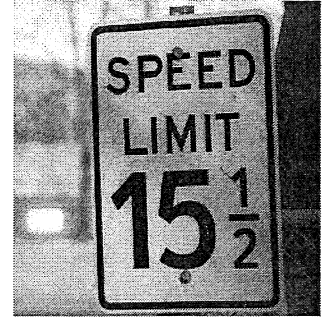# 1.4 Examining Units
A Solidify Understanding Task

(Note: This task refers to the same set of variables as used in *Serving Up Symbols*)

**Units in Addition and Subtraction**

1. Why can you add $N_e + N_s + N_b$ and you can add $B + G$, but you can't add $M + W$?

2. We measure real-world quantities in units like feet, gallons, students and miles/hour (miles per hour).

    a. What units might you use to measure N_e, N_s and N_b?
    What about the sum $N_e + N_s + N_b$?

    b. What units might you use to measure B? G?
    What about the sum $B + G$?

    c. What units might you use to measure M? W?
    What about the sum $M + W$?

3. State a rule about how you might use units to help you think about what types of quantities can be added. How would you use or modify your rule to fit subtraction?

Units in Multiplication, scenario 1

1. Why can you multiply $N_e \times C_e$ and you can multiply $L \times W$, but you can't multiply $G \times C$?

2. Units in multiplication often involve rates like miles/gallon (miles per gallon), feet/second (feet per second), or students/table (students per table).

    a. What units might you use to measure N_e? C_e?
    What about the product $N_e \times C_e$?

    b. What units might you use to measure L? W?
    What about the product $L \times W$?

    c. What units might you use to measure G? C?
    What about the product $G \times C$?

3. State a rule about how you might use units to help you think about what types of quantities can be multiplied.
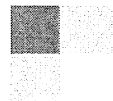
Units in Multiplication, scenario 2

1. Let ℓ represent the length of the cafeteria in feet and w represent its width in feet. What does $\ell + w + \ell + w$ represent? What about $\ell \times w$?

2. Why can we add $\ell + w$ <u>and</u> multiply $\ell \times w$? What is it about these variables that allow them to be added or multiplied?

3. How might you modify your rule for using units to guide your thinking when multiplying?

Units in Division, scenario 1

1. What are the units for the **dividend** (what you are dividing up), the **divisor** (what you are dividing by) and the **quotient** (the result of the division) in the following expressions:

    a. $\dfrac{S}{P}$

    b. $\dfrac{F}{L}$

    c. $\dfrac{S}{F}$

    d. $\dfrac{S_M}{M}$

2. State a rule about the units in division problems like those represented above.

Units in Division, scenario 2

1. What are the units for the dividend (what you are dividing up), the divisor (what you are dividing by) and the quotient (the result of the division) in the following expressions:

    a. $\dfrac{F}{W}$

    b. $\dfrac{P_L}{T}$

2. State a rule about the units in division problems like those represented above.