

# AIM | What is metal activity?

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You have seen rusted iron. But you have never seen rusted gold. Gold does not rust. It keeps its shine year after year—century after century.

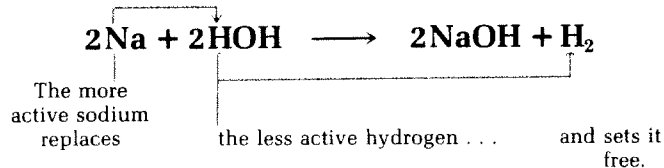
Iron forms compounds. So does gold. But iron forms compounds more easily than gold does. We say that iron is *more active* than gold.

Different metals have different activities. Let's compare aluminum and sodium.

If you drop a piece of aluminum into cold water, nothing happens. There is no reaction. If you drop a piece of sodium into cold water, it's a different story! The sodium and water react *immediately*. The sodium races across the surface of the water. Sometimes the sodium seems to burn with a yellow flame. It's easy to see that sodium is *more active* than aluminum.

If you drop a piece of potassium into the water, the reaction is even *more violent*. Potassium is even more active than sodium. The potassium races across the water even faster. And it always seems to burn with a violet flame.

In these reactions, the *more active* sodium and potassium *replace* the *less active* hydrogen of the water. This is the equation for the sodium/water reaction.



In any replacement reaction, a *more active* metal replaces a *less active* metal.

Chemists know how active each metal is. The table on the next page lists the metals in the order of their activity.

This table lets us predict many chemical reactions.

## UNDERSTANDING METAL ACTIVITY

A table of metal activity is shown on the right. It lists the metals according to their activity. Study the table. Then answer the questions.

M O R E A C T I V E	Lithium	Li	L E S S A C T I V E
	Potassium	K	
	Barium	Ba	
	Calcium	Ca	
	Sodium	Na	
	Magnesium	Mg	
	Aluminum	Al	
	Zinc	Zn	
	Iron	Fe	
	Tin	Sn	
	Lead	Pb	
	Hydrogen*	H	
	Copper	Cu	
	Mercury	Hg	
	Silver	Ag	
Platinum	Pt		
Gold	Au		

- Which is the *most* active metal?  
\_\_\_\_\_
- Which is the *least* active metal?  
\_\_\_\_\_
- Which is correct? (Circle the letter of the correct answer.)
  - A less active metal can replace a more active metal.
  - A more active metal can replace a less active metal.
- Which is more active,
  - sodium or iron? \_\_\_\_\_
  - tin or lead? \_\_\_\_\_
  - gold or silver? \_\_\_\_\_
  - tin or aluminum? \_\_\_\_\_
- Which is *less* active,
  - sodium or calcium? \_\_\_\_\_
  - zinc or tin? \_\_\_\_\_
  - copper or mercury? \_\_\_\_\_
  - hydrogen or platinum? \_\_\_\_\_
- Name the metals that *can* replace calcium. \_\_\_\_\_  
\_\_\_\_\_
- Name the metals that *cannot* replace mercury. \_\_\_\_\_  
\_\_\_\_\_
- Which is the only metal that can replace potassium? \_\_\_\_\_
- Can any metal replace lithium? \_\_\_\_\_
  - Why or why not? \_\_\_\_\_
- Can gold replace any metal? \_\_\_\_\_
  - Why or why not? \_\_\_\_\_

\*Hydrogen is included for reference.