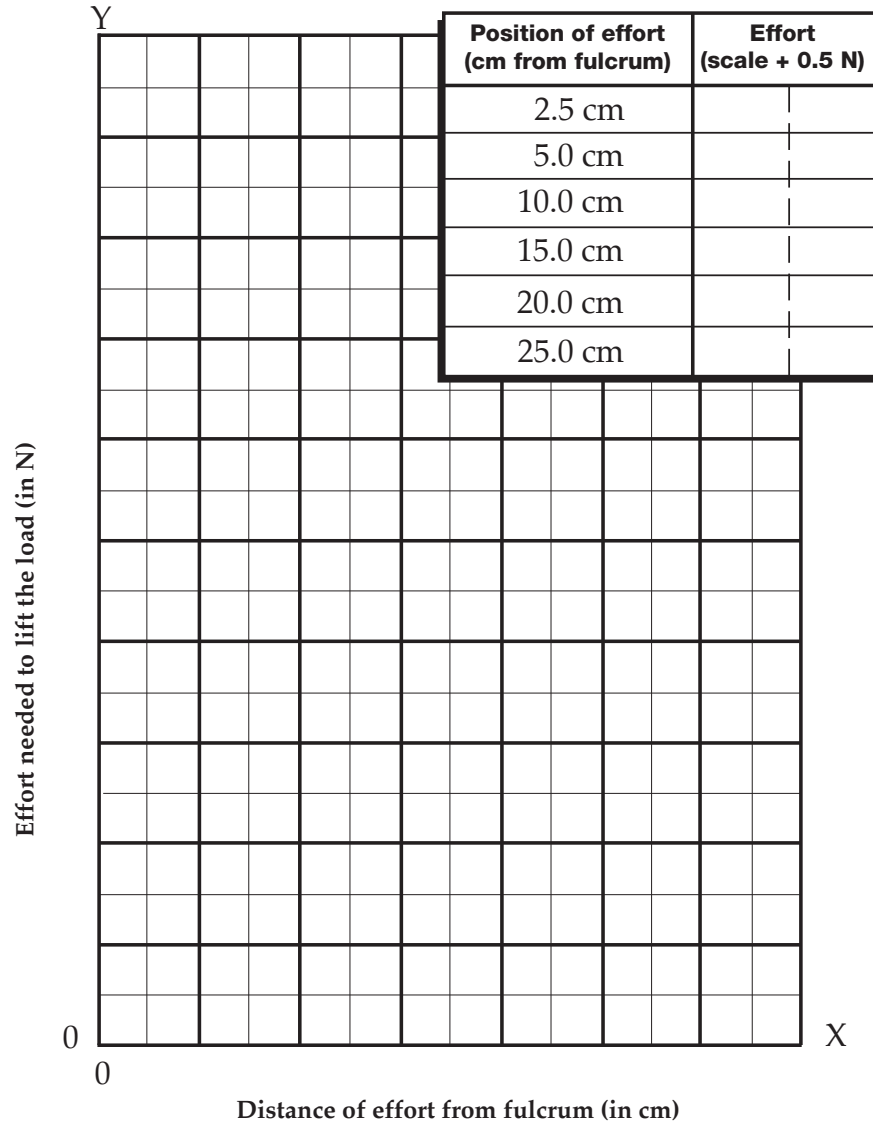


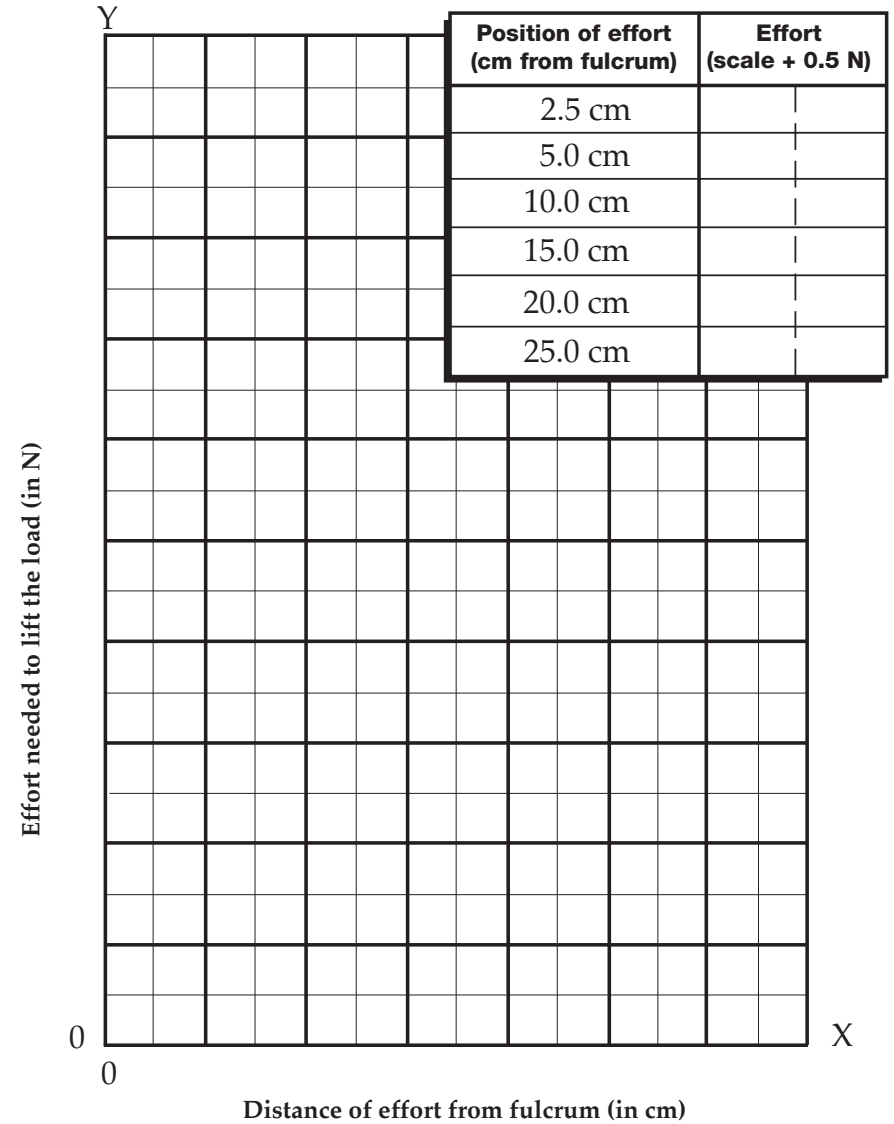
LEVER EXPERIMENT A

Lever experiment with LOAD positioned 10 cm from fulcrum



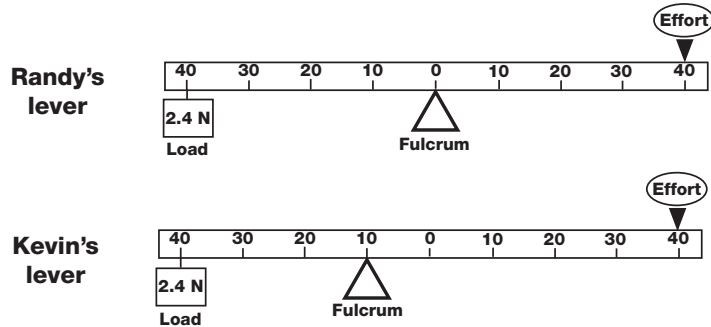
LEVER EXPERIMENT A

Lever experiment with LOAD positioned 10 cm from fulcrum



RESPONSE SHEET—LEVERS

Randy and Kevin had been working with levers for a couple of days. They were trying new ways to set up levers. They each set up a lever system. Both lever systems had the load hanging at the 40-cm position on one side, and the effort pressing at the 40-cm position on the other side.



