

Name:

3.1

Force, Mass, and Acceleration



Question: What is the relationship between force, mass, and acceleration?

1

Thinking about force

- a. What are the ways you can change the amount of force acting to pull the car down the ramp? Keep in mind that force is something which has the ability to change motion.

- b. How will you vary the force on the car for this experiment?

2

Measuring the force on the car

There are no questions to answer in part 2.

3**Conducting the experiment**

1. Follow the procedures in your Investigation guide and record your data in Table 1.

Table 1: Force and acceleration at different ramp angles

Mass	Force	Time A	Time B	Time A to B	Speed A	Speed B	Accel.
(kg)	(N)	(sec)	(sec)	(sec)	(m/sec)	(m/sec)	(m/sec ²)

4**Analyzing the data**

a. List three observations you can make about the data from looking at Table 1.

b. The relation between force and motion is simple but not obvious. Can you see it from the data table? Write a sentence to describe your ideas about the relationship between force and motion.

Combining force and mass


- a. Circle the combination of force and mass that has been assigned to your group. The different combinations of force and mass that we will test are:
- (1) force \div mass
 - (2) mass \div force
 - (3) force $+$ mass
 - (4) force \times mass
- b. Transfer your force and acceleration data from Table 1 to Table 2 below. Add the mass data to this table. Using this data, make the calculations for your group's force and mass combination. Add these calculations to Table 2.
- c. We use graphs to find relationships. One or more of the graphs should show a pattern we can understand. If we find a pattern in the graph then we know the relationship between the variables from that graph is the one we want.
- d.  Use the data in Table 2 to make a graph that shows the relationship between force, mass, and acceleration (*your teacher will give you graph paper*). Plot your group's combination of force and mass on the x -axis. Plot acceleration on the y -axis. Be sure to give a title to your graph and label the axes.

Table 2: Force, Mass, and Acceleration Data

a (acceleration) m/sec^2	F (force) N	m (mass of the car) kg	force and mass calculation:

