

Unit 4

NAME

Class Work

12/9/13

## 4.10 Reactivity

SPARK: flash cards out!

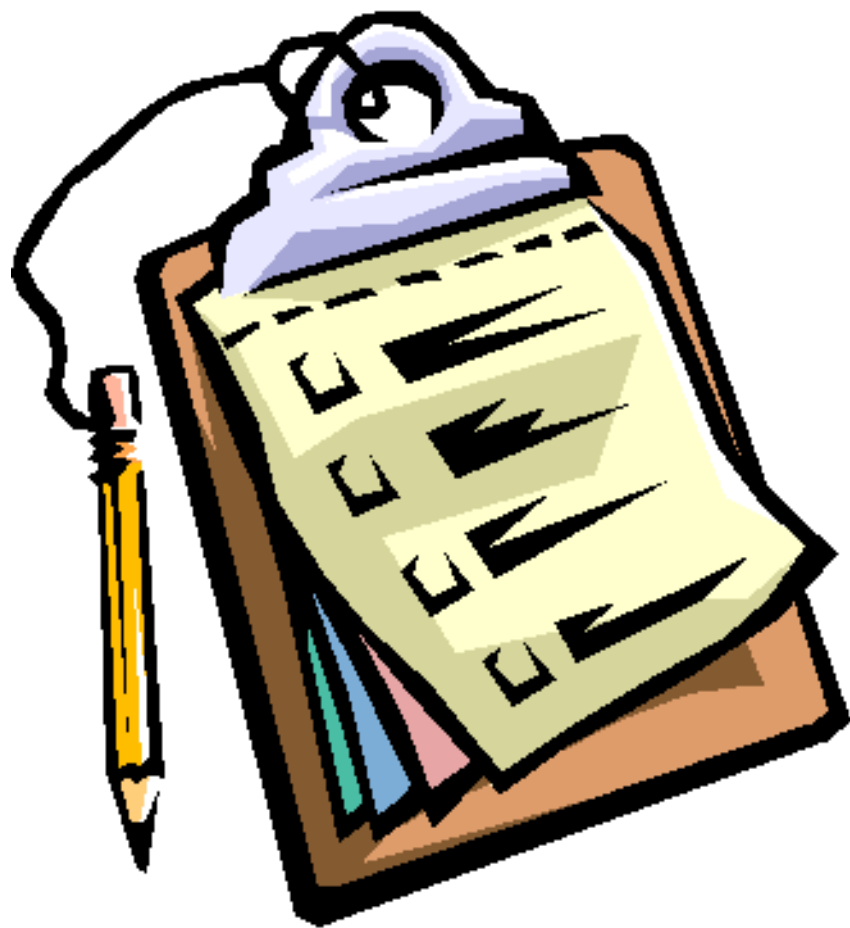
1. What metal has the lowest ionization energy?
2. What non-metal has the highest electronegativity?

## Objective

SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# Agenda:

- Do Now/Objective
- Notes
- Lab
- Practice
- Homework



Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# Review

- 4.7, 4.8, 4.9 HW on document camera!

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# Notes

- Reactivity – is an atom's ability to gain, lose, or share electrons with another element
  - How reactive it will be will be determined by how badly it wants to gain or lose electrons.

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# Notes

- Indications of a chemical reaction
  - Color change, transfer of energy, precipitation, formation of gas, odor change

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# LAB time!

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# CATION

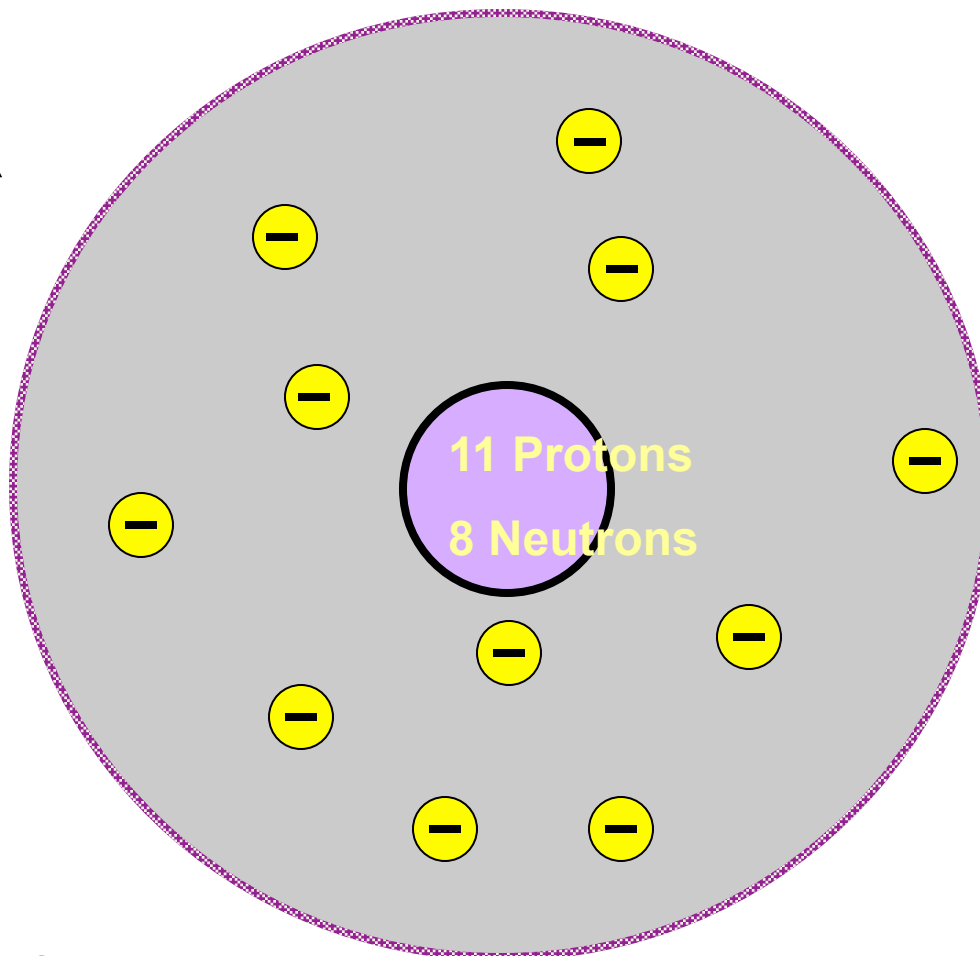
REMINDER: An atom that has lost one or more electrons (has an overall positive charge)

Naming Rule:  
*element* ion

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# A Sodium atom losing an electron

