall, last for approximately three months each and change depending on the distance of the Earth from the Sun. The seasons have different weather patterns, like snow in the winter and rain in the spring.

This teacher's guide serves as an aid to helping young thinkers understand spheres and how they are different from circles, and how to identify spheres, both big and small, in everyday life throughout the different seasons. These activities will provide an understanding of the seasons and the spheres we encounter in nature.

Resources

Websites

<https://www.kidsmathgamesonline.com/facts/geometry/spheres.html>

<https://thirdspacelearning.com/us/blog/what-are-3d-shapes/>

<https://www.theclassroom.com/explain-summer-fall-winter-child-7330539.html>

Books

Circle! Sphere! by Grace Lin

Shapes that Roll by Karen Nagel

A Stroll Through the Seasons (Look and Wonder) by Kay Barnham and Maddie Frost

YouTube Videos

“Learn 3D Shapes SPHERE Fun kindergarten lesson for kids” by VUSD EdTech

“Sphere Song - to the tune of “Itsy Bitsy Spider”” by MidasTitus

“The Seasons Song | Kids Songs | Super Simple Songs” by Super Simple Songs - Kids Songs

About the Author and Illustrator

Elizabeth Everett spent 16 years as a classroom teacher before venturing into writing. Inspired by her energetic youngster, Jalen, and his love for books, she took her background in education and meshed it with his childhood interest. The result was edu-tainment in the form of children's books! She currently lives in Colorado with her family, where they love spending time outdoors in the Western sun. She is the author of *This Is the Sun* and *Twinkle, Twinkle, Daytime Star*. She can be reached at Elizabeth.Everett@ScienceNaturally.com.



Anuki López studied Fine Arts Grade at the University of Seville in Spain. She has been drawing since she can remember; a notebook and colored pencils were her favorite toys. Once she grew up, she studied Art and Graphic Design Art at university. In her final year, she discovered the fantastic world of children's book illustration and fell in love with it. She loves working and living her life as an illustrator, bringing children illustrations that are full of color, magic, humor, animals, respect, and, of course, love. You can see more of her art on her Instagram page, [@anukilopez](https://www.instagram.com/anukilopez).

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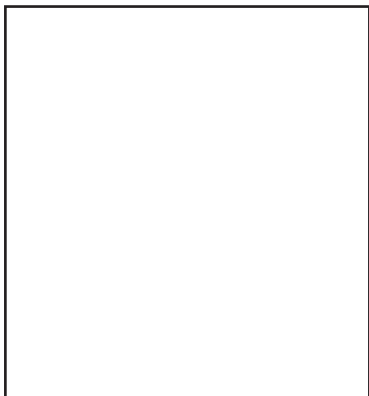
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Pre-Reading: Introducing 2D and 3D

Grades: Pre-Kindergarten - Second Grade

Materials: Playdough (one container for each student)

Subject: 2D shapes, 3D shapes, spheres, geometry

NGSS: K-2-ETS1-3

Skills: Fine motor skills, identification, similarities and differences, making observations

Background: Circles and spheres are similar to each other, but their differences in dimension can be confusing. 2D shapes are defined as having the dimensions of length and width. 3D shapes also have length and width, but they have a third dimension: height. Typically, we think of 2D shapes as drawings we create and 3D shapes as objects in our world that we can touch. The concept of 2D and 3D are complex, but there are ways to make the learning tangible. Using Playdough, the shapes will come to life and students can see the dimensions (length, width, and height) with their own eyes.

Activity:

1. Have each student open their Playdough and split it into roughly two halves.
2. Pick one half of the Playdough and have your students make the sphere first. Roll the Playdough between both hands in a circular motion. Once it's formed a more spherical shape, put the sphere on the table and roll it between your hand and the table in a circular motion. Once you're satisfied with the shape, set the sphere aside.
3. Take the other half of the Playdough to make a circle. Use the same procedure from step 2 to make a sphere. After the sphere is made, press down on the sphere with the palm of your hand to make it flat. Make the sphere as flat as possible to make a circle.
4. Set the circle and the sphere next to each other on the desk and have your students make observations about them.

Discussion: Ask your students what they notice is similar about the two Playdough creations and what differences they observe. Introduce definitions for a sphere and a circle and how the circle is 2D and the sphere is 3D. Explain what the dimensions are and what they mean. 2D shapes only have length and width, but 3D shapes have length, width, and height, which explains why the sphere is taller than the circle. Ask about motion; can the sphere move? How does it move? Can the circle move?

