

POGIL: Work, Power, and Kinetic Energy

Purpose

To become familiar with work, power, and kinetic energy and the relationship between each of them.

Part 1: Work and Power

Let's define two quantities, *work* and *power*, that will be useful for explaining the motion of objects. We will define work done by a force as:

work done by a force = amount of force along direction of motion $\times$ distance moved.

Using algebraic symbols, we will write this equation as:

$$W = Fd.$$

Note the following regarding the sign of the work done:

- if the force is along the direction of motion, the work done by the force is *positive*
- if the force is opposite the direction of motion, the work done by the force is *negative*
- if the force is perpendicular to the direction of motion, the force does *zero* work.

If the force is in Newtons and the distance is in meters, then the unit of work is *Joules* (abbreviated J).

Power is the rate at which work is done. We can define the average power as:

average power = work/time required to do the work.

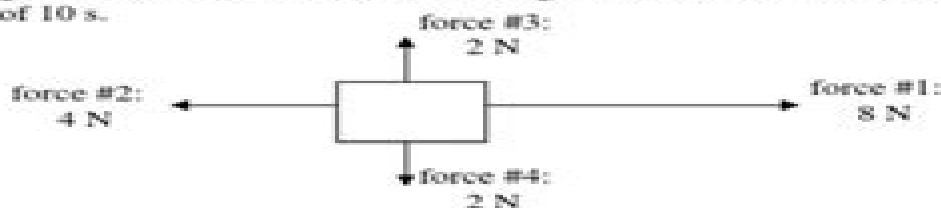
or, using algebraic symbols:

$$P = \frac{W}{t}.$$

If work is measured in Joules and the time is measured in seconds, then we can use the unit *Watts* (abbreviated W) for power.

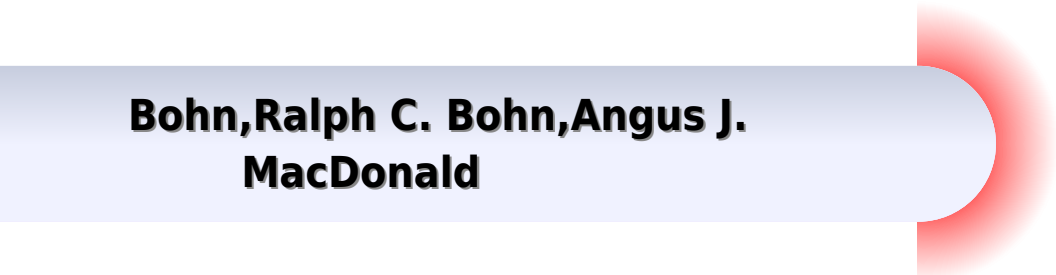
Critical Thinking Questions, part 1

1. In the diagram below, several forces are acting on the box as it moves 5 m to the right in a time of 10 s.



Work Power And Kinetic Energy Pogil

**Bohn,Ralph C. Bohn,Angus J.
MacDonald**



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Harnessing Fluid Kinetic Energy to Generate Electrical Power Jon Melvin, David Swenson, William Yurong, 2008

Power and Energy Technology Ralph C. Bohn, Angus J. MacDonald, 1991 Energy Technology Bohn, Ralph C.

Bohn, Angus J. MacDonald, 1999-01-01

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