HPS Motion & Forces Calcs 2020                        Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per \_\_\_\_\_

OBJECTIVE: Describe motion & forces both qualitatively and quantitatively (Obj 1, 3-5)

Speed = Distance/time (d/t) Velocity = Displacement/time (x/t) direction

Acceleration = (vf – vi)/time Force = mass x acceleration (direction)

Weight = mass x gravity Momentum (p) = mass x velocity (direction)

1. What is the difference between distance and displacement? Draw a picture if necessary.
2. If I go 3 miles east, 5 miles south, and 3 miles west, what are my displacement and distance?
3. Convert 4 days to seconds. (4 days is a measurement)
4. If a train goes 52 mi/hr for 2.0 days, how far will it go?
5. If a sprinter goes from 0 m/s to 8 m/s in 0.1 seconds, what is her acceleration?

1. If you shout into the Grand Canyon, your voice travels at the speed of sound (340 m/s) to the bottom of the canyon and back, and you hear an echo. How deep is the Grand Canyon at a spot where you can hear your echo 5.2 seconds after you shout?

1. Falling objects drop with an average acceleration of 9.8 m/s2. If an object falls from a tall building, how long will it take before it reaches a speed of 49 m/s?

1. What is the weight (in pounds) of a 7.0 kg bowling ball on Earth’s surface. (1kg = 2.2 lbs) What is the weight in N?
2. What is the mass of a 7.0 kg bowling ball on the surface of the moon?
3. What is the weight (in Newtons) of a 7.0 kg bowling ball on the surface of the moon? Gravity on the moon is 1.6 m/s2.
4. What is the rate of acceleration of a 2,000-kilogram truck if a force of 4,200 N is used to make it start moving forward?

1. How much force is needed to accelerate a 68 kg skier at a rate of 1.2 m/s2?

1. What is the mass of an object that needs a force of 4,500 N to accelerate it at a rate of 5 m/s2?

1. My friend’s mass is 65 kg. What is her weight in N?

1. Calculate the momentum of a 11.35 kg wagon rolling down a hill at 12 m/s.

1. Which has more momentum: a 6,000 kg elephant napping or a 0.15 kg baseball traveling at 40 m/s?

1. Which has more momentum: a 111 kg linebacker running at a speed of 5.6 m/s or a 82 kg quarterback moving at 2.5 m/s.