

Sheltered Instruction Adaptations for the NanoDays Surface Area Activity

Yellow shaded boxes indicate changes to the procedures, materials, and set up.

Exploring Properties—Surface Area

Try this!

1. Pour 20 ml of colored water from the pitcher into each measuring cup.
2. Remove two antacid tablets from their wrapper. Break one in half, and drop it into a cylinder. Break the other tablet into many small pieces, and put it in the other cylinder.
3. At the same time, pour the water from each cup into a cylinder.

4. Which fizzes up faster, the tablet you broke in half or the tablet you broke into lots of pieces?

What's going on?

The crushed tablet fizzes faster than the halved tablet. That's because it has a greater *surface area to volume ratio*. For the same amount of antacid, the crushed tablet has more surface—or exterior—to react with the water. Because the water can reach more of the antacid immediately, the chemical reaction (fizzing) happens faster.

Do this while you are talking:

1. Mime the act of pouring water into the cup and point to the 20 ml line.
2. Mime breaking the first tablet in half and point to the sample. Then mime the act of breaking the second tablet into many pieces and point to that sample.
3. Pretend to pick up both cups at once and pour them into the cylinders. After they pour, crouch down next to the table with your eyes near table height and motion them to join you quickly. Use your fingers to follow the rising levels of bubbles and fluid in each cylinder.
4. Shrug your shoulders.

Uncover both stacks of cubes. Starting with the stack on the participant's left, point out the dots as you count them out loud. Turn and hold up the stack to count the dots on the back and the bottom. Turn over the card, point to the number 24.

Uncover the other stack and break it into individual cubes. Count dots again. Turn over the card, and point to the number 48.

Credits and rights



This project was supported by the National Science Foundation under Award No. ESI-0532536. Any opinions, findings, and conclusions or recommendations expressed in this program are those of the author and do not necessarily reflect the views of the Foundation.

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Materials

- 100 ml graduated cylinders (2)
- Small plastic measuring cups (2)
- Pitcher
- Effervescent antacid tablets
- Food coloring
- Permanent marker
- Pointer or a pen (optional)
- Small cubes (16)
- Small cards: one with the number "24" on it and one with the number "48"
- Small cups or boxes (2)

Notes to the presenter

SAFETY: The antacid tablets contain medication. Visitors should be supervised when doing this activity, and should not be allowed to consume the tablets or the water they're dissolved in. You may choose to perform this as a demonstration, rather than allowing visitors to do it as a hands-on activity.

Before beginning this activity, fill the pitcher with water and add food coloring.

Use the permanent marker to mark the 20 ml level on the measuring cups.

Break one antacid tablet in half and place it next to the cylinder on the participant's left.

Break another tablet into many small pieces and place it by the cylinder on the right.

Glue eight of the cubes into a larger cube. Use the permanent marker to put one dot on each visible side of each cube. Place the card marked "24" on the table, face down, next to the cylinder on the participant's left. Put the large cube on top and cover it with a small box or cup.

On each of the remaining eight cubes, use the permanent marker to put one dot on each side of each cube. Place the card marked "48" on the table, face down, by the other cylinder. Stack the cubes into a larger cube on top of the card. Cover the cube with a small box or cup.

SAFETY: If the cubes are small enough to fit through a toilet paper tube, they are a potential choking hazard for small children. If your audience has many toddlers, and you don't have a facilitator designated to watch this activity, don't include this part of the activity.

You'll need a place to dump wastewater. If there isn't a sink near your activity area, you can dump wastewater into a bucket and dispose of it periodically.

Between demonstrations, give the cylinders a good shake to remove excess water.

See also: sheltered English, S.D.A.I.E. (Specially Designed Academic Instruction In English)

Presented by Renee Guerrero, Education Director for WOW! Children's Museum, at the NISE Network *Bilingual Audiences Workshop* on June 7, 2013. This sheet can be downloaded after the workshop from the NISE Net website: www.nisenet.org