While You Read: Sorting by Seasons

Grades: Kindergarten - Second Grade

Materials: *Spheres All Year*, Sorting by Seasons Images (page 1 and 2), scissors

Subject: Seasons, spheres

NGSS: K-ESS2-1

Skills: Sorting, attentive listening, word/picture associations

Background: In *Spheres All Year*, there are 16 spheres depicted in the four seasons. These spheres represent how we think about the seasons in our minds, so they are indicative of the pictures we paint in our heads when we think of the seasons, such as ice cream being attributed to the summertime or snow falling in winter. In this activity, students will put their associations to the test and match images to the season they typically represent.

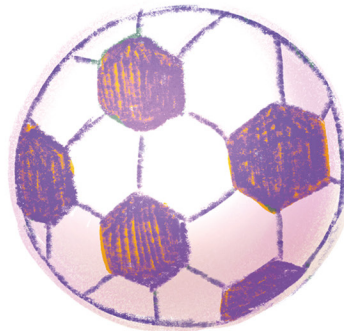
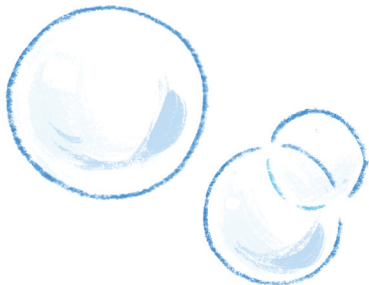
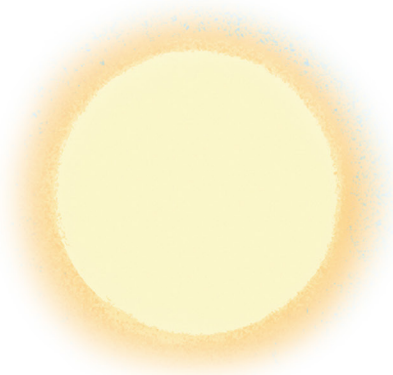
Activity:

1. Print the Sorting by Seasons images out. Make a few copies of these for enough students to be in groups of four for this activity. Cut the images out from the pages to make sets for each of the groups (you can also laminate these pictures if you desire).
2. Evenly separate students into groups of four and have them seated in different parts of the room. Pass out one set of the 16 images to each group.
3. Read *Spheres All Year* aloud to your class. As you read, each group should work together to move their images, which are spheres from the book, into the different seasons. Pause after each season for a minute or two to give students time to find the images and sort them. This means that all of the spring-related spheres will be in one group, the fall-related spheres in another group, and so on. It might be helpful to read a little slower as they do this activity.
4. After you finish reading *Spheres All Year*, give the class an extra three minutes to complete the activity and finalize their groupings.
5. Review and discuss the activity as a class.

Discussion: Was this activity easy or difficult? How did they work as a team? What was their process? Were there some items that they knew where they went faster than others/ Which items were the easiest to sort? The hardest? What other items/spheres would you add to this list?

Sorting by Seasons Images

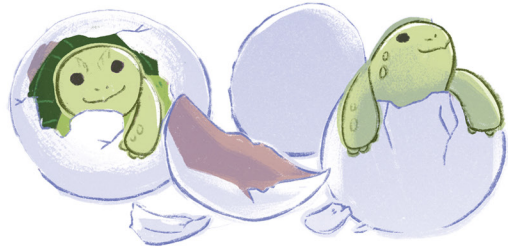
page 1



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Sorting by Seasons Images

page 2



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Activity: Everyday Spheres

Grades: Pre-Kindergarten - Second Grade

Materials: *Spheres All Year*, Everyday Spheres worksheet, pencil, crayons/colored pencils/markers

Subject: Spheres, 3D shapes

NGSS: K-2-ETS1-3

Skills: Identification, description, replicating

Background: Spheres are all around us in our everyday lives, from the balls we play with to the planet we live on. This activity will help students see the spheres around them in their classroom.

Activity:

1. Read *Spheres All Year* aloud to your class.
2. Print and pass out the Everyday Spheres worksheet for everyone in the class to have a copy.
3. Have your students stand up and walk around the classroom to find and identify four different spheres. After finding a sphere, students will draw the object in the box and describe what it is on the lines below the box. Have your students sit in their seats once they've finished the worksheet.

