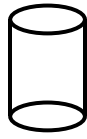


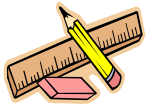
Lab FW 4.1B Filling & Comparing Containers



Name _____

Date _____ Period _____

Filling & Wrapping Unit



Materials: Labsheet 4.1B Cut-outs, Scissors, Glue or Scotch tape, Centimeter Ruler, Rice (uncooked!)



Key Learning: Understand volume as a measure of filling a given container or prism. Further investigate the relationship between various shapes of containers, especially regarding the shape of the **BASE** and its impact on volume.



Background

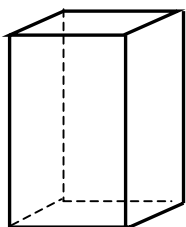


this is a
GROUP
ACTIVITY

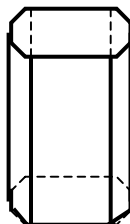
The volume of a container is the number of unit cubes it will hold. In previous investigations, you saw that you could find the volume of a box-shaped container by figuring out how many unit cubes will fit in a **single layer at the bottom** of the box, and then multiplying by the **total number of layers** needed to fill the box (the height). In this lab, you will develop a method for determining how many unit cubes will fit inside of a cylinder, and then compare this volume with a square prism and a hexagonal prism, with similar surface areas.

Definition: A **CYLINDER** is a three-dimensional shape with a top and a base that are **congruent circles**. The dimensions of a cylinder are expressed as the **radius** of the base **times** the **height**.

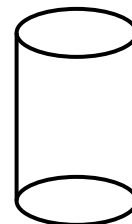
Cylinder



*rectangular
prism
(square base)*



*hexagonal
prism*





Guided Directions



this is a
GROUP
ACTIVITY

- A. Cut-out, fold, and form the various 3D containers from their nets (flat patterns) found on Labsheet 4.1B. Glue and/or tape the tabs in place. Make sure your base is taped solidly enough so that the rice will not leak.
- B. Fill the **rectangular prism** container with rice, level to the top. **Next**, pour from the **rectangular prism** into the **hexagonal prism** and then into the **cylinder**. Make several trial pours from one container to another and discuss your observations within your group.
- C. Which of the containers holds the least volume? _____
- D. Which of the containers holds the most volume? _____
- E. Is this consistent with the information you have learned in prior labs?

Explain: -----

- F. Using a centimeter ruler and the flat patterns from Labsheet 4.1B, make measurements (round to the nearest 10^{th} of a centimeter) and calculate the **volume** and **surface area** for each container.
- N.B. For **surface area**, assume that each container has a **TOP** and a **BASE**, even though only the bases are shown on the lab sheet flat patterns.
- G. Complete the **Measurements Table** on the next page.

Measurements Table

Show your detail work for the Volume and Surface Area calculations on the attached pages!

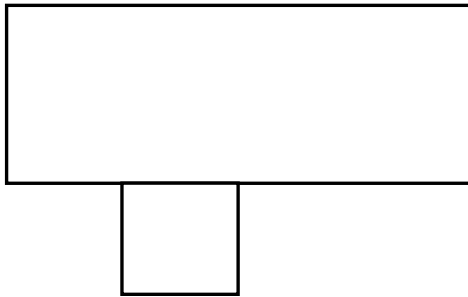
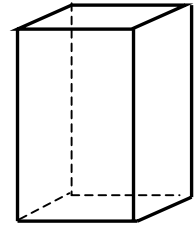
	Formula (or method) used to calculate the area of the base layer	Area of the base layer	Height	Volume	Surface Area (include a TOP and a BASE)
Rectangular Prism					
Hexagonal Prism					
Cylinder					

H. Which value changes the most from container to container, volume or surface area?

I. What does this tell you about the shape of the most “efficient” container?

SHOW ALL WORK for the volume and surface area of the Rectangular Prism on this page

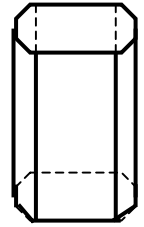
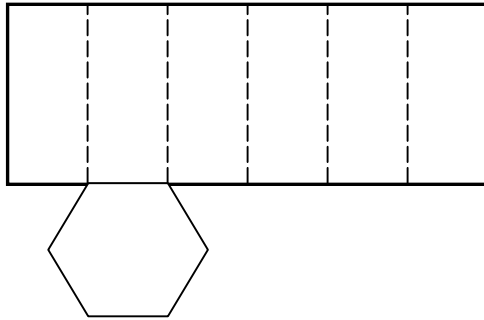
Record your measurements from Labsheet 4.1BR on the drawing below (the TABS don't count):



Show all calculations “vorple-norple” style! Remember Step 1 - Write down the formula!

