Name:___________________ Per:________

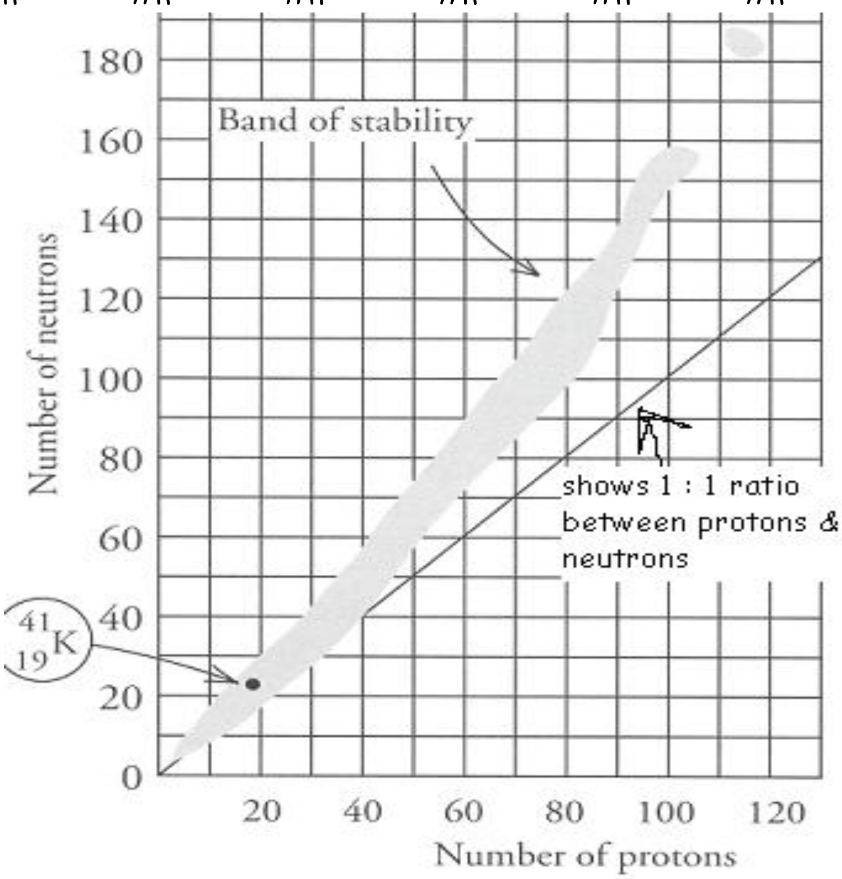
Worksheet- Band of Stability

Objective: Determine if an atom is "stable", "unstable (aka radioactive)", or "does not exist" based on its position on the graph below.

Background Info: Isotopes of elements found in nature are all located within the gray area on the graph below called the **band of stability**. Those elements found in the **middle** of the "band" have a very **stable nucleus**, while those elements on the **outer edges** of the band have an **unstable nucleus** and are said to be **"radioactive".** However, some combinations of protons and neutrons in the nucleus are so unstable that they cannot even exist long enough to be recognized as elements and these fall outside the band of stability.

Instructions: **a)** Determine the # of subatomic particles each element contains **b) Locate** & **plot** where the following atoms would be on the graph below. **Label** each atom after it has been plotted (ex: see Potassium- 41)

$^{24}_{12}Mg$	$^{142}_{60}Nd$	$^{195}_{77}Ir$	$^{81}_{35}Br$	$^{238}_{92}U$	$^{191}_{77}Ir$
# P=	# P=	# P=	# P=	# P=	# P=
# e=	# e=	# e=	# e=	# e=	# e=
#n =	#n =	#n =	#n =	#n =	#n =



Questions to Answer:

1. Did any of your atoms land outside the gray area? Explain why or why not.

2. How can there be two different atoms of iridium? How are they different?

3. Would a small atom (less than 40 protons) be found in nature if it has the same number of protons & neutrons (1:1 ratio)? Explain.

4. Would a large atom (more than 40 protons) be found in nature if it has the same number of protons & neutrons (1:1 ratio)? Explain.

5. Two of the atoms you plotted are naturally radioactive, that is, their nuclei fall apart over time. Which two do you think they are? What is your reasoning?

6. Imagine a chemist was trying to create an atom with 60 protons and a mass number of 155. Would this be possible? Why or why not? (**SHOW** where it would fall on the graph).

7. If an element had 90 protons, how many neutrons would be a good number for it to have in order to be considered a stable element? What element would this be? (**SHOW** where it would fall on the graph).