

Thinking Outside the Box

7th grade Math and Visual Arts

CORE SUBJECT AREA

Math

ART FORM + ELEMENTS

Visual Arts; 3D, Theme, Shapes, Space

MSCCR STANDARDS

7.G.6 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. Solve real-world mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms

MSCCR CREATIVE ARTS STANDARDS

VA:Cr1.2.7 Generate and conceptualize artistic ideas and work a. Develop criteria to guide making a work of art or design to meet an identified goal.

VA:Cr2.1.7 Organize and develop artistic ideas and work. Demonstrate persistence in developing skills with various materials, methods, and approaches in creating works of art or design.

VA:Re8.1.7 Interpret intent and meaning in artistic work. a. Interpret art by analyzing art-making approaches, the characteristics of form and structure, relevant contextual information, subject matter, and use of media to identify ideas and mood conveyed.

RECOMMENDED RESOURCES

TT should get LIFEWTR bottles with art work on them to display for TS (great for visual and kinesthetic learners).

LESSON SEQUENCE

- ‘Make a Career Connection’: Talk with students about careers that involve art.

Explain that someone created the patterns and designs of the clothes, books, furniture, products, and other items around us—that someone could be them in the future.

Introduce students to three young artists—David Lee (23), Luis Gonzalez (18), and KRIVVY (21)— who each had a career opportunity to create a design being featured on LIFEWTR bottles (Short LIFEWTR videos are attached to show to TS).

Ask students what role art may play in the careers they are interested in pursuing. Show TS images of the same product in different type packages.

DURATION

Two or more 30 to 40 minute class periods (about 3 days), depending on whether research and design activities take place in the classroom or are assigned for homework. TT could also pull research for TS to have in hand.

OBJECTIVES

Students will apply their knowledge of math and art to design an effective package that both protects and helps sell a food product.

MATERIALS NEEDED

-8.5” x 11” construction paper -Bag of cotton balls or mini-marshmallows (or other small lightweight objects that will be used to measure the volume of a cylinder.) -Sample food packages (i.e. milk carton, soup can, butter carton, bread bag, yogurt container) -Paper and pencils for 2D designs -Materials for 3D designs (cardboard, markers, paints, tape, etc.) - Copies of the Think Outside the Box! Student handout

VOCABULARY

Cylinder, Volume, Area, Consumer, Food Product, Rectangular Prism, Triangular Prism, Internship, International, Media, Characteristic of form Materials, Art-Making Approach, Criteria Artistic Investigation

TTW ask students which they would buy as a consumer.

TTW then explain to students what 'Thinking Outside of the Box' means (to think outside of the norms of society or life, to be thought weird or abnormal). <https://www.youtube.com/watch?v=61cR4Vlt8s8> 'Luis Gonzalez Story' <https://www.youtube.com/watch?v=ewULUMOcd5U> 'David Lee Story' https://www.youtube.com/watch?v=607cX3w9h1k&list=PL-QOVGqPXi7S3d_kpl3Q1hpgBWaEzSDE&index=3 'KRIVVY Story'.

Show the class an 8.5" x 11" sheet of construction paper. TTW ask TS 'What is this shape? How do you find area of a rectangle?' TTW curve the paper to demonstrate how a cylinder could be made using the 8.5" side as the height. Repeat using the 11" side as the height. TTW ask the class if one cylinder would hold more than the other or if they would hold the same amount. TTW ask 'What do we call the amount a container holds?'

Step 1: To demonstrate, make a cylinder with the paper, using the 8.5" side as the height. Then make another cylinder with the 11" side as the height. (Tape the edges of the paper together with as little overlap as possible.) Place the paper cylinders on a table or a paper plate and fill each one with mini-marshmallows, cotton balls, or other small lightweight objects. Then empty the cylinders and count the pieces. Explain to students that the 8.5"-high cylinder holds more. Review the math together:

- The shorter cylinder has greater volume because, although it is shorter, it has a longer radius.
- The volume of a cylinder = the height of the cylinder times π times the radius squared.
- Using the approximation of 3.14 for π , the radius of the tall cylinder is about 1.35 inches and the short cylinder is about 1.75 inches.
- For the tall cylinder, volume = 11 inches' x 3.14 x 1.352 = approximately 62.95 cubic inches.
- For the short cylinder, volume = 8.5 inches' x 3.14 x 1.752 = approximately 81.7 cubic inches. Indicate to the class that this shows how a small change in a package's design can make a big difference. Note: If time allows and materials are available, have students make the cylinders and do the test themselves for a more hands-on experience.

Step 2: Show the class sample food packages, such as a milk carton, soup can, bread bag, yogurt container, etc. Divide the class into small groups and ask the groups to make a list of what they notice about the packages (answers could include corporate logos, nutritional information, promotional slogans, type of packaging, structural observations, and other design elements).

Step 3: Next, have students brainstorm types of package materials and list the advantages and disadvantages of each. Sample responses are listed on the next page. Prompt students to consider the variety.

Step 4: *Display the Types of Packaging Materials Grid for students to observe. Finally, ask students to make a list of what they think the company was trying to achieve when it designed the packages the way it did. Again, answers will vary, but they should fall into one of three categories: 1) sell the product, 2) protect the product, 3) make the product easier to use (for example, the inclusion of a straw on a juice box package or an easy-to-open soda can lid).

Step 5: To introduce the project, distribute copies of the Think Outside the Box! student handout. *Attached at the end of the Source link. Review the project requirements. Students in grades 7 and 8 might benefit from a review of the volume formulas featured on the page. Depending on the needs of the students and teacher preference, the project could be presented in several different ways:

- The design work could be completed in class or as homework.
- The project could be assigned to individual students, pairs, or small groups. • Presentation options might include posters, slide shows, live demonstrations, etc., depending on the capabilities of the students and the technical resources of the classroom. Provide your students with guidelines and requirements for the final project that works best for your group.

Step 6: On the last day of the project, have students present their designs. Encourage the class to give constructive criticism on the designs of their classmates.

EXTENDED LEARNING ACTIVITIES

Students might research the cost of the materials they selected and create a detailed cost analysis of their design. Students could research the environmental impact of their design and focus on issues such as recycling their packaging. Enhancements to expand the project include: (Great for gifted learners, or an advanced group) Students could be challenged to create primary, secondary, and tertiary packaging for the product. In the case of toothpaste, for example, the primary package is the tube, the secondary package is the box that holds the tube, and the tertiary package is the carton that contains the boxes of toothpaste for delivery to a retail outlet. Students could be asked to create two or more of these packages for their product.

SOURCES

http://www.scholastic.com/InspireArt/pdfs/LIFEWTR_PackageDesignChallenge.pdf, Edited by Jessica Jarman

TIPS + FREQUENTLY ASKED QUESTIONS

Encourage students to express their own creativity and not to copy something that already exists. Help them understand the power of their unique perspective. Review TS work and subject matter for appropriateness (not offensive or disturbing to others). During each project take precautions to ensure there is no damage or injury. Make students work a ‘Think Out of the Box’ Challenge. Students could present in front of a board (teachers/community/different level students). The board would select which container they wished to ‘purchase for their company’, and that group would receive a prize of TT choosing. (i.e. lunch on the lawn, free dress down day, BYOD)