

Just Rolling Along



QUESTION: What factors affect how far a marble will roll?

MATERIALS:

3" x 5" index cards
marble
masking tape

metric tape measure (or meter stick)
metric ruler (*with a groove down the center*)
modeling clay

PROCEDURE:

1. Divide the modeling clay into two clumps, one larger than the other. The clumps of clay will prop the ruler to make a ramp for your marble to roll down.
2. Place one of the pieces of clay on one of the index cards and the other on the other index card. Place the cards and clay on a non-carpeted surface.
3. Place one end of the ruler on the larger clump of clay so that the high end of the ramp is at a height of 15 cm. The other end of the ramp (ruler) should be positioned on the smaller clump of clay so that the low end of the ramp is on the surface. Be sure this surface is level. Mark the base of the ramp with a piece of masking tape to assure that the position of the base remains constant throughout the trials.
4. Roll the marble down the ramp and measure the point at which the marble comes to rest. Make sure that you release the marble from the identical position each time, and make sure that the distance the marble rolls is measured from the end of the ramp. Record the distance in the Data table.
5. Repeat step 4 two more times, recording the distance each time.
6. Lower the height of the ramp to 10 cm. Repeat steps 3, 4, and 5.
7. Lower the height of the ramp to 5 cm. Repeat steps 3, 4 and 5.
8. Repeat steps 3 - 7 on two additional surfaces, such as a carpeted floor, tile floor, concrete, gymnasium floor, or other surface.

DATA: See next page

QUESTIONS:

1. What force or forces caused the motion of the marble?
2. In this experiment, how did you increase the force acting on the marble?
3. What force or forces caused the motion of the marble to change once it reached the bottom of the ramp?
4. What kind of energy does the marble have at the top of the ramp?
5. At what point has all of the potential energy of the marble converted to kinetic energy?

PS – Activity #20

6. In which trial did the marble roll the greatest distance? Why?
7. In which trial did the marble roll the least distance? Why?

Data Table

SURFACE	RAMP HEIGHT	DISTANCE TRIAL 1 (cm)	DISTANCE TRIAL 2 (cm)	DISTANCE TRIAL 3 (cm)	AVERAGE DISTANCE (cm)
Surface 1	15 cm				
Surface 1	10 cm				
Surface 1	5 cm				
Surface 2	15 cm				
Surface 2	10 cm				
Surface 2	5 cm				
Surface 3	15 cm				
Surface 3	10 cm				
Surface 3	5 cm				