**STATION 1: Newton’s 1st Law of Motion-Weight and Mass**

**Directions:** Show your working using the CER and GUESS method.

1. Find the mass of a 150 N couch. *(15 kg)*
2. Find the weight of 85 kg man. *(850 N)*
3. Find the mass of a 2250 N bear. *(225 kg)*
4. Find the weight of a 2 kg book in pounds. *(4.4 lbs)*
5. Find the mass of a 46 N stone. *(4.6 kg)*
6. What is the mass of a 306 N child on earth? *(30.6 kg)*
7. How much does a 5 kg cat weigh on earth? What is the cat’s mass on the moon? *(50 N, 5 kg)*
8. A 62 kg lady stands on a bathroom scale. What will the scale read if she stands perfectly still in pounds? *(136.4 lbs)*
9. A 42 kg crate of physics books is at rest on a table. What is the weight of the crate? What force does the table support the crate with? *(420 N, 420 N)*

**STATION 2: Newton’s Three Laws of Motion-MC and Word Sort**

1. The law of inertia states that an object

a. will continue moving at the same velocity unless an outside force acts on it.

b. will continue moving in a straight line unless an outside force acts on it.

c. that is not moving will never move unless a force acts on it.

d. at rest will remain at rest unless acted on by an outside force.

e. will do all of the above.

2. One object has twice as much mass as another object. The first object also has twice as much

a. velocity.

b. gravitational acceleration.

c. inertia.

d. all of the above

3. Compared to its weight on Earth, a 15-kg object on the moon will weigh

a. the same amount.

b. less.

c. more.

4. Compared to its mass on Earth, the mass of a 15-kg object on the moon is

a. the same.

b. more.

c. less.

5. A sheet of paper can be withdrawn from under a container of milk without toppling it if the paper is jerked quickly. The reason this can be done is that :

a. gravity pulls very hard on the milk carton.

b. the milk carton has very little weight.

c. the milk carton has inertia.

d. none of the above

6. How much does a 2-kg bag of candy weigh?

a. 7.2 N

b. 14.4 N

c. 22.8 N

d. 20 N

e. 0.20 N

7. An object weighs 45 N on Earth. A second object weighs 45 N on the moon. Which has the greater mass?

a. The one on Earth

b. The one on the moon

c. They have the same mass.

d. Not enough information to say

1. A soccer player kicks a ball with his foot. The action force is the impact of the soccer’s player foot against the ball. What is the reaction to this force?

a. The force of the ball against the bat

b. The weight of the ball

c. Air resistance on the ball

d. The grip of the player's hand against the bat

9. How does acceleration of an object change in relation to its mass? It is

a. directly proportional.

b. Acceleration doesn't depend on mass at all.

c. inversely proportional.

10. The acceleration produced by a net force on an object is

a. inversely proportional to the mass of the object.

b. directly proportional to the magnitude of the net force.

c. in the same direction as the net force.

d. all of the above

11. Work on the unit 3 word sort inside the envelope.

Station 3: Newton’s 2nd Law of Motion- Equation and Relationship

**Directions:** Show your working using the CER and GUESS method.

**1.** Given a force of 70 N and an acceleration of 10 m/s2, what is the mass?

*(7 kg)*

**2.** How much force is required to accelerate an 15 kg mass at 11 m/s2?

*(165 N)*

**3.** What is the acceleration of a 30 kg mass pushed by a 8 N force?

*(0.26 m/s2)*

**4.** If you pull a wagon with an acceleration of 12 m/s2. A skunk jumps into the wagon and the **mass** doubles. What is the wagon’s **new acceleration?** Explain your answer or show your work using CER.

**5.** If you pull a wagon with an acceleration of 12 m/s2 . If your friend helps you pull the empty wagon and the **force** doubles. What is the wagon’s **new acceleration?** Explain your answer or show your work using CER.

**6.** How much force is required to accelerate a 1240 kg mass at

8.3 m/s2? *(10292 N)*

**7.** Given a force of 32.85 N and an acceleration of 5.7 m/s2, what is the mass?

*(5.76 kg)*

**8.** What is the acceleration of a 21 kg mass pushed by a 14 N force?

*(0.66 m/s2)*

**STATION 4: *Pressure and Terminal Velocity***

**Directions:** Show your working using the CER and GUESS method.

1. A billboard sign lays on the ground with a weight of 3100 N and covers an area of 64 m2. What pressure does it exert on the ground? *(48.43 Pa)*

2) A 6 kg bowling ball is falling at terminal velocity. What is its mass? What downward force does gravity pull with? What upward force does air push with? What is its acceleration? What is the net force on the ball?

*Ans:* *(6 kg, 60 N, 60 N, 0 m/s2, 0 N)*

3) A Japenese sumo wrestler weighs 1580 N and his bare feet cover an area of 0.35 m2. What pressure does he exert on the ground? *(4514.28 Pa or about 2257.14 Pa on each foot)*

4) A snowboarder exerts a pressure of 950 Pa on a snowboard with an area of 0.65m2.What is the weight of the snowboarder? *(617.5 N)*

**5)** What is the relationship between pressure and area? Provide an example.

**6)** Why is the net force of an object at terminal velocity 0 N?

**7)** 940 N skydiving man is falling at terminal velocity. What is his mass? How much air resistance does he feel? What is his acceleration? What is the net force acting on him?

*Ans:(94 kg, 940 N, 0 m/s2, 0 N)*