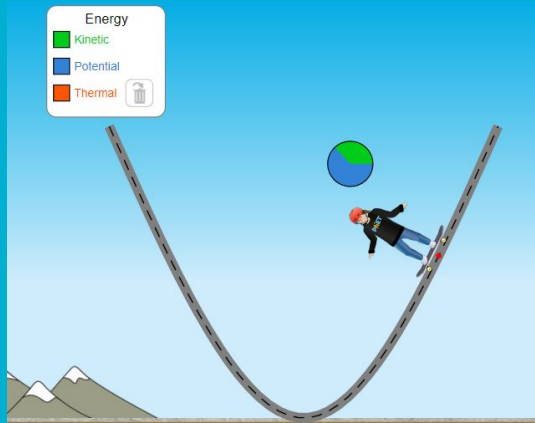
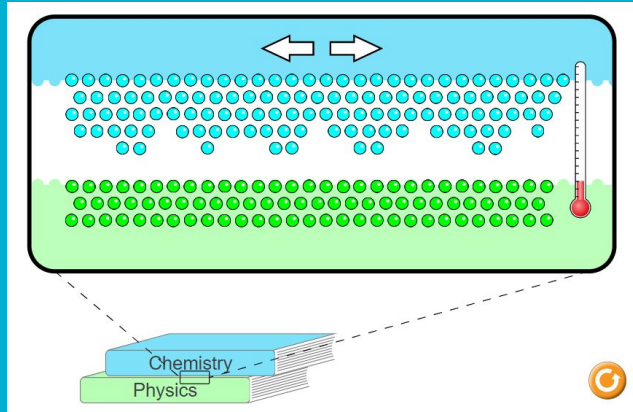


6.4 Friction



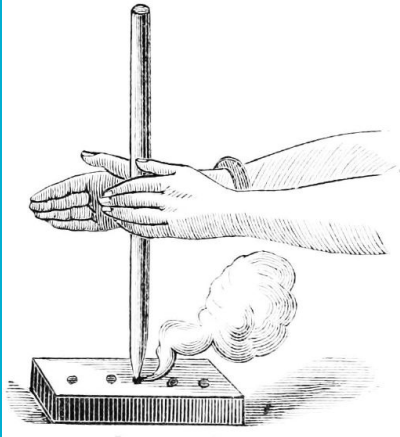
Let's look at these PhET Simulations together...



- What happens when the textbooks rub together?
- Where is the friction of the skateboarder going to be the greatest?
- How does the energy of the skater change?

FRICITION SUMMARY...

- The faster something is moving, the more friction it will create
- Kinetic energy gets converted to thermal energy
 - WORK gets converted to HEAT
- What are some real life examples you can think of?



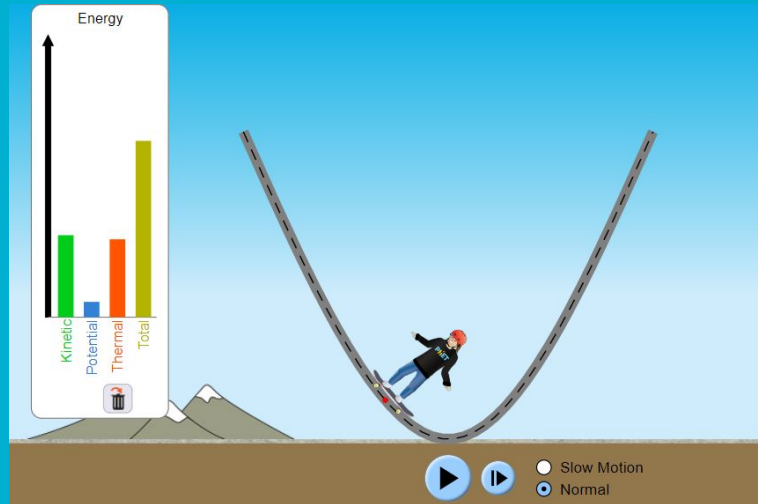
Time for a FRICTION LAB...



