Newton's Challenge

Name_____

Introduction: Science 360 - Hockey & the Laws of Motion

Write each law of motion in your own words.

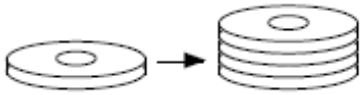
1st Law –

2nd Law –

3rd Law -

Part A: Wacky Washers - Follow your teacher's directions to prepare for this experiment.

1. Aim one washer at the bottom of the stack of four washers and apply a force with your finger or hand to slide it towards the taller stack. What happens?



2. What happens when you slide a stack of 2 washers into a stack of 4?

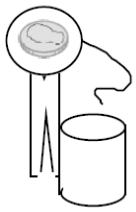
3. What happens when you slide a stack of 4 washers into a stack of 4?

4. What happens when you slide a stack of 4 washers into a stack of 2?

5 Explain your observations in terms of Newton's 1st Law using the terms force, inertia, rest, motion in your answer.

Part B: Tricky Tricks - Follow your teacher's directions to prepare for this experiment.

1. The goal is to remove the circle by pulling on the string, but the penny must remain in place on top of the clothespin. Can you do it? ☺ 😐 ☹



2. Try the experiment again using the plain circle (no string). Can you flick the circle out from under the penny and keep the penny on the end of the clothespin? ☺ 😐 ☹

3. Balance the penny on a circle (string or no string) on the tip of your finger. Try to remove the paper circle to leave the penny balanced on your finger. Can you do it? ☺ 😐 ☹

4. How does this activity relate to the "pull the tablecloth" trick used by magicians and inertia? Use the terms force, rest, and motion in your answer.

<u>Part C: Master the Force</u> - Go to http://www.harcourtschool.com/activity/newton/ to help you complete this section.

1. Experiment with the different masses and forces to fill in the chart.

▼Force Mass▶	1.0 kg	2.0 kg	3.0 kg	4.0 kg	5.0 kg
1.0 N					
2.0 N					
3.0 N					

2. Write a summary of your observations that explains how force, mass, and acceleration are related.

<u>Part D: Balloon Rally</u> - Follow your teacher's directions to prepare for this activity.

1. Blow up the balloon and bend your straw to a 90^{o} angle before allowing the air to escape. What happens?

2. Blow up the balloon and bend your straw to a 45^{o} angle before allowing the air to escape. What happens?

3. Blow up the balloon, but leave your straw straight (180^{o} angle). Release the air in the balloon. What happens?

4. Remove the pin and hold on to the straw as you blow up the balloon. Release the straw. What happens?

5. Explain your observations in terms of Newton's 3rd Law using the terms action, reaction, balloon, force in your answer.