



# IQWST






**Why Do Some Things Stop While Others Keep Going?**

IQWST Standard Edition

Materials Chart – Planning Document

## Why Do Some Things Stop While Others Keep Going? – IQWST Standard Edition





Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>1.1</u>	<ul style="list-style-type: none"> <li>(1) radiometer</li> <li>(1) flashlight</li> <li>(*) Video 1.1: Isaac Newton vs. Rube Goldberg</li> <li>(*) PI: Newton vs. Goldberg Video Events</li> <li>Activity Sheet 1.1</li> </ul>		
<b>TIPS!</b> <ul style="list-style-type: none"> <li>(1.1) Projected Images (PI's) for this unit can be found on the IQWST Teacher Portal. Once logged in, navigate to Physical Science 2 – Why Do Some Things Stop While Others Keep Going? &gt; PS2 – Projected Images</li> <li>(1.1) Find videos for this unit by logging into the IQWST Teacher Portal. Once logged in, navigate to Physical Science 2 – Why Do Some Things Stop While Others Keep Going? &gt; PS2 – Lesson 1 - Videos</li> </ul>			
<u>1.2</u>	<ul style="list-style-type: none"> <li>Stations 1 &amp; 2: (1) rolling can per station + station instruction card</li> <li>Stations 3 &amp; 4: (3) pendulums per station: Simple (#1), Jupiter with non-working battery (#2), Jupiter with working battery (#3) + station instruction card</li> <li>Stations 5 &amp; 6: (2) tops per station: regular top (#1), “Secret” top (#2) + station instruction card</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 1.2</li> <li>Reading 1.1</li> <li>Sticky notes</li> </ul>
<b>TIPS!</b> <ul style="list-style-type: none"> <li>(1.2) To prepare the “Surprising Devices”, refer to the preparation section of this lesson.</li> </ul>			



Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>2.1</u>	<ul style="list-style-type: none"> <li>(1) Secret top (magnetic) and (1) Jupiter pendulum (with battery)</li> <li> Video 2.1: Objects in Motion</li> <li> PI: Energy Chart</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 2.1</li> <li>Homework 2.1</li> <li>Reading 2.1</li> </ul>
<b>TIPS!</b> <ul style="list-style-type: none"> <li>(2.1) Find videos for this unit by logging into the IQWST Teacher Portal. Once logged in, navigate to Physical Science 2 – Why Do Some Things Stop While Others Keep Going? &gt; PS2 – Lesson 1 - Videos</li> </ul>			
<u>2.2</u>	<ul style="list-style-type: none"> <li>(1) toothpick or similar device</li> <li>(1) small can</li> <li>(1) larger can</li> <li>(2) balls of clay</li> <li>(1) 30cm ruler</li> <li> PI: Kinetic Energy Activity</li> </ul>	<ul style="list-style-type: none"> <li>(1) toothpick or similar device</li> <li>(1) small can</li> <li>(1) larger can</li> <li>(2) balls of clay</li> <li>(1) ruler</li> </ul>	<ul style="list-style-type: none"> <li>Activity Sheet 2.2</li> </ul>
<u>2.3</u>	<ul style="list-style-type: none"> <li> Video 2.2: Energy Cart</li> <li> Video 1.1: Isaac Newton vs. Rube Goldberg</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 2.3</li> </ul>


- Items with a (\*) are not included in your kit

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Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>3.1</u>	<ul style="list-style-type: none"> <li>(1) simple pendulum (from Lesson 1)</li> <li>(1) Jupiter pendulum with connected battery (from Lesson 1)</li> <li> Video 1.1: Isaac Newton vs. Rube Goldberg</li> </ul>	<ul style="list-style-type: none"> <li>(2) small OR (2) large cans (vary among groups)</li> <li>(2) clay balls</li> <li>(15) toothpicks or skewers</li> <li>(1) 30cm ruler</li> <li>(*)(3) fine-point markers of different colors</li> <li>(*)(1) calculator</li> </ul>	<ul style="list-style-type: none"> <li>Activity Sheet 3.1</li> <li>Homework 3.1</li> <li>Reading 3.1</li> </ul>
<b>TIPS!</b> - (3.1) Items needed that aren't in your kit: fine point markers of different colors, calculators			
<u>3.2</u>	<ul style="list-style-type: none"> <li> PI: Falling Object</li> <li> PI: Bar Charts</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 3.2</li> <li>Homework 3.2</li> </ul>
<u>3.3</u>	For the Teacher <ul style="list-style-type: none"> <li> PI: Energy Conversion Diagram</li> </ul> For the Class <ul style="list-style-type: none"> <li>(1) simple pendulum (from Lesson 1)</li> <li>(1) Jupiter pendulum (with working battery)</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 3.3</li> </ul>


Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>Intro</u>	<ul style="list-style-type: none"> <li>(1) rubber band (for Teacher demo)</li> </ul>	<ul style="list-style-type: none"> <li>(1) rolling can (from Lesson 1)</li> </ul>	
<u>4.1</u>	<ul style="list-style-type: none"> <li>Racquetballs (more than one)</li> <li> PI: Final Energy Conversion</li> <li> The following 3 videos (from the Portal);               <ul style="list-style-type: none"> <li>- Video 4.1: Basketball Bounce</li> <li>- Video 4.2: Soccer Ball Kick</li> <li>- Video 4.3: Inverted Racquetball Bounce</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 4.1</li> <li>Reading 4.1</li> <li>Homework 4.1</li> </ul>
<b>TIPS!</b> - (4.1) Find videos for this unit by logging into the IQWST Teacher Portal. Once logged in, navigate to Physical Science 2 – Why Do Some Things Stop While Others Keep Going? > PS2 – Lesson 1 – Videos			

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Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>4.2</u>	<ul style="list-style-type: none"> <li>Use as many of these items as possible:               <ul style="list-style-type: none"> <li>- rubber bands</li> <li>- (*)springs</li> <li>- racquetballs</li> <li>- inverted half-balls</li> <li>- (*) guitar or other string instrument</li> <li>- (*) hairclip</li> <li>- snakes-in-a-can</li> <li>- (*) coiled spring toy</li> <li>- (*) toaster</li> <li>- mouse trap</li> <li>- marbles</li> <li>- (*) tennis shoe</li> <li>- (*) pop can</li> <li>- (*) modeling clay</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 4.2</li> </ul>
<b>TIPS!</b> - (4.2) Optional Items: springs, guitar or other stringed instrument, coiled spring toy, toaster, tennis show, pop can			
<u>4.3</u>	<ul style="list-style-type: none"> <li>(2) 12-inch rulers</li> <li>(*)(2) crumpled paper balls</li> </ul>		


Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>Intro</u>	<ul style="list-style-type: none"> <li> PI: Final Energy Conversion</li> </ul>		
<u>5.1</u>	<ul style="list-style-type: none"> <li> Video 5.1: Bouncing Ball</li> <li>(1) racquetball</li> <li> Video 5.2: Billiards</li> <li> Simulation of a Bouncing Ball</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 5.1</li> <li>Reading 5.1</li> </ul>
<u>5.2</u>	<ul style="list-style-type: none"> <li>(1) basketball</li> <li>(1) racquetball</li> <li>(1) meterstick</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 5.2</li> </ul>
<u>5.3</u>		<ul style="list-style-type: none"> <li>Simple pendulum (from Lesson 1)</li> <li>(1) meterstick</li> <li>(*)(1) piece of poster paper to tape on the wall</li> </ul>	<ul style="list-style-type: none"> <li>Activity Sheet 5.3</li> </ul>
<b>TIPS!</b> - (5.3) Items needed that aren't in your kit: piece of poster paper to tape on the wall			
<u>5.4</u>	<ul style="list-style-type: none"> <li> Video 1.1: Isaac Newton vs. Rube Goldberg</li> <li> PI: Newton vs Goldberg Systems</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 5.4</li> </ul>

