WEIGHTED AVERAGE*

NAME SECTION

1. Suppose we have a collection of 15 marbles in a container. 40% of the marbles are red and 60% of the marbles are black. The red marbles weigh 6.00 grams and the black marbles weigh 8.00 grams.

   a. Calculate the average mass of the marbles in the container. (Clearly show how you arrived at your answer.)

   b. Do any marbles in the container have the same mass as the average mass?

2. Suppose we have another collection of 40 marbles in a different container. 40% of the marbles are red and 60% of the marbles are black. The red marbles weigh 6.00 grams and the black marbles weigh 8.00 grams. Calculate the average mass of the marbles in the container.

* Inspired by Moog, R.S. and Farrell, J. J. *Chemistry: A Guided Inquiry*. John Wiley, Sons. New York, 1996. Page 5.

3. Outline your strategy for calculating the average mass of a collection of red and black marbles if the total number of marbles is not known.

4. Suppose we have a collection of marbles in a container. 20% of the marbles are orange and 80% of the marbles are white. The orange marbles weigh 4.00 grams and the white marbles weigh 10.00 grams. Calculate the average mass of the marbles in the container.

5. The element boron is composed of two different isotopes, ^{10}B and ^{11}B. The percent abundance of ^{10}B is 19.78% and the percent abundance of ^{11}B is 80.22%. The relative atomic mass of ^{10}B is 10.01294 u and the relative atomic mass of ^{11}B is 11.00931 u. Calculate the (relative weighted) average atomic mass of boron.

6. If you could reach in and pick a single atom from a sample of boron, what would be the most probable mass of the atom of boron you selected? Explain.