

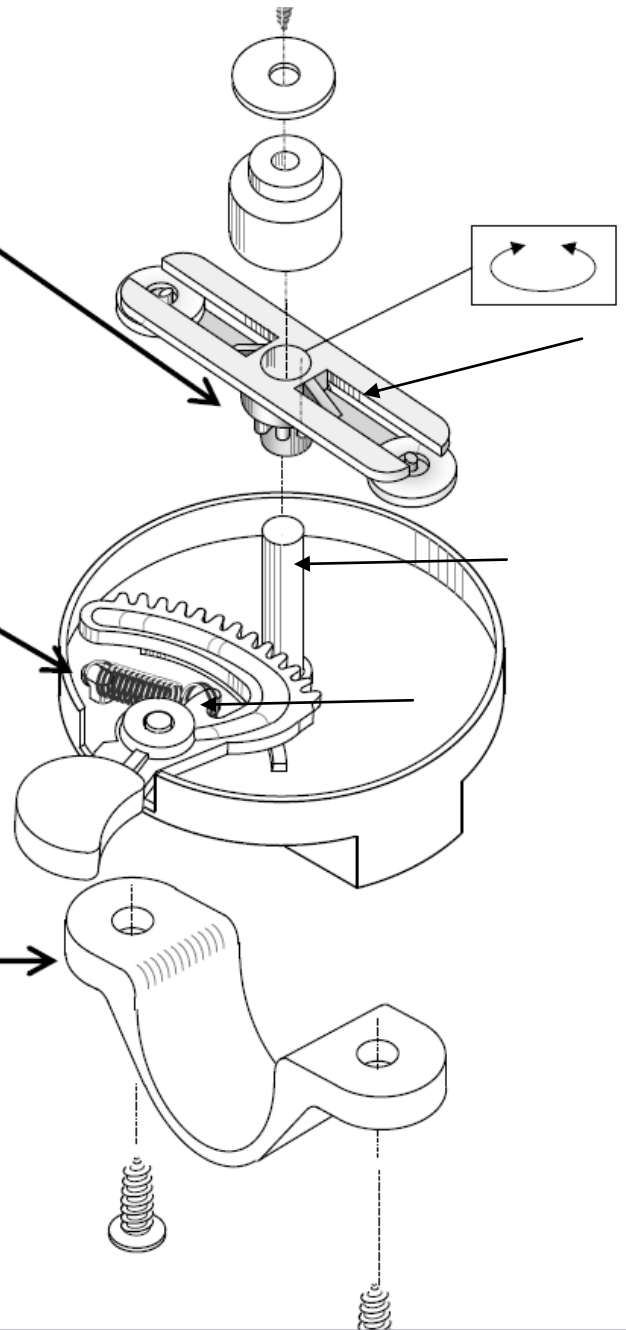
ST/ STE
Pretest 3.3

1. In the tables below, choose the right characteristic for each link. This is a bicycle bell.

Link between: the clapper and the pinion shaft		
Direct	or	Indirect
Rigid	or	Flexible
Removable	or	Non-removable
Complete	or	Partial

Link between: the return spring and the spring retainer		
Direct	or	Indirect
Rigid	or	Flexible
Removable	or	Non-removable
Complete	or	Partial

Link between: the clamp and the housing		
Direct	or	Indirect
Rigid	or	Flexible
Removable	or	Non-removable
Complete	or	Partial



2. a) In the rack and pinion, what transformation of motion is involved?

b) Although this system is often used in steering, how could you use this system to lift a weight? Hint: you would need to add a part that would support a weight.

c) Where would you add the lubricant?



3. a) In this screw-gear system, which part is in a fixed position?

b) Why is it practical to have the other part moving?

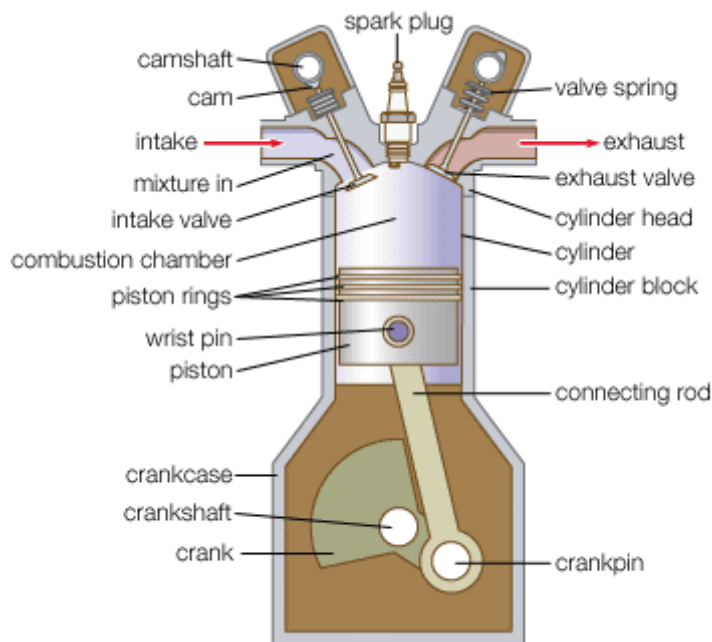


4. a) In the slider-crank system, what part of the engine is moving up and down?
See diagram

b) What's powering the up and down motion?