$^{19}_{11}\text{Na}$

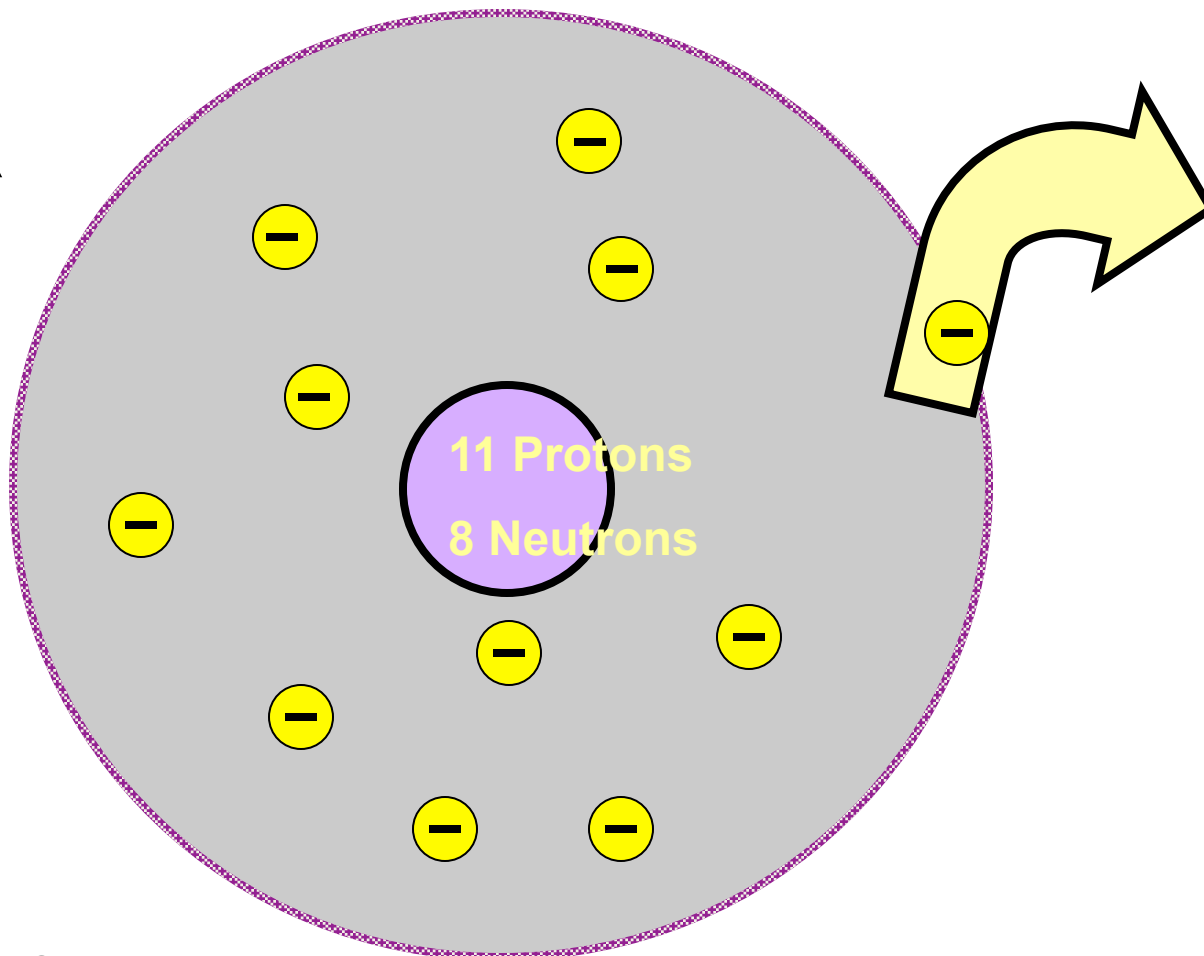


Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!



