

Round 3

Justin Abel • Brad Fischer • James Fischer • Pavithr Goli • Mike Laudermitth
Jessica Markley • Sophie Netzel • Kristin Strey • Ethan Strombeck • Lana Kay Tutterow
Tyler Vaughan

Tossups

(1) **On the Pauling scale, calcium’s electronegativity is this number. Racemization [RAY-suh-mah-ZAY-shun] requires this many steps. Silver’s most common oxidation state is this number, which is also the number of hydroxyl groups in phenol. A (*) methyl group contains this many carbon atoms, and halogens need this many additional electrons to reach a full valence octet. For ten points, give this group number of the alkali metals that is also hydrogen’s atomic number.**

ANSWER: one (accept plus one or one plus)

(2) **This historian wrote the book *The Naval War of 1812* to advocate for building American naval power, which he later accomplished as a politician by funding the Great White Fleet. With the First Volunteer (*) Cavalry Regiment, this man became the “Hero of San Juan Hill” before being elected Vice President under McKinley. For ten points, name this member of the Rough Riders, who was the twenty-sixth U.S. president.**

ANSWER: Theodore Roosevelt Jr. (accept Teddy Roosevelt; prompt on “Roosevelt” alone)

(3) **This action can be performed by Zen Buddhists using a tsu-ku-bai. In Judaism, the limited “netilat yadayim” form of this action can be performed using a cup. This action is performed symbolically through the Christian practice of (*) baptism, and can be performed by Hindus in the Ganges River. For ten points, name this ritual action in which believers purify all or part of their bodies using water.**

ANSWER: washing (accept equivalents like bathing; accept specific descriptions like cleaning one’s hands or washing one’s face; prompt on less specific descriptions like “purifying” or “purifying oneself” before “purify” is read)

(4) **In this novel, Rose Maylie and Mr Brownlow collect information from Nancy shortly before she is murdered by Bill Sikes. This novel’s title orphan is recruited to a gang of pickpockets led by (*) Fagin by a boy nicknamed the Artful Dodger. For ten points, name this novel in which a young boy accidentally enters a life of crime when he is kicked out of a workhouse for asking for more gruel.**

ANSWER: Oliver Twist; or, the Parish Boy’s Progress

(5) **On an episode of this show, titled “Judgment Night,” a passenger aboard the *Queen of Glasgow* discovers he’s actually a U-boat captain being punished for war crimes. On another episode of this show, William Shatner insists that there’s “some... (*) THING on the wing.” A 2019 remake of this show was narrated by Jordan Peele. Rod Serling created, for ten points, what 1960s anthology show known for its science fiction and supernatural twists?**

ANSWER: The Twilight Zone

(6) **This country's Project 596 was part of its "Two Bombs, One Satellite" goal. This country broke with the Soviet Union over ideological differences in the application of Leninism. In 1972, this country hosted (*) Richard Nixon for a diplomatic visit organized by Zhou Enlai [zhoh en-lah-ee]. For ten points, name this communist power that, for much of the twentieth century, was led by Chairman Mao Zedong.**

ANSWER: China (accept People's Republic of China; accept Zhongguo Renmin Gongheguo)

(7) **A "Wankel" [VON-kull] one of these devices uses a Reuleaux triangle rotor. This device's "Carnot" [kar-NOH] type has perfect efficiency. A "four-stroke" type of these devices once relied on carburetors for proper air mixture. (*) Piston compression causes ignition in the "Diesel" type of these devices, which may convey rotational motion via crankshaft. For ten points, which device's "internal combustion" type is found in most cars?**

ANSWER: engines (accept motors; accept Wankel engine, Carnot engine, Diesel engine, or internal combustion engine)

(8) **A poem at the bottom of this expressionist painting describes two friends who walked on "above the blue-black / Fjord," and who appear in this painting's background near a railing. A red sky in this painting illuminates boats on the water in a harbor in (*) Oslo, behind a hairless human figure. For ten points, name this painting by Edvard Munch whose subject raises their hands to their face and opens their mouth wide.**

ANSWER: The Scream (accept Der Schrei der Natur or The Scream of Nature; accept Skrik)

