Science 8

Unit D: Mechanical Systems

Student Name:_____

## 1.0 Machines are tools that help humans do work

### 1.1 Simple Machines – Meeting Human Needs

_____
_____
_____☺

Meeting The Same Needs In Different Ways

_____
_____
_____
_____

Archimedes Invents a More Efficient Way

_____
_____
_____

Simple Machines
Simple machines:

_____
_____
_____

Lever

_____
_____
_____

- _____
- _____
- _____

Diagram:

Draw the diagram on Page 262

Inclined Plane

Inclined Plane: _____
_____
_____

Examples: _____
_____

Wedge

Wedge: _____
_____
_____.

Example:

_____

Screw

Screw:

_____
_____
_____

Pulley

Pulley: _____
_____
_____

Wheel and Axle

Wheel and
axle: _____
_____
_____

Examples:

_____

The Effects of Simple Machine

_____
_____
_____
_____

## 1.2 The Complex Machine – A Mechanical Team

Complex Machines

Complex Machines:

System:

Subsystems:

Subsystems That Transfer Forces

Linkages

Linkage:

Transmissions

Transmission:

Gears

Gears:

How Gears Work

How Gears Affect Speed

2.0 An understanding of mechanical advantage and work helps in determining the efficiency of machines

2.1 Machines Make Work Easier

Mechanical Advantage

Mechanical Advantage:

Input force:

Output force:

Calculating Mechanical Advantage
Formula:

Speed Ratio

Formula:

Less Force But Greater Distance

A Mechanical Advantage Less Than 1

Comparing Real Mechanical Advantage and Speed Ratio

The Effect of Friction

Efficiency
Efficiency:

Formula:

## 2.2 The Science of Work

The Meaning of Work

Calculating Work

- _____
- _____

Formula:

Energy and Work

_____
_____
_____
_____
_____
_____

Work and Machines

_____
_____
_____

Work and Friction

## 2.3 The Big Movers – Hydraulics

### Hydraulic System:

### Pressure in Fluids

### Pressure:

### Pascal's Law:

### A Piston Creates Pressure

### Mechanical Advantage in Hydraulic Systems

_____
_____
_____

Formula:

Pressure and Mechanical Advantage

_____
_____
_____

Formula:

Larger Force – Greater Distance

_____
_____
_____
_____

3.0 Science, society and the environment are all important in the development of mechanical devices and other technologies.

3.1 Evaluating Mechanical Devices

Using Criteria to Evaluate A Device

Efficiency and Effectiveness

Function and Design

Design:

Function:

Evaluation for Development

Considering the Environment

Evaluating a Mechanical Device – A Case Study

- _____
- _____
- _____
- _____

Criteria For Evaluation

_____
_____
_____

- _____
- _____
- _____
- _____

3.2 Technology Develops Through Change

_____
_____
_____

Advances In Science Result In New Technology

_____
_____
_____

From Particles to Trains

Changes In Society Result In New Technology

Changing Society – Changing Technology

Changes In The Environment Result In New Technology

Diagram of a Robot: