Shape Up: 3-D Shapes & Sculptures

3-D Shapes

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Published by *Oklahoma Young Scholars/Javits*

Grade Level	4th Grade	**Time Frame**	2-4 class period(s)
Subject	Mathematics	**Duration**	180 minutes
Course	Elementary Mathematics		

Essential Question

How can we describe our world using 3-D shapes?

Summary

Students will use two-dimensional (2-D) figures and nets to explore three-dimensional (3-D) figures and will talk about how 3-D figures combine to create sculptures.

Snapshot

Engage

Students will use a Honeycomb Harvest strategy to sort 2-D and 3-D figures and discuss how they are connected.

Explore

Students will work with the nets of 3-D figures and then add nets to their Honeycomb Harvest sorts.

Explain

Using a notes document and a Jigsaw strategy, students will describe 3-D figures using the terms "faces," "vertices," and "edges."

Extend

Students will explore different examples of sculptures and will create their own 3-D sculpture using modeling clay.

Evaluate

Students will compare two or three 3-D shapes using a Venn diagram.

Standards

Oklahoma Academic Standards for Mathematics (Grade 4)

4.GM.1.3: Given two three-dimensional shapes, identify similarities, and differences.

Attachments

- 3-D Shape Hexagons.pdf
- 3-D Shape Nets.docx
- 3-D Shape Nets.pdf
- 3-D Shapes Note Page.docx
- 3-D Shapes Note Page.pdf

Materials

- Hexagon cards for the Honeycomb Harvest activity (cut out, sorted, and placed in envelopes)
- 3-D Shape Nets document
- Tape
- 3-D Shapes Note Page
- Modeling clay

Engage

Prep Note

Prior to the lesson, print a copy of the hexagon cards for each group of three to four students. Cut out the cards and put the 2-D and 3-D shape cards into envelopes to pass out to each group. Keep the 3-D net cards separate—you will pass these out during the Explore activity.

Have students form small groups. Pass out a set of 2-D and 3-D shape cards to each group. Students will use the Honeycomb Harvest strategy to sort the 2-D and 3-D shapes in a way that makes sense to them.

Have students conduct a Gallery Walk to see how other groups organized their cards. Have students keep the honeycombs on the table as-is—they will work with them again in the Explore activity.

As a class, discuss student observations. Talk about similarities and differences in the shapes. Talk about how some shapes can be categorized into multiple categories.

Possible Observations

The square and cube are connected. A triangle could pair with the triangular prism and the rectangular pyramid. A rectangular pyramid could connect with the square, rectangle, and triangle.

Explore

Pass out a copy of the 3-D Shape Nets handouts to each group. Have students work in their small groups to cut, fold, and assemble the various nets. Students can use tape to hold the structures in place.

Give students the additional 3-D net honeycomb cards and have them add to or re-sort their honeycombs to include these cards.

As a class, discuss how students made changes to their shape sorts.

Explain

Provide each student with a copy of the 3-D Shapes Note Page. Students will use this page to complete the Explain portion of the lesson and can use it as a resource later.

Looking at a 3-D figure, have students think about the vocabulary words "faces," "vertices," and "edges." In their small groups, have them create a definition for each of the words. As a class, share the definitions and determine a class definition for each word.

Using the Jigsaw strategy, have students work in pairs or small groups to examine one of the 3-D shapes listed on the notes page: rectangular pyramid, triangular prism, cube, or cylinder.

Allow students to determine the number of faces, vertices, and edges. Students should also brainstorm some real-world examples of the shape.

Have students share the information with the class and fill in the details on their notes page.

Extend

Show students a picture of a sculpture. You can find some examples of pre-Columbian pieces here, or use a sculpture from your local area. Have students identify various 3-D shapes that have been used to make the sculpture.

Option

Have students take a virtual tour of a sculpture park. Check out one in Little Rock here.

Have students use modeling clay to create their own sculpture by combining 3-D shapes.

Allow students to share their sculptures and describe the various shapes they used to create them. Encourage students to describe the faces, edges, and vertices.

Teacher's Note

This could be a great piece to put into a student portfolio.

Teacher's Note

This is a great opportunity to partner with an art teacher.

Evaluate

Ask students to choose two 3-D shapes and create a Venn diagram to help them describe how they are related. For an extra challenge students could choose three 3-D shapes to compare in a three-ring Venn diagram.

Resources

- Denver Art Museum (n.d.) Pre-Columbian art. Collections. Retrieved from https://denverartmuseum.org/collections/pre-columbian-art
- K20 Center. (n.d.). Gallery walk / carousel. Strategies. Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505a54d
- K20 Center. (n.d.). Honeycomb harvest. Strategies. Retrieved from https://learn.k20center.ou.edu/strategy/6f19b778b73e4c339d1a7d9653001825
- K20 Center. (n.d.). Jigsaw. Strategies. Retrieved from https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f507c1b8
- Sculpture at the River Market (n.d.). Take a virtual tour. Retrieved from http://sculptureattherivermarket.com/?page_id=1380