

Physics Lab: Energy Transfer in Motion

Grade Level: 8th Grade

Duration: 30 minutes

Objective:

Students will construct, use, and present arguments to support the claim that when the motion energy of an object changes, energy is transferred to or from the object.

Materials Needed:

- Toy car
- Ramp (books or cardboard)
- Meter stick
- Stopwatch
- Masking tape
- Paper and pencils

Safety Precautions:

- Ensure the ramp is stable and secure.
 - Clear the area to prevent tripping or collisions.
 - Follow all school safety policies.
-

Lab Procedure:

1. **Setup:**
 - Use books or cardboard to create a ramp. Secure it with masking tape.
 - Mark a starting line at the top of the ramp and a finish line at the bottom using masking tape.
 - Place the toy car at the starting line.
2. **Hypothesis:**
 - Predict what will happen to the car's energy as it moves down the ramp.
3. **Experiment:**
 - Release the toy car from the top of the ramp without pushing it.
 - Use the stopwatch to measure the time it takes for the car to reach the finish line.
 - Repeat the experiment three times for accuracy and record the times.
4. **Data Collection:**

- Measure the height of the ramp using the meter stick.
- Record the distance from the starting line to the finish line.
- Calculate the average time it takes for the car to travel down the ramp.

5. **Analysis:**

- Discuss how the height of the ramp affects the speed of the car.
- Explain how energy is transferred from potential to kinetic energy as the car moves down the ramp.

6. **Reflection Questions:**

- What happens to the car's energy as it moves down the ramp?
- How does the ramp's height affect the speed of the car?
- Can you think of a real-life example where energy is transferred in a similar way?

7. **Assessment:**

- Write a short paragraph explaining how energy is transferred in this experiment.
- Present your findings to the class.

Standards Addressed:

- **MS-PS3-5:** Construct, use, and present arguments to support the claim that when the motion energy of an object changes, energy is transferred to or from the object.
- **MS-PS3-1:** Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.