Warm Up

1. What is the force needed to move a 47.0 kg object if it was moved 65.2 m/s in 7.89 sec?
2. What is the acceleration of a rotating cylinder with a radius of 13.0 m if it is moving at a velocity of 7.45 m/s?
3. How far has a ball fallen if it was dropped 38.0 sec earlier?
4. What is the mass of a person who obtained a velocity of 4.00 m/s after pushing off another person with a mass of 42.5 kg and a velocity of 9.44 m/s?
5. What is the height of a person with a mass of 40.0 kg if they have 830. joules of energy?

Target

- I can explain Hooke's Law and periodic motion.

Periodic Motion

- Motions that repeat in a regular cycle are called periodic motions.
- Waves will have a periodic motion to them with waves repeating the same motion over and over.
- The period is the time it takes for a wave to repeat one complete cycle of the motion.

Hooke’s Law

- Hooke's law involves springs and mass attached to them.
- It states that the force exerted by a spring is equal to the spring constant times the distance the spring is stretched from its zero point.
- $F = -kx$

Practice

- How much force is necessary to stretch a spring 0.25 m when the spring constant is 95 N/m?
- Answer:
- 24 N

- Springs also are a type of potential energy.
- $PE = 1/2kx^2$
- This energy is stored in the stretched spring and is turned into kinetic energy if the mass is removed.

Practice

- A spring stretches by 18 cm when a bag of potatoes weighing 56 N is suspended from its end.
  - Determine the spring constant.
  - How much elastic energy is stored in the spring?
- Answer: 310 N/m and 5.0 J

- Resonance occurs when small forces are applied at regular intervals to a vibrating or oscillating object causing the amplitude of the vibration to increase.
- This is done when a person is on a swing.

Summary

Assignment

Period Motion (Hooke's Law and Elastic Potential Energy)

Odd-Numbered Problems plus #4