“Mystery Elements” and Clues

Inspired from NOVA’s Hunting the Elements

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1. In 1868, French astronomer Pierre Janssen first noticed this element as a bright yellow line in the solar spectrum. Is it … hydrogen, helium, neon, or fluorine?

Additional clues:
1. It boils at -268.93 °C, the lowest boiling point of all the elements.
2. It’s the second most abundant element in the universe.
3. It tops the group of noble gases.
4. It puffs up party balloons and blimps.

Answers:
- Helium
- 2
- He

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2. Which element is named for a famous Renaissance man even though it didn’t exist in nature during the Renaissance? Is it … leonardium, newtonium, copernicium, or nobelium?

Additional clues:
1. It may have isotopes, yet undiscovered, that inhabit an “island of stability.”
2. Its most stable isotope known to date has a half-life of only 29 seconds.
3. A marriage of lead and zinc gave birth to it.
4. It was named after a revolutionary astronomer.

Answer:
- Copernicium
- 112
- Cn

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3. An elevator to space might one day ride up super-strong tracks made from this element. Name it! Is it … titanium, carbon, nickel, or steel?

Additional clues:
1. It’s the fourth most abundant element in the universe.
2. In its most precious form, it has the highest melting point of all the elements, 3550 °C.
3. It’s the kingpin of organic chemistry.
4. A burnt burger is coated with this element.

Answer:
- Carbon
- 6
- C

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4. Antoine Henri Becquerel discovered radioactivity by exposing a photographic plate to which element? Is it … radium, radon, uranium, or plutonium?

Additional clues:

1. It's a silvery-white member of the Actinide family that can be found in nature.
2. One kilogram of this element can produce almost a million times more energy than a kilogram of coal.
3. As a fuel for nuclear reactors and weapons, it's a dangerous commodity.
4. Discovered eight years after the discovery of the seventh planet from the Sun, it has a similar name.

Answer:
- Uranium
- 92
- U

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5. Which element accounts for the brilliant green colors of the aurora borealis? Is it … oxygen, nitrogen, helium, or neon?

Additional clues:
1. It's the most abundant element in the human body, making up 61% of you.
2. It's the third most abundant element in the sun and in the universe as a whole.
3. Plants produce it through photosynthesis.
4. Mountain climbers carry it to the highest peaks in the world.

Answer:
- Oxygen
- 8
- O

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6. Highly prized by alchemists, this metal was sometimes represented by the symbol of a serpent. Name it!

Is it .. palladium, cadmium, mercury, or platinum?

Additional clues:
1. While used as a medicine and cosmetic in ancient China and Greece, it's now known to be highly toxic.
2. It's also known by the name hydrargyrum, derived from the Greek words for water and silver.
3. Fish at or near the top of the food chain, like tuna, can contain high levels of it, a byproduct of industrial pollution.
4. It filled old-fashioned thermometers.

Answer:
- Mercury
- 80
- Hg

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7. While relatively rare on Earth, this element is the fifth most abundant in the universe. Is it … argon, helium, neon, or xenon?

Additional clues:
1. It has the second lowest melting point of all the elements, -248.59 °C.
2. In 1898, British chemists William Ramsay and Morris Travers were the first people to see this element glow.
3. Its name derives from the Greek word for "new."
4. When energized by electricity, its orange-red glow lights up diner and donut shop signs.

Answer:
- Neon3
- 10
- Ne

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8. Which transition metal has the second highest melting point of all the elements, 3422 °C? Is it … copper, tungsten,, scandium, or zinc?

Additional clues:
1. During World War II, it played a key role in the armaments industry.
2. Its name comes from the Nordic words for "heavy stone," a reflection of its high density.
3. This element's chemical symbol relates to its German name, wolfram.
4. Because it stays intact at high temperatures, it's commonly used in light bulb filaments.

Answer:
- Tungsten
- 74
- W

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9. Photographers used a powder of this element to provide light in the early days of flash photography. Name it! Is it … iridium, sodium, magnesium, or zinc?

Additional clues:
1. It's extremely flammable and hard to extinguish—burning even when dosed by water or typical fire-extinguishing gasses.
2. It does not exist in a pure form in nature because it combines so readily with other elements—forming as many as 60 separate minerals.
3. Highly concentrated in Earth's mantle, it's the fourth most abundant element on our planet.
4. Its compounds are common in laxatives and antacids, and one of these compounds has the nickname "milk of _____."

Answer:
- Magnesium
- 12
- Mg

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10. Which element comes first in Tom Lehrer's classic 1959 song "The Elements"? Is it … hydrogen, antimony, carbon, or actinium?

Additional clues:
1. The ancient Egyptians used a sulfide compound of this element as eyeliner.
2. It later became a popular medieval laxative—effective at causing elimination because of its toxicity.
3. Its name derives from the Greek for "not found alone."
4. While this element's name starts with an "A," its chemical symbol is an abbreviation for its Latin name, stibium.

Answer:
- Antimony
- 51
- Sb

11. Which element is the second most abundant element in Earth's crust, making up 27% of it? Is it … iron, silicon, aluminum, or tin?

Additional clues:
1. With the same valence number as carbon, it could be the basis of life elsewhere in the universe.
2. It's found in quartz.
3. It's sometimes confused with a synthetic rubber used for oven mitts and medical implants. (The synthetic does, however, incorporate this element.)
4. It's the semiconductor at the heart of computer chips and solar cells.

Answer:
- Silicon
- 14
- Si

12. During the Victorian era, wealthy women sometimes consumed concoctions of this element to make their skin paler. Is it … magnesium, arsenic, zinc, or sulfur?

Additional clues:
1. This metalloid is added to bronze, copper, and other alloys to provide strength.
2. Before the age of penicillin, doctors used it to treat syphilis.
3. A key component of pesticides and herbicides, it has contaminated ground water in many parts of the world.
4. Combined with "Old Lace," it makes a classic Frank Capria film.

Answer:
- Arsenic
- 33
- As

13. The compounds in onions that can make you cry contain this element. Is it … chlorine, nitrogen, potassium, or sulfur?

Additional clues:
1. Ancient Egyptians and Greeks exploited its medicinal properties, and Song Dynasty Chinese first used it in gunpowder.
2. It's a solid at room temperature, but when burned it becomes a red liquid.
3. Associated with the devil, it's the stuff of "fire and brimstone."
4. You might smell it in its pure form at Yellowstone National Park or on Mt. St. Helens.

Answer:
- Sulfur
- 16
- S

14. During the Cold War, the Soviet Union pioneered the use of which metal for military applications? Is it … aluminum, platinum, titanium, or scandium?

Additional clues:
1. This transition element has the highest strength-to-weight ratio of any metal.
2. A bright white oxide of this element is the pigment most commonly used in white paint.

3. Its name has become a buzzword for marketing consumer goods—from golf clubs and bicycles, to belly button rings.
4. It was named after the powerful Greek deities who were overthrown by the Olympians.

Answer:
- Titanium
- 22
- Ti

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15. Ions of this element are critical to human health, and a shortage of them can lead to a potentially fatal condition called hypokalemia. Name the element! Is it … sodium, lithium, potassium, or cesium?

Additional clues:
1. Extremely reactive and a powerful reducing agent, it will explode if dropped into water.
2. Its positive ions, or cations, are critical for cell membrane functions, including nerve transmission.
3. Never seen in its pure form in nature, it was first isolated in 1807 from plant ashes called potash.
4. To get more in your diet, eat bananas!

Answer:
- Potassium
- 19
- K

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16. In 1952, American scientists discovered this element in the fallout of the first hydrogen bomb ever tested. Is it … einsteinium, technetium, radium, or americium?

Additional clues:
1. It is highly radioactive and has no known use outside of scientific research.
2. Its most stable isotope has a half-life of 471.7 days.
3. It's a neighbor of Californium on the periodic table.
4. It was named for the most famous scientist of the 20th century.

Answer:
- Einsteinium
- 99
- Es

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17. Scientists fused nuclei of this element together with plutonium nuclei to make the super-heavy synthetic element 114. Is it … magnesium, calcium, technetium, or phosphorus?

Additional clues:
1. It gets its name from the Latin word for lime (the gardening supplement, not the fruit).
2. It's the 5th most abundant element in the human body as well as in Earth's crust.
3. While you might think "white and chalky," it's a silvery metal in its pure form.
4. It's essential for your bones and teeth, so eat your broccoli and drink your milk.

Answer:
- Calcium
- 20
- Ca

18. Which element has the highest atomic number of all stable (non-radioactive) elements? Is it … thallium (#81), lead (#82), bismuth (#83), or polonium (#84)?

Additional clues:
1. Its chemical symbol sometimes confuses chemistry students.
2. A toxic and sometimes deadly element, it can accumulate in tissues and cause nervous system and blood disorders.
3. Yet it's sometimes present in the paint on older houses.
4. If you really were to "bite the bullet," you would get a mouthful of it.

Answer:
- Lead
- 82
- Pb

19. Which element is the sixth most abundant in the human body and one of six elements considered essential for life? Is it … phosphorus, sodium, carbon, or nitrogen?

Additional clues:
1. High levels of this element in urine can be a sign of disease.
2. It's a key ingredient in fireworks and explosives.
3. Mere friction can ignite it—think of the red tips of kitchen matches, which get their color and spark from the red form, or allotrope, of this element.
4. Its name derives from the Greek words for "light" and "bearer."

Answer:
- Phosphorus
- 15
- P

20. This element, which is insoluble in nitric acid, helped give rise to the term "acid test." Is it … platinum, silver, gold, or tin?

Additional clues:
1. It's valued as a corrosion-resistant conductor of electricity. Many cell phones contain small amounts of it.
2. Its chemical symbol comes from the Latin word aurum.
3. The U.S. government holds nearly 9,000 tons of it in reserve depots around the country.
4. Pyrite is the fool's version of it.