# A Sodium atom losing an electron

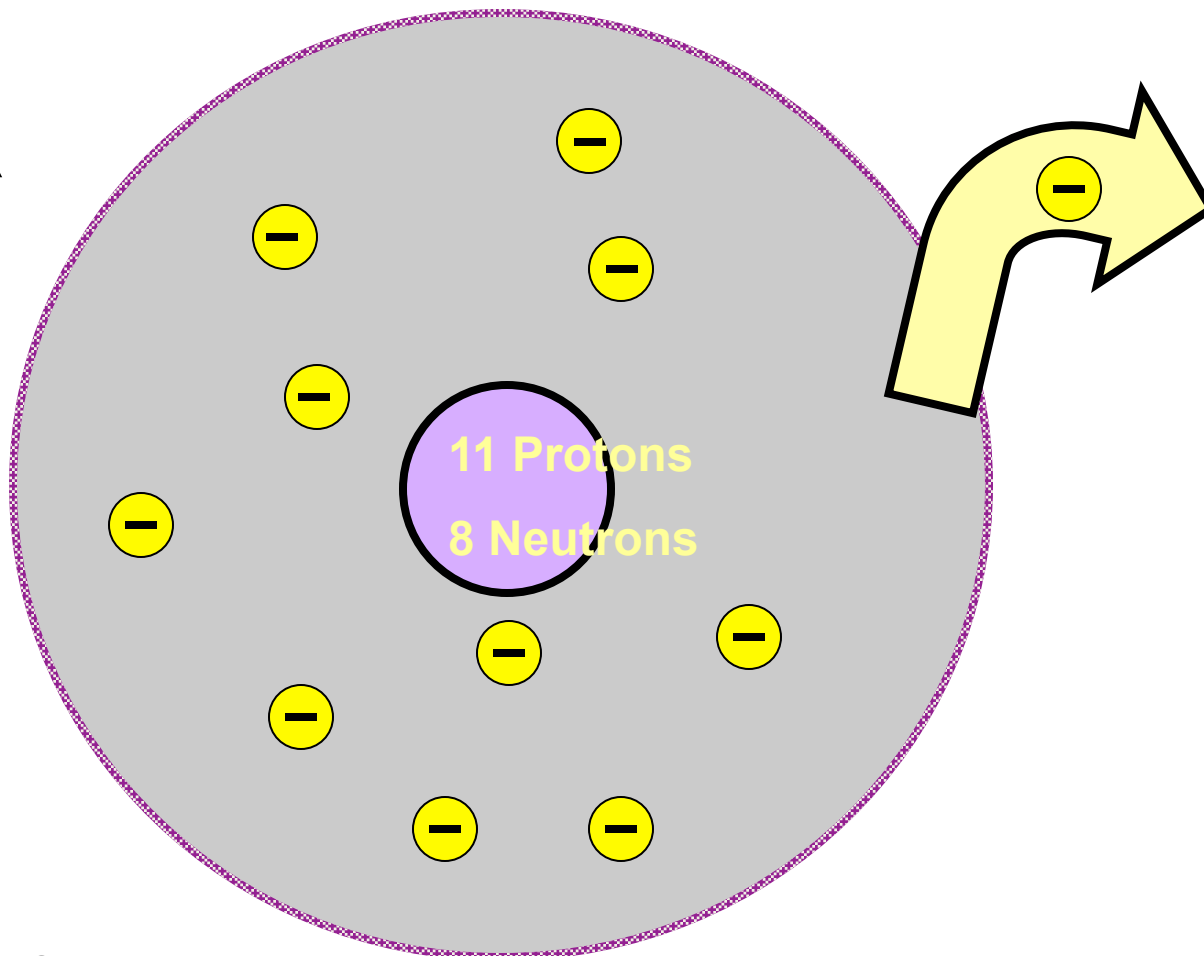
$^{19}_{11}\text{Na}$



Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

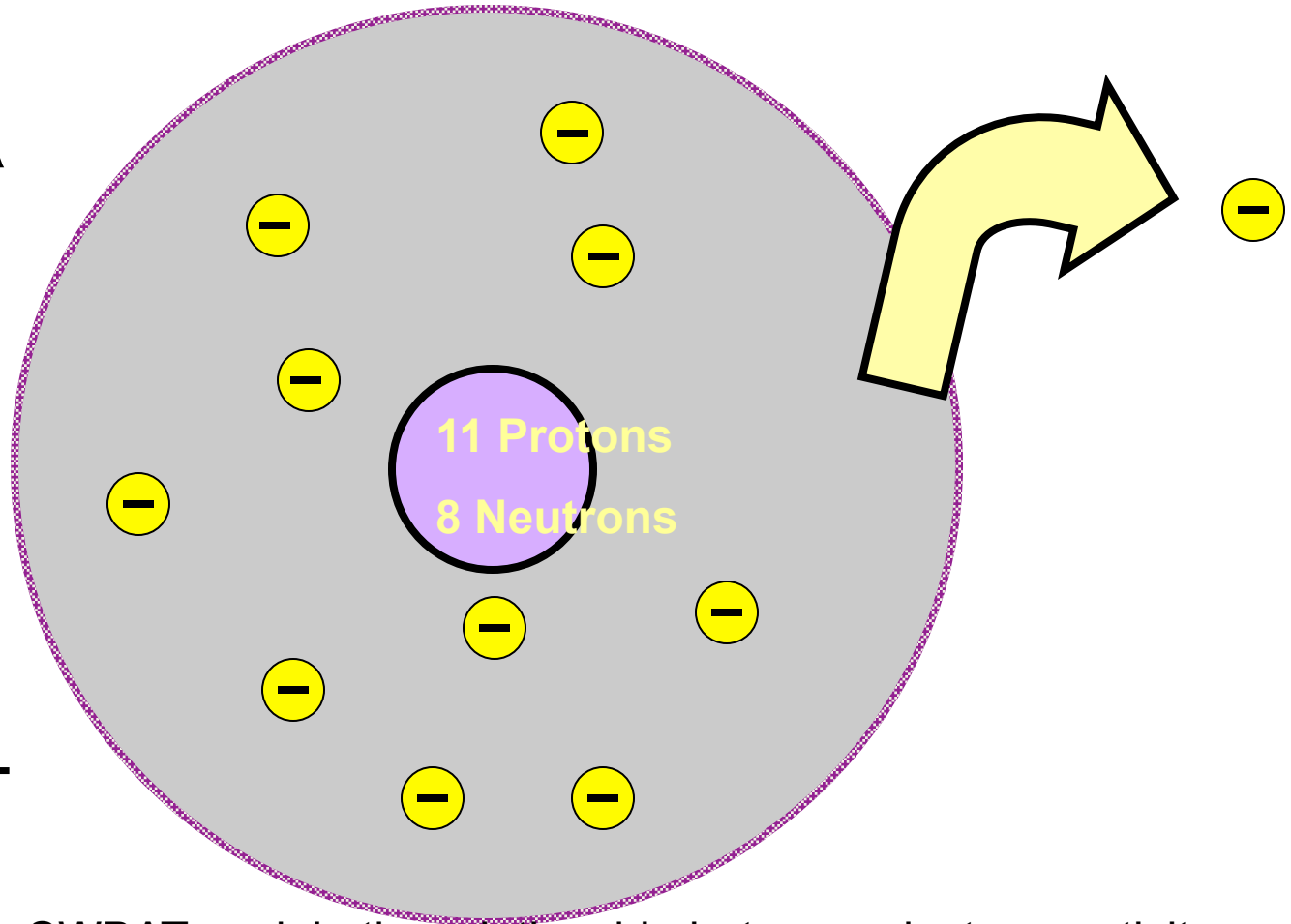
# A Sodium atom losing an electron

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Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# A Sodium atom losing an electron

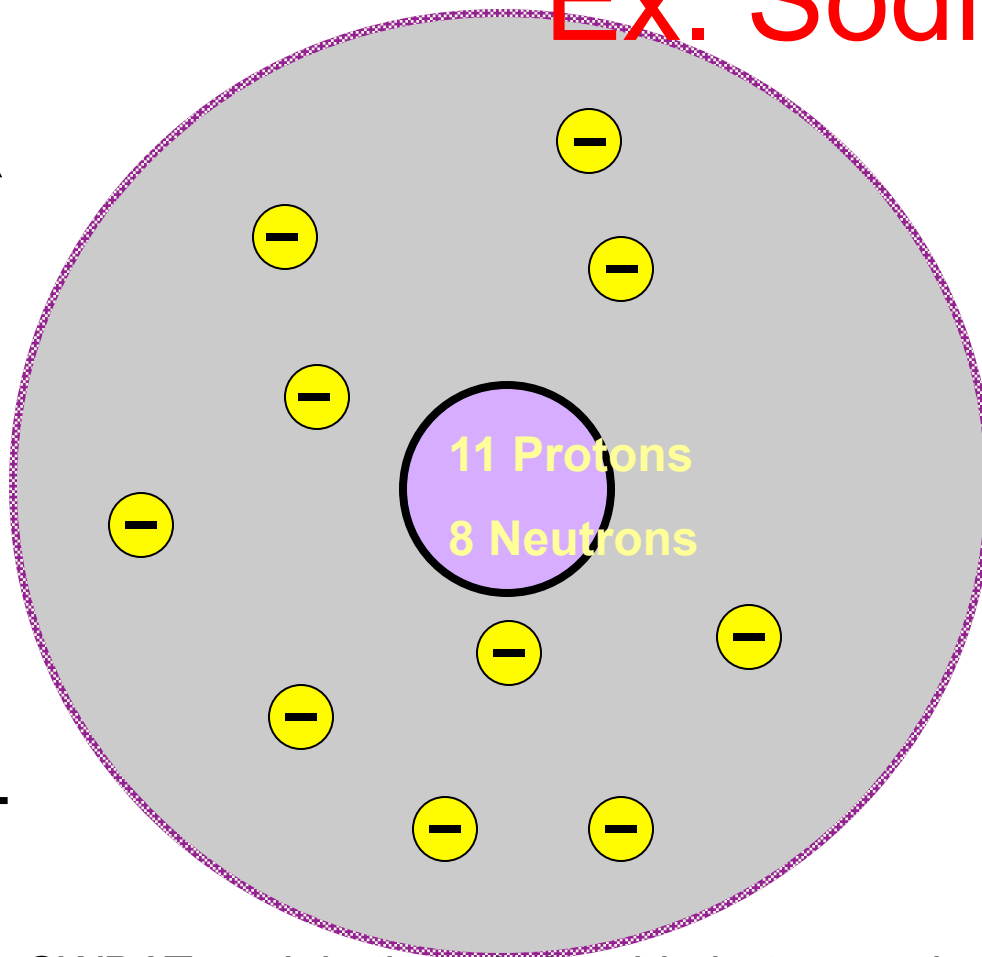


Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

A Sodium atom losing an electron



Ex. Sodium Ion



Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# Quick Check!

If a neutral Magnesium atom loses two electrons, what will its overall charge be?

1. -2
2. +1
3. +2
4. -1

C

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# Quick Check!

How many electrons are in an ion of  $K^+$ ?

