



EFFINGHAM SECONDARY SCHOOL
SECOND TERM – ACTIVITIES - 2022
GRADE 9



Question One:

Define the following key words

- 1.1 Master syringe
- 1.2. Slave syringe
- 1.3. Piston
- 1.4. Cylinder
- 1.5. Displacement
- 1.6. Extension
- 1.7. Hydraulic press
- 1.8. Pivot
19. Gear system
- 1.10. Synchronise

Question Two:

Study the scenario below and answer the questions

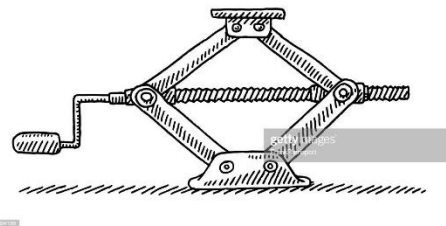
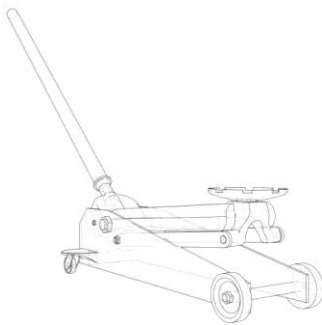


Read the scenario given then answer the questions below: Siphso had a flat tyre and needed to lift the car up to take the wheel off and fit another wheel. Since a car was too heavy for him to lift with his bare hands, he needed a device that provides a mechanical advantage.

- 2.1. What is the device that Sipho will need to lift the car?
- 2.2. Will the device do the job? Explain
- 2.3. What should the device be made of?
- 2.4. What should the device cost?
- 2.5. Will the device look good (aesthetics)?
- 2.6. Will the device be safe/easy to use for the end user (ergonomics)?
- 2.7. Draw a systems diagram which describes the way the device will work

Question Three:

Study the two types of hydraulic jacks below and answer the following questions



- 3.1. Who uses hydraulic motor jack?
- 3.2. What does one do with a hydraulic engine jack?
- 3.3. Is a hydraulic engine jack a good tool to lift a car? Explain.
- 3.4. What materials are hydraulic motor jack made from?
- 3.5. What does a hydraulic engine jack cost more or less?
- 3.6. Is it worth paying that much money for a hydraulic engine jack?
- 3.7. Is it necessary for a hydraulic engine jack to look nice?
- 3.8. Is a hydraulic engine jack safe to use?

Question Four:

Use the words in the table below to complete each sentence. NB* one word can be used twice

GEARS MECHANICAL	IDLER	BEVERL GEARS	CIRCULAR	SLOWER	RATIO	FASTER	MA
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4.1 A _____ is a round wheel that has teeth that mesh with another gear tooth that allows a force to be transferred without any slippage

4.2 _____ of unequal sizes (diameters) can be combined to produce mechanical advantage

4.3 Each gear type has a different effect in a _____ device as a result of the type of gear system.

4.4 Mechanical advantage is the _____ of load to effort.

4.5 An _____ gear in between the two gears changes the direction of movement ensuring that both gears rotate in the same direction.

4.6 A rack and pinion changes linear motion to _____ motion

4.8 _____ gears are used to change the direction of rotation

4.9 Gearing up results in the driven gear turning or rotating _____ than the driver gear.

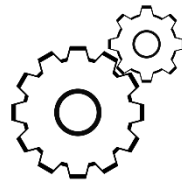
4.10 Gears of unequal sizes can be combined to produce _____ advantage

Question Five

Study the case study below and answer the following questions

GEARS THROUGH TIME

Gears have existed since rotating machinery was invented. Because they can multiply force, early engineers used them to hoist heavy loads, such as loads of building materials. The mechanical advantage of the gear was used for ships' anchor hoists. Early gears were made of wood, with cylindrical pegs for cogs. They were often lubricated or greased, with animal fat. Gears were also used in wind and water wheel machinery, to increase or decrease the rotational speed provided by the wheels for pumps and other powered machines. The rotational speed provided by the wheels for pumps and other powered machines. The rotational speed of the waterwheel or a horse drawn wheel was usually too slow to use, so people would use a set of wooden gears to increase the speed so that they could use it. After the industrial revolution began in Britain, metal gears were used widely, and a science of gear design and manufacture developed rapidly in the nineteenth century. Almost all machines and domestic appliances use gears. Some of these gears are easy to see, for example in hand drills, can-openers, guitars and lever-action corkscrews. But we often cannot see the gears, because they are usually hidden inside a machine's housing. Each machine uses its gears to perform a specific task. Sometimes this task is obvious: for example, the gears in a lettuce spinner are there to increase the rotational speed of the drum



- 5.1 Explain four differences between a gear system and a pulley system
- 5.2 Discuss one similarity between a simple gear system and a ratchet and pawl mechanism
- 5.3 From the text above, describe the old word for a 'tooth' on a gear wheel
- 5.4 Outline 5 examples from the text of where gear systems can be found
- 5.5 Discuss 2 disadvantages of bevel gears of unequal sizes

Question Six : Answer the following questions

- 6.1 Draw a simple gear system. Label the input gear (A) and output gear (B)
- 6.2 If gear A rotates one revolution, how many revolutions will gear B rotate?
- 6.3 If the driver gear (A) rotates clockwise how would the driven gear (B) rotate?
- 6.4 Explain how you would make gear A and gear B to rotate in the same direction.
- 6.5 Give THREE examples of common machines that use gears

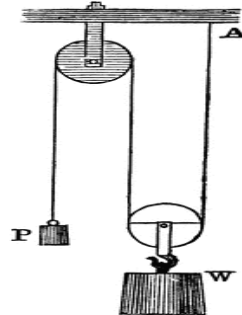
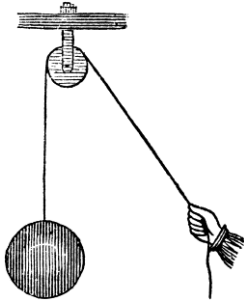
Question Seven

Define the following terms

- 7.1. Pulley
- 7.2. Crank
- 7.3. Cam
- 7.4. Cleat
- 7.5. Cam cleat
- 7.6. Frictional force
- 7.7. Single wheel fixed pulley system
- 7.8. Caliper
- 7.9. Brake pad
- 7.10. Brake Disc
- 7.11. Ratchet and pawl
- 7.12. Control devices

Question Eight

Study the diagrams below and answer the following questions



8.1 What is a pulley system

8.2 What is the advantage of a single fixed pulley system

8.3 Where are pulley systems found

8.4 Name the 3 main components of a pulley system

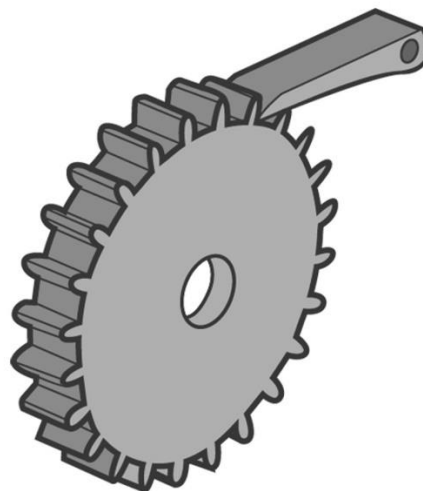
8.5 State the advantages of using a pulley system

Question Nine

Identify the following mechanisms



A



B