

**Aim:** How do we find the *surface area* of a cylinder?

**Objectives:**

By the end of this lesson students should be able to...

- (7.G.3) - *Identify the two-dimensional shapes that make up the face and bases of a three-dimensional cylinder*
- (7.G.4) - *Determine the surface area of a cylinder, using a calculator and a variety of methods*
- Explain, using verbal and written communication, why the formula used to calculate the surface area of a cylinder is  $SA_{\text{cylinder}} = 2\pi rh + 2\pi r^2$

**Materials:**

- Attached worksheets
- 6 canned good products (two different sizes of cans; 3 of one size, 3 of another size)
- Straight edge rulers

**Do Now:** (see attachment below)

- #1: *First:* partner discussions at tables. *Then:* share-out example responses as a class.
- #2: Two students will come up to show work on document camera (random selection)

**Launch:** Think Tank! (see attachment below)

- 2-3 minute silent reflection and response.
- 2-3 minute group discussion
- 2-3 minute whole class discussion

**Activity:** Challenge! (group-work, tables of 4, heterogeneously mixed) (see attachment below)

- **Challenge #1:** Students work together to find surface area of 1 of 2 canned goods.
  - Each table group is given one of the two different cans. As students work, most will realize that they can decompose the cylinder by taking the label off. This will allow them to see that the middle face of a cylinder is a rectangle.
- **Discussion:** whole class, random selection
  - The first challenge will be debriefed as a class. Conversation will focus on the need for decomposition of the cylinder to find Surface Area.
- **Challenge #2:** Students should be instructed to take the label off the can they just calculated the Surface Area for and hold on to it. All 6 cylinders in the room will now have no label. Each table group will now trade cans with another group that has the other can they have yet to calculate surface area for. The task is the same: calculate the surface area of the can. (a hint for students: remember Think Tank)
  - With no label to peel off, students will struggle to calculate the area of the rectangular face of the cylinder (they cannot flatten it out). The only way to calculate the area of this section is to realize that the length of the rectangular face is equal to the circumference of the circular bases. This is why the formula used to calculate the surface area of a cylinder is  $2\pi rh + 2\pi r^2$
- **Discussion:** whole class, random selection
  - The second challenge will be debriefed as a class. As a facilitator of the discussion I will aim to elicit the formula used to calculate the surface area of cylinders. The diagram and notes put up on the board will become notes that are given to students after the debrief has taken place.

**Debrief:** exit slip, filled out silently and independently (see attachment below)

- Exit slips will be used to assess student understanding of lesson objectives.

**Practice & HW:** Once students turn in exit slip, they are given practice problems worksheet.