

Principles of Engineering Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Unit 1.1 – Mechanisms – Study Guide Date \_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_

Concepts

1.    Engineers and engineering technologists apply math, science, and discipline-specific skills to solve problems.

2.    Engineering and engineering technology careers offer creative job opportunities for individuals with a wide variety of backgrounds and goals.

3.    Technical communication can be accomplished in oral, written, and visual forms and must be organized in a clear and concise manner.

4.    Most mechanisms are composed of gears, sprockets, pulley systems, and simple machines.

5.    Mechanisms are used to redirect energy within a system by manipulating force, speed, and distance.

6.    Mechanical advantage ratios mathematically evaluate input work versus output work of mechanisms.

Performance Objectives

It is expected that students will:

* Differentiate between engineering and engineering technology.
* Conduct a professional interview and reflect on it in writing.
* Identify and differentiate among different engineering disciplines.
* Measure forces and distances related to mechanisms.
* Distinguish between the six simple machines, their attributes, and components.
* Calculate mechanical advantage and drive ratios of mechanisms.
* Design, create, and test gear, pulley, and sprocket systems.
* Calculate work and power in mechanical systems.
* Determine efficiency in a mechanical system.
* Design, create, test, and evaluate a compound machine design.

Essential Questions

1.    Why is it important to begin considering career paths during high school?

2.    What career opportunities are available to match your specific interests?

3.    What are some current applications of simple machines, gears, pulleys, and sprockets?

4.    What are some strategies that can be used to make everyday mechanisms more efficient?

5.    What are the trade-offs of mechanical advantage related to design?

6.    Why must efficiency be calculated and understood during the design process?

Vocabulary

ABET

Actual Mechanical Advantage

Belt

Career

Chain

Effort Force

Efficiency

Friction

Fulcrum

Gear

Ideal Mechanical Advantage

Idler Gear

Inclined Plane

Lever

Mechanism

Moment

Pitch

Pulley

Resistance Force

Screw

Simple Machine

Sprocket

Static Equilibrium

Technical Communication

Torque

Wedge

Wheel and Axle