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Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>6.1</u>	<ul style="list-style-type: none"> <li>(2) steel balls</li> <li>(2) metersticks</li> <li>(*)(1) sheet of paper</li> <li>() Video 6.1: Colliding Balls</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 6.1</li> <li>Homework 6.1</li> <li>Reading 6.1</li> </ul>
<b>TIPS!</b> - (6.1) Items needed that aren't in your kit: sheets of paper			
<u>6.2</u>	<ul style="list-style-type: none"> <li>() Video 6.2: Molecular Motion in a Hot and Cold Solid</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 6.2</li> </ul>
<u>6.3</u>	<ul style="list-style-type: none"> <li>() Video 6.3: Molecular Motion in a Hot and Cold Liquid</li> <li>() Video 6.4: Molecular Motion in a Hot and Cold Gas</li> </ul>	<ul style="list-style-type: none"> <li>() (2) 150mL beakers</li> <li>(*) water (very hot and very cold – no ice)</li> <li>Food coloring (liquid)</li> <li>() (1) plastic pipette</li> <li>() (1) thermometer</li> </ul>	<ul style="list-style-type: none"> <li>Activity Sheet 6.3</li> </ul>
<u>6.4</u>	<ul style="list-style-type: none"> <li>() PI: Thermal Energy</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 6.4</li> </ul>

Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>7.1</u>	For the Teacher <ul style="list-style-type: none"> <li>() PI: Rolling Can</li> <li>(1) petri dish, half-filled with water</li> <li>(1) tuning fork</li> </ul> For the Class <ul style="list-style-type: none"> <li>(1) guitar or other string instrument (optional) OR a metal can with a rubber band stretched around its open side</li> <li>(1) ticking clock</li> <li>(1) meterstick</li> <li>(1) rolling can (from Lesson 4)</li> <li>Racquetballs</li> <li>(*)(1) drum (optional)</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 7.1</li> <li>Reading 7.1</li> </ul>
<b>TIPS!</b> - (7.1) Items needed that aren't in you kit: water, drum (optional), guitar or other stringed instrument (optional)			
<u>7.2</u>	<ul style="list-style-type: none"> <li>Transparent/translucent materials</li> </ul>	<ul style="list-style-type: none"> <li>(1) flashlight</li> <li>(*)(1) light sensor</li> <li>Tape (to secure lab setup)</li> <li>(*)(1) book (or other object to elevate the flashlight and sensor above the tabletop)</li> </ul>	<ul style="list-style-type: none"> <li>Activity Sheet 7.2</li> <li>Homework 7.2</li> </ul>
<u>7.3</u>	<ul style="list-style-type: none"> <li>(*)(1) projector</li> <li>() PI: Consensus Model</li> </ul>		<ul style="list-style-type: none"> <li>Activity Sheet 7.3</li> <li>Reading 7.3</li> <li>Homework 7.3</li> </ul>




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Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>Intro</u>	<ul style="list-style-type: none"> <li>• (📖) PI: Engine</li> <li>• (📖) PI: Exercise</li> <li>• (📖) PI: Watch</li> </ul>		
<u>8.1</u>	<ul style="list-style-type: none"> <li>• (📖)(1) electronic scale (or *triple beam balance)</li> </ul>	<ul style="list-style-type: none"> <li>• (⚙️) 5g cupric chloride dissolved in 50mL water in a 150mL beaker</li> <li>• 0.5g aluminum foil</li> <li>• (⚙️) (1) thermometer (*or temperature probe)</li> <li>• (⚙️)(1) stirring rod</li> </ul>	<ul style="list-style-type: none"> <li>• Activity Sheet 8.1</li> </ul>
<b>TIPS!</b> - (8.1) Items needed that aren't in your kit: water			
<u>8.2</u>	<ul style="list-style-type: none"> <li>• (*) (1) kitchen lighter</li> </ul>	<ul style="list-style-type: none"> <li>• (1) paper or plastic cup with four rectangular windows (5cm long and 1cm wide) cut in the same direction on the outside of the cup and a small pinhole on the center of the bottom (These should be prepared first.)</li> <li>• (1) piece of string, approximately 22cm long</li> <li>• (⚙️)(1) ring stand with ring support</li> <li>• (1) tea light</li> </ul>	<ul style="list-style-type: none"> <li>• Activity Sheet 8.2</li> </ul>
<u>8.3</u>	<ul style="list-style-type: none"> <li>• (⚙️)(1) electronic scale (*or triple beam balance)</li> </ul>	<ul style="list-style-type: none"> <li>• (⚙️)(2) 150mL beakers</li> <li>• (⚙️) 10g cupric chloride dissolved in 100mL of water, distributed evenly between two beakers</li> <li>• 0.75g of aluminum foil</li> <li>• 0.5g of steel wool</li> </ul>	<ul style="list-style-type: none"> <li>• Activity Sheet 8.3</li> </ul>
<b>TIPS!</b> - (8.3) Items needed that aren't in your kit: water			
<u>8.4</u>	<ul style="list-style-type: none"> <li>• (📖) PI: Engine</li> <li>• (📖) PI: Exercise</li> <li>• (📖) PI: Watch</li> <li>• (📖) PI: Fireworks</li> </ul>		<ul style="list-style-type: none"> <li>• Activity Sheet 8.4</li> <li>• Homework 8.4</li> <li>• Reading 8.4</li> </ul>


