

Rhodes High School

Technology: Grade 9 Worksheet

Term 2: Mechanical Systems and Controls and structures

1. Complete a systems diagram to show how a system works.
2. Name the sub-systems in a bicycle.
3. Differentiate between pneumatic and hydraulic systems. Provide an example of each
4. Draw the illustration on page 48, figure 3.6. Label and explain the function of each label.
5. List the advantages and disadvantages of a
 - pneumatic system
 - hydraulic system
6. Complete the following:-
 - The smaller cylinder's piston moves a g..... distance but exerts l..... force to lift the box
 - The piston of the larger cylinder moves a s..... distance; but with m..... force to lift the box
7. Explain Pascal's principle.
8. Explain the following terms:
 - Pressure
 - Closed system
9. Draw the pressure equation triangle.
10. Complete the following:-
 - Pressure is equal to..... and Force is equal to.....
 - When a small piston drives a larger piston, force is multiplied and there is mechanical advantage of m..... than 1
 - When a big piston drives a smaller piston, force is reduced and there is mechanical advantage of l..... than 1
11. *Hydraulic press*: What is the function of a hydraulic press? Name the components within a press.
12. Describe the ram in a hydraulic press.
13. Write down the formula for the calculation of mechanical advantage in a hydraulic press.
14. Complete questions 1, 3 and 4 on page 59, task 1.
15. *Hydraulic jack*: What is the function of a hydraulic jack? Name the components the jack and explain the function of each one.
16. Differentiate between the terms: aesthetic and ergonomics.
17. Illustrate a systems diagram of the use of a hydraulic jack.
18. *Pulley systems*: What is the function of a pulley? Describe a pulley.

19. Describe the following pulleys and explain their mechanical advantages

- a compound pulley
- single wheel fixed pulley
- single wheel movable pulley
- block and tackle pulley

20. *Mechanical control systems*

20.1 The ratchet and pawl: Describe, List the functions and Draw

20.2 The Disc brake in cars: Describe, List the functions and Draw

20.3 Bicycle brakes: Describe, List the functions and Draw

20.4 Cleats: Describe, List the functions and Draw

20.5 Gears: Complete the table below

Name of gear	Function of gear	Uses of the gears	Drawing of the gear
Spur			
Bevel			
Rack and pinion			
Worm			

Complete task 1, page 87 on gears

21. *Evaluate fitness for purpose.*

21.1 How are machines designed in our homes using ergonomics?

21.2 Explain the terms: anthropometrics and systems

22. *Communication skills*

22.1 Explain how one draws a vanishing point perspective drawing. Provide an example.

22.2 List ways of texturing an object.

22.3 Describe the methods used to shade an object.

23. Complete term 2 practice test, page 110-111 in your notebooks

24. **Assessment: Term 2**

June examination: 120 Marks (30%) , 2 hours

- Mechanical Systems and Controls
- Structures
- Graphic communication
- Design process

Mini-PAT: 70 Marks (70%), 2 hours

- Pages 99- 109
- Design and make a rescue system including an integrated mechanical system that can lift or pull a large animal such as elephant, horse, small whale or shark. .