ChemQuest 9

# Average Atomic Mass

Name: _____

Date: _____

Hour: _____

## **Information**: Weighted Averages

Examine the table of student test scores for five tests they have taken.

| Test | Student A | Student B |
|---|---|---|
| 1 | 95 | 76 |
| 2 | 74 | 88 |
| 3 | 82 | 90 |
| 4 | 92 | 81 |
| 5 | 81 | 72 |
| **Average Grade** | | |

## Critical Thinking Questions

1. Calculate the average grade for students A and B and enter the average in the table above.

2. If you know a student's average grade can you tell what the student's individual test scores were? Explain.

3. Suppose student C had an average of 83%. On each of his five tests he scored either 65% or 95%. Which score occurred more often? Explain.

4. What if the teacher decided that test five would count for 40% of the final grade and test four would count for 30% of the final grade and each of the other tests would count for 10%. Calculate the new average for each student. Note: this is called the weighted average.

Student A's new average: _____ Student B's new average: _____

## **Information**: Average Atomic Mass

On the periodic table you can find the average atomic mass for an element. This average is a weighted average and it tells you the average mass of all the isotopes of an element. The periodic table does not contain mass numbers for individual atoms, instead you can find the average mass of atoms. The average atomic mass is calculated just how you calculated the weighted average in question 4 above.

## Critical Thinking Questions

5. Neon has three different isotopes. 90.51% of neon atoms have a mass of 19.992 amu. 0.27% of neon atoms have a mass of 20.994 amu. 9.22% of neon atoms have a mass of 21.991 amu. What is the average atomic mass of neon?

6. Chlorine-35 is one isotope of chlorine. (35 is the mass number.) Chlorine-37 is another isotope of chlorine. How many protons and how many neutrons are in each isotope of chlorine?

7. Of all chlorine atoms, 75.771% are chlorine-35. Chlorine-35 atoms have a mass of 34.96885 amu. All other chlorine atoms are chlorine-37 and these have a mass of 36.96590. Calculate the average atomic mass of chlorine.

8. Do your answers for questions 5 and 7 agree with the average atomic masses for neon and chlorine on the periodic table?

## Skill Practice

9. Complete the following table.

| Symbol | # of neutrons | # of protons | # of electrons | Atomic # | Mass # |
|---|---|---|---|---|---|
| $^{31}_{15}P$ | | | | | |
| $^{28}_{13}Al^{+3}$ | | | | | |
| | | | 38 | 38 | 80 |
| $^{119}_{50}Sn$ | | | | | |
| | | 84 | 84 | | 210 |
| | 8 | 7 | 10 | | |

10. A certain element has two isotopes. One isotope , which has an abundance of 72.15% has a mass of 84.9118 amu. The other has a mass of 86.9092 amu. Calculate the average atomic mass for this element.

11. Given the following data, calculate the average atomic mass of magnesium.

| Isotope | **Mass of Isotope** | **Abundance** |
|---|---|---|
| Magnesium-24 | 23.985 | 78.70% |
| Magnesium-25 | 24.986 | 10.13% |
| Magnesium-26 | 25.983 | 11.17% |