

**Rough Draft**  
**Force and Motion Educational CD**  
**John Merowsky**

**Explanation of Force and Motion**

<b>Narration</b>	<b>Video</b>
<p>You see motion everyday. It is all around us. From the bending of a dandelion in the wind to the high-speed travel of a roller-coaster.</p> <p>Force is related to motion. It often causes things to move. Force is a push or pull that acts on an object.</p> <p>Machines are often the source for the force needed to get things in motion. A machine is simply a device that changes the direction or the amount of force needed to do work.</p> <p>There are two types of machines. Simple machines and complex machines. Simple machines have only a few parts and help to make work easier. Examples would be a level, pulley, screw, wedge, incline plan, and wheel and axel.</p> <p>One example of a simple machine would be a lever. A level consists of a fulcrum and a flat surface. Examples of levers are see-saws, can-openers, scissors and a crowbar.</p> <p>Complex machines use two or more simple machines together. One example of a complex machine is a car. A car uses all types of simple machines as one unit.</p>	<p>Words on screen: Force and Motion            Video of dandelion and roller-coaster</p> <p>Video of apple dropping</p> <p>Video of machine</p> <p>Video of simple machines</p> <p>Diagram of lever</p> <p>Video of examples of levers</p> <p>Video of car. Show examples of lever, pulley, screws, wedge, incline plane and wheel and axel on the car.</p>

**Friction Experiment**

<b>Narration</b>	<b>Video</b>
<p>It's time to see how motion is affected by different forces. One of those forces is friction. Friction is the force that results when two materials rub against each other. Friction slows down the motion of an object or prevents it from moving.</p> <p>You have probably experienced friction. You know how easy it is to slide across a smooth floor in your</p>	<p>Words on screen: Friction</p> <p>Video of sliding in socks and shoes on hard-wood floor</p>

<p>socks. And it become impossible once you put on shoes.</p> <p>In this experiment, we will try to determine how friction can affect the motion of an object. We will also try to understand which surfaces help with movement and how other surfaces make it more difficult.</p> <p>For this experiment, we will require several different shoes, a laptop computer, a temperature probe and the software program, "Go! Motion"</p> <p>Once we have all these items, we will start the experiment by rubbing the soles of the shoes with the temperature probe to measure the amount of heat created. Different shoes produce different levels of heat and friction. Can you guess which shoes will generate the most friction?</p> <p>If you guessed the ballet shoe and the bowling shoe, you were right. Based on the results, why did some shoes generate more friction than others?</p> <p>Try this experiment on your own. Rub your hands together. If you change the motion of your hands, you are creating different pushing and pulling motions.</p>	<p>Video of elements needed for experiment</p> <p>Video of showing the temperature probe being rubbed across the soles of the shoes. Video of computer screen showing heat readings of each shoe.</p> <p>Video of ballet and bowling shoes. Video of line graph with heat results.</p> <p>Video of rubbing of hands together</p>
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### **Pine Wood Derby Experiment**

<b>Narration</b>	<b>Video</b>
<p>Now it's time to see force and motion in action through an experiment using both simple and complex machines. By using pine wood derby racing cars, you can see different factors can change the motion of an object.</p> <p>Here student begin the process by designing their pine wood derby racecars with the idea of creating the fastest car. The cars are cut and assembled according to the plans laid out by the students. Of course, there's time to paint and decorate their cars. After the design and assembly is done, the real fun</p>	<p>Video of students drawing out plans for cars. Video of high school students cutting the cars in shop class. Video of students painting and decorating cars.</p>

begins. Racing!

Once racing begins, students measure and record times and start to piece together why some cars have higher speeds than others.

You can see now how force and motion occur in our lives. Think about how force and motion are present in your lives. From the car you travel in everyday to the sports you play on the playground. Force and motion exist and play big roles in our lives everyday.

Video of students racing cars.  
Video of students recording speed and times.

Video of different objects moving from cars, to roller coasters to baseballs on a playground.