Name:_____

Investigating Forces Part Two

Brief Introduction

In physics, experimental evidence plays a critical role in establishing the rules and laws that govern models. This lab will help you establish a rule that governs forces, and therefore all models you create must obey this law as well. You will be using force sensors to collect data.
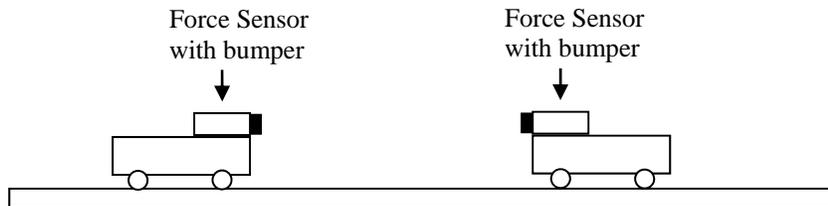
Pre-Lab Question to Ponder:

One of your friends who drives an obnoxiously large Sport Utility Vehicle (SUV) claims that SUVs are safer because they are bigger than nearly every car on the road and therefore in an accident would exert a greater force on the other car in the collision. Does this make sense? Is your friend's claim correct all of the time, some of the time or none of the time?
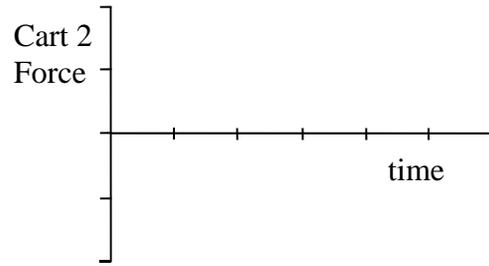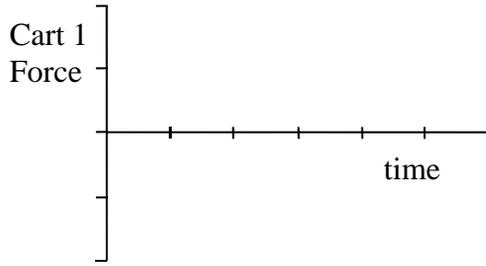
Today, you are going to collect evidence to either support or reject your friend's claim. You will have 30 minutes collect evidence that supports or rejects this claim. In order to be sure whether your friend is right or not, you should collect evidence in as broad a set of conditions as possible. The evidence you collect will be in terms of two force vs. time graphs (one graph for each cart in your trials).

Before turning on the computer connect two Force Sensors to the LabQuest. Plug the LabQuest into the USB port on the computer. After all hardware is connected, turn on the computer.
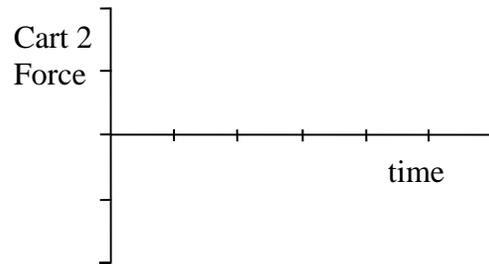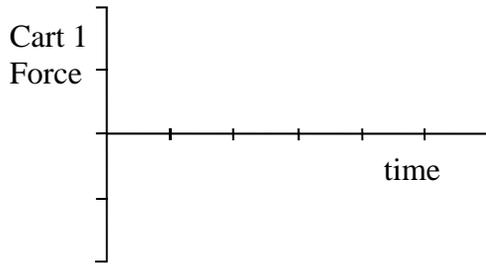
Set up the track, carts and force sensors as shown below. The force sensors have two different connectors, a rubber bumper and a hook, you will need to connect the bumper to the force sensor. Your force sensor should then be attached to the PasCar using the long screw. **This is important: Before collecting data using the force sensors, you will first need to calibrate each force sensor and then you will need to Zero each force sensor. Be sure nothing is connected to the force sensor when you do this.**
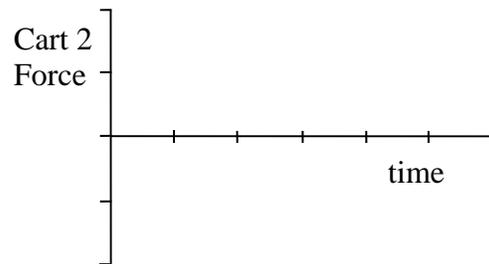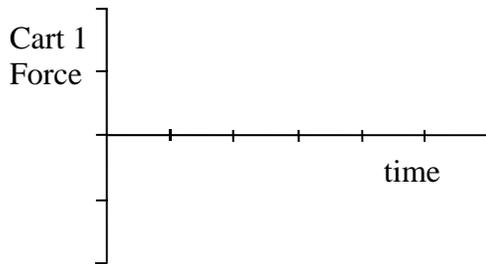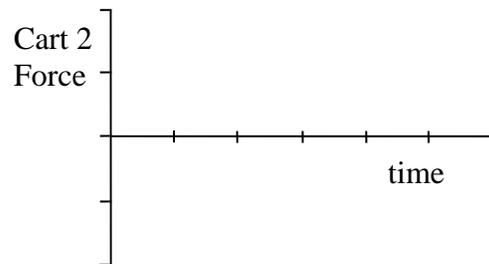
Force Sensor   Force Sensor
with bumper   with bumper

Trial 1 description:

Cart 1 Force | time

Cart 2 Force | time

Trial 2 description:

Cart 1 Force | time

Cart 2 Force | time

Trial 3 description:

Cart 1 Force | time

Cart 2 Force | time

Trial 4 description:

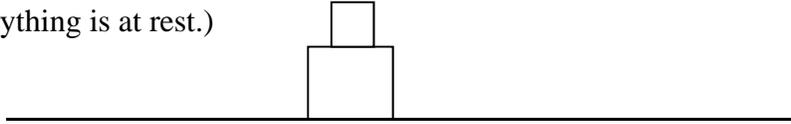Cart 1 Force | time

Cart 2 Force | time
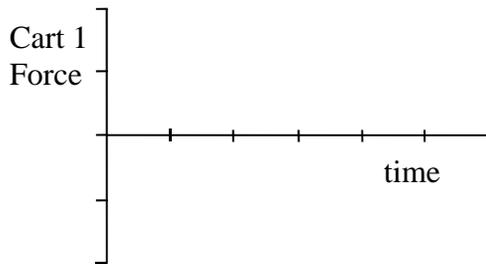
Modeling Forces:

In your homework for last night, you modeled the following situation:

For the following situation construct a system schema and a force diagram for both of the boxes in the diagram below.

(Everything is at rest.)

After collecting data in the trials above, what can you say about the force the top box exerts on the bottom box as compared with the force the bottom box exerts on the top box?

State this finding as a law that governs all forces:

Create a whiteboard, that revises the problem you did for homework and makes accurate force diagrams and reflects the law stated above.