

CHEMDU · COMMUNITY CHEMISTRY · LEVEL 1

LECTURE 2

Periodic Table

The Map of Everything: Why the Periodic Table Can Save Your Life

■ Duration: 50 minutes

Lecture script · with hooks, segments, demos, and key takeaways

Hook (opening 2 minutes)

Teacher holds up (or shows a photo of) two items:

A sodium chloride (table salt) shaker

A small chunk of pure sodium metal in oil (photo or video)

Teacher says: “Here are two things that contain sodium. One you put on your food every day. The other will explode if you drop it in water.

How can the same element be completely safe in one form and dangerous in another?

By the end of today, you will be able to answer:

How to read the periodic table like a map

Which families of elements are dangerous — and why

What the periodic table tells you about your vitamins, your batteries, and your safety”

SEGMENT 1: The Periodic Table Is a Map, Not a Monster (8 minutes)

Teacher says: “The periodic table looks complicated. But it’s really just a map. Like a map of a city, it shows you where things live and what they have in common.”

Show a simple, color-coded periodic table (free printable from ACS or PhET).

Teacher continues: “Let’s learn the three most important things about this map:

Rows = Periods (left to right). As you move across a row, the atomic number (number of protons) increases by one each time.

Columns = Groups or Families (up and down). Elements in the same column act similarly because they have the same number of outer electrons.

The staircase line separates metals (left) from nonmetals (right).”

Physical action (stand up / point):

“Point to the left side of the room — that’s where metals live on the table.”

“Point to the right side — that’s nonmetals.”

“Point to the middle — those are metalloids (like silicon in your computer).”

Quick partner talk (1 minute): “Tell your partner: One thing that is the SAME for all elements in one column.” (Answer: number of outer electrons → similar chemical behavior.)

SEGMENT 2: The Dangerous Families — and the Safe Ones (12 minutes)

Teacher says: “Now let’s meet the families that matter for your life and safety.”

Show or draw a simplified table with these groups highlighted:

Family Name	Location on Table	Personality	Real-World Example	Safety Rule
Alkali Metals	Far left (Group 1)	Super reactive — explode in water	Sodium (Na), Potassium (K)	Never touch pure alkali metals; they’re stored under oil
Alkaline Earth Metals	Next to left (Group 2)	Reactive, but less	Magnesium (Mg), Calcium (Ca)	Magnesium burns bright — used in flares
Halogens	Second from right (Group 17)	Toxic, corrosive	Chlorine (Cl — bleach), Fluorine	Never mix bleach with acids or ammonia
Noble Gases	Far right (Group 18)	Totally unreactive — “the snobs”	Helium (He), Neon (Ne)	Helium is safe to inhale? NO — can suffocate you. One balloon is fine.
Transition Metals	Middle block	Mostly safe in solid form	Iron (Fe), Copper (Cu), Gold (Au)	Essential for your body (iron in blood)

Interactive guessing game (3 minutes): “I’ll describe an element — you guess which family it’s in.”

“This gas is in glowing signs. It never reacts with anything.” (Noble gases)

“This metal explodes when it touches water. It’s stored under oil.” (Alkali metal)

“This yellow-green gas is in bleach. Never mix it with vinegar.” (Halogen)

Safety spotlight (2 minutes within this segment): “Two safety rules from the periodic table that could save your life:

Never mix bleach (contains chlorine, a halogen) with vinegar (acid) or ammonia. You will create chloramine or chlorine gas — both can kill you.

Never put pure alkali metals in water — but the compounds (like table salt, sodium chloride) are safe because the reaction already happened.”

SEGMENT 3: The Mystery of the Exploding Salt — Solved (6 minutes)

Teacher returns to the opening hook: “Remember: Salt = sodium + chlorine. Sodium alone explodes in water. Chlorine gas is poisonous. But together? Safe enough to eat.”

Draw or show this simple reaction:

text

Sodium (metal) + Chlorine (gas) → Sodium Chloride (table salt)

(dangerous) (dangerous) (safe)

Teacher explains: “When sodium and chlorine meet, they transfer an electron — sodium gives one electron to chlorine. That creates an ionic bond. The result is a completely new substance with new properties. This is why chemistry matters: you can turn dangerous things into safe things — and sometimes the opposite.”

Quick poll (show hands / chat): “Raise your hand if you’ve ever seen a ‘do not mix’ warning on a cleaning product.”

Teacher: “That warning exists because of the periodic table. Chlorine (bleach) is in the halogen family. Vinegar (acid) is in a different family. Together? Deadly gas.”

