Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ JMJ Date \_\_\_\_\_\_\_\_\_\_

Period \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Miss Pisciotta

Chapter 2 Homework Sheet

**For ALL homeworks: Please restate the question in your answers in the Homework section of your notebook.**

***Lesson 1***

HW #1

1) What is a force?

2) What is a contact force?

3) What is a noncontact force?

4) What is the unit of force?

5) What are three noncontact forces?

6) What is the difference between mass and weight?

7) Explain how the gravitational force between two objects is affected by their mass and the distance between them.

8) What is friction?

9) What are the three kinds of friction discussed?

10) Use the picture to answer the question: The gravitational force between the star and planet A is the same as the gravitational force between the star and planet B. Explain why this is true.

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Object X

star

Planet A

Planet B

***Lesson 2***

HW #2

1) Draw arrows showing a positive force of 400 N and a negative force of 200 N. Use “to the right” as the reference direction. What is the net force?

2) How much force would be needed to balance the force represented by the two arrows in the diagram above?

3) What are balanced forces? What are unbalanced forces?

4) What is Newton’s first law of motion?

5) What is inertia?

HW #3

1) What is the difference in net force between forces acting on an object in the same direction and forces acting on an object in opposite directions?

2) What does Newton’s first law of motion tell us about velocity?

3) At a bowling alley, people bowl while a storm howls outside. Suddenly, a side door of the building is blown open and a strong wind sweeps through the alley. The wind scatters many objects, but the bowling balls rolling down the lanes are unaffected. Why did the wind entering the bowling alley scatter many objects but have no effect on the bowling balls?

HW #4

Read the passage to answer the questions.

*Using Gravity:* A roller-coaster ride begins as the line of cars moves to the top of a hill on the structure. The higher the first hill is, the greater the distance is that gravity can pull it down. As the cars start moving down the hill, gravity takes over and applies a constant downward force on the cars. The energy of this forward motion, increased by the pull of gravity, propels the train up to the top of the second hill, where gravity takes over and pulls the train down again.

The tracks channel the force of the motion- they control the way the cars fall. If the tracks slope down, gravity pulls the front of the car toward the ground; so it accelerates. If the tracks tilt up, gravity applies a downward force on the back of the car; so it slows down.

*Objects Keep Doing What They’re Doing:* According to Newton’s first law of motion, the roller-coaster cars maintain velocity even when they are moving up the track against the force of gravity. Newton also applied the concept of friction to moving objects. Using an example of bowling ball put into motion on a bowling alley, according to the first law it will stay in motion unless acted upon by an outside force. If the alley never ended, however, the ball would not roll forever; the force of friction would eventually cause the ball to stop. The same thing happens with the roller-coaster cars- during the ride, friction gradually slows the cars, and by the end of the ride, they are moving slowly and are easily halted.

1. In a race, as runners cross the finish line, why do they continue to move a few steps before halting?
2. In which sport, field hockey or ice hockey, is it easier to move the ball or puck across the playing area? Why?

***Lesson 3***

HW #5

For this activity, you will need a piece of chalk, a golf ball, and a table tennis ball (or two others that are similar in size but different in mass), a straightedge, and a measuring tape. Set up the activity outside on a level sidewalk or driveway. Make a line on the driveway or sidewalk. During this activity, you will move balls from the line. Start with the lighter ball. Set it on the line and strike the ball with the flat side of the straightedge. You will strike the second, heavier ball with the same force, so practice a few times to be sure you strike the ball from the same distance and with the same force. Measure the distance the ball traveled. Record the results. Repeat with the heavier ball and record the result.

1. Recall Newton’s second law of motion (A=F/m). What does it state?
2. Does the activity demonstrate Newton’s second law? Explain.

HW#6

A=F/m OR F=ma

1) If a 6 kg bowling ball is rolled down the bowling lane with a force of 12 N, What is the acceleration of the ball?

2) A 25 N net force is applies to a rolling cart and produces an acceleration of 5 m/s2. What is the cart’s mass?

3) If a 16 N net force makes an object accelerate at 8 m/s2, what is the mass of the object?

4) A 0.5 kg ball accelerated at 50 m/s2. What force was applied?

5) A boy throws a 1 kg rock with a force of 5 N. What is the acceleration of the rock when he lets go of it?

6) A toy boat accelerate through calm water at 2.5 m/s2 powered by a motor exerting a net force of 5 N. What is the mass of the boat?

7) A net force pushing a 15 kg wagon a level road results in an acceleration of 2 m/s2. What is the net force?

A

HW #7

B

Use the figure to answer the questions.

1) What force keeps the ball moving in a circle?

2) What is producing this force?

3) Why is the ball accelerating?

C

4) In which direction is it accelerating?

5) If the ball broke away from the string at the position shown, would it move away on line A, B, or C?

6) What causes it to take this path?

7) After the breaking away from the string, what is the main force that would be acting on the ball?

***Lesson 4***

HW #8

1) What is Newton’s third law of motion?

2) What are the two parts of a force pair?

3) Why don’t those two parts cancel each other?

4) Explain the combination of forces that enable a swimmer to move through the water.

5) When you throw a ball against a wall, the ball applies a force on the wall. However, the wall also applies a force against the ball. How does this demonstrate Newton’s third law of motion?

HW #9

1) What is the equation p=m x v used to determine?

2) Determine the momentum of a 3 kg ball moving at a speed of 4 m/s.

3) If a 6 kg bowling ball is rolled down the bowling lane with a velocity of 3.5 m/s, what is the momentum of the ball?

4) A bicycle has a momentum of 25 kg X m/s and a velocity of 2.5 m/s. What is the bicycle’s mass?

5) If an object has a velocity of 8 m/s and a momentum of 40 kg x m/s, what is the mass of the object?

6) What is the velocity of a 0.5 kg ball that has a momentum of 3 kg x m/s?

7) Would an oil ship at a speed of 10 km/h have more or less momentum than a car moving at a speed of 100 km/h? Explain.

HW #10

1) Explain conservation of momentum.

2) What are elastic and inelastic collisions?

3) If a moving car crashes into the back of a stopped car, the stopped car moves. The moving car slows down or stops. How does this illustrate the law of conservation of momentum?

4) Consider two kinds of collisions – between two billiard balls on a pool table and between two football players, one of them tackling the other. Which collision is elastic, and which is inelastic? Explain your answer.

5) When moving objects collide, their total momentum is conserved unless an outside force acts on them. What outside force brings most colliding objects, such as billiard balls, to stop?