Force and Motion: Student Activity Sheet

Name:_____ Date:_____

Part 1: Effect of Height on Speed

Ramp A - Time the marble rolling over the runway **three** times. Record your results for all three times below.

Ramp A	Trial 1	Trial 2	Trial 3	Average
Time				

What do you think will happen if you raised the ramp higher and released the marble from a higher place?

_____

What would happen to the average time? Explain your reasoning. _____

_____

Ramp B - Adjust your ramp to **50mm**. How many seconds *(include tenths of seconds)* do you predict it will take for the marble to travel the whole runway? _____ seconds

You will time the marble rollings over the runway **three** times. Record your results for all three times below.

Ramp B	Trial 1	Trial 2	Trial 3	Average
Time				

What do you think will happen if you lowered the ramp and released the marble from a lower place?

_____

What would happen to the average time? Explain your reasoning. _____

_____

Ramp C - Adjust your ramp to **30mm**. How many seconds *(include tenths of seconds)* do you predict it will take for the marble to travel the whole runway? _____ seconds

You will time the marble rollings over the runway **three** times. Record your results for all three times below.

Ramp C	Trial 1	Trial 2	Trial 3	Average
Time				

Compare your results to your prediction. What did you notice? _____

_____

How does the height of the ramp affect the time it takes for the marble to travel 1 meter? _____

_____

Part 2: Effect of Mass on Speed

The wooden ball and the marble are the same sizes, but the marble is heavier. The marble weighs 5 grams and the wooden ball weighs 1.5 grams.

How do you think the speed *(time it takes to travel 1 meter)* of the wooden ball will compare to the speed of the marble? _____

_____

Set up **Ramp A** (40mm) and time the wooden ball rolling over the runway **three** times. Record your results for all three times below.

Wooden Ball	Trial 1	Trial 2	Trial 3	Average
Time				

How did changing the mass of the ball affect the speed? _____

_____

Part 3: Friction Forces

Foam - For this investigation use the **marble** and the **Ramp A** set-up (40mm). Set up **Ramp A** with the foam.

What do you predict will happen to the speed of the marble? _____

_____

Time the marble rolling over the runway **three** times. Record your results for all three times below.

Foam	Trial 1	Trial 2	Trial 3	Average
Time				

How did the speed change when the marble ran across the foam sheet? _____

_____

What do you think could cause the difference? _____

_____

Salt - Set up **Ramp A** (40mm) with a piece of paper at the end with a **small sprinkle** of salt. What do you predict will happen to the speed of the marble? _____

_____

Time the marble rolling over the runway **three** times. Record your results for all three times below.

Salt - sprinkle	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Time				

How did the speed change when the marble ran across the sheet with salt? _____

_____

Set up **Ramp A** (40mm) with a piece of paper at the end with **a lot** of salt. What do you predict will happen to the speed of the marble? _____

_____

Time the marble rolling over the runway **three** times. Record your results for all three times below.

Salt - a lot	**Trial 1**	**Trial 2**	**Trial 3**	**Average**
Time				

How did the results compare to your prediction? _____

_____

Using the term **friction**, explain how salt affected the speed of the marble. _____

_____

_____

_____