

WAMC Lab Template

Math Concept(s): Make sense of problems and persevere in solving them. Reason abstractly and quantitatively. Attend to precision. Look for and express regularity in repeated reasoning.

Source / Text:

Developed by:

E-Mail: lkelly@ohsd.net

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

Discuss expectation/duration of parking lot info gathering. Students shall collect two different tire sizes to work with and write them down on paper (total of 15 minutes). Instructor assigns indicated speed to each group (written on handout). Weather depending, problems can be solved by tennis courts/classroom. Once complete, we share and discuss answers.

Lab Plan

Lab Title: Identifying Relevant Data

Prerequisite skills: Know where to find the tire size.

Lab objective: Demonstrate how to find tire size and convert to inches. Know the effect a change in size could have on our actual speed versus our indicated speed.

Standards: (Note SPECIFIC relationship to Science, Technology, and/or Engineering)

Mathematics K–12 Learning Standards:

- G-GMD Geometric Measurements and Dimension

Standards for Mathematical Practice:

- Make sense of problems and persevere in solving them. Reason abstractly and quantitatively. Attend to precision. Look for and express regularity in repeated reasoning.

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- **RST.11-12.7** Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-ETS1-1), (HS-ETS1-3)

K-12 Science Standards

HS-S1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

Technology

- Use calculating devices

Engineering

- Understanding how changing shapes and volumes effect performance outcome

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 INNOVATIONCreativity 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 SKILLSInformation 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 SKILLSFlexibility 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 andResponsibility

- 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:

Piece of paper, pen, a parking lot with cars and calculator.

Set-Up Required:

Give proper notice students will be in the parking lot during this period (And good weather).

Lab Instructions:

Discuss expectation/duration of parking lot info gathering. Students shall collect two different tire sizes to work with and write them down on paper (total of 10 minutes). Instructor assigns indicated speed to each group (written on handout). Weather depending, problems can be solved by tennis courts/classroom. Once complete, we share and discuss answers.

Student Handout:

See attached.

Rubric and/or Assessment Tool:

Participation in information gathering

Participation/accuracy in solving equations

Participation in open discussion/debate

Understanding the concept of circumference being a length of measurement in regards to finding speed

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- ***Guide and Lead Others (11.A)***

Cooperative Learning:

- ***Produce Results (10.B)***

Expectations:

Produce Results (10.B)

Timeline:

- 15 minute set up, 10 minute data collection, 30 minute computation, and 15 minute closing discussion.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Tires go bad...must be changed. So, ensure you acquire the right one

Career Applications

Petroleum industry, Transportation, logistics, engineering, construction, aviation

Optional or Extension Activities

- Once students complete lab they are encouraged to assist others.

Identifying Relevant Data – Data Collection

Initial tire size: _____

New tire size: _____

Actual speed: _____ mph

Formulas:

Tire Diameter (inch) = $2(\text{Sector Width} * \text{Aspect Ratio}/2540) + \text{Rim Size}$

Actual Speed (mph) = $(\text{New Tire Diameter}/\text{Old Tire Diameter}) * \text{Indicated Speed (mph)}$

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