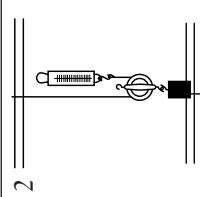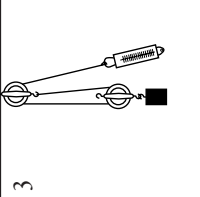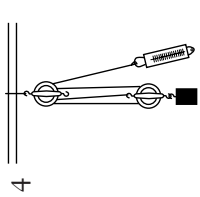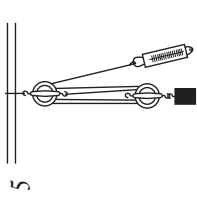**FLINN**
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Investigating Pulleys Worksheet

Data Table

Pulley Arrangement	Mass Raised (kg)	Weight (W) (Newtons)	Height (h) raised (meters)	Work Output (W·h) (Joules)	Input Force (F) (Newtons)	Distance (d) of force (meters)	Work input (F·d) (Joules)	Number of Supporting Strands	MA	Efficiency $\frac{W \cdot h}{F \cdot d}(100\%)$
1										
2										
3										
4										
5										

Investigating Pulleys Worksheet (Cont.)

Post-Lab Questions and Calculations

1. Calculate the mechanical advantage (MA) for each pulley arrangement by using Equation 5 from the *Background* section. Record the mechanical advantage in the data table.

2. Calculate the percent efficiency of each pulley arrangement by using Equation 4 from the *Background* section. Record each value in the data table.

3. Examine the percent efficiency for each pulley arrangement.

   a. Do any of the arrangements have an efficiency of 100%?

   b. What are some possible reasons that the efficiency of a pulley arrangement may be less than 100%?

4. Consider the mechanical advantage of the different pulley arrangements.

   a. What happens to the input force (F) as the mechanical advantage increases?

   b. What happens to the distance (d) the force moves as the mechanical advantage increases?

5. Both pulley arrangements 1 and 2 use a single pulley.

   a. Describe some differences between pulley arrangement 1 and arrangement 2.

   b. What is the advantage of using pulley arrangement 1?

   c. What is the advantage of using pulley arrangement 2?

   d. What is the advantage of using a combination of pulleys?

6. Remember that for an ideal pulley, the input work is equal to the output work.

   a. What would be the efficiency of an ideal pulley system?

   b. What would be the relationship between the number of supporting strands and the mechanical advantage of an ideal pulley system?

7. Consider the following statement: A machine reduces the amount of work you have to do.

   a. Is the above statement true or false?

   b. Explain your answer.