Answer:
- Gold
- 79
- Au

21. This highly reactive element is often used for its power to disassemble the membranes of bacteria. Is it … fluorine, chlorine, zinc, or neomycin?

Additional clues:
1. It's highly toxic in its pure state, yet the 10th most abundant element in the human body.
2. It's the third most abundant element in the world's oceans.

3. You likely consume it every day—sprinkled, along with sodium, on your food.
4. It's most commonly associated with swimming pools, where it's used as a disinfectant.

Answer:
- Chlorine
- 17
- Cl

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22. Which element is named for the Swedish village near where it was discovered in 1878? Is it … tungsten, yttrium, thulium, or ytterbium?

Additional clues:
1. It's a member of the lanthanide family of lustrous, malleable metals.
2. When it's placed under pressure, its electrical resistance increases dramatically—an unusual property that makes it useful in seismic gauges.
3. It's one of only two elements that have names beginning with "y."
4. If you guessed wrong, just try the other answer starting with "y"!

Answer:
- Ytterbium
- 70
- Yb

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23. It's the most abundant metal on our planet, making up 8.1% of Earth's crust. Name it! Is it … iron, tin, aluminum, or nickel?

Additional clues:
1. In 1886, an American chemist devised a way to purify it from ore—a key advance in the Industrial Revolution.
2. It's too chemically reactive to exist in a pure metallic form in nature.
3. In 1913, candy makers in the U.S. first used it in a foil for wrapping sweets.
4. It's the strong, lightweight stuff of bicycle frames and soda cans.

Answer:
- Aluminum
- 13
- Al

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24. Of all the elements that are solid at room temperature, which is the least dense? Is it … rubidium, cesium, lithium, or francium?

Additional clues:
1. It's a lightweight alkali metal that's soft enough to cut with scissors.
2. Silvery-white, it quickly forms a black tarnish when exposed to air.
3. Psychiatrists use it to treat bipolar disorder.
4. It powers cell phones and laptop computers.

Answer:
- Lithium
- 3
- Li

25. What's the sixth most abundant element in the universe? Is it … oxygen, iron, nitrogen, or boron?

Additional clues:
1. It's also the fourth most abundant element in Earth's crust.
2. It's primarily obtained from the minerals hematite and magnetite.
3. An Age in history was named for it.
4. It's vital to how hemoglobin carries oxygen through your bloodstream, but its affinity for oxygen also means that it's prone to rust.

Answer:
- Iron
- 26
- Fe

26. Scottish physician Daniel Rutherford discovered this element in 1772 and called it "noxious air." Name it! Is it … argon, hydrogen, nitrogen, or methane?

Additional clues:
1. Medieval alchemists called an acid of this element aqua fortis, Latin for "strong water."
2. This odorless gas makes up 78% of Earth's atmosphere.
3. At -196 °C it is a liquid, and a favorite prop for chemistry and magic shows.
4. It's a key element in fertilizers, explosives, poisons, and plastics.

Answer:
- Nitrogen
- 7
- N

27. What's the fourth most common element in the world's oceans? Is it … hydrogen, sodium, chlorine, or oxygen?

Additional clues:
1. It exists in nature only in combination with other elements, not in its elemental form.
2. If dropped into water, this alkali metal will explode and generate hydrogen gas.
3. Its ions are essential to how nerve cells communicate.
4. Eating too much of one of its compounds can raise your blood pressure.

Answer:
- Sodium
- 11
- Na

28. Compounds made with this element helped treat wounded soldiers in World War I, but overdoses caused patients to turn blue, a condition called argyria. Name it! Is it … argon, arsenic, cadmium, or silver?

Additional clues:
1. It has been used to "seed" clouds and produce rain.
2. Of all the elements on the periodic table, it's the best conductor of heat and electricity.
3. It's the shiniest of metals, but it tarnishes more quickly than other elements.
4. Paul Revere crafted this precious metal into tableware.

Answer:
- Silver
- 47
- Ag

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29. Together with carbon, it forms Teflon, the non-stick coating on many pots and pans. Name it! Is it … phosphorus, fluorine, bromine, or chlorine?

Additional clues:
1. It's the most electronegative and chemically reactive element on the periodic table.
2. Several chemists died trying to be the first to isolate it.
3. In its pure form as a pale yellow gas, it's highly corrosive and toxic.
4. When combined with sodium and phosphate, it is commonly used in toothpaste.

Answer:
- Fluorine
- 9
- F

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30. Which element has the lowest melting point, -259.14 °C (-434.452 °F)? Is it … radon, xenon, hydrogen, or lawrencium?

Additional clues:
1. A type of chemical bond is named for it.
2. It's the primary stuff of stars, including our sun.
3. It makes up 90% of all atoms in the universe.
4. It's numero uno on the periodic table.

Answer:
- Hydrogen
- 1
- H