Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block \_\_\_\_\_\_\_\_\_\_\_\_\_MATH **IN SCIENCE: PHYSICAL SCIENCE**

***Calculating Work***

**Part 1: An Equation for Work**

As you sit and read this worksheet, are you doing work? You might say, “Yes, of course.”

But are you doing work in the scientific sense? Scientists use the word *work* to describe a very specific concept. In physics, **work** is a force applied over a distance. You can calculate work with the equation below.

**EQUATION:** work = force x distance

*W* = *F*  *d*

The SI unit for work is the newton-meter (Nm), also known as a **joule ( J).**

**SAMPLE PROBLEM:** How much work is done on a 16 N sack of sand when

you lift the sack 1.5 m?

*W = Fd*

*W* = 16 N x 1.5 m

*W* = **24 J**

**Solve the following problems. Be sure to show your work.**

**1.** An empty hot-air balloon weighs a total of 8000 N. Filled with hot air, the balloon rises to a height of 1000 m. How much work is done by the hot air?

**2.** You and a friend lift a 300 N bundle of lumber 2 meters off the ground. How much work have you done?

3. A 150 N boy rides a 60 N bicycle a total of 200 m at a constant speed. The frictional force against the forward motion of the bicycle equals 35 N. How much work does the boy do? Explain your answer. (Hint: Remember that work is only done when the motion is in the same direction that the force is applied.)

4. A student lifts a 2 kg textbook 0.5 m straight up.

5. A student carries a 2 kg textbook across a 10 m long room.

Adapted from Math in Science by Holt, Rinehart and Winston