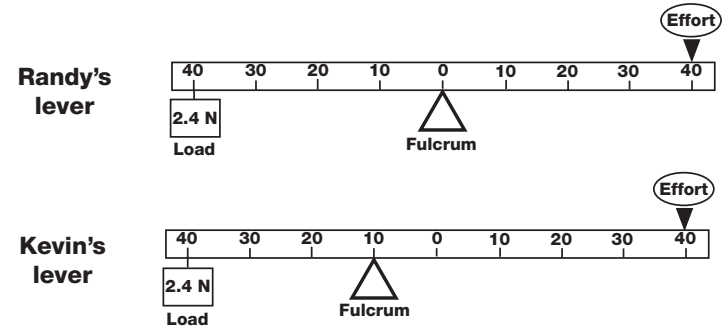
Randy said, "Our levers are the same. They will both take the same amount of effort to lift the load."

Kevin responded, "I don't think so. One of these systems will require less effort to lift the load."

Which student do you think was right? Explain why you think so.

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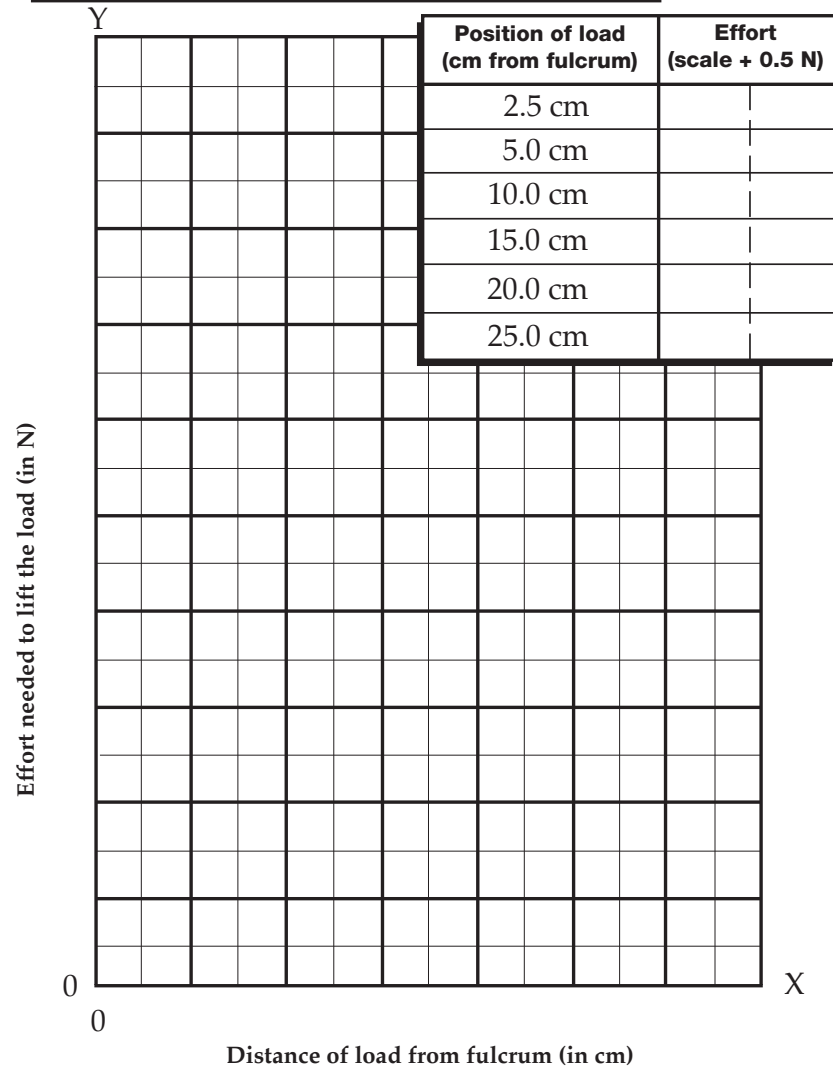
