

## Lab FW 2.2: Saving Trees



Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

### *Filling & Wrapping Unit*



**Materials:** Centimeter or inch cubes, Isometric Dot Paper, Pencil



**Key Learning:** Investigate the relationship between the varying dimensions of boxes that have the same volume. Make a conjecture about the rectangular arrangement of cubes that requires the least amount of packaging material (the least surface area).



### **Scenario & Guided Directions**



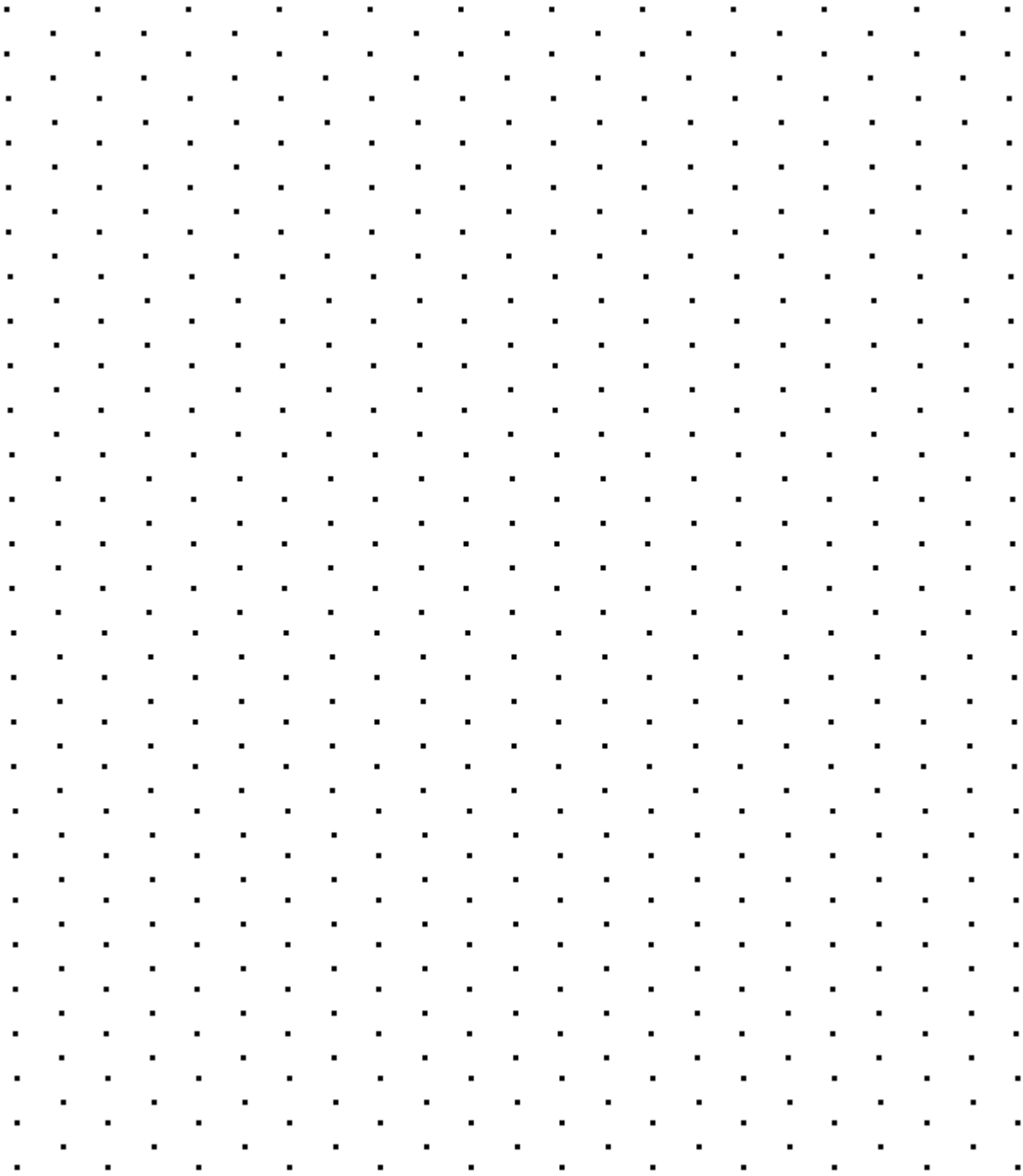
*this is a*  
**PAIRS**  
**ACTIVITY**

### **Scenario:**

Manufacturing companies save money when they package their products in the most cost efficient (cheapest) manner. All things equal, it is cheaper and more environmentally friendly to package products using the least amount of material possible. To help investigate this issue, you should look at some special cases and see if a pattern emerges in the results.