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Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>9.1</u>	<ul style="list-style-type: none"> <li>•  PI: Electrical and Water Circuits</li> <li>• (*) (1) AA battery, cup open (Graphic provided in your kit)</li> </ul>	<ul style="list-style-type: none"> <li>• (1) AA battery</li> <li>• (1) DC motor</li> <li>• (1) battery receptacle</li> <li>• (2) connecting wires with clips (2 wires with different colors)</li> </ul>	<ul style="list-style-type: none"> <li>• Activity Sheet 9.1</li> <li>• Homework 9.1</li> </ul>
<u>9.2</u>		<ul style="list-style-type: none"> <li>• (1) DC motor</li> <li>• Connecting wires with metal clip leads</li> <li>• 50g of salt</li> <li>• (*) 400mL of warm water</li> <li>•  (1) 500mL beaker</li> <li>• (1) 30cm strip of magnesium tape (be sure students use plenty of magnesium, or else the battery may not work)</li> <li>• 2-3g of steel wool</li> </ul>	<ul style="list-style-type: none"> <li>• Activity Sheet 9.2</li> <li>• Homework 9.2</li> <li>• Reading 9.2</li> </ul>
<b>TIPS!</b> - (9.2) Items needed that aren't in your kit: water			
<u>9.3</u>	<ul style="list-style-type: none"> <li>• (1) hand-cranked electrical generator</li> <li>• (*) (1) sensor interface</li> <li>• (*) (1) voltage-current sensor</li> <li>• (1) secret top</li> <li>•  PI: Electric Generator</li> </ul>		
<b>TIPS!</b> - (9.3) If Probe Alternatives were purchased for you, the following items can be used: C04104 – Voltage Meter (1)			

Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>10.1</u>	<ul style="list-style-type: none"> <li>•  PI: Traffic Light</li> <li>•  PI: Plant</li> <li>•  PI: Camera</li> <li>•  PI: Suntan</li> <li>•  PI: Solar Cooker</li> <li>• (1) radiometer</li> <li>• (1) flashlight</li> </ul>	<ul style="list-style-type: none"> <li>• (1) guitar or other string instrument (optional) OR a metal can with a rubber band stretched around its open side</li> <li>• (1) ticking clock</li> <li>• (1) meterstick</li> </ul>	<ul style="list-style-type: none"> <li>• Activity Sheet 10.1</li> <li>• Reading 10.1</li> <li>• Homework 10.1</li> </ul>
<b>TIPS!</b> - (10.1) Items needed that aren't in your kit: guitar or other string instrument (optional)			

Lesson	For the Teacher/Class	For Each Group	For Each Student
<u>11.1</u>	<ul style="list-style-type: none"> <li>•  PI: Activity Sheet</li> </ul>		<ul style="list-style-type: none"> <li>• Activity Sheet 11.1</li> <li>• Reading 11.1</li> </ul>

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