

Element Detective Notes

Use properties and periodic-table patterns to classify elements.

PS.4.b "elements are classified as metals, metalloids, and nonmetals."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Circle each named element, underline the words that give clues about its properties or location, and write M, Mt, or N beside it for metal, metalloid, or nonmetal.

Sorting the Elements

- ① Scientists sort elements by patterns in how their atoms behave. Metals usually have shiny surfaces, conduct heat and electric current well, and can often be bent or drawn into wire. Copper, used in electrical wires, is a metal because it conducts electricity easily. Aluminum is also a metal. Its light weight and ability to be shaped make it useful for cans and aircraft parts. Most metals appear on the left side and center of the periodic table.
- ② Nonmetals often have different traits. Many are dull when solid, do not conduct electricity well, and break instead of bending. Sulfur, a yellow solid used in some fertilizers, is a nonmetal. Oxygen is a nonmetal gas that living things use in respiration. Most nonmetals are on the right side of the periodic table. Hydrogen is also a nonmetal, even though it is placed on the left side. Location helps, but properties provide stronger evidence when scientists classify an element.
- ③ Metalloids have a mix of metal and nonmetal traits. They are found along the zigzag boundary between metals and nonmetals on the periodic table. Silicon is a metalloid. It can conduct electricity under certain conditions, so it is useful in computer chips and solar panels. Unlike a typical metal, silicon is brittle and can break rather than bend. A classification uses several clues together. One clue, such as a location or a shiny surface, may not tell the whole story.

2

ANSWER WITH EVIDENCE

Use the passage

1

How should copper be classified? Give one passage detail that supports your answer.

2

Why should hydrogen not be classified as a metal just because of its location on the periodic table?

3

According to the passage, where are most metals located on the periodic table?

4

How do silicon's traits show that it is a metalloid? Name two traits from the passage.

3

YOUR TURN

Your own words

Complete the table. For each element, classify it as a metal, metalloid, or nonmetal, then add one property, use, or placement detail from the passage.

ELEMENT	CLASSIFICATION	PASSAGE DETAIL

PART 1 • READ AND MARK

Circle each named element, underline the words that give clues about its properties or location, and write M, Mt, or N beside it for metal, metalloid, or nonmetal. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How should copper be classified? Give one passage detail that supports your answer.	Copper is a metal. It conducts electricity easily.
2	Why should hydrogen not be classified as a metal just because of its location on the periodic table?	Hydrogen is a nonmetal even though it is on the left side. Properties provide stronger evidence than location alone.
3	According to the passage, where are most metals located on the periodic table?	Most metals are on the left side and center of the periodic table.
4	How do silicon's traits show that it is a metalloid? Name two traits from the passage.	Silicon can conduct electricity under certain conditions, but it is brittle and can break rather than bend.

PART 3 • YOUR TURN (SAMPLE ANSWER)

ELEMENT	CLASSIFICATION	PASSAGE DETAIL
Aluminum	metal	It is light and can be shaped.
Sulfur	nonmetal	It is a yellow solid used in some fertilizers.
Silicon	metalloid	It is brittle and can break rather than bend.

Accept the stated classifications and any accurate passage detail for aluminum, sulfur, or silicon. For question 3, require the qualifier "most" before left side and center.