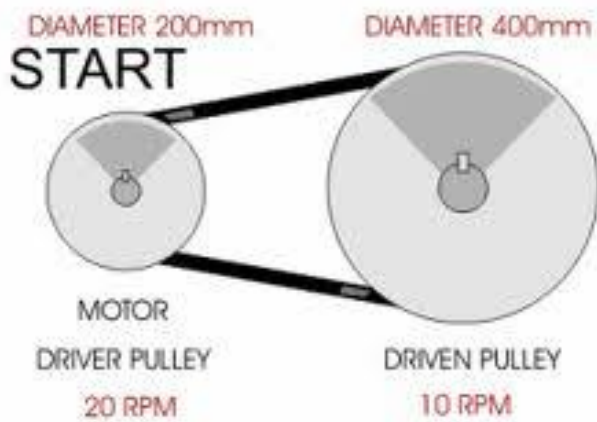
c) What kind of motion is experienced by the crank?

d) Is the link between the crank and piston direct?



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5. a) If we turn the small gear(11 teeth) so that it make 34 turns, how many turns will the large gear(17 teeth) complete?
 a) How much more turning force (find the mechanical advantage) does the large gear have?
6. a)What makes this system different from a chain-sprocket system? Give two differences



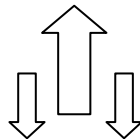
b) Calculate the speed(velocity ratio)of this system.

7. You want the motor to spin a certain gear very quickly, but you want the other gear that's attached to the 1st one to move very slowly.

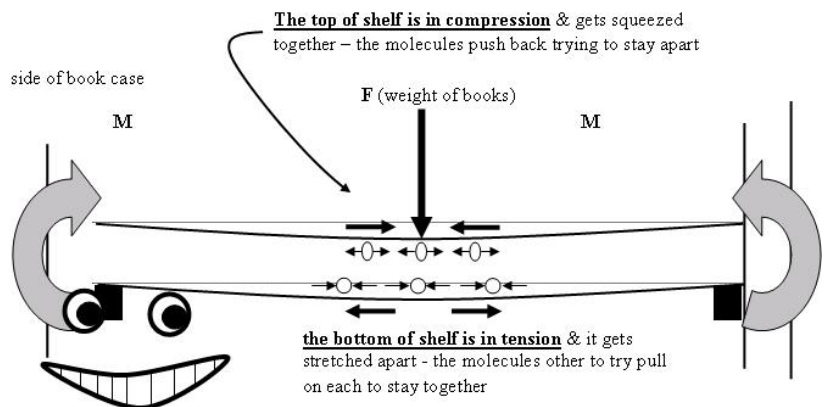
What kind of gear system will work best?

8. A machine requires no toothed gears, and you don't want any belts either. What kind of gear system can be used?

9. Which twisting constraint (stress) is experienced by buildings during earthquakes?
 (A) Shearing
 (B) Torsion
 (C) Tension
 (D) Compression



10. What constraint (stress) is symbolized by
11. What property of materials has the units W/(mK)?
12. Many weights are placed on a shelf. After a few months we find it bent out of shape.

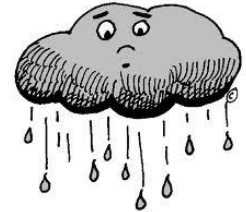


a beam is said to "smile" in bending: the top is in compression & bottom is in tension

FLASHBACK

13. a) The second most common gas in the atmosphere is _____
 b) The gas in the air with the most variable composition is _____
 c) Atmospheric pressure is caused by the _____ of the air acting on a certain unit of area.

14. Use the following terms to answer the following: troposphere, stratosphere, mesosphere, thermosphere, exosphere



- a) The layer closest to the surface _____
 b) The layer closest to outer space _____
 c) The layer that has the important protective gas ozone _____
 d) Where Northern lights form _____
 e) Found at an altitude of 50 to 80 km, it's where unusual noctilucent clouds form _____

15. In which hemisphere do cyclone (tropical storm) winds move **clockwise** towards the low pressure area?

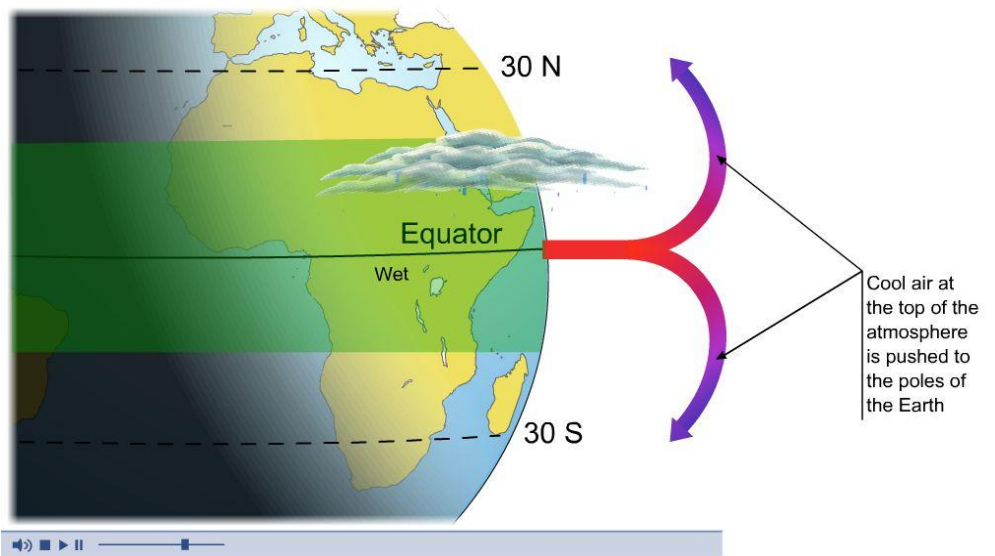
16. What two forces combine create the Coriolis effect?

17. a) Use the diagram to explain why the Hadley cell exists.

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- b) How does it help explain the location of some desert and tropical biomes?

18. On the map to the right show the westerlies and trade winds with the correct direction.



19. What are two important properties of CH₄, CO₂ and H₂O?

20. Where does most of the excess CO₂ that we inject into the atmosphere come from?