Name_____ Lab Physics Notes – Work and Power

Enduring Understanding: For work to be accomplished, some type of energy is needed?
Essential Question: What are the different types of energy?
Essential Question: What are the social and economic impacts of energy use?

Work (W)

- the _____ applied to the object _____ the _____ travelled while that force is applied.

Equation:

The SI unit for work is the _____

Example: Example: A force of 100 N is used to push a stalled car 20 m across a parking lot. How much work was done on the car?

The Joule is a _____ unit. That means that forces must be in _____ and

distances must be in _____.

Name another derived unit that we have used.

What are the base units used to derive the Newton and all of our derived units?

To calculate work, the force and the displacement the object is moved must be _____.

When you carry something up a staircase, you supply a force in the _____ direction.

So, the direction that matters is the upward or _____ direction. The _____ distance does not matter because there is no force in that direction.

Direction Matters

If force and distance are in the same direction, the work done is positive (+).

If force and distance are in opposite directions, the work done is negative (-).

_____ work is done if

- _____
- the object doesn't move (zero distance)
- no force is applied

+, - , or zero work?

1. A football player carries a football across a field.
2. A boy pulls his wagon down the sidewalk.
3. Tori carries a box up a flight of stairs.
4. Tori carries a box down a flight of stairs.
5. A waitress carries a tray of food across a room.
6. Zach holds a heavy barbell.
7. Steve pushes on a closed door.
8. Friction acts on a sled moving down a hill.

The force required to _____ an object is the object's _____.
Remember that weight = mg.

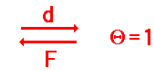
Example: A person is carrying a 10 N object up a staircase which is 7.5 m in the horizontal direction and 15 m in the vertical direction. How much work was done on the object?

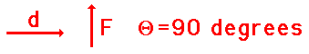
Sometimes the force is applied at an _____.

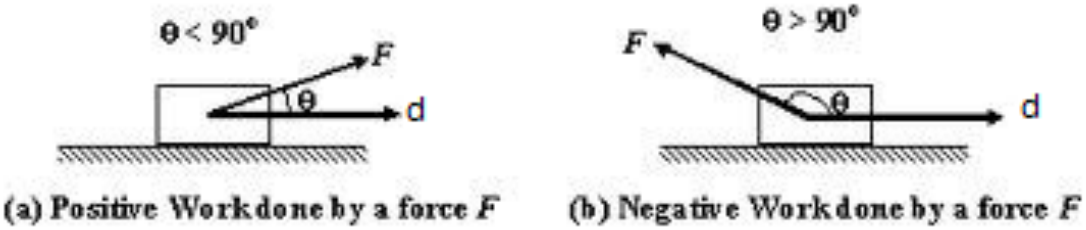
Only the _____ (x) component of the force is parallel to the displacement

To find that component use cosine of the angle.

W =







(a) Positive Workdone by a force F (b) Negative Workdone by a force F

Power (P)

Power is defined as the rate at which _____.

SI Unit is _____

Equation:

Example: A 250 N force is used to move a mass 30 m in 40 s. How much work was done to the mass?

How much power was used?

Give an example that you know of where Watts are used to measure Power.

James Watt Steam Engine 1763

Example: A 40 kg mass is lifted 20 m in 15 s. How much power was used?