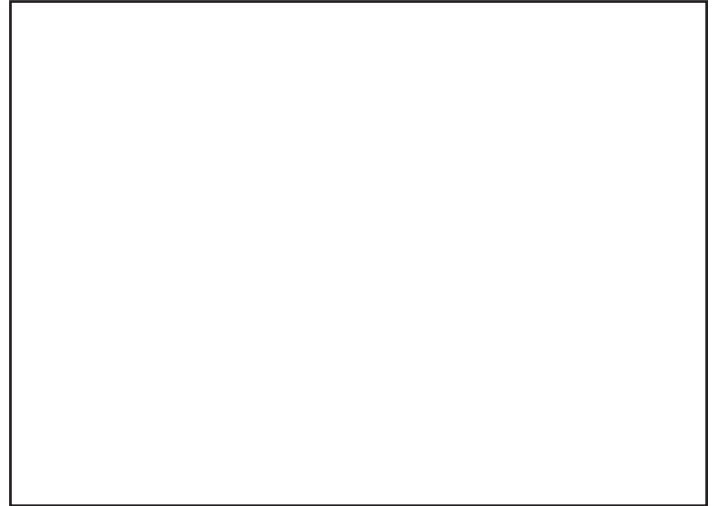
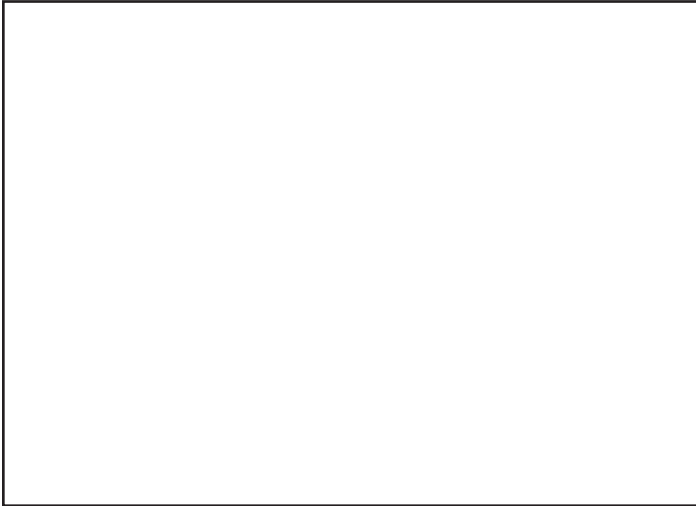
Discussion: Ask the students what spheres they identified in the classroom. Ask what properties the objects have and how those match the properties of spheres (having three dimensions: length, width, and height).

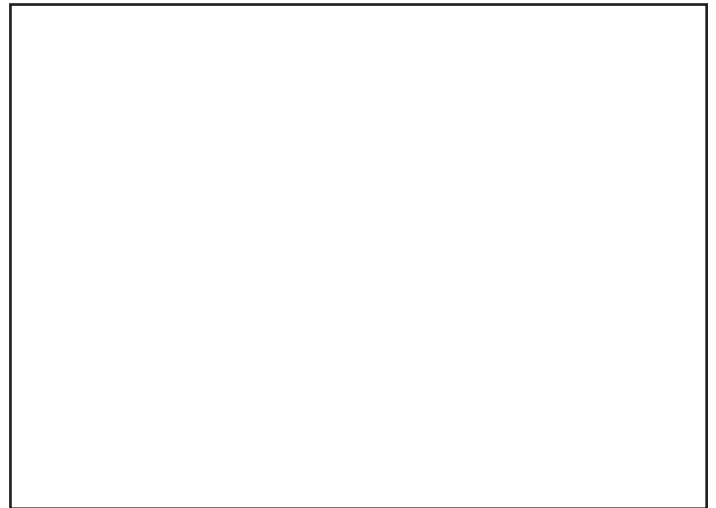
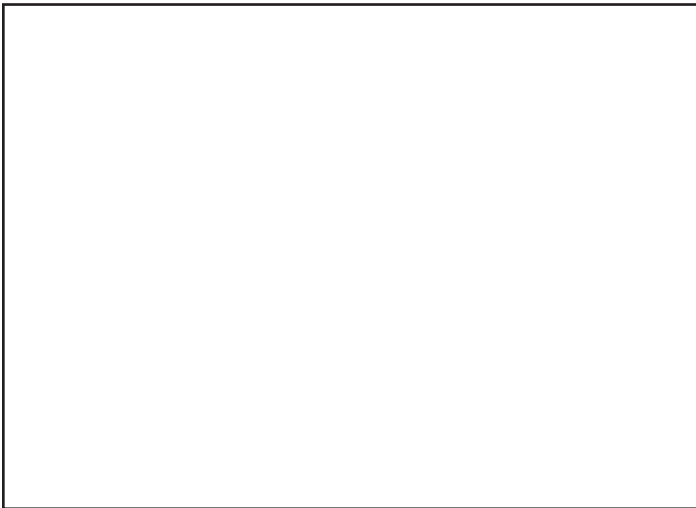
Everyday Spheres