1. 39
2. 18
3. 19
4. 20

**B**

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

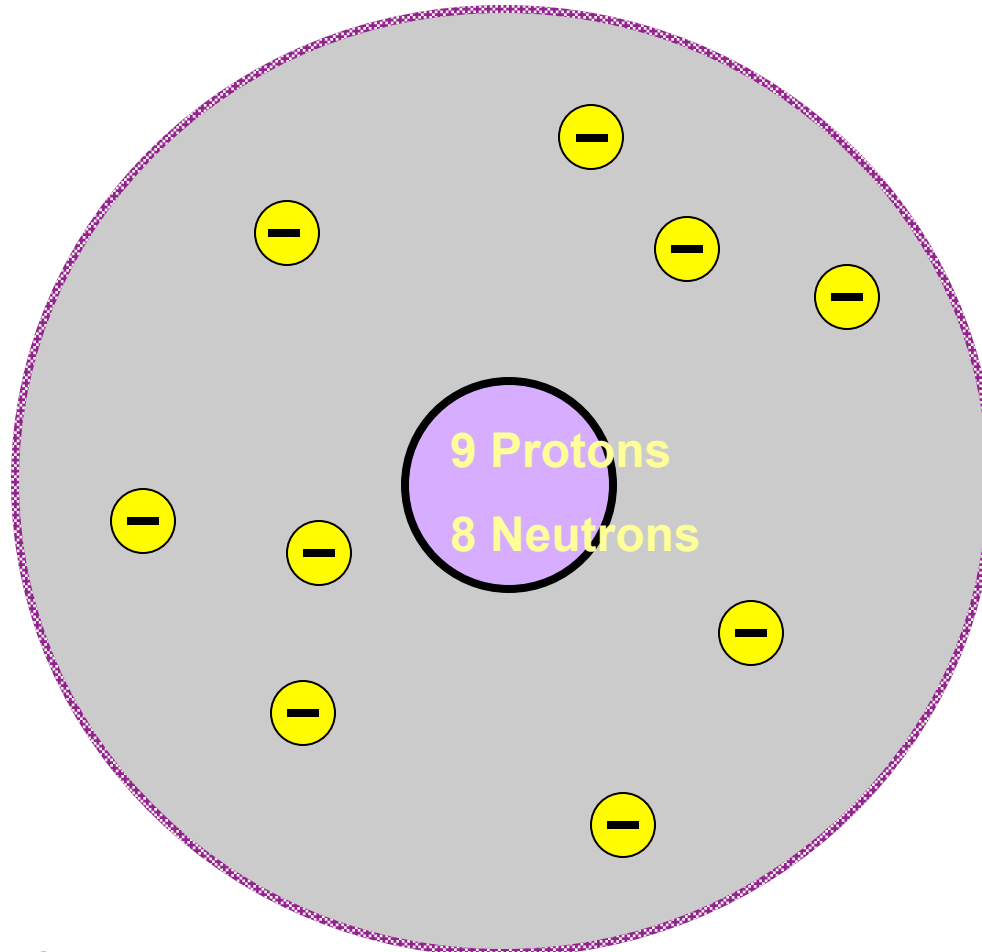
# ANION

REDMINDER: An atom that has gained one or more electrons (has an overall negative charge).

Naming Rule:  
root + “*ide*” ion

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# An atom gaining an electron

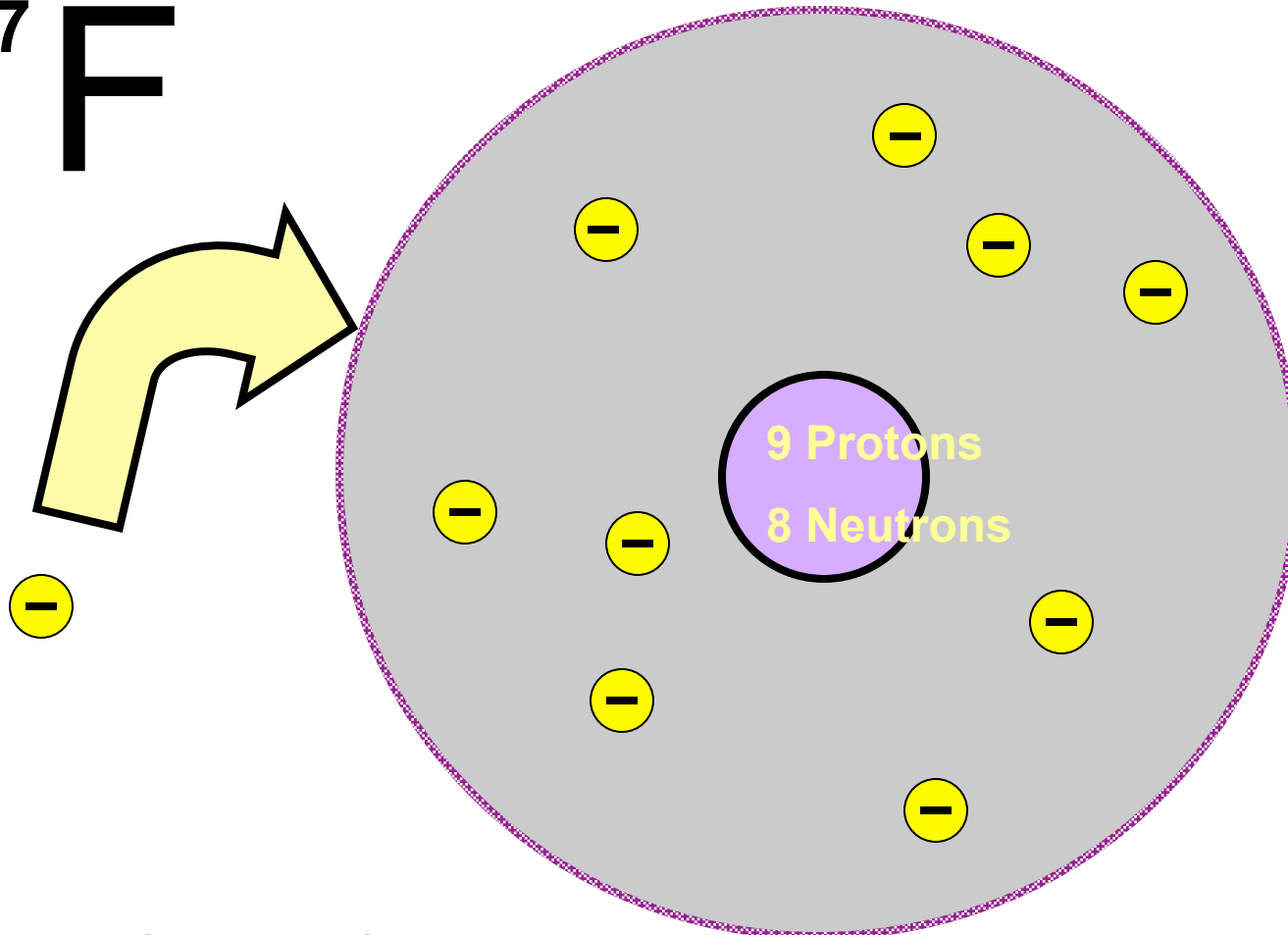


Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!



