Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Projects in Science

Date \_\_\_\_\_\_\_\_\_\_\_ Hour \_\_\_\_\_\_\_\_

Surface Area vs. Volume

The “Cheerio Silo”

Purpose To investigate food packaging in relation to the amount of food found in containers.

Materials 8 ½” by 11” Sheets of Paper Cereal or Beans Paper Plate Masking Tape

 Calculator

Procedures

1. Begin with three sheets of 8 ½ by 11” paper (*Scrap paper works fine*).
2. Fold one sheet into “Cylinder A” by folding “width-wise.” Tape the seam.
3. Fold a second sheet of paper into “Cylinder B” by folding “length-wise.” Tape the seam.
4. Leave the third sheet of paper alone.

### B

### A

1. Predict which cylinder, A or B, will contain the most “food” based on appearance:
2. They will both hold the same amount
3. The short cylinder, A, will hold more
4. The tall cylinder, B, will hold more
5. Place the paper plate under the taller cylinder (B) and fill it with the cereal or beans.
6. Place the shorter cylinder (A) OVER / AROUND the taller cylinder (B) and lift up the taller cylinder so the cereal or beans flow into the shorter cylinder.

## Calculations and Data

## Based on your observation shade in the cylinder below, A or B, that held the most “food.”

1. Measure the length and width of the unlabeled sheet of paper to the NEAREST TENTH of a CENTIMETER. *Record this in the chart on the next page.*
2. Measure the diameter of Cylinder A and Cylinder B to the NEAREST TENTH of a CENTIMETER. *Record this in the chart on the next page.*

21.5 cm

### A

### B

28.0 cm

1. Fill in the chart below based on your measurements from procedure 10. A sample set of data has been provided for your help.

|  |  |  |  |
| --- | --- | --- | --- |
| Length of paper | Width of paper | Radius Cylinder A | Radius Cylinder B |
|  |  |  |  |
| 28.0 cm | 21.5 cm | 4.5 cm | 3.6 cm |

1. Calculate the VOLUME of cylinder A as follows:

a. You will use the following equation to calculate volume: V = (π r2) h

1. radius (r) = radius of cylinder A
2. Height (h) = width of the paper
3. π = 3.14
4. Show work below: VA = (π x 4.52) x 21.5 cm = 1367.8 cm3
5. Calculate the VOLUME of cylinder B as follows:

a. You will use the following equation to calculate volume: V = (π r2) h

1. radius (r) = radius of cylinder B
2. Height (h) = length of the paper

d. π = 3.14

e. Show work below: VB = π x 3.62 x 28.0 cm = 1140.0 cm3

## Conclusions and Questions

1. In determining how much “food” a cylindrical container can hold, what is the most important factor? What kind of container will you look for when comparing products on the shelf?

2. What does the FDA require on most food product containers related to this lab?