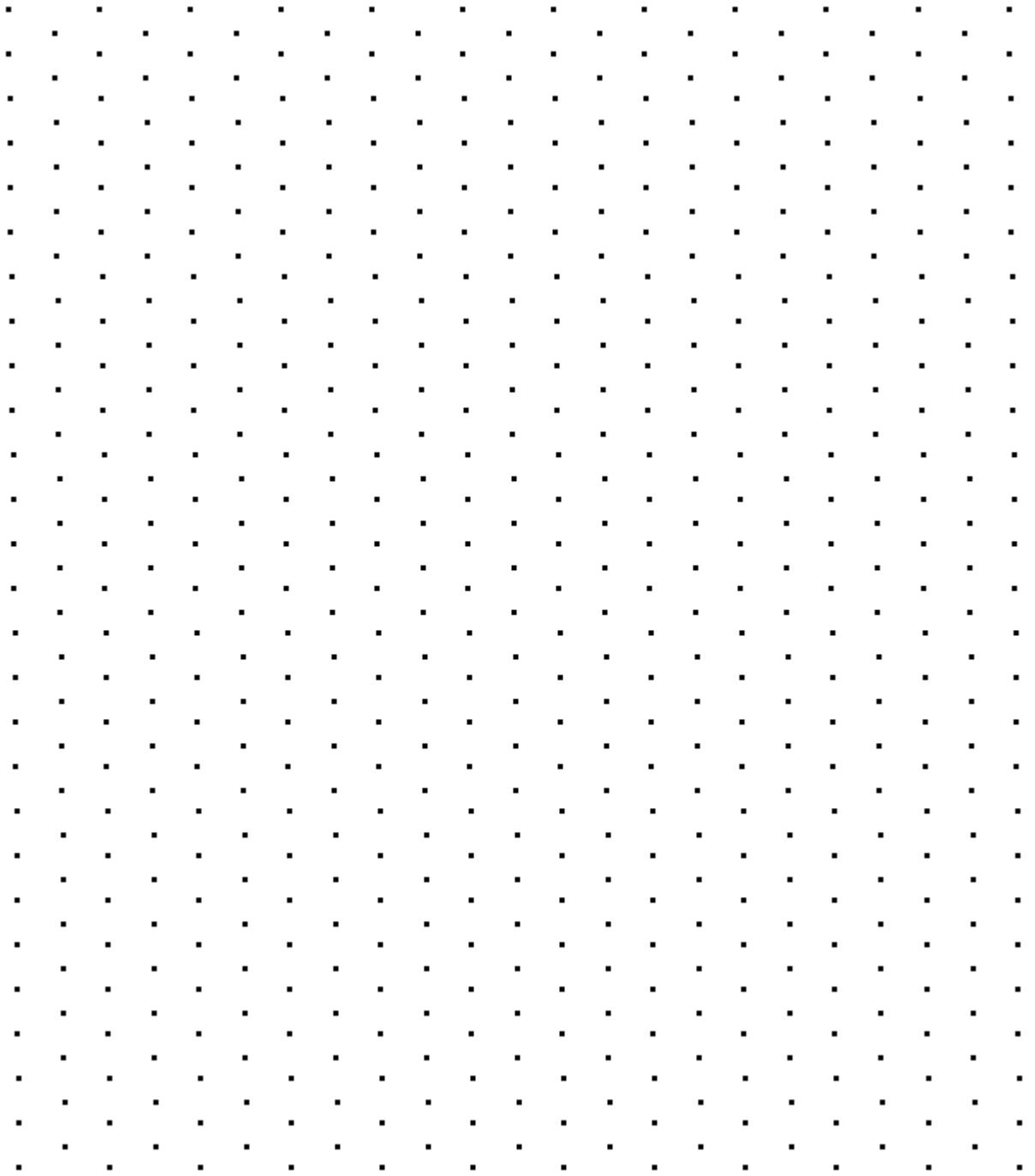
### **Guided Directions:**

Find different dimensions for each of the following box volumes listed on the following pages. Draw the boxes from each table using the isometric dot paper. Complete the information required in each table and use your findings to discuss the follow-up questions for this lab (see last page).



