

Chapter 14 Review Sheet – Work, Power, and Machines

1. Work is the product of _____ and _____.
2. For a force to do work on an object, some of the force must act in the _____ direction as the object moves.
3. In terms of work, what happens if there is not movement?
4. True or False: If all of the force acts in the same direction as the motion, all of the force does work.
5. True or False: If part of the applied force acts in the direction of motion, none of the force does work.
6. True or False: If none of the force is applied in the direction of the motion, the force does no work.
7. **When does a weightlifter do work? EXPLAIN.**

8. **When is a weightlifter applying a force but NOT doing work? EXPLAIN.**

9. Work and distance are _____ proportional, while work and force are _____ proportional.
10. What is the SI unit for the following: force, distance, and work.

11. _____ is the rate of doing work.
12. **What are two ways you can increase your power?**

13. Power and work are _____ proportional, while power and time are _____ proportional.
14. What is the SI unit for the following: work, time, and power.

15. What is the other common unit for power?

16. How many watts are equal to one horsepower?

17. A machine is a device that changes a _____.
18. Machines can change a force in 3 ways. List those ways.

19. A small force exerted over a large distance becomes a _____ force exerted over a _____ distance.
20. A machine that decreases the distance through which you exert a force _____ the amount of force required.

21. True or False: The force exerted on the machine is the input force.
22. True or False: The force exerted on the machine is the output force.
23. Describe how input force, input distance and work input relate to an oar.

24. Describe how output force, output distance, and work output relate to an oar.

25. All machines use some amount of input work to overcome _____.
26. Work done by a machine is always _____ than the work done on a machine; output work is _____ than input work.
27. True or False: You cannot get more work out of a machine than you put into it.
28. The mechanical advantage of a machine is the number of times that the machine increases an _____.
29. Which value is always less than the other: ideal mechanical advantage or actual mechanical advantage?
EXPLAIN!
30. _____ mechanical advantage (AMA) is determined by measuring the actual forces on a machine.
31. What is the equation for AMA?

32. _____ mechanical advantage (IMA) is the mechanical advantage of a machine in the absence of friction.
33. What is the equation for IMA?

34. True or False: There is no unit for AMA or IMA.
35. The percentage of work input that becomes work output is the _____ of a machine.
36. Why is the efficiency of a machine always less than 100 percent?

37. Efficiency is usually expressed as a _____.
38. What is the equation for efficiency?

39. What are some ways in which friction can be reduced?

40. Match each type of simple machine to its correct description:

- _____ a. A rigid bar that is free to move around a fixed point.
- _____ b. A simple machine that consists of a rope that fits into a groove in a wheel.
- _____ c. A slanted surface along which a force moves an object to a different elevation
- _____ d. A simple machine that consists of two disks or cylinders, each one with a different radius
- _____ e. A slanted surface wrapped around a cylinder
- _____ f. A V shaped object whose sides are slanted and slope towards each other.

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| 1. Lever |
| 2. Wheel and Axle |
| 3. Inclined Plane |
| 4. Wedge |
| 5. Screw |
| 6. Pulley |

41. What is a fulcrum?

42. How are levers classified?

43. For a first class lever, the _____ is in the middle. Depending on the position, the ideal mechanical advantage can be greater than, equal to, or less than _____.

44. For a second class lever, the _____ is in the middle.

- a. The input distance is _____ than the output distance, therefore, the IMA is _____

45. For a third class lever, the _____ is in the middle.

- a. The input distance is _____ than the output distance, therefore, the IMA is _____.

46. Give a real life example of a first class, second class, and third class lever.

47. What are real-life examples of a wheel and axle?

48. What are real-life examples of an inclined plane?

49. Which wedge would have a greater IMA: a thin wedge or a thick wedge of the same length?

50. What are real-life examples of a wedge?

51. True or False: Screws with threads farther apart have a greater ideal mechanical advantage.

52. What are real-life examples of a screw?

53. A fixed pulley can change the _____ of a force but not the _____ of a force, while a movable pulley is able to change both.

54. A _____ machine is a combination of two or more simple machines that operate together.

55. Give a real life example of a compound machine?