SHOW ALL WORK for the volume and surface area of the Hexagonal Prism on this page

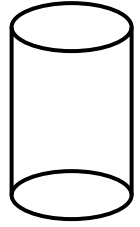
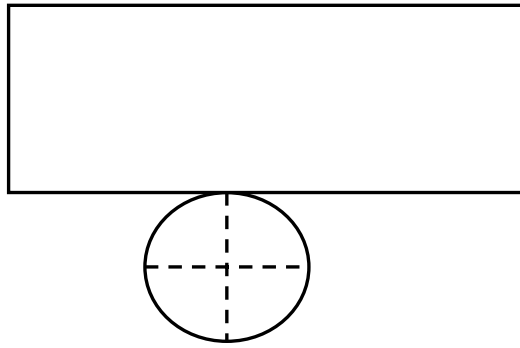
*Record your measurements from Labsheet 4.1BH
on the drawing below (the TABS don't count):*



Show all calculations “vorple-norple” style! Remember Step 1 - Write down the formula!

SHOW ALL WORK for the volume and surface area of the Cylinder on this page

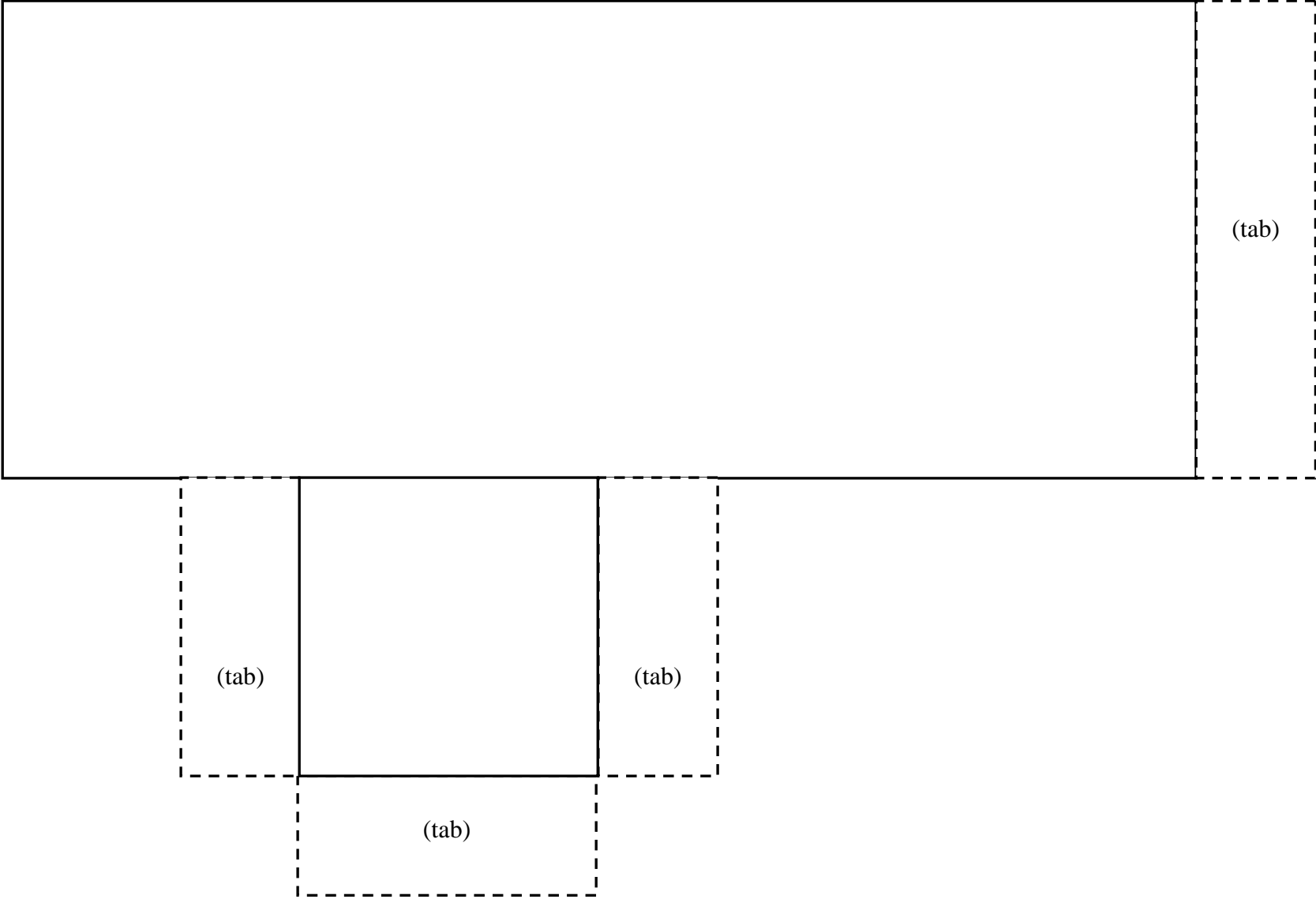
*Record your measurements from Labsheet 4.1BC
on the drawing below (the TABS don't count):*



Show all calculations “vorple-norple” style! Remember Step 1 - Write down the formula!

