

# Booklet # 58

“This booklet is dedicated to Irene & Sam”



**Congratulations to Irene & Sam (winners of Genius Competition) who have been accepted to the two prestigious universities. We are very proud of them.**

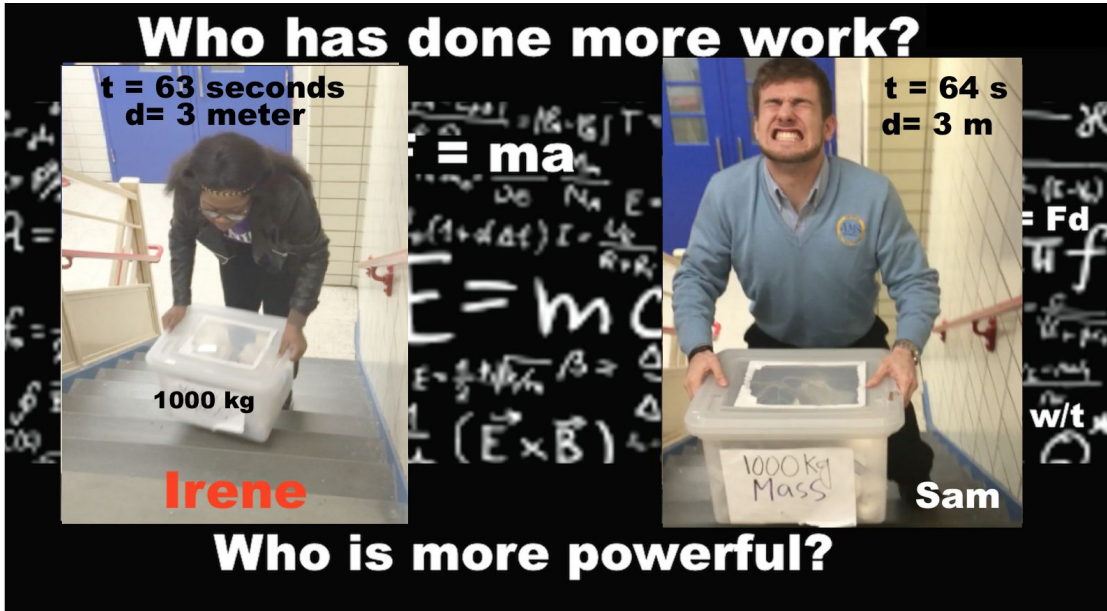
**NAME:** (I will collect the Booklet 5 minutes before the end of the period)

**1. Do Now (10 minutes)**

A 200 Hp motor lifts an elevator 17 meter in 10 seconds. Find the mass of the elevator.

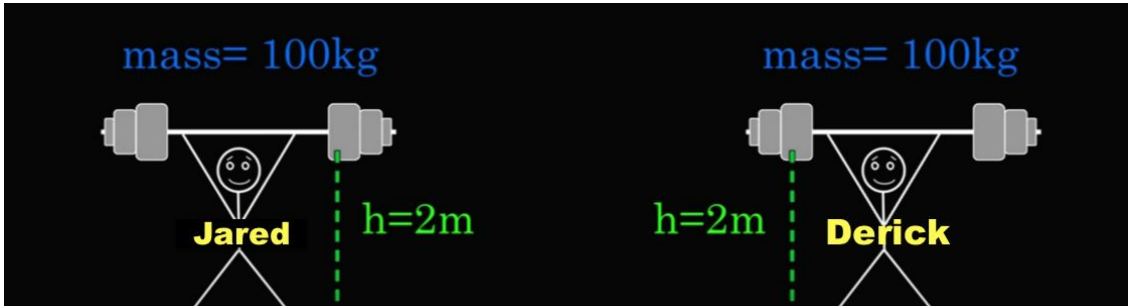
Data	Equation	Math	Answer

2 Sam took 64 seconds to lift a 1000 kg container from the second floor the 3rd floor, which is 3 meter long. Irene took 63 seconds to do the same job. Who has done more work? Who is more powerful? Explain your answer.