1. Groups of 3
2. Individual lab reports
3. What is a coefficient of friction?

6.5 Total Energy in a System

1. Open PhET Energy Skate Park : Basics
2. Answer questions 1-7 on your sheet
3. We will take up questions 8 & 9 together!



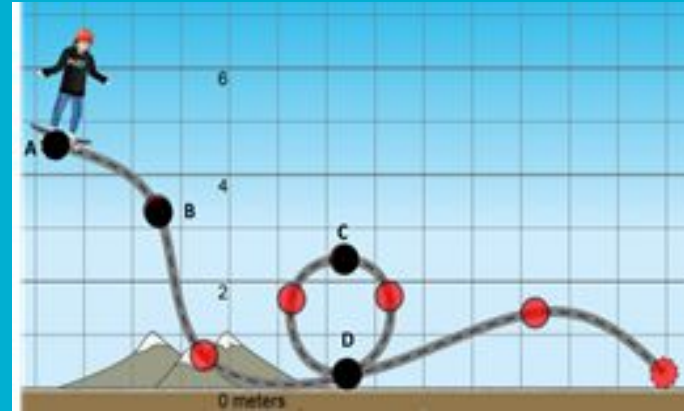
Question 8

Based on your observations of total energy at different times and positions, write an equation to show the relationship between total energy at A and C.

- At A, skater has all PE and no KE or E_{TH}
- At C, skater has some PE, some KE, and some E_{TH}

BUT, total energy is always the same!!!

$$E_{TOT A} = E_{TOT C}$$



Question 9

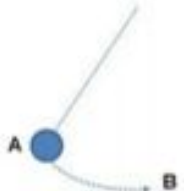

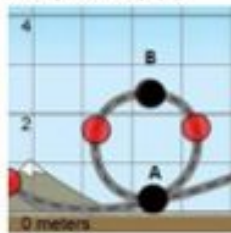
Use your observations on total energy and the different forms of energy to build a general equation for the total energy in the system.

- Total energy is just a sum of all types of energy present!
- So in this case....

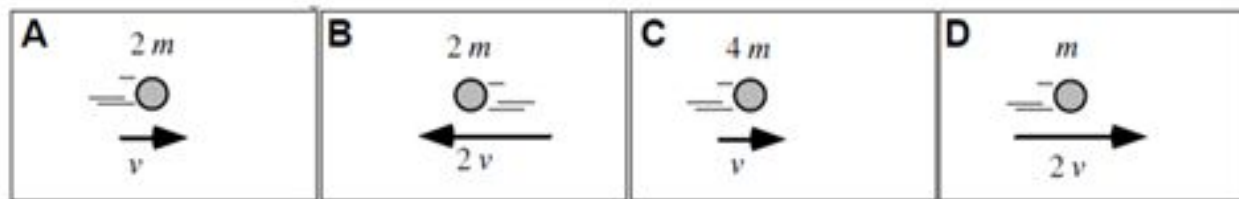
$$E_{\text{TOT}} = KE + PE + E_{\text{TH}}$$

I'm not lazy, I'm energy efficient.



System	E_{tot} at A	KE at A	PE at A	E_{th} at A	E_{tot} at B	KE at B	PE at B	E_{th} at B
 <p>Pendulum falls from its highest position (A) to its lowest position (B)</p>	16 J	0 J	16 J	0 J			0 J	2 J
<p>After being kicked, a soccer ball flies upward into the air, slowing down as it reaches its maximum height.</p> 			1.1 J	0.3 J	24 J	6.3 J		0.7 J
<p>A toy ball rolls along a track through a position at the bottom of a loop (A) to the top of a loop (B)</p> 		14.5 J	1 J	0.5 J		4.5 J		0.9 J

Critical Thinking: In the figures below, balls are travelling in different directions. The balls have the same size and shape, but they have different masses and are traveling at different velocities as shown. Rank the kinetic energy of the balls.



<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	OR	<input type="text"/>	<input type="text"/>	<input type="text"/>
1	2	3	4		All	All	Cannot
Greatest			Least		the same	zero	determine