**Title: Investigating the Factors Affecting Stopping Distance in Vehicles**

**Objective:** To explore and analyze the factors that affect the stopping distance of vehicles.

**Materials:**

1. Toy cars (with similar design and mass)
2. Smooth, flat surface (e.g., hallway or gymnasium)
3. Meterstick or measuring tape
4. Stopwatch or timer
5. Surface with different textures (e.g., sandpaper, carpet, smooth tile)

**Variables:**

1. Independent Variable: Surface texture (smooth, rough)
2. Dependent Variable: Stopping distance of the toy car
3. Controlled Variables: Mass of the toy cars, initial velocity, angle of the surface, and force applied.

**Procedure:**

1. **Preparation:**
   * Ensure the toy cars have similar designs and masses.
   * Set up a smooth, flat surface for the experiment (e.g., hallway or gymnasium).
   * Place the meterstick or measuring tape along the surface to measure distances.
2. **Baseline Measurement:**
   * Place the toy car at the starting point on the smooth surface.
   * Release the car from rest and measure the stopping distance using the meterstick or measuring tape.
   * Repeat this process multiple times and calculate the average stopping distance.
3. **Surface Texture Experiment:**
   * Change the surface to a rough texture (e.g., sandpaper).
   * Repeat the experiment by releasing the toy car from rest on the rough surface.
   * Measure and record the stopping distance.
   * Repeat this process multiple times and calculate the average stopping distance.
4. **Analysis:**
   * Compare the stopping distances on the smooth and rough surfaces.
   * Discuss the impact of surface texture on the stopping distance of the toy car.
   * Consider factors such as friction and traction in your analysis.
5. **Extension:**
   * If time permits, students can explore the effect of other variables like initial velocity or angle of the surface.
   * Students can also research and discuss how real vehicles' stopping distances are affected by factors such as road conditions, tire quality, and vehicle speed.
6. **Conclusion:**
   * Summarize the findings and draw conclusions about the factors that influence stopping distance in vehicles.
   * Discuss the real-world implications of the experiment and how these factors relate to vehicle safety.

**Safety Considerations:**

* Ensure the experiment is conducted in a safe environment.
* Avoid using heavy or fast-moving objects to minimize the risk of injury.
* Supervise students during the experiment.