



Children's
Discovery
Museum
of San Jose

California Content Standards

Kindergarten:

- Mathematics –
Meas. 2.1, 2.2

Grade One:

- Mathematics –
Meas. & Geom 2.1,
2.2

Grade Two:

- Mathematics –
Measurement &
Geometry
2.1, 2.2

Grade Three:

- Mathematics –
Measurement &
Geometry
2.1, 2.2, 2.3, 2.4,
2.5, 2.6

Secrets of Circles

Teacher's Guide: Grades K – 3



What's Going On?

The ***Secrets of Circles*** exhibition features 18 exhibits designed to inspire children and adults to ask questions and investigate the answers as they explore the math, science, and engineering of circles. The exhibition offers multiple ways to appreciate the many uses of circles in nature and by people and the perfect introduction to learning about shapes. The activities described in this guide extend children's learning from circles to other shapes.

Before You Visit

Before You Visit CDM, review different shapes and their real world uses.

During Your Visit

During Your Visit to CDM, challenge children to complete their scavenger hunts by finding at least one example of each shape within the exhibit.

After Your Visit

After Your Visit, create three-dimensional shape sculptures.



Before You Visit

Name and Describe Shapes

What you'll need

For each pair of students:

- Pattern blocks, 3-D geometric shapes, attribute shapes, or teacher-made geometric shapes (choose shapes appropriate to the grade level you teach)
- Paper
- Crayons
- Pencils

Objective:

Children name and describe two- and three-dimensional shapes appropriate to their grade level.

What to Do:

1. Invite children to sit in a large circle on the floor. Place the geometric shapes you have chosen in the middle of the circle.
2. Choose a child to go first. That child picks up a shape from the middle of the circle and sits down while holding it. He or she can tell the rest of the class one of the following:
 - the name of the shape
 - a descriptor of the shape
 - a real world example of the shape

(Note: What you accept for answers to these categories will depend on the grade level you teach, the standards, the abilities of the children, and their prior experiences with the shapes. For example – it may be acceptable for kindergarteners to describe a triangle as "blue" if it indeed is so; first graders may talk about the number of sides of that triangle; second graders may notice that it has three angles; and third graders may mention that it is one side of a pyramid. Real world examples should also differ according to grade level. Kindergarteners can be expected to find shapes on the walls of their classroom, while third graders should be able to point out practical uses of the shape.)

After the child has chosen one thing to say, he or she passes the shape to the child on his or her left.

3. The next child chooses something different to say about the shape.
4. Play continues until there is nothing left to say about a particular shape. The shape is then retired and the next child chooses a new shape from the center of the circle.
6. Next, let each child choose one of the shapes to take back to their desks.
7. Each student can create a shape poster by drawing the shape and then labeling it with its name, one attribute, and a real world example.

Third graders can be challenged to draw an accurate two-dimensional representation of a three-dimensional object.)

Assessment:

Are children able to name and accurately describe shapes?

Name and Describe Shapes (continued) 

Extensions:

- Use a similar procedure to play a version of *Twenty Questions*. Keep the shapes hidden. Have a child describe the shape so that his or her classmates can guess what it is.
- Play "In My Family." Start in a circle on the floor, with the shapes in the middle. Choose one shape and announce that it is "in my family." Place it away from the rest of the objects, but where children can still see it – on a chair, big book easel, in a transparent container, etc. Choose another shape that shares a characteristic with the first (same number of sides, same base, etc.); announce that it too is "in my family;" and place it with the first shape. Tell the children that these shapes are in the same family because they are the same in some way. Do the children know how they are the same? Ask a child to add something that matches to your family. Play the game a number of times. Once the children are familiar with the game, they can lead it.





During Your Visit Finding Shapes

What you'll need:

- Clipboards
- Pencils
- Student Sheet:
Shape Scavenger
Hunt

Note: The Student Sheet includes shapes applicable to all four grade levels. You can simply cut the sheet to highlight only the shapes applicable to the grade level you teach.

What to Do:

Challenge children to complete their scavenger hunts by finding at least one example of each shape within the exhibit. When you return to the classroom after your visit, have the children discuss where they found the different shapes.

Variations:

- Assign one shape to each child or group of children. Challenge them to find as many examples of that shape as they can.
- Ask children to take close-up photographs of the shapes that they see. When you return to your classroom, create a bulletin board of "Museum Shapes."
- For older children, have them find "footprints" of solid shapes. Imagine that blocks of various shapes were used to make imprints all over the exhibit. Which shapes were used to make which prints? Challenge children to imagine the sides, as well as the base of the solid, as the stamp. For example, the base of a cylinder (a circle) could have been used to imprint all of the circles in the exhibit. Its side (a rectangle) could have been used to imprint all of the rectangles.



After Your Visit

Building Shapes

What you'll need:

- Straws, cut into 2 inch lengths
- Pipe cleaners or flexible wire cut in half
- Clay

Objective:

Children will use what they learned about shapes to create their own.

What to Do:

1. Review shapes and their attributes by revisiting the posters from the pre-visit activity or by debriefing the scavenger hunt from the field trip.
2. Assign one shape or a set of shapes to each child.
3. Have children use the straws, pipe cleaners or wire, and small balls of clay to create their shapes. For example, a triangle could be made by joining three pieces of straw together with balls of clay as the three corners.
4. Give children time to show their creations to the rest of the class.

Assessment:

Was the child able to use his or her knowledge of a shape's attributes to create a representation of the shape?

Extensions:

- Let children choose a different shape to create.

Related CDM lesson plans:

- [Compasses \(Family Workshop activity\)](#)
- [Wheels \(Family Workshop\)](#)
- [Symmetry \(Family Workshop\)](#)
- [Geo Bubbles](#)

Weblinks:

- www.enchantedlearning.com/math/geometry/shapes/
- www.apples4theteacher.com/square.html
- www.artsconnected.org/toolkit/watch_shape_geometric.cfm
- www.thinkingfountain.org/nav/shapescluster.html
- http://nlvm.usu.edu/en/nav/topic_t_3.html

Additional reading for children:

- *Shapes, Shapes, Shapes*, by Tana Hoban
- *When a Line Bends, a Shape Begins*, by Rhonda Gowler Greene
- *The Shape of Things*, by Julie Lacombe
- *Cubes, Cones, Cylinders, & Spheres*, by Tana Hoban
- *Shape Up!*, By David A. Adler

Student Sheet: Shape Scavenger Hunt

Circle	Triangle
Square	Rectangle
Cube	Cone
Sphere	Shape with 3 sides
Shape with 4 sides	Shape with 0 sides
Pyramid	Rectangular Prism

Shape with 12 edges	Shape with zero edges
Shape with five faces	Shape with six faces
Polygon	Pentagon
Hexagon	Octagon
Isosceles triangle	Equilateral triangle
Shape with at least two right angles	Cylinder
Prism	Shape with parallel sides