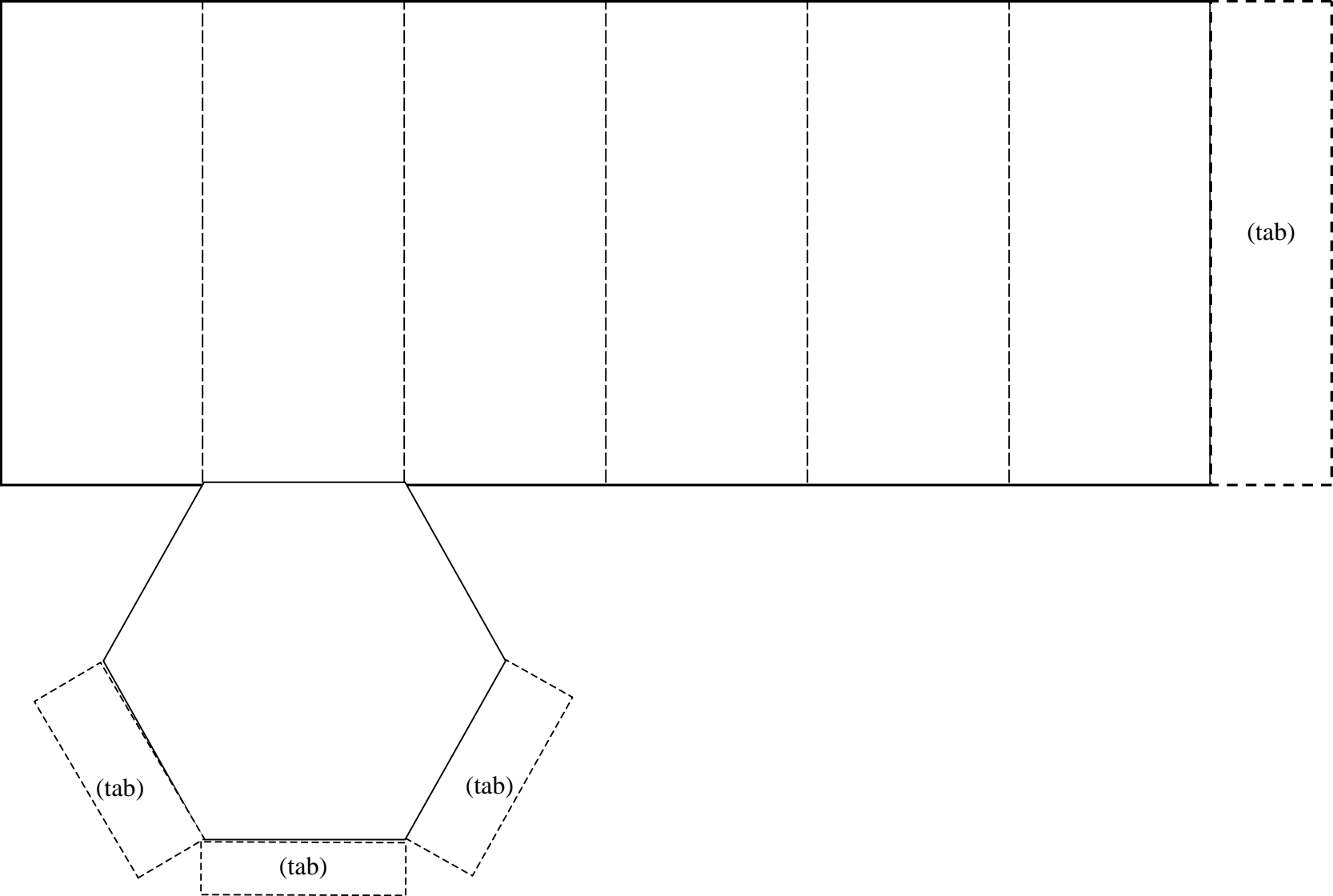
Labsheet 4.1BR – Rectangular Prism (with a square base) Net

use this sheet for measurements... do not cut-out



Labsheet 4.1BH – Hexagonal Prism Net

use this sheet for measurements... do not cut-out



Labsheet 4.1BC – Cylinder Net

use this sheet for measurements... do not cut-out