# An atom gaining an electron

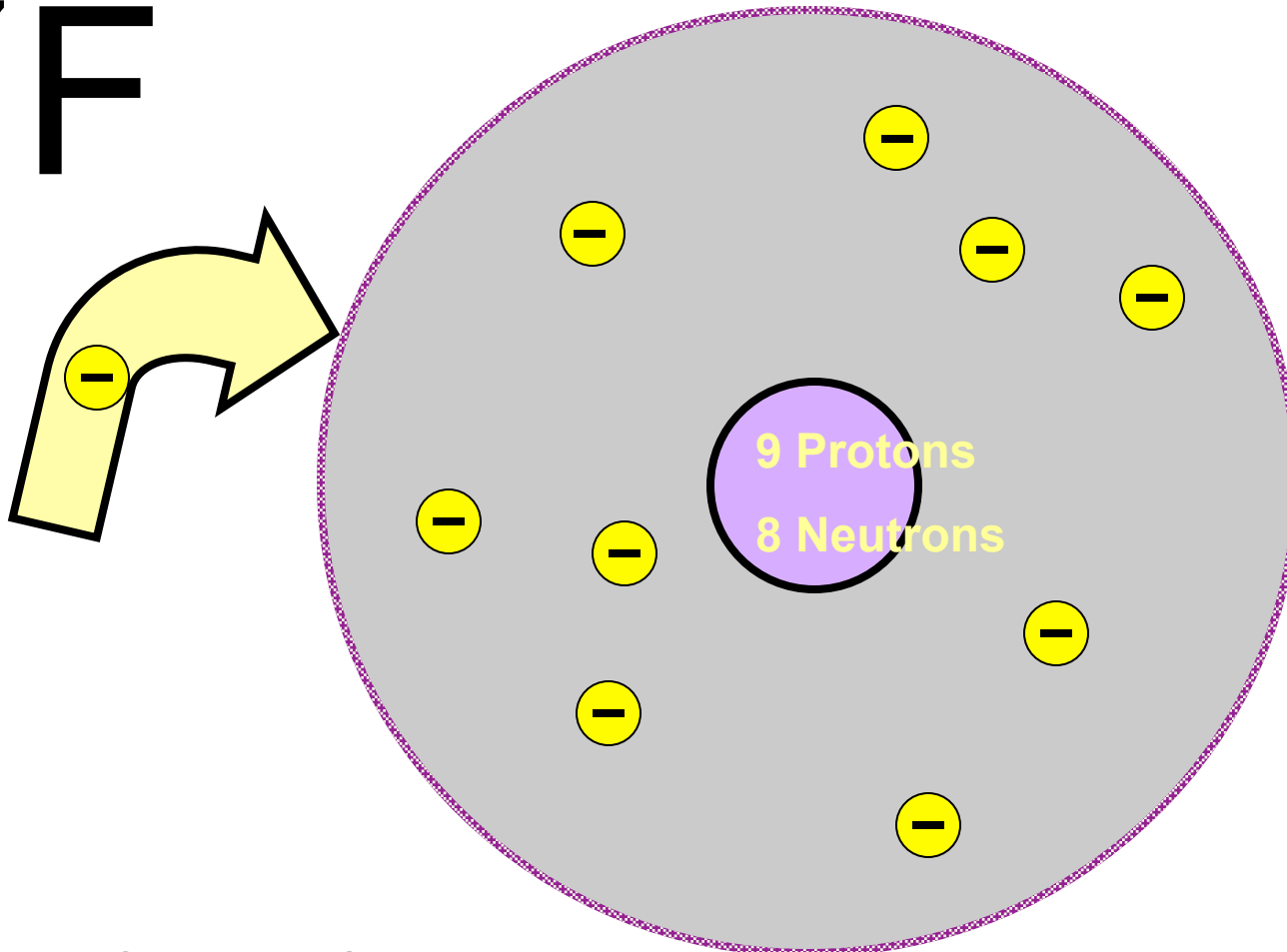
$^{17}_{9}\text{F}$



Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# An atom gaining an electron

