

SHAPELY FIGURES

Performance Standard 9C.C

Represent various three-dimensional geometric figures with pictures, categorize each picture by the figure it represents, justify the placement of each picture, answer questions about the relationship between two-dimensional and three-dimensional shapes:

- *Mathematical knowledge:* Identify rectangular prism, sphere, cone, pyramid and cylinder and their attributes;
- *Strategic knowledge:* Categorize pictures correctly
- *Explanation:* Explain completely what was done and why it was done.

Procedures

1. ***In order to construct convincing arguments and proofs to solve problems (9C)***, students should experience sufficient learning opportunities to develop the following:
 - Make and test conjectures about mathematical properties and relationships and justify the conclusions.
2. Give each student magazines, scissors, glue, and one sheet of 12" x 24" construction paper.
3. Explain to the students that they will be looking for pictures showing real life representations of rectangular prisms, spheres, cones, and pyramids.
4. Ask students to cut out pictures showing each of these figures (at least three per figure).
5. Using markers and the construction paper, have students write the proper headings (leaving room for gluing pictures).
6. Explain to students that they are to glue each picture under the proper heading. At this point, you might want to photograph each "Figure Poster."
7. Make clear to the students that they will provide a justification for the placement of each picture on the poster.
8. Remind students to answer all of the questions in Part B.
9. Evaluate student work using all three sections of the rubric. Check for **Mathematical Knowledge** by looking at the finished "Figure Poster." Check for **Strategic Knowledge** by looking both at the finished "Figure Poster" and reading the written justification for placement of each picture. Check for **Explanation** by reading the justification and explanation of placement for each picture.
 - A score of **4** indicates that a student has done all work correctly, shown the correct placement of pictures and written a complete and accurate explanation/justification of each picture.
 - A score of **3** in **Math Knowledge** or **Strategic Knowledge** indicates that a student may have made a minor placement or justification error but not both. A score of **3** in **Explanation** indicates that a student has explained what was done and why it was done, but may have left some parts unclear.
 - A score of **2** in **Math Knowledge** or **Strategic Knowledge** indicates that a student may have made errors both in placement and justification of figures. A score of **2** in **Explanation** indicates that the student may have explained what was done but not why it is correct. Conversely, the student may justify why a picture placement is correct but will not explain the actual placement.
 - A score of **1** in **Mathematical Knowledge** or **Strategic Knowledge** indicates that the student attempted to complete the task but major errors occurred in all areas. A score of **1** in **Explanation** indicates that major errors were made in the explanation or that the explanation does not match the work that was done.

Part A: It is recommended to take either a digital picture or a photograph of each child's "Figure Poster." However, if you prefer, you may video tape the project, allowing children to orally explain the placement of each picture in the poster. Whether written or oral, the explanation must include student understanding of:

Rectangular Prism: A three-dimensional figure with six faces. Each shape is a rectangle

Sphere: A three-dimensional figure that has the shape of a round ball. It has no faces.

Cone: A three-dimensional figure that has one face. The face is a circle

Cylinder: A three-dimensional figure that has two faces. Each face is a circle.

Pyramid: A Three-dimensional figure that has five faces. Four faces are triangles and the fifth face is a square.

Part B:

10. Rectangle
11. Circle
12. Square, triangle
13. Circle
14. Circle

Examples of Student Work follow

Time Requirements

- One class period

Resources

- Many old magazines with lots of pictures
- Scissors for each child
- One 12” by 24” sheet of construction paper (for the Figure Poster) for each child
- Glue (one for each child)
- One Student Recording Sheet per child.
- One pencil, and markers for each child
- One camera with film or a digital camera with an appropriate disk

NAME _____ DATE _____

SHAPELY FIGURES

Student Recording Sheet

Part A: You have each been given magazines, scissors, glue, markers, and a sheet of 12" x 24" construction paper. Cut out pictures showing real-life representations of each of the following shapes:

- Rectangular Prism
- Sphere
- Cone
- Pyramid
- Cylinder

Using your markers and the construction paper, make a heading for each of the shapes mentioned above. Glue each picture under the appropriate heading. You should have at least three pictures for each heading.

Use this Recording Sheet to write explanations for the placement of your pictures..

Rectangular Prism

Sphere

Cone

Pyramid

Cylinder

Part B:

Answer each of the following questions.

1. What two-dimensional shape is the basis for a rectangular prism? _____
2. What two-dimensional shape is the basis for a sphere? _____
3. What two two-dimensional shapes are needed to make a pyramid? _____
4. What two-dimensional shape is needed to make a cone? _____
5. What two-dimensional shape is needed to make a cylinder? _____

NAME _____

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Rectangular Prism

I put a shoe box as a ^{Prism} Rectangular because it has 6 faces and 12 angles. I put a fast opinion because it is a ^{shop} Rectangular Prism and it is not flat it sticks up. I put a Vocabulary Building box

Sphere because it is not a flat piece of paper so if it sticks up it is a Rectangular Prism. I put the earth because it has no points and if it has no points it makes a Sphere. I put a big red orange ball because if it is a circle and has no points then it is a Sphere. I put a little orange ball because it is circle not pointed equals.

Cone

I put a pencil ink because it has a point on the tip. I put a party hat because it has only one point and the rest is round. I put a pencil because it has a point on the wooden.

Pyramid

I put a little green Pyramid because it has 5 faces and 8 angles and if it has all of them it makes it a Pyramid. I put a picture of a real Pyramid because it has 5 points ^{for where it makes to go} and that makes a Pyramid. I put a picture of white Pyramid because it has flat sides.

Cylinder

I put a mug that is red and green because it is round like a circle. I put a glue stick because it has two little circles on the end and one big one on the rest of the cylinder. I put a median ball because it has circle all around it.

Part B:

Answer each of the following questions.

1. What two-dimensional shape is the basis for a rectangular prism? rectangle
2. What two-dimensional shape is the basis for a sphere? circle
3. What two two-dimensional shapes are needed to make a pyramid? triangle, rectangle
4. What two-dimensional shape is needed to make a cone? circle
5. What two-dimensional shape is needed to make a cylinder? circle

Shapely Figures

cone



Rectangular Prism



Pyramid



Sphere



Cylinder

