

Name

Period

Date

What is the relationship between the net force applied to an object and its motion?

Like Newton, we will observe a simple system to look for a relationship between net force and motion. From earlier studies, we know that a mass hung from a spring experiences a force due to

Make sure that your sampling rate is set to at least 20 samples per second, and if your motion sensor is set to 20 samples per second, you should see a smooth curve.





Ensure that your Time axes are aligned and then describe the relationship between the position of the object and the force the objects experiences.

Sketch the graphs in the Data Analysis section.

Analyze Data – Velocity and Force

Display two graphs simultaneously. On one graph, display Velocity on the y-axis and Time on the x-axis. On the second graph, display Force on the y-axis and Time on the x



Newton's Second Law

Display Time, Force, and Acceleration in a table. ♦ 21

Select three different time values, and record them in the Table 1 in the Data Analysis Section along with the corresponding force and acceleration values.

Analyze Data – Force versus Acceleration

Display Force on the y-axis of a graph with Time on the x-axis. ♦ 11

Change the measurement on the x-axis from Time to Acceleration. 1

Sketch your graph in the Data Analysis Section.

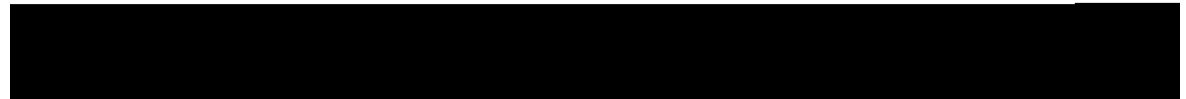
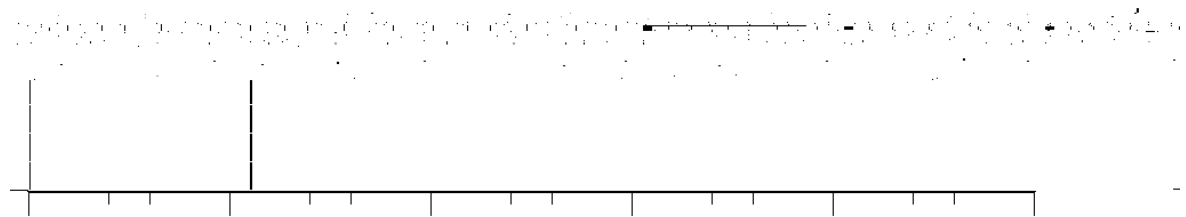
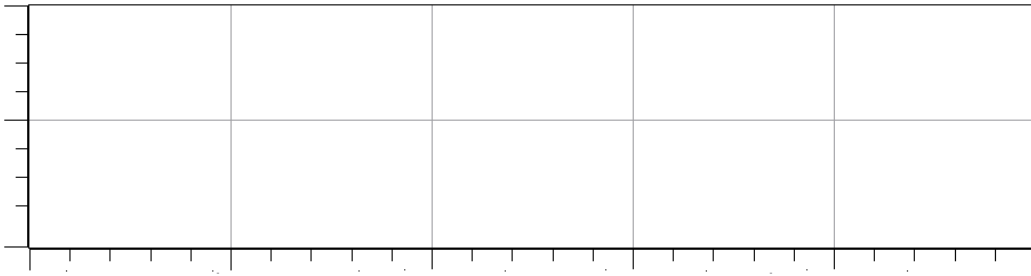


Drawing the graph: Make sure to label the overall graph, the x-axis,

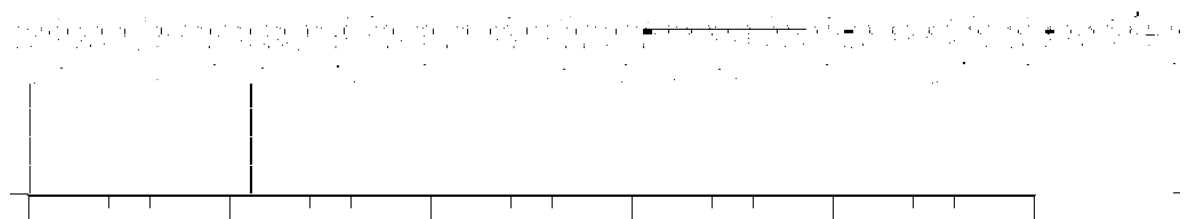
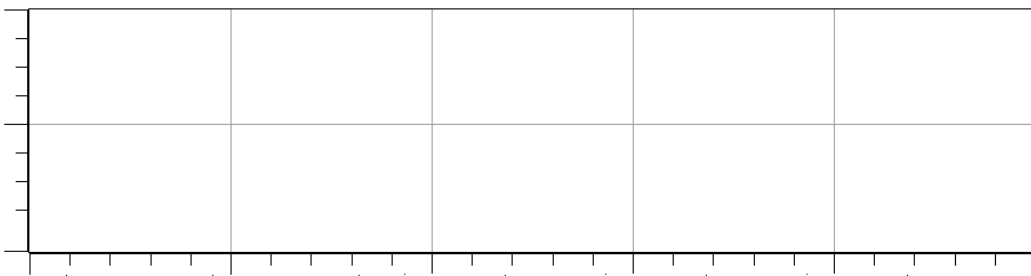


Newton's Second Law

Force and Velocity



Force and Acceleration



Student Inquiry Worksheet

Newton's Second Law

From the table of selected points in the Data AnalData Anal

D



Use available resources to help you answer the following questions.

Select the best answer or completion to each of the questions or incomplete statements below.

Which statement is true if two potatoes of different mass are launched from a potato launcher that applies the same force to each one?

- The heavier potato will be traveling faster than the lighter one.
- The lighter potato will be traveling faster than the heavier one.
- Regardless of their mass, they will be traveling at the same velocity.
- There is not enough information to draw a conclusion.

A rollercoaster is designed to deliver a 3 g acceleration at the bottom of a dip. The mass of the cart is 500 kg. and the rider is 100 kg. The track at this point is designed to withstand 15,000 N of force without buckling. Will the cart and rider make it through the dip?

- No, this ride will likely end in disaster.
- Yes, the cart and rider will easily make it past the dip.
- Yes, but a second rider of equal size would not make it through.
- There is not enough information to draw a conclusion.

If a 1,000 kg rocket is launching straight up with its engine producing a force of



Fill in the blanks from the list of randomly ordered words in the Key Term Challenge Word Bank.

Newton's _____ law predicts the following relationship between _____, force, and mass: The acceleration of an object is directly _____ to the net force and will always be in the same direction as the net _____. Acceleration will be inversely proportional to the _____ of the object, meaning that more massive objects will have less acceleration if



Newton's Second Law

Acceleration

F

Force

M

Second

proportion

↕ $a = \frac{F}{M}$