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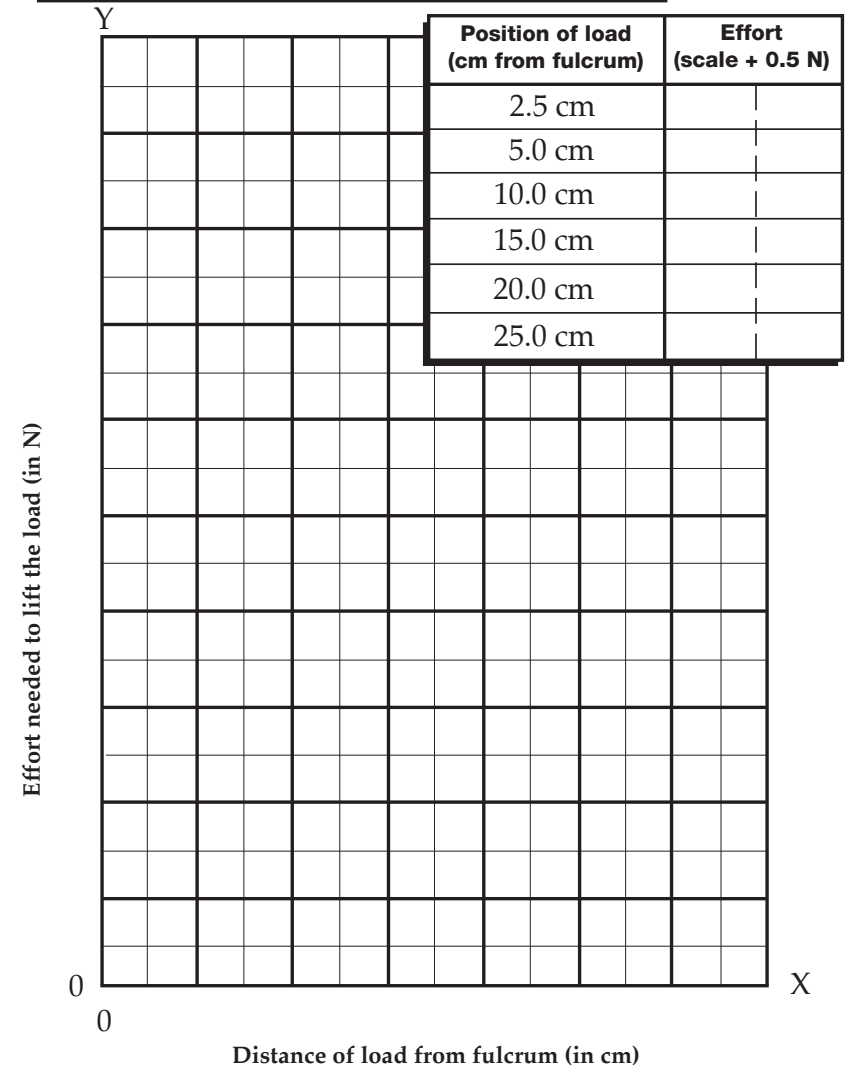
LEVER EXPERIMENT B

Lever experiment with EFFORT applied 10 cm from fulcrum.



LEVER EXPERIMENT B

Lever experiment with EFFORT applied 10 cm from fulcrum.



LEVER DIAGRAMS

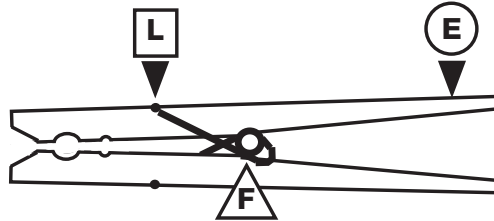
<p>①</p>	<p>②</p>
<p>③</p>	<p>④</p>
<p>⑤</p>	<p>⑥</p>
<p>⑦</p>	<p>⑧</p>

