

Activity Lab



A Day at the Races

0507.11.1 Predict how the amount of mass affects the distance traveled given the same amount of applied force.

Each group needs the following supplies:

- A piece of plywood (approx. 3 ft. x 1 ft.) or other sturdy flat material to make an inclined plane track
- Four to five books to stack on one end of the track
- One small toy car
- Pennies, washers or other weights
- Tape
- Sandpaper
- Bubble Wrap
- Wax paper
- Stop watch or watch with a second hand
- Meter stick or yardstick

In your Science journal, write down the steps in the Scientific Method and record this experiment.

Experiment:

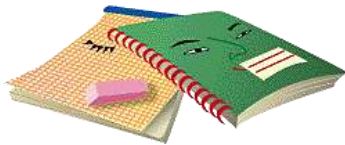
- 1) Create the inclined plane track by putting one end of the plywood on one of the books.
- 2) Release the toy car from the top of the track and time it until it stops. Measure the distance it traveled with the meter stick and record the time and distance in your Science journal.
- 3) Add another book and release the car again. Record the time and distance.
- 4) Add another book and release the car again. Record the time and distance. Continue until all the books have been added and the data recorded.
- 5) Decide at which height the car traveled the farthest. Draw a picture in your Science journal of the ramp.

- 6) Tape three pennies or washers to the top of the car. Write in your journal your hypothesis of whether the added weight will make the car faster or slower. Roll the car down the ramp and record the time and distance. You may want to try it two or three times and take an average. Record this in your journal.

7) Now tape the wax paper to your track. Roll the car and record the time and distance. You may want to try it two or three times and take an average. Record this in your journal.

8) Now take off the wax paper and tape the bubble wrap to the track. Roll the car and record the time and distance. You may want to try it two or three times and take an average. Record this in your journal.

9) Finally, take off the bubble wrap and tape the sand paper to the track. Roll the car and record the time and distance. You may want to try it two or three times and take an average. Record this in your journal.



In your journal, answer these questions:

- **Which surface caused the car to go faster?**
- **Which surface caused the car to go slower?**
- **Which of the four surfaces (wood, wax paper, bubble wrap, or sand paper) caused the MOST friction?**
- **What did you learn about mass (added to the car) and distance traveled?**
- **What force was at work to cause the car to go down the ramp? What force was at work to slow the car down?**

Additional Experiment:

Set up the track as above. Put an object at the bottom of the track, such as a ball. Release the car down the track and let it hit the ball. Record the distance the ball travels. Then add weight to the car (tape on the pennies or washers) and release it again. Record the distance the ball travels. What is the relationship between the distance traveled by the ball and the mass of the car?