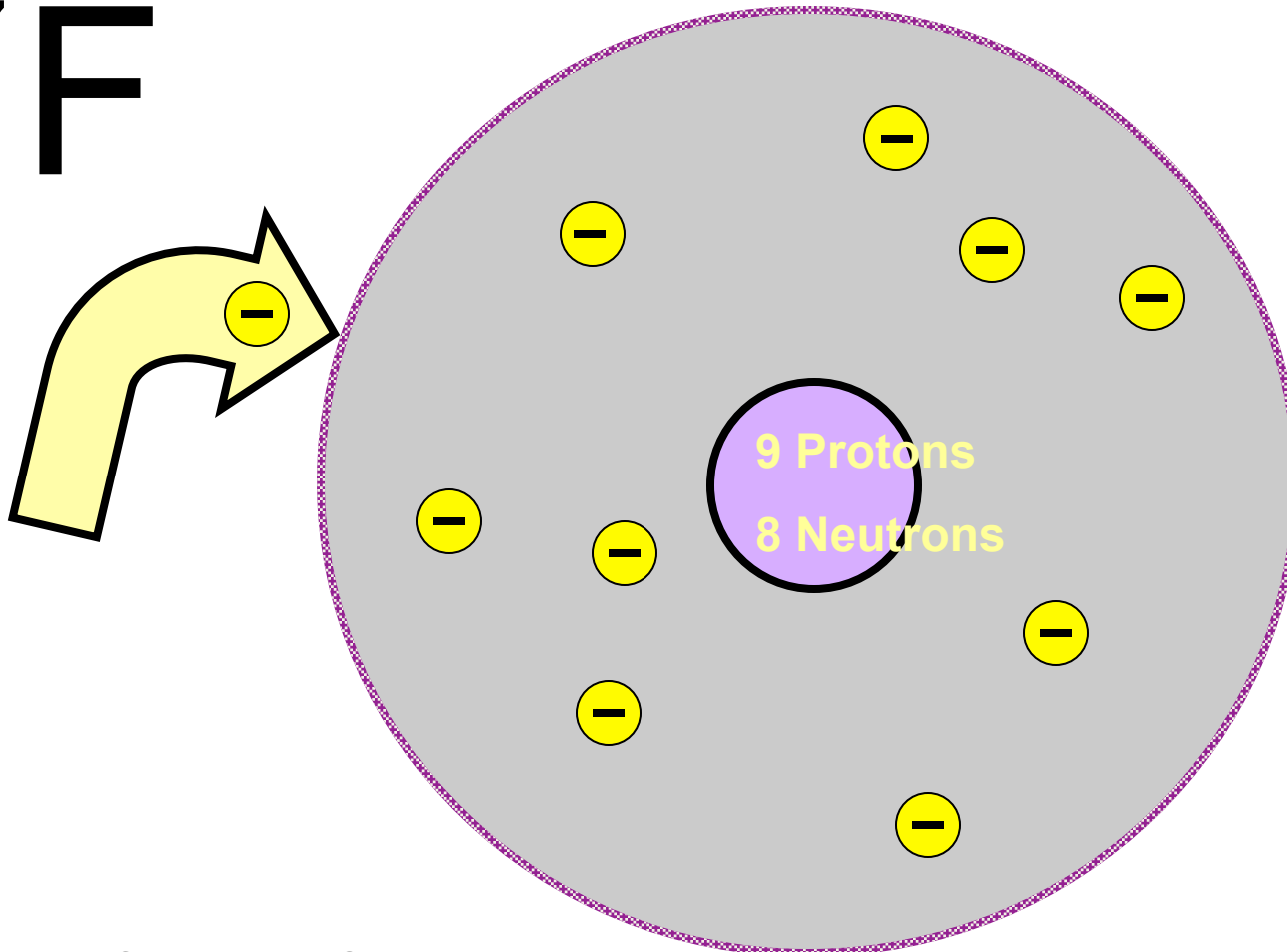
$^{17}_{9}\text{F}$



Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

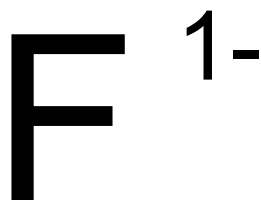
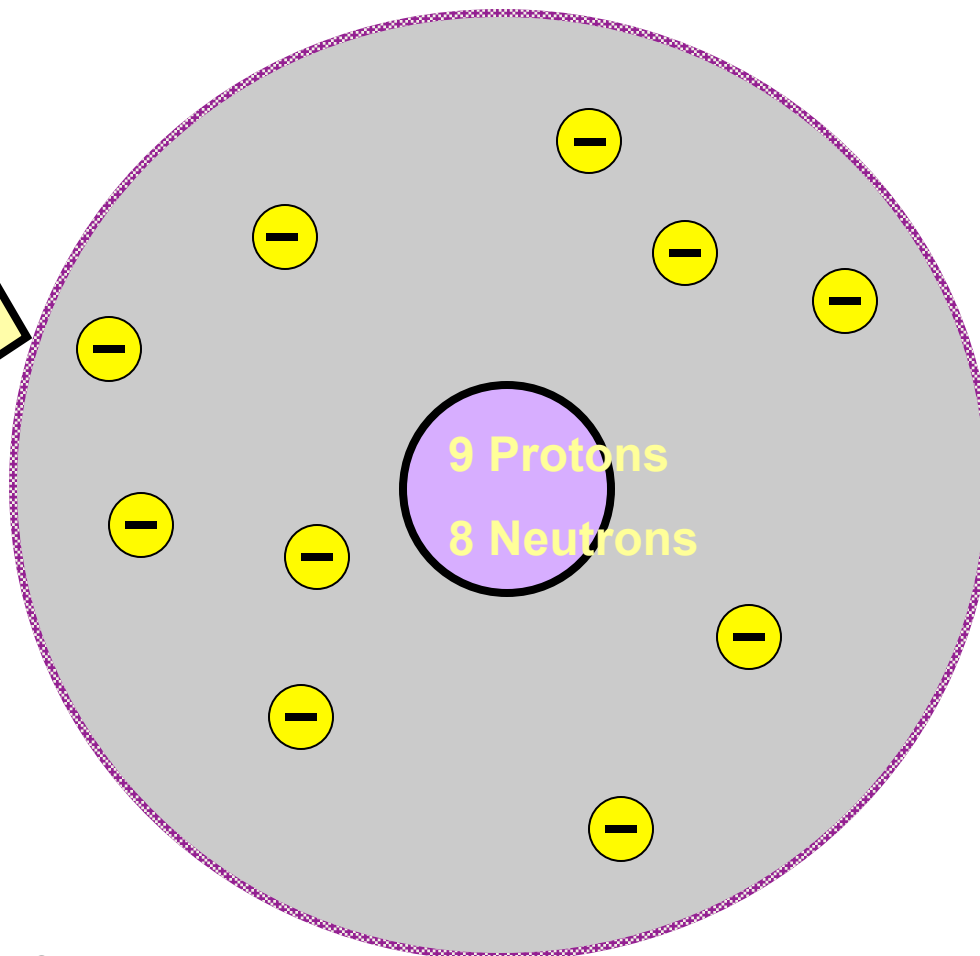
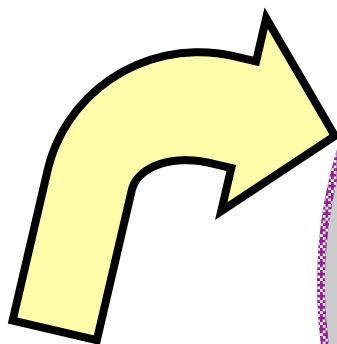
# An atom gaining an electron

$^{17}_{9}\text{F}$



Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

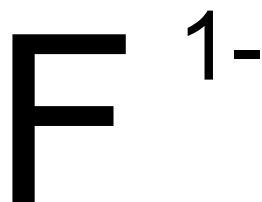
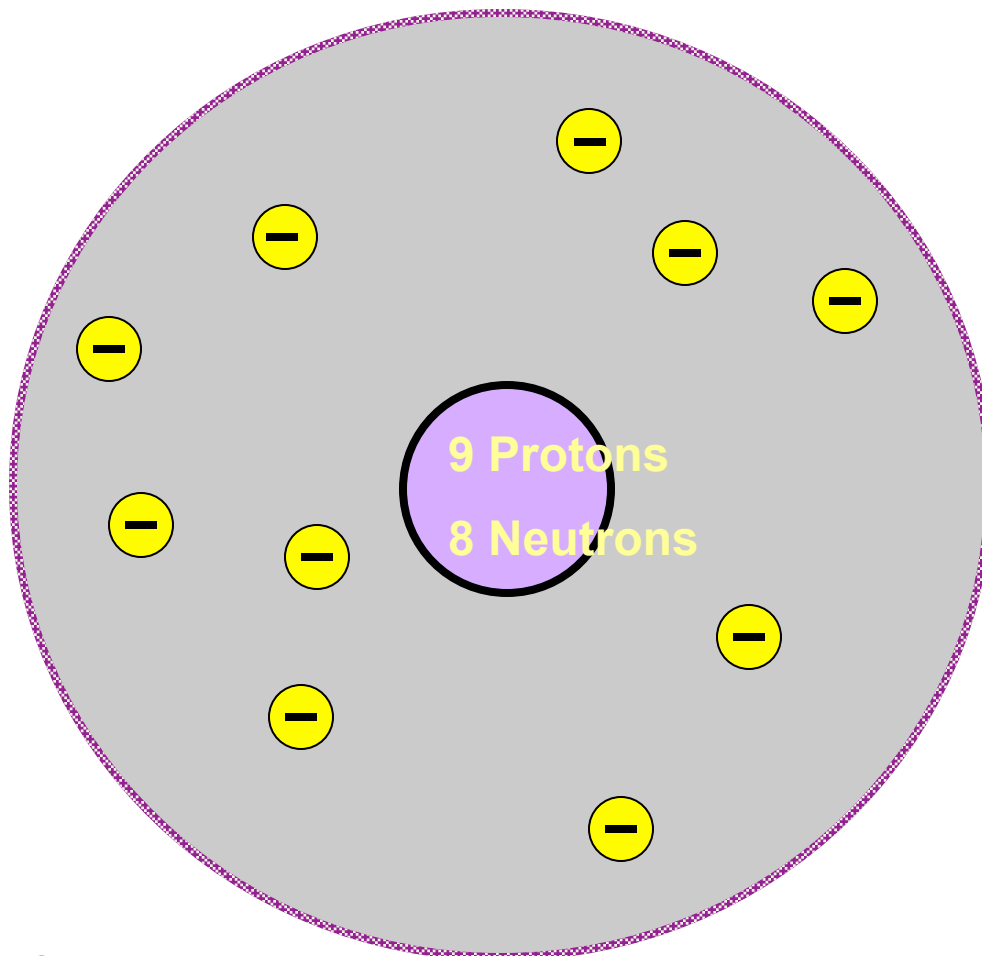
# An atom gaining an electron



Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

An atom gaining an electron

Ex. Fluoride Ion



Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# Quick Check!

