

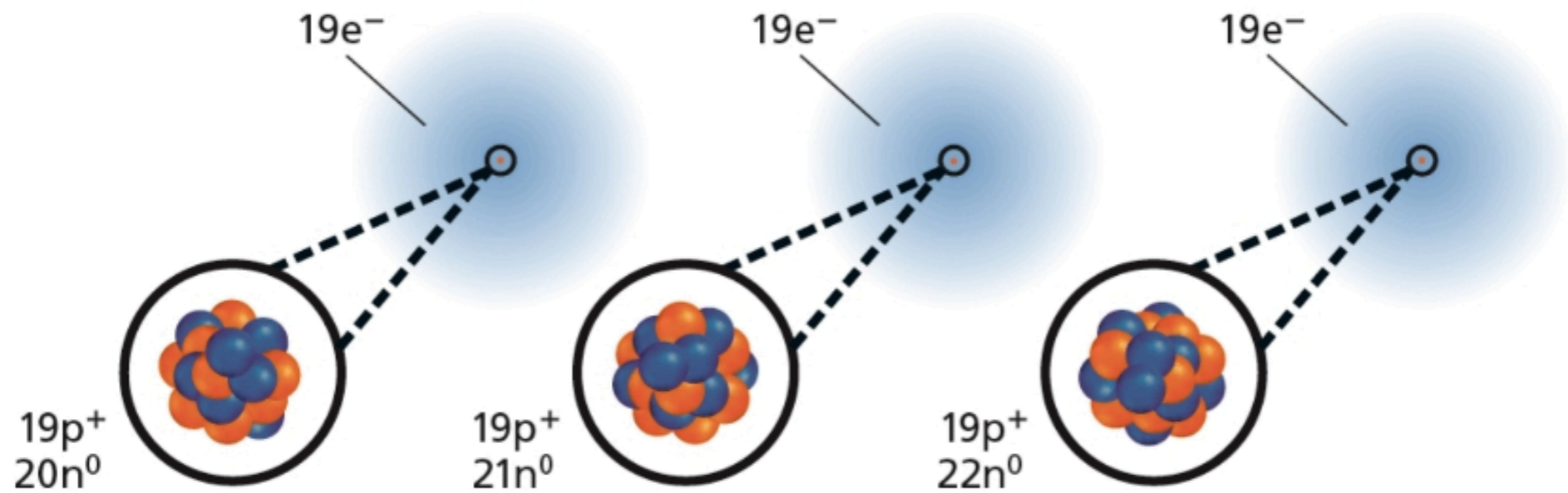
Isotopes and Atomic Mass

**Isotope - atoms of the same element
with different numbers of neutrons**

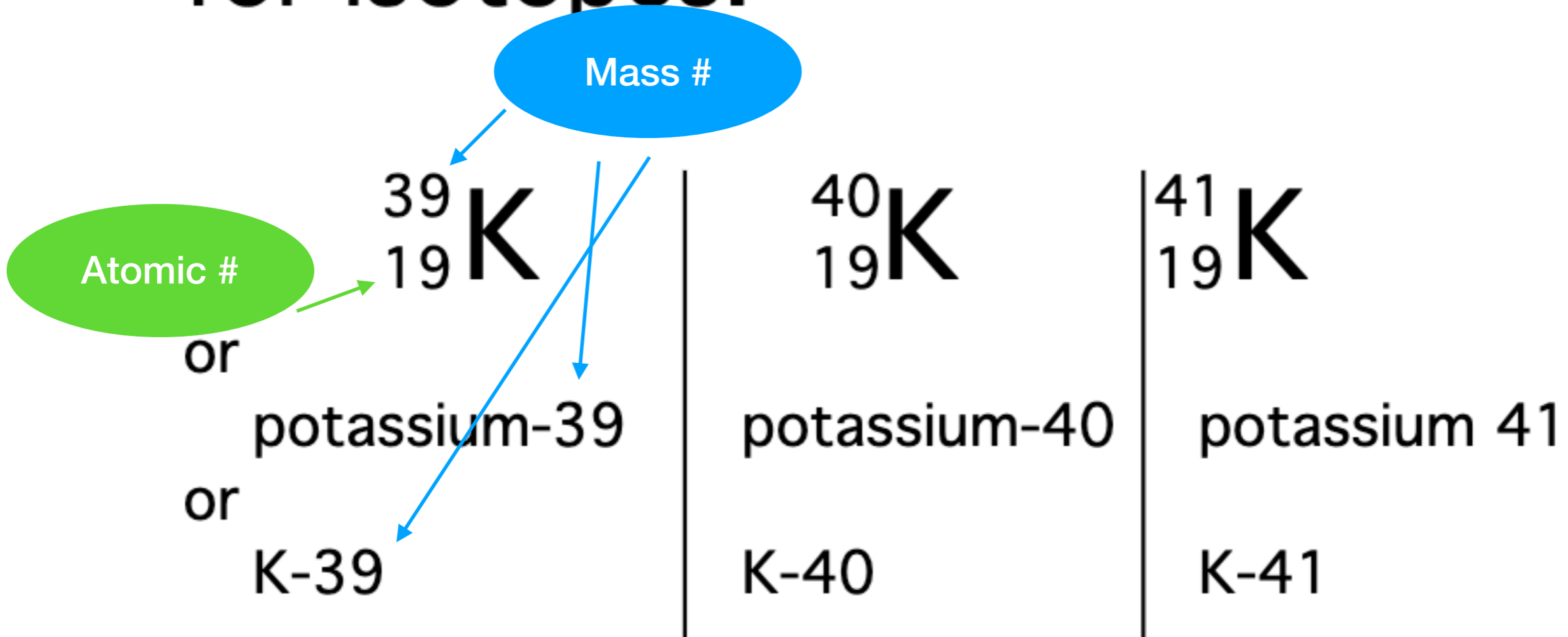
***note - because isotopes have the
same number of protons, they have
identical chemical properties**

Example:

Isotopes of potassium



Various symbolic notations for isotopes:



Mass number changes!
(more or less neutrons)

Atomic Mass -

**Remember that the mass of
1 proton ~ 1 neutron**

**Scientists have defined a unit that is the
average mass of these two nucleons
called the**

atomic mass unit (amu)

1 amu = 1/12 the mass of a carbon-12 isotope

**Important
definition!**

Atomic mass: the weighted average mass of all the isotopes of an element

General Formula for calculating a weighted average:

$$a\%(A) + b\%(B) + c\%(C)\dots$$

*change the % to a decimal by moving the decimal point 2 places!

$$35\% = 0.35$$

$$1.43\% = 0.0143$$

Important definition!

Example Problem:

