

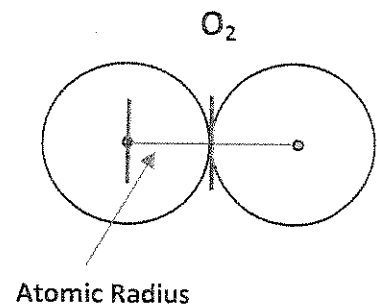
## Exploring Periodic Trends

### Introduction

Periodic trends are distinct patterns which exist in the periodic table due to the present day arrangement of the elements. Being familiar with these trends can help scientists to quickly predict different properties for the representative group elements. In this class, we will study the trends for atomic radii, electronegativity, ionization energy & reactivity. Today, we will begin by exploring the trends for atomic radius and ionization energy.

### Part 1: Atomic Radius

Atomic radius can be determined by calculating half the distance between nuclei of two identical atoms bonded together. This property is used to determine an atom's size. To determine the periodic trend associated with atomic radius, complete the activity and questions below.



### Instructions

- 1) On your group's iPad, navigate to [ptable.com](http://ptable.com).
- 2) Select the properties tab at the top of the screen.
- 3) Select "Radius" from the list of choices middle of the screen.
- 4) Determine & record the calculated radius for the elements with atomic number 1-20 on your worksheet.
- 5) Plot the points on the graph for atomic size.
- 6) Connect the points on the graph with a line.
- 7) Answer the questions about atomic radius.

### Part 2: Ionization Energy

Ionization energy is the energy required to remove an electron from an atom. We will be exploring the first ionization energy which is the amount of energy required to remove the first electron from an atom. To determine the periodic trend associated with ionization energy, complete the activity and questions below.

### Instructions

- 1) On your group's iPad, navigate to [ptable.com](http://ptable.com).
- 2) Select the properties tab at the top of the screen.
- 3) Select "Ionization" from the list of choices middle of the screen (it will automatically set it to 1<sup>st</sup> ionization energy).
- 4) Determine & record the first ionization energy for the elements with atomic number 1-20 on your worksheet.
- 5) Plot the points on the graph for ionization energy.
- 6) Connect the points on the graph with a line.
- 7) Answer the questions about ionization energy.



Name \_\_\_\_\_

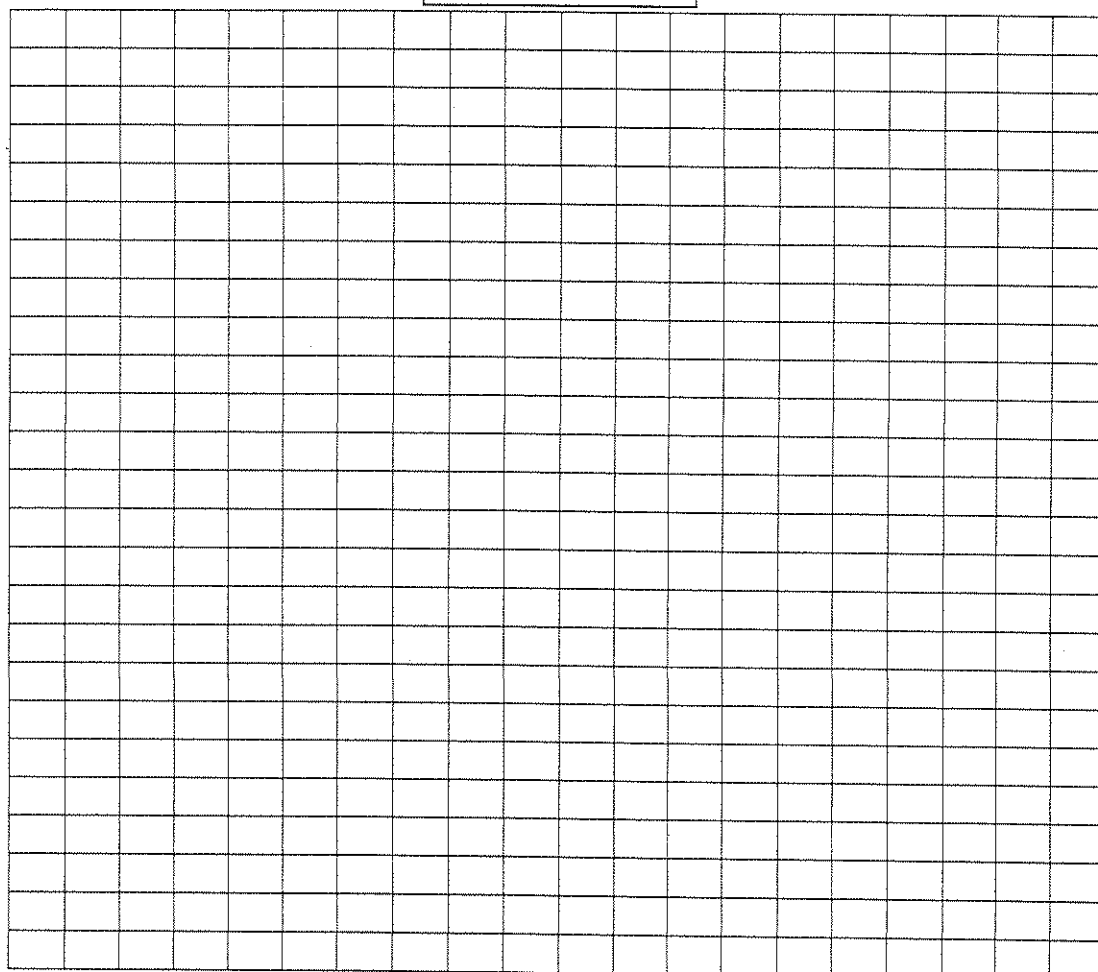
Period \_\_\_\_\_

Date \_\_\_\_\_

**Atomic Radius**

Atomic #	Radius (pm)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Atomic Radius (pm)