If a neutral oxygen atom gains two electrons, what will its overall charge be?

- A. -2
- B. +1
- C. +2
- D. -1

A

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# Quick Check!

How many electrons are in an ion of  $\text{Br}^{1-}$ ?

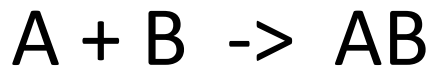
- A. 35
- B. 34
- C. 36
- D. 79

C

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# What does it mean to be reactive?

- We describe elements according to their reactivity.
- Reactivity is also how easily an element will bond with another element to make a compound.



- If its easy it is reactive or active.
- If its difficult its inactive or stable

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!



# Reactivity

- What is a compound?
- Two or more elements chemically bound.
- Bonding means: gaining, losing, or sharing electrons.

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# Sneak Preview - Bonding

## **Ionic Bonding**

- Between metals and non-metals
- **Transfer of electrons!**

## **Covalent Bonding**

- Between non-metals
- **Sharing electrons!**

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# What makes an element reactive?

- An incomplete valence electron level.
- Atoms bond until this level is complete.
- WHY??
- All atoms (except hydrogen) want to have 8 electrons in their very outermost energy level (Octet Rule).

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# What makes an element reactive?

## Ionization energy?

- Atoms with few valence electrons (low ionization energy) lose them during bonding.

## Electronegativity?

- Atoms with 5, 6, or 7 valence electrons (high electronegativity) gain electrons during bonding.

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# Ion Formation

- Metals tend to **lose electrons** to become **cations**.
- Non-metals tend to **gain electrons** to become **anions**.

	Metals	Non-Metals
Gain or lose electrons?	Lose	Gain
Form + or – ions?	+	-
Cations or anions?	Cations	Anions

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

- From your lab:
- What is the most reactive metal?

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

- What is the trend in reactivity for metals?

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

group

1

2

13

3

4

5

6

7

8

9

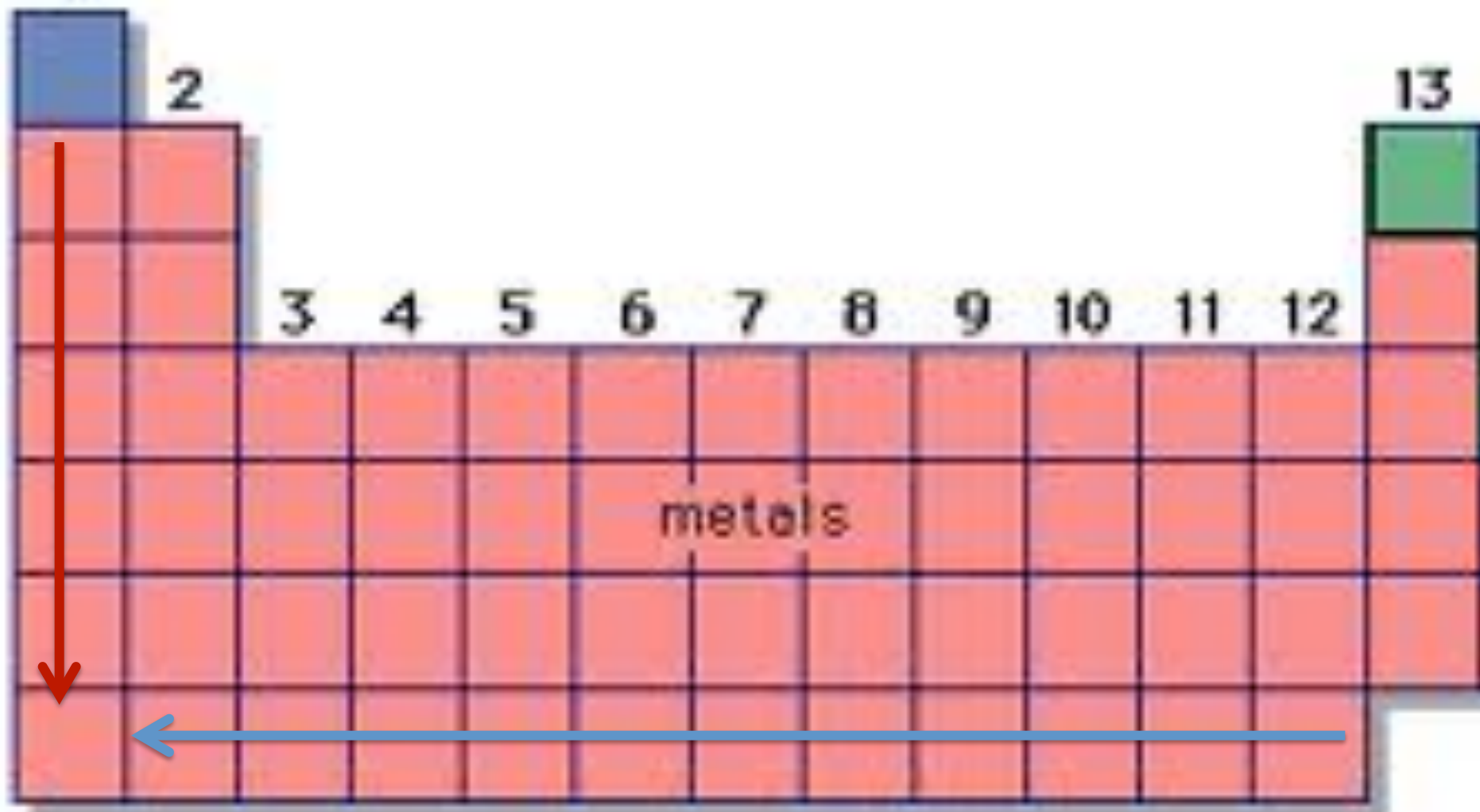
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11