Name: _____

Date: _____

Find four new spheres in your home or classroom that you did NOT see in *Spheres All Year*.
Draw a picture of the spheres in the boxes below, and label what they are.





Activity: Seasons Story Book

Grades: Pre-Kindergarten - Second Grade

Materials: *Spheres All Year*, lunch size paper bags (3 for each student), hole punch, yarn or string, markers, stickers (optional), old magazines (optional), scissors (optional), glue (optional), etc.





Subjects: Seasons, weather

NGSS: K-ESS2-1

Skills: Storytelling, word/picture associations, drawing

Background: As the Earth revolves around the Sun, the shifts in the distance from the Sun causes the four seasons. Each of these seasons have different weather patterns, activities, plants, and other things associated with them, and they can all be predicted based on the season.

Activity:

1. Read *Spheres All Year* aloud to your class.
2. Fold the paper bags in half. Have the students arrange them either nested like this:  or side-by-side like this: .
3. Use the hole punch to punch two holes through all three bags. If the bags are nested, lay the bags open flat and punch through the middle fold like this:  If the bags are arranged side-by-side, keep them folded and punch the holes near the folded edge like this: .
4. Thread the yarn through the holes and tie a strong knot in the middle. The knot should be on the outside of the spine. If the knot isn't staying tied, you can add some glue to the middle of the knot so it stays tied (you can also make these books ahead of time and give them to your class if desired).
5. Have students pick markers, stickers, and other decorations of their choice from the ones you have provided. Instruct your students to write the season on one of the pages of a two-page spread (this is both pages of the book when the book is open). On the two-page spread, encourage students to decorate the pages with things that remind them of that season, using the markers and other supplies. For example, students can draw snowflakes on the “winter” spread or add flowers to the “spring” spread.

Discussion: Ask your students what they drew or added to their books, season by season. What about those things remind them of that season? Are those things unique to that season? Did they add those items to other seasons too? What stories are they telling about the seasons with the pictures they added? For an extra discussion with older students, ask if any of their objects are spheres.

Activity: Making Spheres

Grades: Kindergarten - Second Grade

Materials: *Spheres All Year*, Sphere Net, scissors, glue, crayons/colored pencils/markers

Subject: Spheres, seasons, geometry, 3D shapes

NGSS: K-2-ETS1-3, 1-ESS1-2

Skills: Fine motor skills, making inferences, making observations, thinking in 3D