LEVER DIAGRAMS

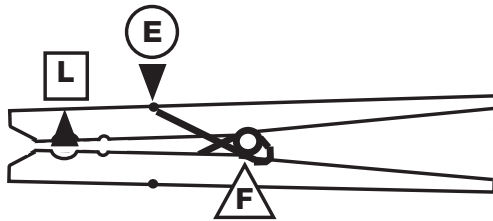
<p>①</p>	<p>②</p>
<p>③</p>	<p>④</p>
<p>⑤</p>	<p>⑥</p>
<p>⑦</p>	<p>⑧</p>

RESPONSE SHEET—MORE LEVERAGE

Millie and Jasmine were looking at a clothespin. They were pretty sure that the clothespin is a class-1 lever. They analyzed it like this.



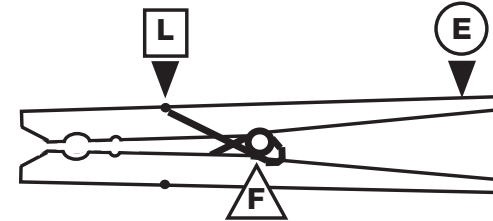
When Carrie looked at the clothespin, she said, “When you squeeze the clothespin, it is a class-1 lever, but when it is holding clothes on the line, it is a class-3 lever.” Carrie analyzed the clothespin like this.



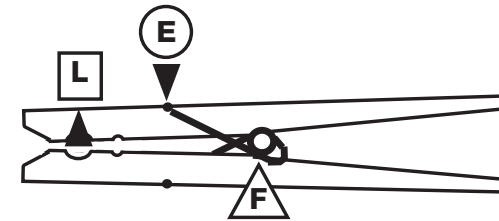
Do you agree with the girls? Why or why not? Explain your reasoning.

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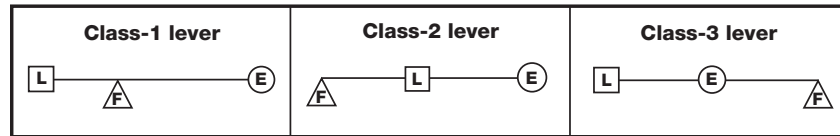


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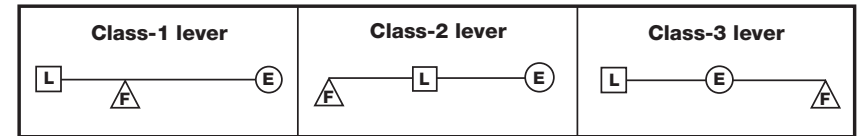
Do you agree with the girls? Why or why not? Explain your reasoning.

LEVERS AT WORK



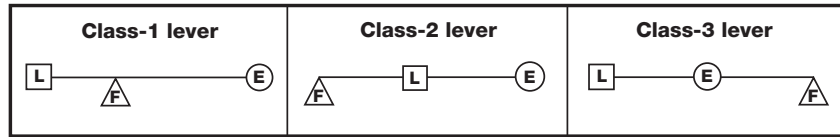
<p>1 BROOM</p> <p>This is an example of a class- ____ lever.</p>	<p>2 NUTCRACKER</p> <p>This is an example of a class- ____ lever.</p>
<p>3 SCISSORS</p> <p>This is an example of a class- ____ lever.</p>	<p>4 BOTTLE OPENER</p> <p>This is an example of a class- ____ lever.</p>
<p>5 PLIERS</p> <p>This is an example of a class- ____ lever.</p>	<p>6 TWEEZERS</p> <p>This is an example of a class- ____ lever.</p>
<p>7 HAMMER</p> <p>This is an example of a class- ____ lever.</p>	<p>8 HUMAN ARM</p> <p>This is an example of a class- ____ lever.</p>