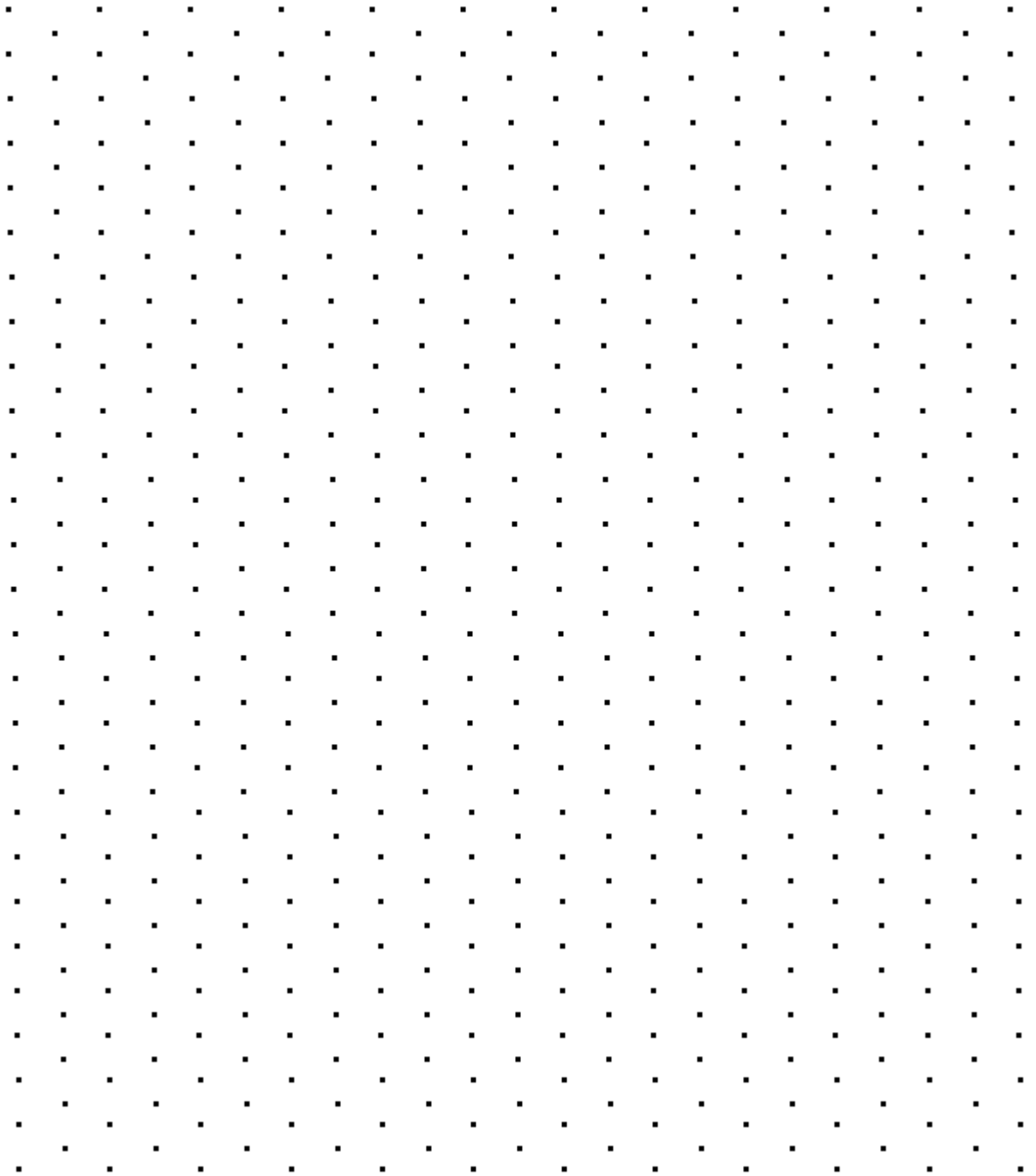
*Possible Arrangements of 8 Cubes*

	Length	Width	Height	Volume	Surface Area
Box 1	1	1	8	$\text{in}^3$	$\text{in}^2$
Box 2					
Box 3					



*Possible Arrangements of 27 Cubes*

	Length	Width	Height	Volume	Surface Area
Box 1	1	1	27	$\text{in}^3$	$\text{in}^2$
Box 2					
Box 3					



*Possible Arrangements of 12 Cubes*

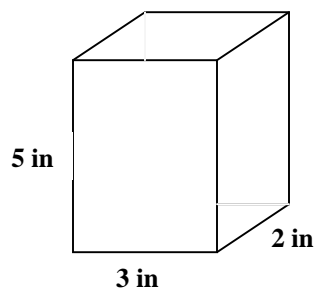
	Length	Width	Height	Volume	Surface Area
Box 1	1	1	12	$\text{in}^3$	$\text{in}^2$
Box 2					
Box 3					
Box 4					

Name \_\_\_\_\_

## Lab FW 2.2 Saving Trees: Follow-up

Date \_\_\_\_\_ Period \_\_\_\_\_

1. What is your conjecture about the most efficient way to package a given volume?
2. Test your conjecture from this lab on some other examples, such as 30 cubes or 64 cubes. Does your conjecture work for the examples you tried? If not change your conjecture so it works for any number of cubes. When you have a conjecture that you think is correct, give reasons why you think your conjecture is valid.
3. In general terms, how would you describe the rectangular arrangement of cubes that uses the most packaging material? Why do you think this is so?
4. Find the volume and the surface area of the box below.



5. Suppose the box above was resting on a different face. How would this affect its surface area? Its volume?