PHYSICS
EXPERIMENT 5:
Newton's 2nd Law

Name:_____   Date:_____

Partners: _____

1. **PURPOSE:** To study the forces producing acceleration.

2. **HYPOTHESIS: (SKIP)**

3. **PROCEDURE:**

APPARATUS:	MATERIALS:
1 pulley 1 timer 1 500g mass and 100g mass	string tape ruler

   1. Set up the pulley and masses as illustrated in the diagram on the right. Someone will need to hold the 100 g mass so that it doesn't fall.

   2. Measure 50 cm of tape using a ruler and stick it on the edge of table, starting from where the 500 g mass is located.
   3. Let the 100 g mass go and allow it to fall freely. As soon as you let it go, start the timer, and as soon as it reaches the other end of the tape, stop the timer. Record the time in the table provided.
   4. Repeat step 3 two more times.
   5. Use your results to answer the questions.

4. **RESULTS:**

Time (s)	Calculation
Average →	

5. ANALYSIS:

1. Draw a diagram of the system and label all the forces acting on the system.

2. What is the acceleration of the masses? (*Hint: Use one of the kinematics formulas.)

_____

_____

_____

_____

_____

_____

_____

Answer:_____

3. What is the tension in the string?

_____

_____

_____

_____

_____

_____

_____

Answer:_____

4. What is the frictional force in this system?

_____

_____

_____

_____

Answer:_____

5. What is the coefficient of friction of the table?

_____

_____

_____

_____

Answer:_____

6. The actual coefficient of friction of the table is 0.15. Calculation the percent error of the acceleration in your experiment.

➲ Note: You must first calculate the standard value for the acceleration, using k = 0.15.

$$\text{Percent error} = \frac{\text{your result} \ - \ \text{standard value}}{\text{standard value}} \text{ x } 100$$

7. If this was an ideal system (no friction), calculate the

   a) acceleration.

   _____

   _____

   _____

   _____

   _____

   _____ **Answer:**_____

   b) tension in the string.

   _____

   _____

   _____

   _____

   _____

   _____ **Answer:**_____

8. List three sources causing errors in your experiment:

   ① _____

   ② _____

   ③ _____