**12. Simple Machines homework problems (Physical Science)**

Name and date submitted (3 pts):

Instructions: Using this form as a template, create space in the document below and write or type your answers. Turn in your completed work as an email attachment.

First read the chapter and review the notes posted in this Unit.

(20 questions, 100 points possible).

Equations: W = f x d work = force x distance moved (units: Joules or ‘J’)

P = $\frac{W}{t}$ Power = work ÷ time (units: Watts or ‘W’)

M.A. = $\frac{load}{effort}$ Mechanical advantage = load (N or lbs) ÷ effort (N or lbs)

The ‘six simple machines’: Lever, inclined plane, pulley system, wheel & axle, wedge, screw

First class lever: The fulcrum is in between the load and the effort

Second class lever: The load is in between the fulcrum and the effort

Third class lever: The effort force is in between the fulcrum and the load

1. Write 1st, 2nd, or 3rd next to each of the following examples to indicate which type of lever (1st class, 2nd class, 3rd class) is exemplified by each one.
2. Forearm
3. Seesaw
4. Wheelbarrow
5. Hinge
6. Scissors
7. Nutcracker
8. Tweezers
9. Crowbar
10. T/F: Efficiency is the measure of the amount of the work put into a machine which produces useful output.
11. T/F: The equation for work is W = f/d.
12. T/F: Power is increased by increasing the amount of work done
13. T/F: If you do 25 J of work in 50 s, you have used 1,250 W.
14. T/F: When two boys balance a seesaw, the lighter boy sits nearer to the end of the seesaw.
15. T/F: If force is gained, distance must be sacrificed
16. The unit for work is the
17. Foot
18. Joule
19. Newton
20. Degree
21. The work equation is “work =
22. Push x pull
23. Force x distance
24. Friction x distance
25. Force x direction
26. Comment on the veracity of this statement: “A weightlifter holding an 800 N weight motionless above his head does no work”.
27. What is the name for the distance from the applied force to the pivot in a lever?
28. Effort arm
29. Force distance
30. Push arm
31. Resistance arm
32. Which of these is the “Law of moments”?
33. Effort x load = effort x load
34. Fulcrum x force = fulcrum x force
35. Mechanical advantage = load ÷ effort
36. Force x distance = force x distance
37. Identical triplets are on a seesaw, one on one side and two on the other. If the lone triplet sits 1 m from the pivot, how far must the other two be from the pivot to balance the seesaw?
38. 1/3 m
39. 1/2 m
40. 1 m
41. 2 m
42. An inclined plane wrapped around a cylinder or cone is a
43. Screw
44. Seesaw
45. Wheelbarrow
46. Wedge
47. What is formed when two inclined planes are placed back to back?
48. Scissors
49. Seesaw
50. Wedge
51. Screw
52. Where is the fulcrum on a bicycle wheel?
53. Along the rim of the wheel
54. In the spokes between the rim and the center of the wheel
55. In the center of the wheel
56. Varies according to rotation
57. If a woman pushes a grocery cart with a force of 10 N for a distance of 35 m, how much work goes into that motion?
58. If a high school student pushes a vacuum cleaner a distance of 40 m in 300 seconds using a force of 50 N, how much power is put out?
59. A boy wants to lift a 100-N rock using a stick lever and stone fulcrum. If the rock is ½ m from the fulcrum, and the boy can exert 50 N of force, how far from the fulcrum must he push?
60. A laborer can lift 200-lbs of bricks in a wheelbarrow by exerting just 50-lbs of force at the handles. What is the mechanical advantage of this simple machine?