SEGMENT 4: Real-Life Reading — Your Vitamins, Your Batteries, Your Phone (10 minutes)

Teacher says: “The periodic table isn’t just in labs. It’s in your kitchen, your medicine cabinet, and your pocket.”

Show or describe these everyday items:

Item	Elements Inside	Periodic Table Location	Why It Matters
Multivitamin	Iron (Fe), Calcium (Ca), Zinc (Zn), Magnesium (Mg)	Transition metals + Alkaline earth metals	Your body needs these; you can see them on the label
Lithium-ion battery	Lithium (Li)	Alkali metal (Group 1)	Lightweight, reactive — why batteries can catch fire
Smartphone screen	Silicon (Si)	Metalloid (staircase line)	Si is a semiconductor — controls electricity
LED lights	Gallium (Ga), Indium (In)	Post-transition metals	Create bright colors with little heat
Toothpaste	Fluorine (F) in fluoride	Halogen (Group 17)	Prevents cavities — but pure fluorine is deadly

Partner talk (2 minutes): “Look at your partner’s clothing, water bottle, or phone. Name ONE element you think is in it — and guess which family it belongs to.”

Teacher circulates (or listens in) and then shares one example: “A water bottle might have titanium (transition metal) if it’s expensive, or just plastic (carbon, nonmetal).”

SEGMENT 5: The \$20 Bill Challenge — Can You Spot the Danger? (6 minutes)

Teacher says: “I’m going to describe a real situation. You decide: Is this safe, dangerous, or safe-if-done-correctly? Raise your hand with your answer.”

Scenario 1: “You buy a “rechargeable battery pack” for your phone. It says ‘Contains Lithium.’ You drop it, and the case cracks. You see a silvery metal inside. What do you do?”

Answer: Do not touch. Lithium reacts with moisture in the air (and your skin). Dispose of it at a battery recycling center. Tape the ends first.

Scenario 2: “Your multivitamin says: ‘Iron 18 mg.’ You decide to take the whole bottle because ‘more is better.’”

Answer: Dangerous. Iron overdose is toxic. Never exceed the labeled dose.

Scenario 3: “Your toilet is stained. You pour bleach (contains chlorine) and then vinegar (acid) to make it stronger. You see a greenish gas forming.”

Answer: Evacuate immediately. Open windows. Call poison control: 1-800-222-1222. You just made chlorine gas.

Teacher: “The \$20 bill is yours if you remember this one rule from the periodic table: Bleach (halogen family) does not mix with acids — ever.”

CLOSING — The 30-Second Challenge (4 minutes)

Teacher says: “Same as last week: Pair up. Person A talks for 30 seconds — say everything you remember about the periodic table and safety. Then Person B gets 30 seconds.”

After the challenge, show final takeaway table:

You learned...	So you can...
Columns = families with similar behavior	Predict whether an element is reactive or safe
Alkali metals (sodium) + water = explosion	Never touch pure alkali metals
Halogens (chlorine) + acids = deadly gas	Never mix bleach with vinegar or ammonia
Transition metals (iron, zinc) = in your vitamins	Read supplement labels safely
Noble gases = unreactive (but helium can suffocate)	Use helium safely — no deep inhaling

Final line (preview of next week): “Next week: Chemical Bonding. You’ll learn why water and oil don’t mix — and why that knowledge can save you from a poison on your skin. See you then.”

SUPPLEMENTARY MATERIALS FOR LECTURE 2 (No Grade)

Resource	Source	What It Covers	Link
Periodic Table Game – “Which Element?”	PhET / various	Identify elements by family and property	Search “PhET periodic table game”
ACS Periodic Table Poster (free PDF)	American Chemical Society	Print or screen-share a colorful table	ACS.org
Video: “The Periodic Table – Families”	Khan Academy	8-minute overview of groups	YouTube search “Khan Academy periodic table families”
Video demonstration: Sodium + water explosion	YouTube (any safety-vetted source)	Shows why alkali metals are dangerous	Search “sodium water explosion demonstration”
Printable family coloring sheet	Various (free)	Students color alkali metals red, halogens blue, etc.	Search “periodic table coloring activity PDF”

OPTIONAL “NO-PRESSURE” ASSIGNMENT

“Between now and next session, find ONE thing in your home that has an element name on the label (examples: iron, calcium, lithium battery, aluminum foil). Next time, tell us: what element, and what family is it in?”