As you complete this scientific investigation, fill in any needed information on this template. If you need more information about each section, please visit the Developmental Module.

**Title**

Newton’s Second Law Scientific Investigation

**Hypothesis**

Using the Procedure and Data Collection section of the scientific investigation, read through the procedural information for this scientific investigation. Based on your understanding of the procedure, develop your own hypotheses which describe your expected results. What do you think the relationship between acceleration and force and the relationship between acceleration and mass will be? Record your hypotheses below:

**Data**

Using the tables below, record your data from this scientific investigation.

**Effect of Force on Acceleration**

|  |  |  |
| --- | --- | --- |
| **Applied Force** | **Cabinet Mass** | **Acceleration (m/s2)** |
| 100.0 N | 200.0 kg |  |
| 200.0 N | 200.0 kg |  |
| 400.0 N | 200.0 kg |  |

Notes:

**Effect of Mass on Acceleration**

|  |  |  |  |
| --- | --- | --- | --- |
| **Applied Force** | **Object** | **Mass (kg)** | **Acceleration (m/s2)** |
| 200.0 N | File Cabinet |  |  |
| 200.0 N | Refrigerator |  |  |
| 200.0 N | Crate |  |  |
| 200.0 N | Sleepy Dog |  |  |

Notes:

**Data Analysis**

Once you have completed the Procedure and Data portions of the scientific investigation, provide responses to the following questions:

**Effect of Force on Acceleration**

1. What happens to the acceleration when you double the force on the cabinet from 100 to 200 Newtons?
2. What happens to the acceleration when you quadruple the force on the cabinet from 100 to 400 Newtons?
3. What is the relationship between force and acceleration?

**Effect of Mass on Acceleration**

1. Compare the acceleration of the file cabinet and the refrigerator, which has two times the file cabinet’s mass, by completing the following sentence: The acceleration of the file cabinet is \_\_\_\_\_\_\_ times [greater/less] \_\_\_\_\_\_\_ than the acceleration of the refrigerator.
2. Compare the acceleration of the sleepy dog and the crate, which has twelve times the sleepy dog’s mass, by completing the following sentence: The acceleration of the sleepy dog is \_\_\_\_\_\_\_ times [greater/less] \_\_\_\_\_\_\_ than the acceleration of the crate.
3. What is the relationship between mass and acceleration?

**Conclusion**

Compose three to four sentences describing an overall conclusion about the relationship between acceleration and force and the relationship between acceleration and mass, based on your data. Were your hypotheses true or false, and how do you know? Refer to your data and notes to include information you gained from data analysis and to support your conclusion.

**Experimental Sources of Error**

Provide responses to the following questions: Are there any sources of error? If so, what are they, and what could be done to minimize error?