LAB: Friction

Name: _____

Focus: How does friction between two objects affect the movement of objects?

Investigation #1

Question: Is friction a force?

Hypothesis: A force is a _____ or a _____. If friction is a force it should _____ "back" on a book as it slides across the table.

Procedure: Place a textbook at the center of the table and apply a gentle force with your hand. Can you feel the force of friction pushing back? Describe what you can feel below.

Conclusion: Was your hypothesis correct? Write a short conclusion below.

Investigation #2

Question: How can we measure the force of static friction?

Hypothesis: Static friction is the force that must be overcome in order for an object to accelerate from a stop. We should be able to calculate the static frictional force between a block of wood and the table if we can measure the force required to start an object moving.

Procedure: Tie one end of a piece of string to the nail sticking out of the end of the wood block and tie a loop in the other end. Hook your force scale onto the loop of string. Hold onto the scale and gently pull on the block until it starts to move. The static frictional force between the block and the table is equal to the force required to start the object moving.

Conclusion: What was the static frictional force between the block of wood and the table?

Investigation #3

Question: How can we measure the force of kinetic (motion) friction?

Hypothesis: Kinetic friction is the force that must be overcome in order for an object to maintain a constant velocity. We should be able to calculate the kinetic frictional force

between a block of wood and the table if we can measure the force required to maintain a constant speed.

Procedure: Tie one end of a piece of string to the nail sticking out of the end of the wood block and tie a loop in the other end. Hook your force scale onto the loop of string. Hold onto the scale and gently pull on the block until it starts to move. The kinetic frictional force is equal to the force required to maintain a constant velocity.

Conclusion: What was the kinetic frictional force between the block of wood and the table?

Investigation #4

Question: How does the type of surface affect the static and kinetic frictional forces?

Hypothesis: A rougher surface will create a _____ static frictional force than a smooth surface. A rougher surface will create a _____ kinetic frictional force than a smooth surface.

Procedure: Measure the static frictional force (see #2) and kinetic frictional force (see #3) between a block of wood and the table, a block of wood and sandpaper, and a block of wood and a surface of your choice.

Data:

Surface 1	Surface 2	Static Frictional Force (N)	Kinetic Frictional Force (N)
Wood	Table		
Wood	Sandpaper		
Wood			

Conclusion: Which surface created the greatest frictional forces and why?

Investigation #5

Question: How does the mass of an object affect the static and kinetic frictional forces?

Hypothesis: A block of wood with a greater mass will create a _____ static frictional force and a _____ kinetic frictional force.

Procedure: Measure the mass of the block that you used previously. Now add a block to the top of your other block and measure the total mass of the two blocks. Measure the static and

kinetic friction between the blocks and the table, sandpaper, and the surface of your choice. Add another block and repeat.

Data:

Wood on Table

Mass of Wood Block(s)	**Static Frictional Force (N)**	**Kinetic Frictional Force (N)**

Wood on Sandpaper

Mass of Wood Block(s)	**Static Frictional Force (N)**	**Kinetic Frictional Force (N)**

Wood on _____

Mass of Wood Block(s)	**Static Frictional Force (N)**	**Kinetic Frictional Force (N)**

Name: _____

Data Analysis

Graph your data below. Label the y-axis static frictional force in newtons and the x-axis mass in grams.