

Lab Framework

Text: Cord

9 – Ratios and Proportions

Short Description: Finding a Differential Ratio on a Vehicle

Developed by: Tim Campbell

Contact Information: NC Tech Center

Date: January 18, 2008

Lab Title Differential Ratio

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**
Find a vehicle's differential ratio and understand the purpose of a differential on a car.
- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)
Basic Math Skills
- **Vocabulary**
Differential
Pinion
Ring Gear
Gear
- **Materials List**
Shop Vehicle
Oil Drain Pan
Shop Tool Box
Rags
Cleaner
- **GLEs (State Standards) addressed**

Math: EALR 4: The student communicates knowledge and understanding in both everyday and mathematical language.

COMPONENT 4.1: Gather information.

4.1.1 Maintain Skills

4.1.2 Maintain Skills

COMPONENT 4.2: Organize, represent, and share information.

4.2.1 Use symbols, diagrams, graphs, and words to clearly communicate mathematical ideas, reasoning, and their implications. (aligns with CRS 2.2)

EXAMPLES

- EX Identify the variables and constants used.
- EX Identify units associated with these variables and constants.
- EX Use correct mathematical symbols, terminology, and notation.

4.2.2 Summarize and interpret mathematical information which may be in oral or written formats. (aligns with CRS 2.1)

EXAMPLES

- EX Summarize and interpret many different types of graphs.
- EX Recognize and explain the meaning of information presented using mathematical notation.
- EX Formulate symbolic representations for situations described in everyday language.

4.2.3 Produce mathematically valid oral, written, and/or symbolic arguments to support a position or conclusion, using both mathematical and everyday language. (aligns with CRS 2.3)

EXAMPLES

- EX Develop explanations that are appropriate to the needs of the audience and the situation.
- EX Use appropriate details or evidence to support the explanation.

- **Leadership Skills**
 - Team Work
- **Set-up information**
 - Organize and prepare materials from materials list (above).
- **Instructions**
 1. Raise vehicle on hoist
 2. Drain oil from differential
 3. Clean and remove differential cover
 4. Wipe gears dry with rag
 5. Count the number of teeth on the pinion gear (small gear)
 6. Count the number of teeth on the ring gear (large gear)
 7. Note your answers on paper
 8. Divide the ring gear teeth total by the pinion gear teeth total (large gear divided by the small gear)
 9. Note your answers in ratio form
 10. Explain what this means to you as the driver of this vehicle
 11. Replace diff. cover, and fill with oil, clean up area.
- **Summary of learning** (to be finished after student completes lab)
 - discuss real world application of learning from lab
 - opportunity for students to share/present learning
 - Student will understand the effect of gear ratios in a transmission on a vehicle.
- **Optional activities**
 - Check the gear ratios of a 10-speed bicycle.
- **Career Applications**
 - Automotive Technician
 - Millwright
 - Factory Line Technician

Student Assessment(s)

Student is assessed by performing the lab with the instructor.