Atomic Number

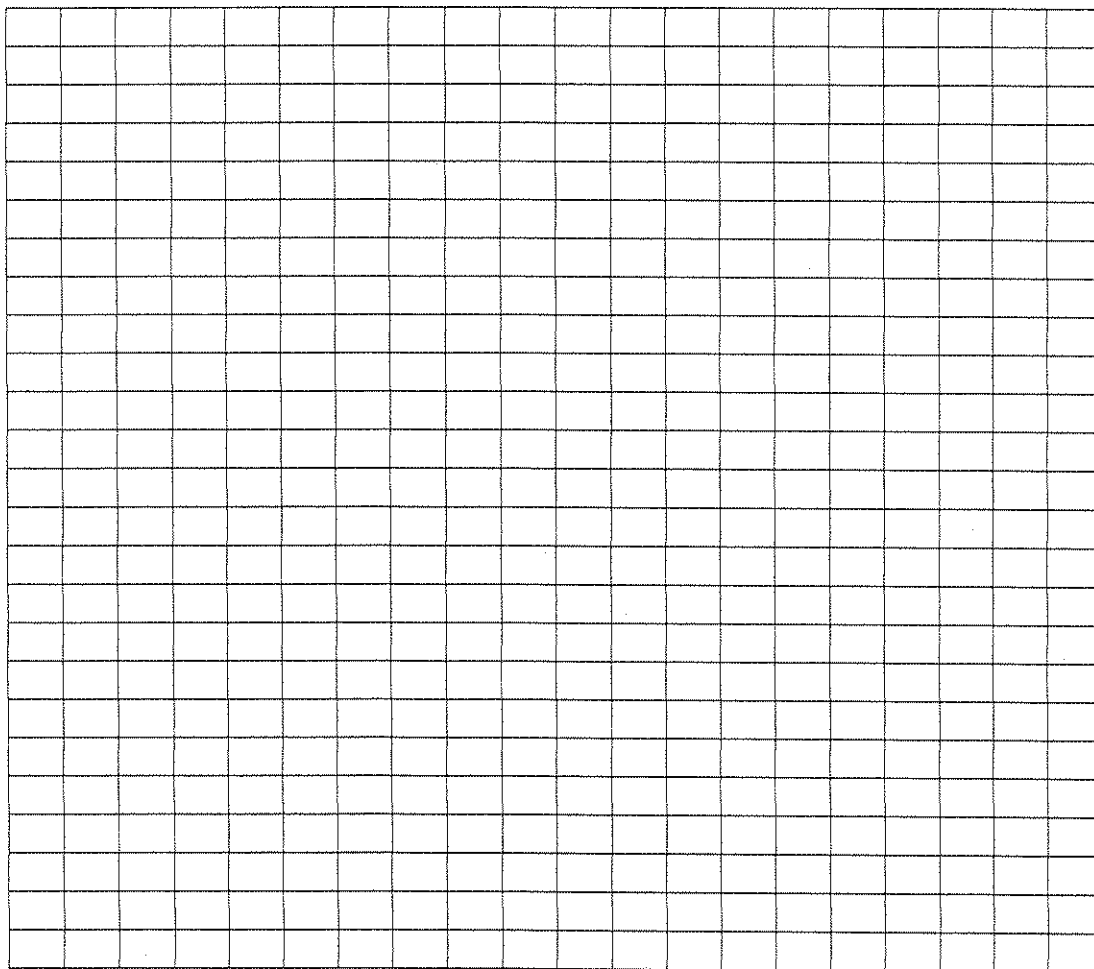
After you finish creating the graph, answer the following questions:

- 1) Look at the points for atomic numbers 3, 11 & 19. What pattern do you notice?
- 2) Look at the points for atomic numbers 2, 10 & 18. What pattern do you notice?
- 3) If you asked to predict the pattern for atomic numbers 33, 51 & 83 what would you predict?
- 4) Look at the points from atomic number 3 to 10. What pattern do you notice?
- 5) Look at the points from atomic number 11 to 18. What pattern do you notice?
- 6) If you were asked to predict the pattern for atomic numbers 37 to 54 what would you predict?
- 7) Summarize the overall periodic trend for atomic radius.

## Ionization Energy

Atomic #	1 <sup>st</sup> Ioniz. Energy (kJ/mol)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

1<sup>st</sup> Ionization Energy (kJ/mol)



Atomic Number

After you finish creating the graph, answer the following questions:

- 1) Look at the points for atomic numbers 3, 11 & 19. What pattern do you notice?
- 2) Look at the points for atomic numbers 2, 10 & 18. What pattern do you notice?
- 3) If you asked to predict the pattern for atomic numbers 33, 51 & 83 what would you predict?
- 4) Look at the points from atomic number 3 to 10. What pattern do you notice?
- 5) Look at the points from atomic number 11 to 18. What pattern do you notice?
- 6) If you were asked to predict the pattern for atomic numbers 37 to 54 what would you predict?
- 7) Summarize the overall periodic trend for atomic radius.