Use the information below to calculate the atomic mass for magnesium.

<u>Isotope</u>	<u>Percent Abundance</u>	<u>Mass</u>
Mg-24	78.70 %	23.99 amu
Mg-25	10.13 %	24.99 amu
Mg-26	11.17 %	25.94 amu

Where can you go to check that your answer is correct?

**Remember...%(mass) + %(mass) + etc
(change % to a decimal first)**

<u>Isotope</u>	<u>Percent Abundance</u>	<u>Mass</u>
Mg-24	78.70 %	23.99 amu
Mg-25	10.13 %	24.99 amu
Mg-26	11.17 %	25.94 amu

$$(0.7870 \times 23.99) + (0.1013 \times 24.99) + (0.1117 \times 25.94) =$$

(do this as 1 long step in your calculator!)

$$= \boxed{24.31 \text{ amu}}$$

Find the Atomic Mass

isotope	mass (amu)	% abundance
Cu-63	62.929	69.15%
Cu-65	64.928	30.85%

Try this and then we
will check your
answer...

Find the Atomic Mass

isotope	mass (amu)	% abundance
Cu-63	62.929	69.15%
Cu-65	64.928	30.85%

Remember to move
decimal on %

$$(62.929 \times 0.6915) + (64.928 \times 0.3085) =$$



How can you check your answer?

Use your periodic table and check the atomic mass.