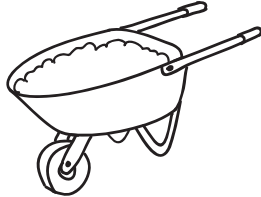
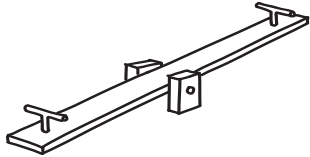
LEVERS AT WORK

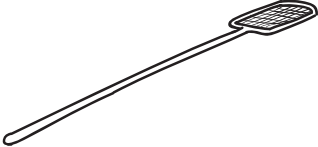



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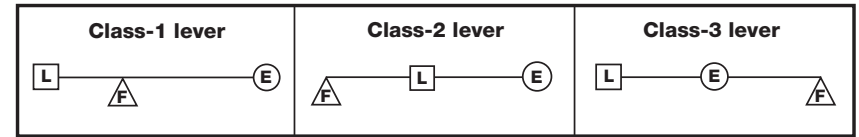
LEVER PICTURES A

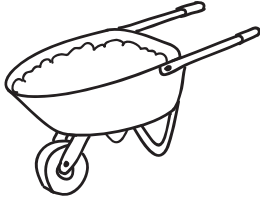
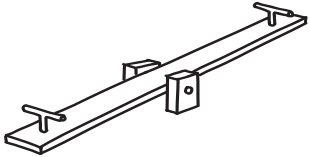


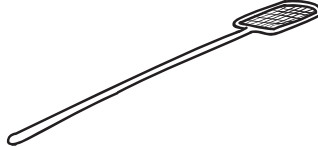

<p>WHEELBARROW</p>  <p>This is an example of a class- ____ lever.</p>	<p>TEETER-TOTTER</p>  <p>This is an example of a class- ____ lever.</p>
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<p>FLY SWATTER</p>  <p>This is an example of a class- ____ lever.</p>	<p>PAINT-CAN OPENER</p>  <p>This is an example of a class- ____ lever.</p>
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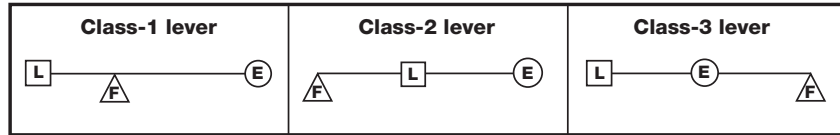
LEVER PICTURES A

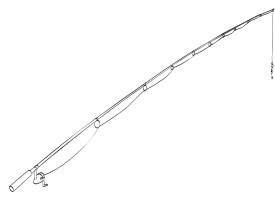
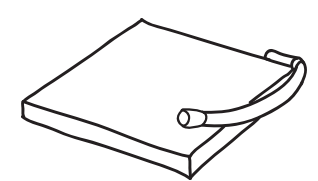
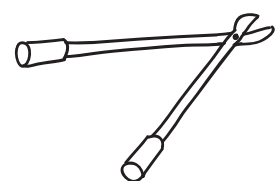
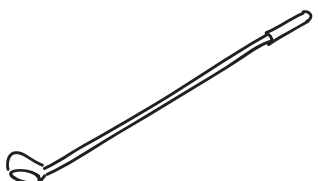


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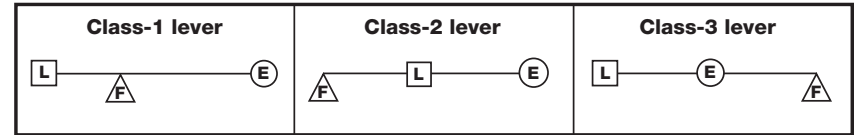
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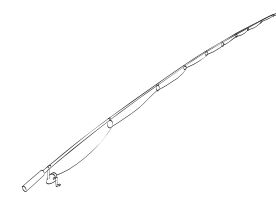
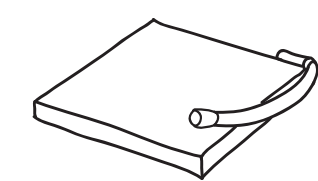
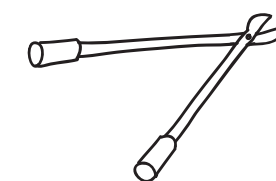
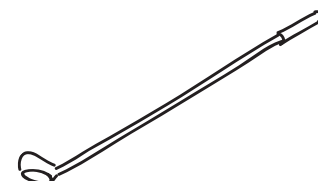
LEVER PICTURES B



