

Lecture 3 CH101 A1 (MWF 9:05 am) Fall 2018

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[TP] For an hypothetical class, 75 students weigh 100 lbs, 100 students weigh 150 lbs, 50 students weigh 200 lbs. Roughly (guesstimate), what will the average weight be?

- 25% 1. Less than 100
 25% 2. Between 100 and 150
 25% 3. Between 150 and 200
 25% 4. Greater than 200



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Monday, September 10, 2017

For today ...

- Continue: Isotopes → atomic weight

Next lecture: Complete isotopes and the mole. Begin ch3: Naming things; molecular mass spectra

Representative questions: 3.17, 3.18c, 3.19c, 3.23, 3.24, 3.49, 3.51, 3.55

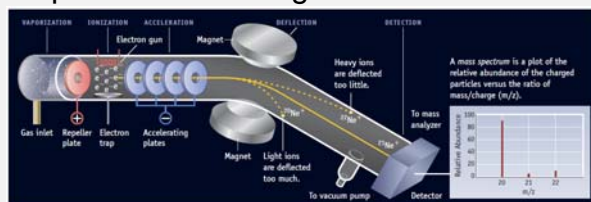
To memorize: Tables 3.2 and 3.4; Figures 3.7 and 3.8 (see Handouts tab)



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Mass spectrometer “weighs” atoms



Strip away an electron, accelerate **positive ions**, and then **deflect** them in a magnetic field.

Less deflection, heavier mass

Neon has three “isotopes”: ^{20}Ne , ^{21}Ne , and ^{22}Ne

Relative peak heights → isotopic abundance



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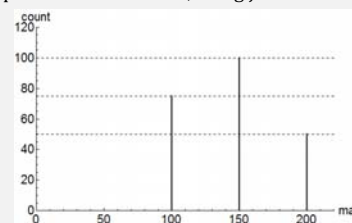
Average mass of CH101 students?

75 students weigh 100 lbs

100 students weigh 150 lbs

50 students weigh 200 lbs

Sketch the “mass spectrum” of the class, using just counts for the vertical axis



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[TP] For our hypothetical class,
 75 students weigh 100 lbs,
 100 students weigh 150 lbs,
 50 students weigh 200 lbs.

Based on your "mass spectrum" sketch, roughly (guesstimate), what will the average be?

0% 1. Less than 100
 0% 2. Between 100 and 150
 0% 3. Between 150 and 200
 0% 4. Greater than 200

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Average mass of CH101 students?

75 students weigh 100 lbs
 100 students weigh 150 lbs
 50 students weigh 200 lbs

What is the expression for the fraction of students with mass 150 lbs, f_{150} ?

$f_{150} = \dots$

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Average mass of CH101 students?

75 students weigh 100 lbs
 100 students weigh 150 lbs
 50 students weigh 200 lbs

In terms of the fractions f_{100} , f_{150} , and f_{200} , write the expression that evaluates to the exact average.

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Average mass of CH101 students?

In terms of the fractions f_{100} , f_{150} , and f_{200} , write the expression that evaluates to the exact average.

total mass = $75 \times 100 \text{ lbs} + 100 \times 150 \text{ lbs} + 50 \times 200 \text{ lbs}$

average mass = $\frac{\text{total mass}}{\text{students}} = \frac{75 \times 100 \text{ lb} + 100 \times 150 \text{ lbs} + 50 \times 200 \text{ lbs}}{75 + 100 + 50}$

$= \frac{75}{225} \times 100 \text{ lbs} + \frac{100}{225} \times 150 \text{ lbs} + \frac{50}{225} \times 200 \text{ lbs}$


$= f_{100} \times 100 \text{ lbs} + f_{150} \times 150 \text{ lbs} + f_{200} \times 200 \text{ lbs}$

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[TP] For our hypothetical class, average weight of a CH101 student is 144 lbs.
Which of the following statements is true for this class?

- 0% 1. The weight of each student is 144 lbs
- 0% 2. No student weighs 144 lbs
- 0% 3. Neither of the statements is true.

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