Chapter 5 Test Review Physical Science

Answer the following questions on a separate piece of paper. If you are working on a problem make sure to show your work to receive credit! If the answer requires units, make sure to include the unit.

1. Draw a diagram showing the two primary simple machines and the other simple machines that fit under those two categories.
2. Sketch a first class lever and give an example of its use. Make sure the lever is labeled.
3. Sketch a second class lever and give an example of its use. Make sure the lever is labeled.
4. Sketch a third class lever and give an example of its use. Make sure the lever is labeled.
5. How are work and energy related?
6. Which lever has mechanical advantages of less than 1?
    a. What is the advantage of this type of lever?
7. How can you increase the mechanical advantage of a first class lever?
8. How can you increase the mechanical advantage of a second class lever?
9. What is always trying to reduce the mechanical advantage of any machine?

10. What type of simple machine is this?

11. What type of simple machine is this?
    a. How do you determine the mechanical advantage of this type of simple machine?

12. What type of simple machine is this hammer being used as?
    a. Where is the effort?
    b. Where is the resistance?

c. Where is the fulcrum?

13. What simple machine is being used above?
    a. What is its mechanical advantage?

14. What is this simple machine (above)?

15. What type of simple machine is this (above)?

16. Pulleys like this are used on ships to raise sails. What is the mechanical advantage of this pulley system?
17. Sketch a pulley system that has a mechanical advantage of 4.
18. Can the output of a machine ever be greater than the input?
    a. Explain.
19. What is the formula for calculating work?
20. What is the unit for work?
21. What two conditions have to be met in order to do work on an object?
22. If you are holding a stack of books in your arms, are you doing work to the books?
    a. Explain
23. If you are working out and use a force of 725 N to jump up on a box that it 0.5 m high, how much work will you do?
    a. How much work will you do if your workout requires you to do this 50 times?
24. Is it possible to apply a force to something, and do zero work?
    a. Give an example.
25. If you push a car with a force of 525 N and you know that you did 12,000 J of work, how far did you push the car?

26. What is the mechanical advantage of the incline plane pictured above? The ramp is 2 m long and 0.21 m tall.
    a. If the man and the wheel chair have a combined weight of 220 pounds, how many pounds of force will his daughter have to push with to get him up the ramp?
27. What is the equation for power?
28. What is the unit for power?
29. If you lift a stack of bricks into the back of a truck how much work is done? There are 500 bricks, each weight 30N, the bricks have to be raised 1.2 m to get them into the back of the truck.
    a. If you can do this in 10 minutes, how powerful are you? (make sure to convert minutes to seconds before calculating)
    b. What would you have to do to increase your power?
30. How is actual mechanical advantage calculated?
31. If the input force to a machine is 65 N and the output force is 525 N, what is the mechanical advantage?
32. If less force is required when using a machine to do work, what has to increase? Remember you never get something for nothing.

33. If you have a lawnmower that is rated at 5 horsepower, how many watts of power will it have?

34. What does it mean to be a compound machine?
    a. Give an example of a compound machine that you use every day.
35. How do you calculate the efficiency of a machine?
36. For an automobile, for every 1000 J of energy you burn as gasoline, you get about 250 J of work from the car in the form of it moving you down the road. What is the efficiency of an automobile?
    a. What is it that prevents the car form being 100% efficient?
    b. Give two examples of this.