

Name: \_\_\_\_\_

## Work and Energy

Complete the following charts by filling in the blanks.

| Example  | Is Work Done? | Explanation   |
|--|---------------|---|
| 1. A crane lifts a steel beam from the ground to the second floor of a building. | Yes           | <i>The crane lifts the mass through a vertical distance in the same direction as the force that it applies.</i> |
| 2. A person carries a heavy box down a hallway from one room to another.         |               |   |
| 3. A book falls from a shelf to the floor.                                       |               |   |
| 4. A toboggan slides down a hill.  |               |   |
| 5. A weight lifter holds a 200-kg mass motionless above his head.                |               |   |

| Example   | Type of Energy Change       | Work Done by...       |
|---|-----------------------------|-----------------------|
| 1. An arrow is shot from a bow.                               | <i>Potential to kinetic</i> | <i>The bow string</i> |
| 2. A boulder falls from a cliff.                              |                             |                       |
| 3. A car comes to a stop after the driver applies the brakes. |                             |                       |

| Example  | Force (N)  | Work (J)   |
|--|--|--|
| 1. A 2.0-kg book is lifted from the floor to the desk 0.80 m from the floor.                         | $F = mg$<br>$F = (2.0 \text{ kg})(9.8 \text{ N/kg})$<br>$F = 19.6 \text{ N}$ | $W = Fd$<br>$W = (19.6 \text{ N})(0.80 \text{ m})$<br>$W = 15.7 \text{ J}$ |
| 2. A crane lifts a 4500-kg concrete pillar to a height of 44.0 m.                                    |  |  |
| 3. The brakes of a car apply a force of 15 000 N to bring the car to a stop in a distance of 80.0 m. |  |  |
| 4. A helicopter does 50 000 J of work to lift off from the ground to a height of 200 m.              |  |  |