ANSWER KEY.

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Metals, Nonmetals & Metalloids

Chemistry | ANSWER KEY

Use a periodic table. Show your work. Use the word bank and sentence frames where they are given.

1. Classify each element as a metal, nonmetal, metalloid, or noble gas.

Word bank: metal, nonmetal, metalloid, noble gas

(a) potassium (K) (b) phosphorus (P) (c) arsenic (As) (d) neon (Ne) (e) iron (Fe) (f) antimony (Sb) (g) iodine (I) (h) barium (Ba)

(a) **metal** (b) **nonmetal** (c) **metalloid** (d) **noble gas** (e) **metal** (f) **metalloid** (g) **nonmetal** (h) **metal**

2. A student tests four unknown solids. Classify each one as a metal, nonmetal, or metalloid, and give one piece of evidence.

Sample	Luster	Conductivity	Hammer test	Hydrochloric acid
W	Shiny	Good	Flattens	Fizzes
X	Dull	None	Shatters	No reaction
Y	Shiny gray	Weak	Shatters	No reaction
Z	Shiny	Good	Flattens	No reaction

Sentence frame for W: *Sample W is a* _____ *because* _____.

W: metal (shiny, conducts well, flattens). **X: nonmetal** (dull, does not conduct, shatters). **Y: metalloid** (shiny but brittle, weak conductor).

Z: metal (shiny, conducts well, flattens). Not every metal fizzes in acid; copper does not.

3. Physical or chemical? (a) to (d): is each a physical property or a chemical property? (e) and (f): is each a physical change or a chemical change?

(a) luster (b) fizzes in hydrochloric acid (c) conducts electricity (d) tends to lose electrons

(e) a metal is hammered into a thin sheet (f) magnesium fizzes in acid and gives off hydrogen gas

(a) **physical** (b) **chemical** (c) **physical** (d) **chemical**

(e) **physical change**: only the shape changes. (f) **chemical change**: new substances form, including hydrogen gas.

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4. Element Q is in group 1, period 5. Predict three of its physical properties. Will it tend to gain or lose electrons?

Group 1 is on the left side, so Q is a **metal** (it is rubidium). **Shiny, a good conductor, malleable** (also ductile and solid).

It tends to lose electrons and forms a cation, Rb^{+}.

5. Element R is in group 17, period 3. Is it a metal, nonmetal, or metalloid? Will it tend to gain or lose electrons?

Group 17 is in the upper right, so R is a **nonmetal** (it is chlorine). **It tends to gain electrons** and forms an anion, Cl^{-}.

6. Aluminum is used to make foil, and copper is used to make electrical wires. Explain each use with a property of metals.

Aluminum is malleable, so it can be rolled into thin sheets without breaking. **Copper is ductile and a good conductor**, so it can be pulled into wires that carry electricity.

7. Argon is used inside light bulbs, and helium is used in balloons. What property of noble gases makes these uses safe?

Noble gases are very unreactive. They almost never form compounds, so they do not burn or react with the hot filament or the air.

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