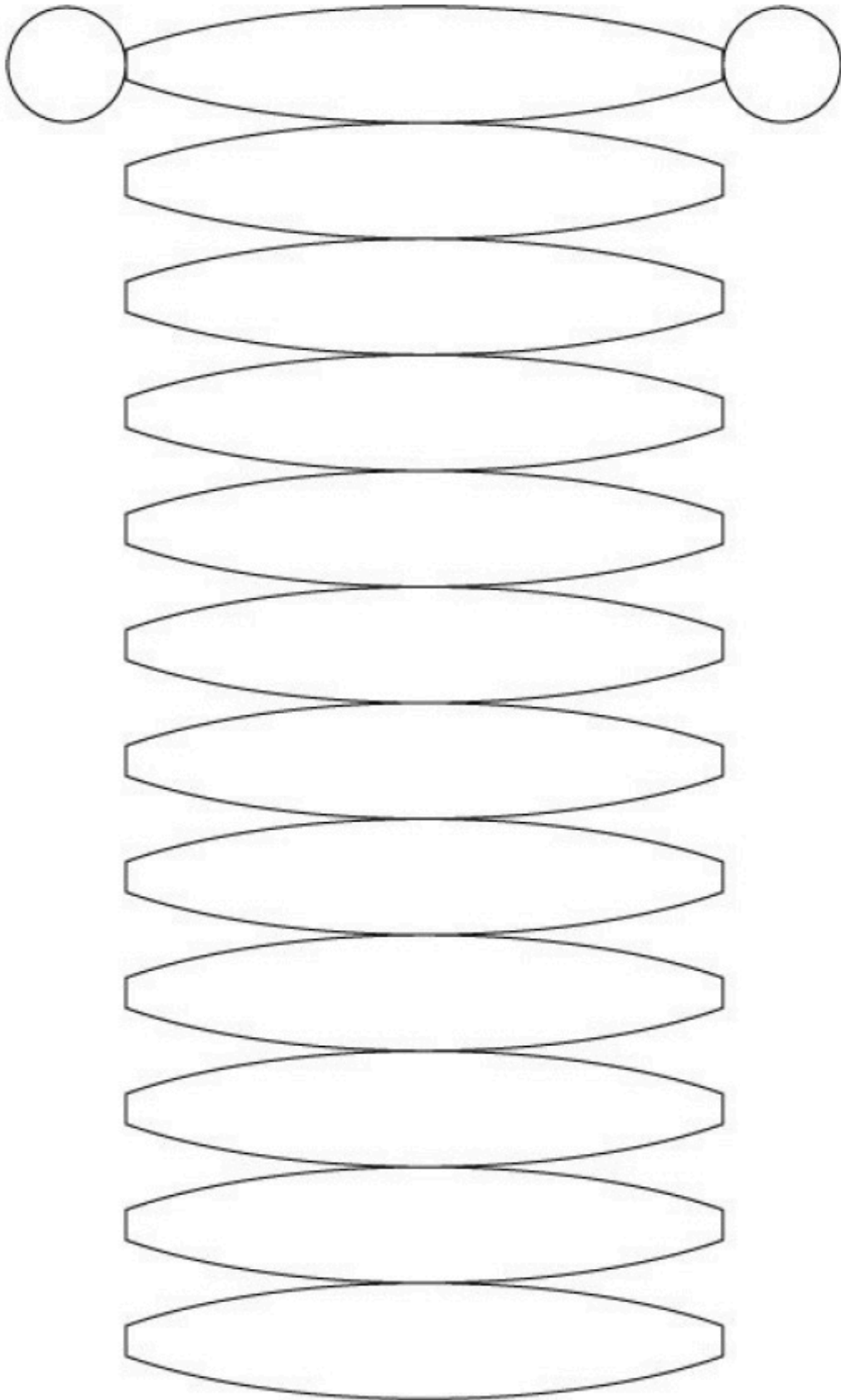
Background: *Spheres All Year* highlights some of the spheres that we encounter in our daily lives as the seasons change. In this activity, students will create their own spheres out of paper and decorate them to become a sphere they encounter in their own lives. Turning a 2D shape into a 3D object will help kids begin conceptualizing in a 3D space. This is a great starting point for introducing important STEM fields that now use 3D modelling and printing.

Activity:

1. Read *Spheres All Year* to your class.
2. Print enough Sphere Nets for every student to have one. You can also print extras in case students want to make more than one sphere. You can print the nets onto any paper you have, including but not limited to: printer paper, construction paper, or scrapbook paper.
3. Before beginning, ask the students what the outline looks like. Tell them they are going to cut it out and make something. Ask what 3D shape they think it will make.
4. Demonstrate to students on how to make the sphere. Cut along the black outline of the two small circles and the sphere pattern in one line. After cutting out the sphere, fold the two circles towards each other to be the top and bottom of the sphere. Fold the oval-shaped pieces inward and glue the edges to the top and bottom circles. Help your class as needed.
5. Have the students pick their favorite season (this can be assigned to them as well, such as choosing the season they were born in) and decorate their sphere to remind them of a sphere they see during this season. For an extra challenge, ask your students to pick a type of sphere not included in *Spheres All Year*. Decorating the sphere might be challenging after it's glued together, so there is an option to decorate/color it before gluing the sphere together.

Discussion: Ask your students questions about the construction of the sphere. Were they surprised that the 2D shape they cut out turned into a sphere? If so, what did they think the 2D shape on paper would look like? Are there other 2D shapes that could be turned into a sphere? Do they think other 3D shapes, like a cube, might be easier to make out of paper? Bonus: walk the students through drawing a 2D shape that can be folded into a cube, pyramid, cylinder, etc.

Sphere Net



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