

## WAMC Lab Template

Math Concept(s):

Source / Text:

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### Attach the following documents:

Lab Instructions Use student handout to explain city planning with blocks.

Student Handout(s)

Toy City

Pretend you and your fellow group members have been assigned the duty of designing a scale model of a new city. The city must include at least 4 roads two to which are parallel and at least one other road being perpendicular. The city also must include 5 building made out of blocks. Additional shapes can be included, use your imagination and be creative.

Materials:

Blocks (childrens or any wooden blocks of various size)

Graph paper

Ruler

Procedure:

1. Create roads on the coordinate graph paper. Sketch the lines and write the equations/name the streets. Additional streets should be named but do not need to find equations.

	Equations	Street name	Parallel or perp.
1			
2			
3			
4			

2. Sketch street names into you city plans and label them appropriately. The names should be based on their slopes. For example, if the slope was -2 the street name would be “-2<sup>nd</sup> “ street.

3. Construct 5 buildings of different size using the 3-D solids provided. Place them along your roads. Buildings must also use various blocks... in other words don't make 5 rectangular buildings.

Use the table below to record data:

	Name of shape(s) used.	Sketch of building.	Formula needed.	Volume
1				
2				
3				
4				
5				

You can now add detail to the graph (ponds or parks etc.) and or create additional buildings.

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Rubric and/or Assessment Tool

For grading the project you can keep simple as in completion or filling out of the chart. You can also give prizes or extra points for going above and beyond for classrooms that students vary greatly in skills. Students can vote for their favorite... the more creative you make it the better the activity.

**Indicate “SPECIFIC” relationship to Science, Technology, or Engineering**

Engineering for the idea of city planning. Finding and using dimensions to find volume.

**Short Description (Be sure to include where in your instruction this lab takes place):**

**Lab Plan**

Lab Title: Toy City Lab

Prerequisite skills: Parallel and Perpendicular Lines  
Finding volume of 3-D objects

Lab objective: Plan a road system (lines) and 5 buildings to find volume... See worksheet copy above.

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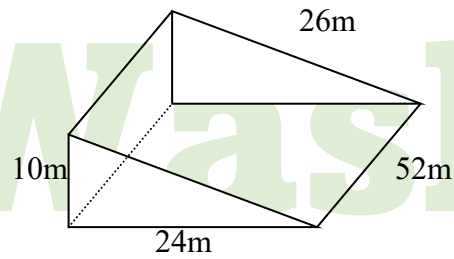
**Chapter 11 TEST A**

**Name:** \_\_\_\_\_

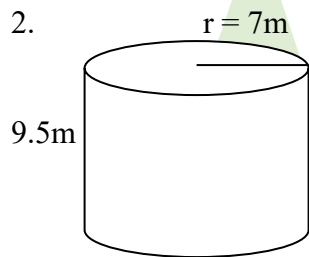
**Per.** \_\_\_\_\_

Find Surface area of the right prism and regular pyramids.  
Please label and circle your answers.

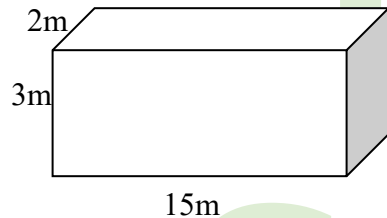
1.



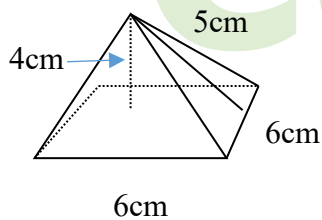
2.



3.

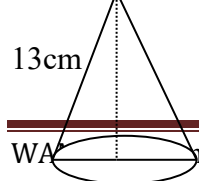


4.



Find surface area:

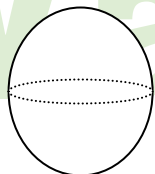
5.



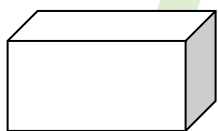
10cm

**SOLVE the problems given to the nearest hundredth, (if a decimal is needed)**

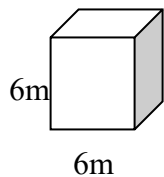
6. The surface area of a sphere with a radius of 3 meters is  $36\pi$  square meters. A similar sphere is created with a 1:3 ratio, as in the radius is Tripled... What is the surface area of the new sphere?



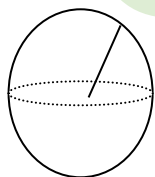
7. Find the height of a rectangular prism with a length of 8in and width of 4in and an overall surface area of  $160\text{in}^2$ .



8. A cube with sides of 6 is doubled in all directions. How many times larger is the volume of the new prism compared to the original?