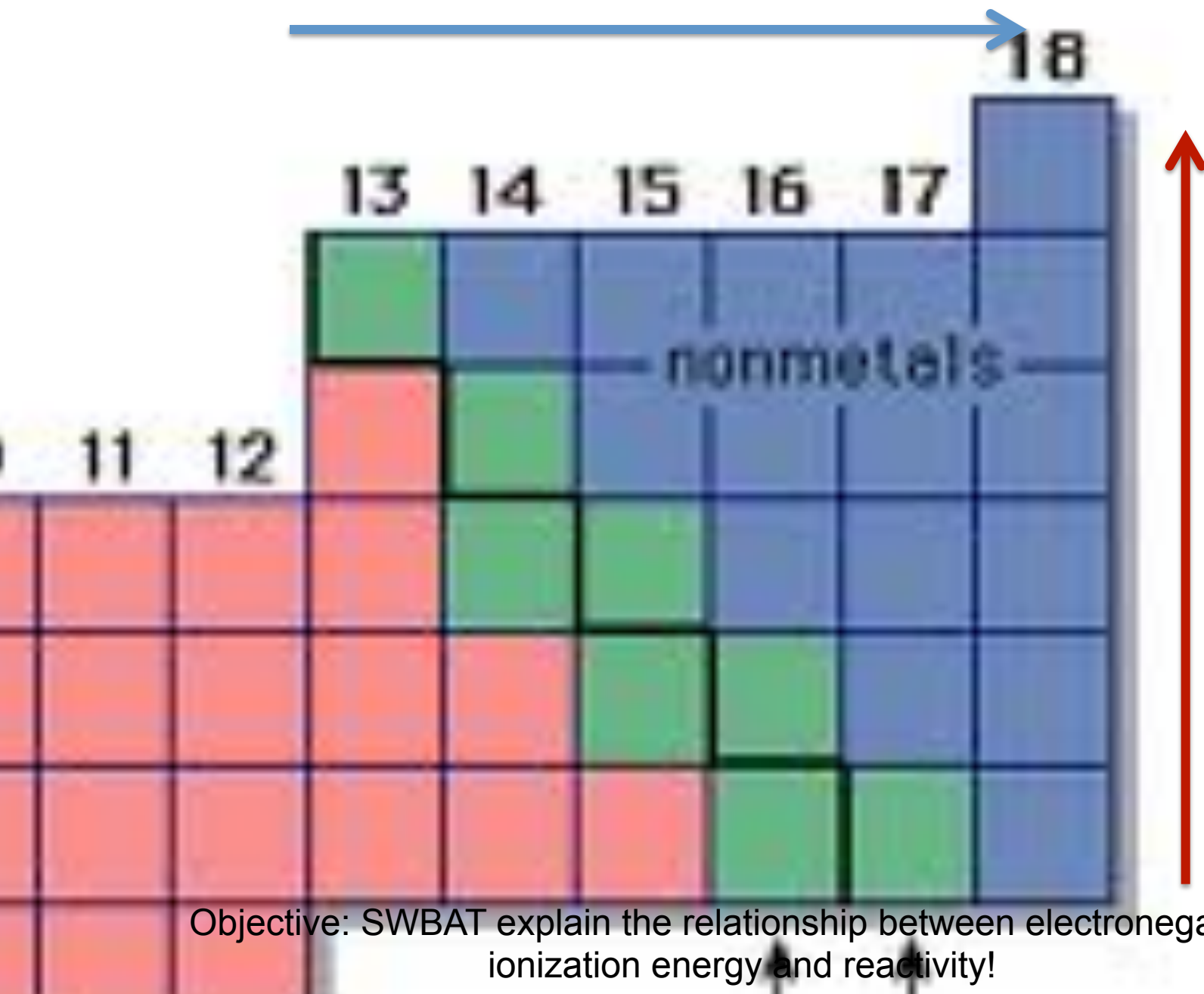
12

metals

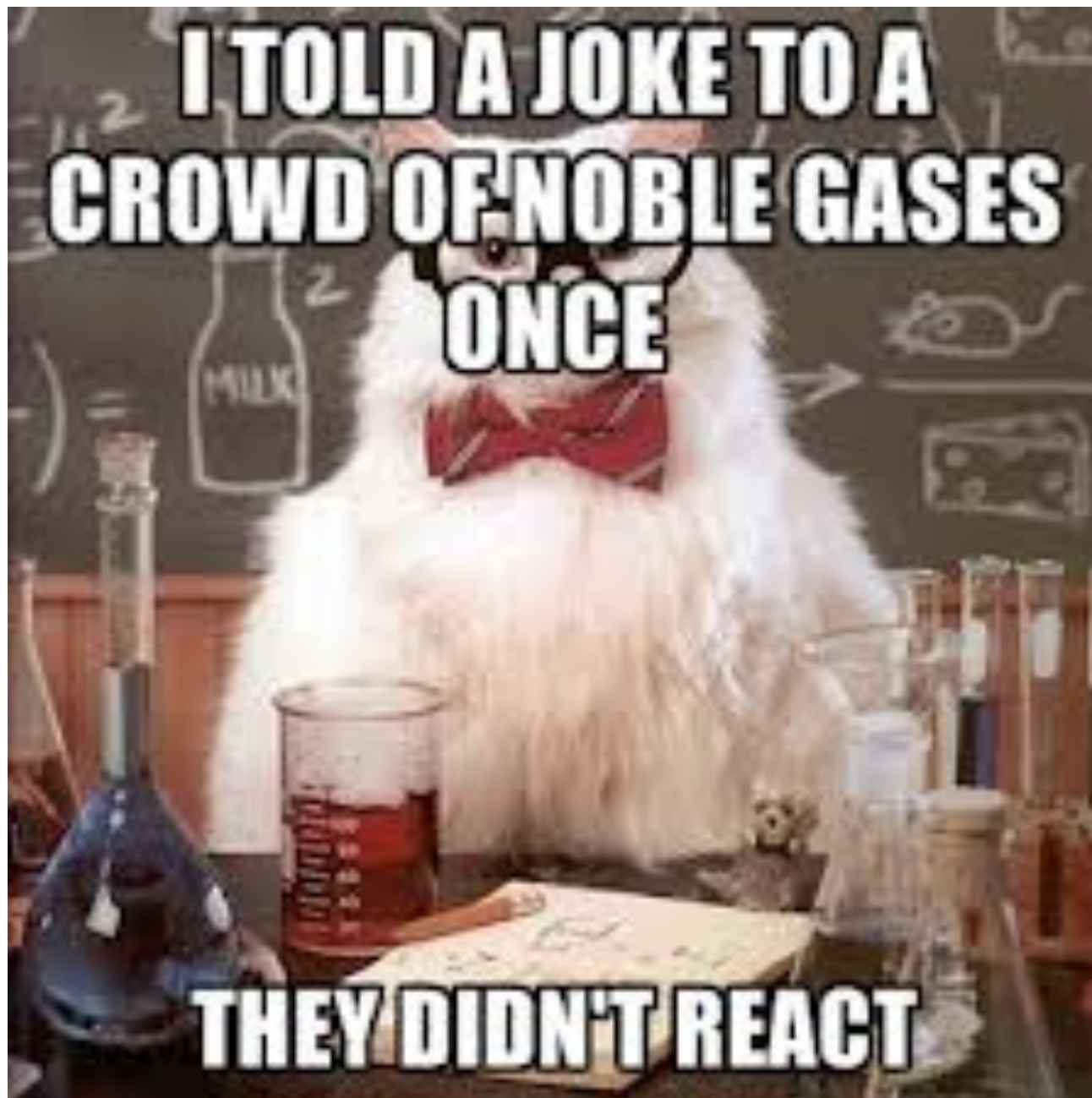
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# Study Skills: Outlines!

- What does a good outline contain?

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!

# HOMEWORK

Make a cheat sheet to study for your Unit 4 test!

Objective: SWBAT explain the relationship between electronegativity, ionization energy and reactivity!