Atomic Radius Trends

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

Use the 2025 periodic table to locate groups and periods. Atomic radius in this worksheet refers to the relative size of neutral atoms.

1 Which element is expected to have a larger atomic radius than lithium because it is lower in the same group?

(1) Beryllium

(2) Sodium

(3) Boron

(4) Carbon

2 Sodium and chlorine are in the same period. Explain why a neutral chlorine atom is generally smaller than a neutral sodium atom. [1]

Answer and work

_____

_____

3 What typically changes as you move down a main-group column from one period to the next?

(1) The number of occupied principal energy levels increases.

(2) The number of protons decreases.

(3) The valence electrons move into a lower principal energy level.

(4) The occupied energy levels stay the same.

4 Use periodic trends to compare potassium and sodium. State which atom is larger and give a reason. [1]

Answer and work

_____

_____

Atom Model Scale

Use the information below to answer the questions.

A museum uses covalent radii from Cordero and colleagues (2008) to build atom models. The scale is 1 mm of model radius per 10 pm of covalent radius.

Element	Covalent radius (pm)
Na	166
Mg	141
Al	121
K	203

5 Which element’s model will have a radius closest to 14 mm?

(1) Na

(2) Mg

(3) Al

(4) K

6 Calculate the difference between the listed covalent radii of sodium and aluminum. Include units. [1]

Answer and work

7 Which comparison directly illustrates a decrease in radius across Period 3?

(1) Na to K

(2) K to Mg

(3) Na to Al

(4) Al to K

8 Two model labels for Na and K may have been swapped. The K-labeled model has a smaller radius. Explain how the table can help diagnose the mistake. [1]

Answer and work