

WAMC Lab Template

Math Concept(s): Calculate and identify radius points on real world curved objects

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Attach the following documents:

Lab Instructions.

1. Divide into groups of 3.
2. Collect equipment. (Tape measure, Survey stakes, hammer, grid paper and clip board, Calculator)
3. Proceed outside to parking lot.
4. Begin to search for curved objects in the school parking lot.
5. Identify parts of the curve. Tangent and point of curvature radius point.
6. Using your knowledge of triangles and circles, identify the location of the radius point on the ground.
7. Use grid paper to draw and label your curve or circle in the field including the radius. Identify the type of construction (curb, sidewalk, road, planter, ect)
8. Show all calculations of components of the curve.

Student Handout(s) A field drawing on grid paper of the groups house layout by each student is required for this lab.

Rubric and/or Assessment Tool- A rubric is available on rubistar for this lab.

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

This lab is related to engineering, land surveying and construction.

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

Lab Plan

Lab Title: Square House Lab

Prerequisite skills: Scaling drawings, Right triangle calculations, Parts of a circle

Lab objective: Students will identify curved objects in the field and mark the radius point. The radius should be perpendicular to the tangent line. Student will draft an as-built plan of the constructed curve.

Standards:

Mathematics K–12 Learning Standards: Circles. Understand and apply theorems about circles
G.C.2. Identify and describe relationships among inscribed angles, radii, and chords

Standards for Mathematical Practice: MP.1, MP.4, MP5

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening): Students will be required to write a reflection of this activity.

Leadership/21st Century Skills:

<u>21st Century Interdisciplinary themes</u> (Check those that apply to the above activity.)			
<input type="checkbox"/> Global Awareness	<input type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy	<input type="checkbox"/> Civic Literacy	
<input type="checkbox"/> Health/Safety Literacy	<input type="checkbox"/> Environmental Literacy		
<u>21st Century Skills</u> (Check those that students will demonstrate in the above activity.)			
LEARNING AND INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS	Productivity and Accountability
<u>Creativity and Innovation</u>	<u>Information Literacy</u>	<u>Flexibility and Adaptability</u>	<u>Accountability</u>
<input type="checkbox"/> Think Creatively	<input type="checkbox"/> Access and Evaluate Information	<input type="checkbox"/> Adapt to Change	<input type="checkbox"/> Manage Projects
<input type="checkbox"/> Work Creatively with Others	<input type="checkbox"/> Use and manage Information	<input type="checkbox"/> Be Flexible	<input type="checkbox"/> Produce Results
<input type="checkbox"/> Implement Innovations	<u>Media Literacy</u>	<u>Initiative and Self-Direction</u>	<u>Leadership and Responsibility</u>
<u>Critical Thinking and Problem Solving</u>	<input type="checkbox"/> Analyze Media	<input type="checkbox"/> Manage Goals and Time	<input type="checkbox"/> Guide and Lead Others
<input type="checkbox"/> Reason Effectively	<input type="checkbox"/> Create Media Products	<input type="checkbox"/> Work Independently	<input type="checkbox"/> Be Responsible to Others
<input type="checkbox"/> Use Systems Thinking	<u>Information, Communications and Technology (ICT Literacy)</u>	<u>Social and Cross-Cultural</u>	
<input type="checkbox"/> Make Judgments and Decisions	<input type="checkbox"/> Apply Technology Effectively	<input type="checkbox"/> Interact Effectively with Others	
<input type="checkbox"/> Solve Problems		<input type="checkbox"/> Work Effectively in Diverse Teams	
<u>Communication and Collaboration</u>			
<input type="checkbox"/> Communicate Clearly			
<input type="checkbox"/> Collaborate with Others			

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

Materials

- Tape measure, Grid paper, Calculator, clip board, survey stakes, hammer

Set-Up Required:

- Prior to lesson identify appropriate locations in parking area where curves are located to give advice where students could look for constructed objects.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Students will be required to persevere while attempting to locate the radius of the circle.

Cooperative Learning:

- Students will work in groups of 3 and must effectively work as a team.

Expectations:

Students will have the opportunity to apply math practices they are learning to real world construction.

Timeline: This lab will follow a class activity about circles (see lesson plan) and will consist of one 45 minute class.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Discuss the process of construction design and layout of buildings and roads before construction begins.

Career Applications

- This activity will introduce students to civil engineering, surveying and various construction trades

Optional or Extension Activities

- This lab could lead to other related topics such as calculating volumes and costs of materials.

Washington Applied Math Council

<https://wa-appliedmath.org/>