

Lab Framework

Text: Cord

Unit 2 - Estimating Answers

Short Description: Calculating Horsepower

Developed by: Tim Campbell

Contact Information: NC Tech Center

Date: January 18, 2008

Lab Title Calculating Horsepower

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**

The student will learn how to estimate an engine's horsepower.

- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)

Basic math skills.

- **Vocabulary**

Horsepower

BTU

Torque

Telescoping Gauge

Micrometer

Bore

Shop Vehicle

Telescoping Gauges

Micrometer

Disassembled Engine Block

Rags

Pencil & Paper

- **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 Cooperation

- **Set-up information**

- Organize and prepare materials from materials list (above).

- **Instructions**

1. Using the following formula, estimate your engine's horsepower. The formula is $H.P.=D^2N/2.5$ $D^2 = \text{cyl bore squared}$ $N = \# \text{ cylinders}$
2. Remove cylinder head from engine.
3. Rotate piston to bottom of stroke.
4. Place snap gauge into cylinder, position and lock gauge.
5. Remove gauge and insert into micrometer and note the reading.
6. Record your reading then, using the formula, calculate the horsepower.

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations;

- Allow yourself two periods to accomplish this task.

- **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

The student will learn that different sizes of various engines will produce more or less horsepower. This knowledge will then aid a student to decide the correct engine for the job/work that needs to be completed.

- **Optional activities**

- Dyno testing if available.

- **Career Applications**

- Automotive Technician

- Automotive Rebuilder

- Automotive Salesman

- Industry Motor Salesman

Student Assessment:

The student will perform the lab with the instructor.