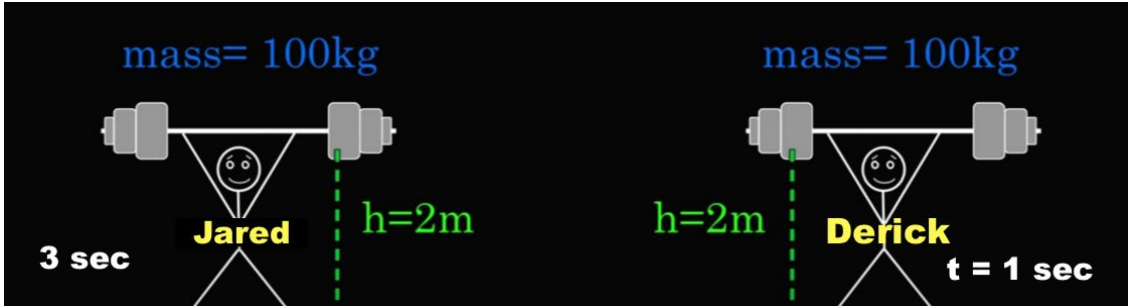


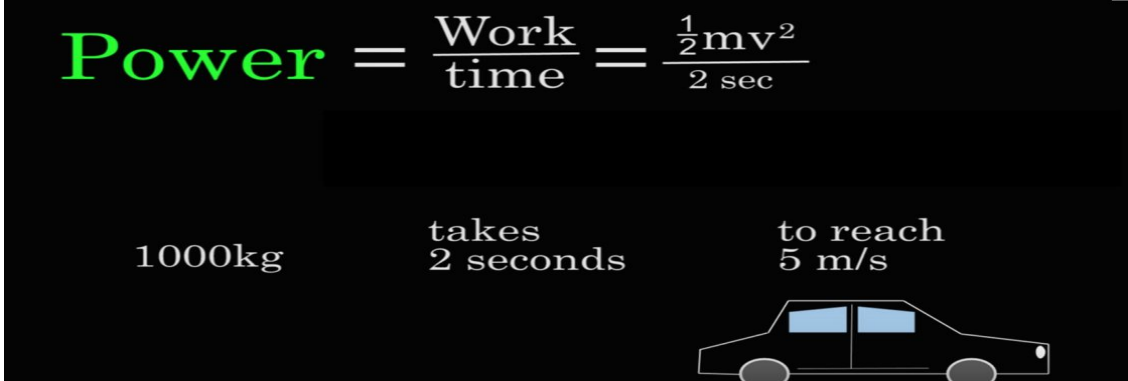
3 What is work? Write the equation for work.

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4	Two weightlifters, Jared and Derick, lifted 100 kg for the distance of 2 meters. Who has done more work? Make a hypothesis and calculate their work to support the hypothesis.
	

5	What is Power? Write the equation for Power.

6	Two weightlifters, Jared and Derick, lifted 100 kg for a distance of 2 meters. It took Jared 3 seconds to complete the job while Derick took only 1 second. Who is more powerful? Make a hypothesis and do the math to support the hypothesis.
	 <p>The diagram illustrates two weightlifters, Jared and Derick, performing the same task: lifting a 100 kg barbell to a height of 2 meters. Jared takes 3 seconds to complete the lift, while Derick takes only 1 second. The mass of the barbell is labeled as 100 kg, and the height is labeled as h=2m. The names 'Jared' and 'Derick' are written in yellow, and their respective times are '3 sec' and 't = 1 sec'.</p>

7	A 1000 kg car takes 2 seconds to reach the velocity of 5 m/s from the rest. How powerful is the engine of the car?
	 <p>The diagram shows the formula for Power: <math>Power = \frac{Work}{time} = \frac{\frac{1}{2}mv^2}{2 \text{ sec}}</math>. Below the formula, it specifies the mass of the car as 1000kg, the time taken as 2 seconds, and the final velocity as 5 m/s. A simple line drawing of a car is shown at the bottom right.</p>

8

Mr. Bari's car is 200 HP. Is the car above more powerful than Mr. Bari's Car?




**For Regents Physics Students only (Calculus based):**

9	What is the average power? What is instantaneous Power? Write the difference between average power and instantaneous power. Write the equation for instantaneous Power.

10

What is the average power of the following car. What is the instantaneous power of the following car?

instantaneous  
**Power**




$P=6250W$        $P=6250W$        $P=6250W$

**Position 1**      **Position 2**      **Position 3**

The image shows a black rectangular area containing the text 'instantaneous Power' in green. Below this, there are three car icons, each with a white outline and a blue window. Under each car icon, the text ' $P=6250W$ ' is written in white. Below each car icon, the text 'Position 1', 'Position 2', and 'Position 3' are written in white, respectively.



11	What is the average power of the following car. What is the instantaneous power of the following car? (Be careful)
	<div style="background-color: black; color: green; padding: 20px; text-align: center;"> <p>instantaneous <b>Power</b></p>  <p><b>1000 W</b>                      <b>3000 W</b>                      <b>7000 W</b></p> <p><b>Position 1</b>                      <b>Position 2</b>                      <b>Position 3</b></p> </div>

**Energy Skate Park: SIMULATION LAB (25 minutes)**

12	Takeout laptop and start working on "Energy Skate Park" Simulation
	<p>1. Name (Slow) :</p> <p>2. Name (Fast):</p> <p>When would you like to make the presentation.....</p>

## Energy Skate Park Lab

$$KE = \frac{1}{2} mv^2$$



$$PE = mgh$$

Take some time and play with the skater. Turn on the Bar Graph, Pie Chart, and Speed options.

How does increasing skater's mass change the skater's...  
 Kinetic Energy?  Potential Energy?  Total Energy?

How does the skater's kinetic energy change as he moves down the ramp?

How does the skater's kinetic energy change as he moves up the ramp?

How does the skater's potential energy change as he moves down the ramp?

How does the skater's potential energy change as he moves up the ramp?

How does the skater's total energy change as he moves down the ramp?

How does the skater's total energy change as he moves up the ramp?

Describe the skater's kinetic energy at the bottom of the ramp.

Describe the skater's potential energy at the bottom of the ramp.

What happens when the skater is dropped onto the ramp from above the ramp?



**14. Exit Ticket:**

Mr. Bari push a 60 kg shopping cart, which was at rest, with a force of 1000 N for a distance of 2.5 meters. If all this work become cart's KE, how fast does the cart end up going?

Data	Equation	Math	Answer

-----No Homework----