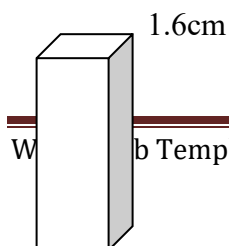


9. What is the radius of a sphere whose surface area is  $452.16$  cubic meters?



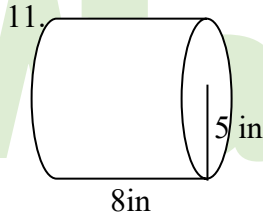
**Find the Volume:**

10.

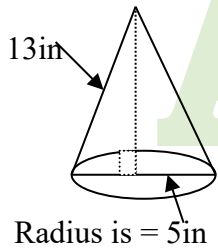


11cm

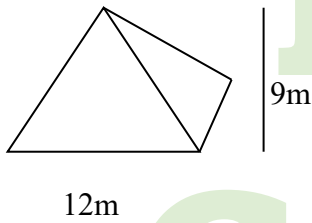
3cm



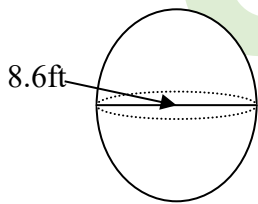
12.



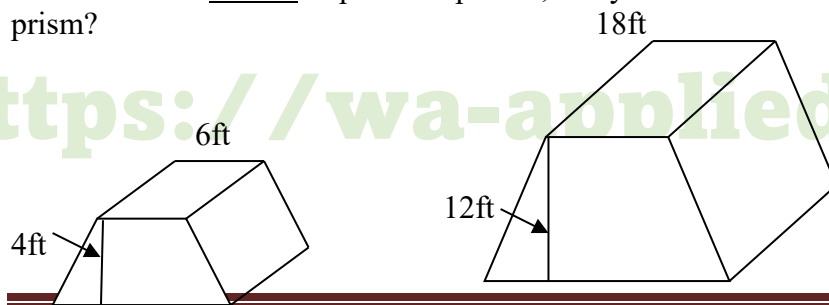
13.



14.



15. Given two similar trapezoidal prisms, can you find the Surface area and Volume of the larger prism?



36ft

12ft  
Surface area =  $316\text{ft}^2$

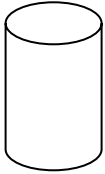
Surface Area= \_\_\_\_\_

Volume =  $180\text{ft}^3$

Volume= \_\_\_\_\_

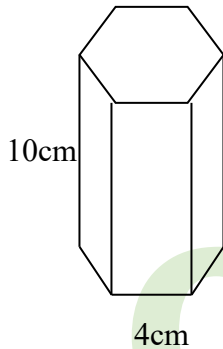
EC #1

What would increase the volume of a cylinder more, doubling the radius or doubling the height? Justify your answer using an example. No credit given to just guessing, PROVE IT!!



EC #2

Find the surface area and/or volume of the regular hexagonal Prism.



**Standards:**

Mathematics K–12 Learning Standards: Geometric Measure and dimension

Standards for Mathematical Practice: GMD.A.3

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

- Global Awareness       Financial/Economic/Business/Entrepreneurial Literacy       Civic Literacy  
 Health/Safety Literacy       Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

**LEARNING AND INNOVATION**

Creativity and Innovation

- Think Creatively  
 Work Creatively with Others  
 Implement Innovations

Critical Thinking and Problem Solving

- Reason Effectively  
 Use Systems Thinking  
 Make Judgments and Decisions  
 Solve Problems

Communication and Collaboration

- Communicate Clearly  
 Collaborate with Others

**INFORMATION, MEDIA & TECHNOLOGY SKILLS**

Information Literacy

- Access and Evaluate Information  
 Use and manage Information

Media Literacy

- Analyze Media  
 Create Media Products

Information, Communications and Technology (ICT Literacy)

- Apply Technology Effectively

**LIFE & CAREER SKILLS**

Flexibility and Adaptability

- Adapt to Change  
 Be Flexible

Initiative and Self-Direction

- Manage Goals and Time  
 Work Independently  
 Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others  
 Work Effectively in Diverse Teams

**Productivity and Accountability**

- Manage Projects  
 Produce Results

Leadership and Responsibility

- Guide and Lead Others  
 Be Responsible to Others

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**Teacher Preparation: (What materials and set-up are required for this lab?)**

Materials

- 

Set-Up Required:

- 

**Lab Organization Strategies:**

Leadership (Connect to 21<sup>st</sup> Century Skills selected):

- 

Cooperative Learning:

- 

Expectations:

- 

Timeline:

- 

**Post Lab Follow-Up/Conclusions:**

Discuss real world application of learning from lab

- 

Career Applications

- 

Optional or Extension Activities

- 

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