Warm Up

1. What is the gravitational force between a 100. kg mass and another object with a 115 kg mass if they are 2.00 m apart?
2. What is the centripetal acceleration of circular object rotating with a velocity of 17.0 m/s if it has a radius of 25.0 m?
3. What is the mass of a person who pushed off a car at 16.0 m/s if the 1200. kg car moved in the opposite direction at 2.30 m/s?
4. What is the gravity on a planet if a 72.0 kg person has a weight of 1087 N?
5. How fast was a person going if they traveled to the beach (mile marker 255) if they left from mile marker 145 and drove for 3.00 hours?

Warm Up

1. What is the velocity if a 82 kg person who had a centripetal force of 50 N applied to him over a period of 15 sec with a radius of 40 m?
2. What is the length of a track if cars racing on it accelerate at 21 m/s^2 to achieve a velocity of 195 m/s from a standstill?
3. How long, in hours, did it take a car traveling at 13 m/s to travel a distance of 700 km?
4. What is the velocity that a 7.5 kg ball was kicked into the air if it has a total energy of 1050 J?
5. What is the velocity of a 1500 kg car if two 75 kg person's push off the car with a total velocity of 7 m/s?

Target

- I can explain what work is and how it relates to energy and power.

Work and Energy

Work

- Work is the product of the force and the distance an object is moved by the force.
- $W = Fx$
- For work to be done, the object has to be moved a distance and the force has to be in the same direction as the motion of the object.

Practice

- A person applies 60 N of force to move a box 10 m. What is the work done by the person?
- Answer:
- 600 J of work

- The ability of an object to produce a change in itself or the world around it is called energy.
- Energy that is the result of motion is kinetic energy
- $KE = 1/2mv^2$
- Work and energy are related to each other so both use the same unit called the joule (J).

Power

- Power is the amount of work done, divided by the time taken to do the work.
- $P = W/t$
- Power is measured in watts (W). One watt is equal to 1 J of energy in 1 s.
- Power can be manipulated by changing either the amount of work over a set time, or by doing a set amount of work over time.

Practice

- If a person uses 600 J of work to move a box, how much power is needed if that work happens over 3 sec?
- Answer:
- 200 W of power

Practice

- How much power is needed to move a box with 45 N of force 4 meters in 6 secs?
- Answer:
- 30 W of power

Summary

- Work is the force and distance applied to an object.
- Power is the work done over time.
- Work is measured in joules (J) and power is measured in watts (W).

Assignment

- Work and Power Worksheet