<p>FISHING ROD</p>  <p>This is an example of a class- ____ lever.</p>	<p>PAPER CUTTER</p>  <p>This is an example of a class- ____ lever.</p>
<p>TREE PRUNERS</p>  <p>This is an example of a class- ____ lever.</p>	<p>GOLF CLUB</p>  <p>This is an example of a class- ____ lever.</p>

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PULLEY DIAGRAMS

Part 1. One-Pulley Systems

Pulley system	Load (N)	Direction of pull	Scale reading (N)	Effort (N)
Single-fixed				
Single-movable				

What did you learn about pulleys?

Part 2. Pulley-System Diagrams

Single-fixed	Single-movable	Single-fixed/ single-movable	Single-fixed/ single-movable

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RESPONSE SHEET—PULLEYS

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Karl told his brother Charles, “I just couldn’t lift that 30-kg bag of cement into Dad’s wheelbarrow until I got a pulley and a rope. Then it was easy.”

Charles was surprised. “You got the cement into the wheelbarrow!? How did you do it? How much easier was it?”

Explain how you think Karl lifted the cement and how much effort he had to apply.

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PULLEY DATA

Part 1					Part 2		
One- and two-pulley systems	Number of pulleys	Direction of effort	Load (N)	Effort (N)	Number of ropes lifting load	Distance effort moved	Distance load moved
Single fixed pulley							
Single movable pulley							
Single fixed / single movable pulley							
Single fixed / single movable pulley							

What relationships can you see in this chart?

What are the advantages and disadvantages of using pulleys?

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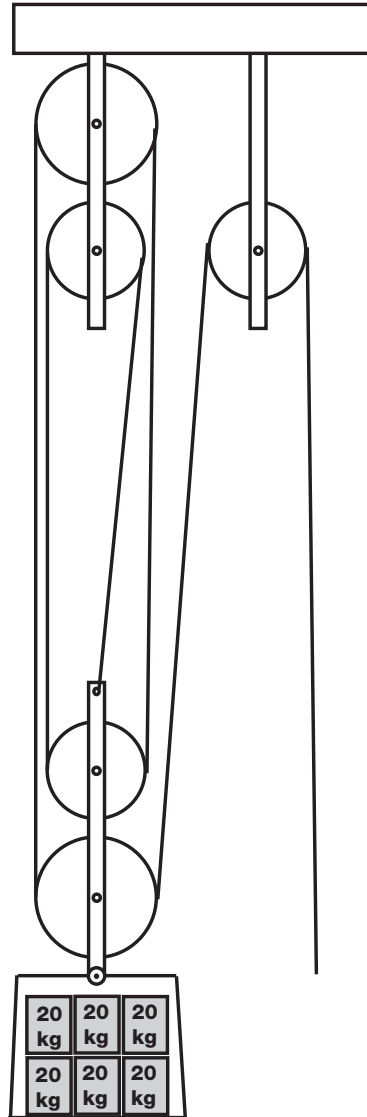
RESPONSE SHEET—PULLEYS AT WORK

Belinda and her mother cut and polish rocks to make beautiful bookends. They pack them in crates for shipment. Each crate has a mass of 20 kg. Belinda can lift only one crate of bookends at a time up to the shipping area.

Belinda decided to put together a pulley system to lift the crates up the 2 m to the shipping area. She said,

With this system I will be able to lift six crates at a time. And there is no disadvantage. Using a pulley system is just like getting something for free.

Is Belinda right about the number of crates she will be able to lift? Is her statement right that there is no disadvantage? Explain.



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