(9) **In a story by this author translated by Jean de la Fontaine, one of the title characters is told to "dance" instead of eating, since she spent the summer singing. In another story by this author, a title character loses a (*) race against a slower, but more diligent, animal. For ten points, "The Ant and the Grasshopper" is attributed to what Greek slave, whose namesake fables include "The Tortoise and the Hare?"**

ANSWER: Aesop

(10) **A palace in this country contains the Court of the Myrtles, and was built during the Nasrid Dynasty. In this country, an eighteen-spired cathedral combining Gothic and Art Nouveau styles has been under construction since 1882, and was designed by (*) Antoni Gaudí. The Alhambra in Granada is within, for ten points, what European country, where the Sagrada Familia cathedral is being built in Barcelona?**

ANSWER: Spain (accept Kingdom of Spain; accept Reino de España)

(11) **This composer wrote a set of *Variations* to help Count Keyser-lingk deal with his insomnia. This composer dedicated a set of concertos to Margrave Christian Ludwig of Brandenburg, and used all twenty-four major and minor keys to write a set of preludes and (*) fugues [fyoogs]. For ten points, name this German Baroque composer whose works for keyboard instruments include the *Goldberg Variations* and *The Well-Tempered Clavier* [klah-veer].**

ANSWER: Johann Sebastian Bach (accept J.S. Bach)

(12) **Tourism to this historic compound usually includes visits to the towns of Zalesye and Kopachi and a tour of the Red Forest. This compound's New Safe Confinement was built in 2016 over a concrete sarcophagus around (*) reactor number four. This compound's "elephant's foot" was discovered by "liquidators" in 1986. For ten points, name this power plant near the town of Pripyat in Ukraine, the site of a massive nuclear disaster.**

ANSWER: Chernobyl Nuclear Power Plant (accept ChNPP; accept Vladimir Lenin Nuclear Power Plant)

(13) **This literary character stores a sixpenny birthday gift in a wooden box and eats it over several weeks. This boy receives an inheritance by outlasting a girl who falls down a trash chute and one who chews an entire meal in a (*) stick of gum and becomes a blueberry. For ten points, Veruca Salt and Violet Beauregard compete with what fictional boy who, in a book by Roald Dahl, tours Willy Wonka's chocolate factory?**

ANSWER: Charlie Bucket (accept either underlined name)

(14) **In his taxonomy, Carl Linnaeus described three classifications at this level, including Regnum Lapideum, where he placed rocks. Some classification systems of living things divide one of these ranks, the (*) Monerans, into Archaea and Bacteria. This level of classification in biology is more specific than a domain, but less specific than a phylum. For ten points, name this classification level that can classify living things as protists, plants, or animals.**

ANSWER: kingdom

(15) **This country's city of Maidan Shahr was briefly led by Zarifa Ghafari, its youngest female mayor. A bombing killed nearly two hundred people at this country's Hamid Karzai Airport. This country's last president, (*) Ashraf Ghani, fled to nearby Uzbekistan in August 2021. Two weeks of airlift evacuations followed the American withdrawal from, for ten points, what Asian country led from Kabul by the Taliban?**

ANSWER: Afghanistan (accept Islamic Emirate of Afghanistan; accept Da Afganistan Islami Imarat; accept Emarat-e Eslami-ye Afghanestan; accept Islamic Republic of Afghanistan; accept Jumhuri-yi Islami-yi Afganistan; accept Da Afganistan Islami Jumhoryat)

(16) **One of these religious structures has a "Cannibal Hymn" inscribed on its walls as part of a "Text" named for these places, and was built for Teti. One of these structures near Saqqara was built for Djoser [JOH-sur] by Imhotep. (*) Mastabas were a "stepped" type of these structures, three of which were built for rulers like Khafre and Khufu near Giza. For ten points, name this large, imposing kind of structure where Egyptian pharaohs were buried.**

ANSWER: pyramids (accept pyramids of Giza; accept descriptions of specific pyramids, such as the Pyramid of Teti, Djoser, Menkaure, Khafre, and/or Khufu; prompt on more general terms like "tomb," "necropolis," or "burial place")

(17) **When this type of angle is involved, the Law of Cosines reduces to the Pythagorean Theorem. Orthogonal lines meet at this type of angle. Triangles can contain a no more than one of either an (*) obtuse angle or an angle of this type. Perpendicular lines meet at this type of angle. For ten points, name this type of angle that measures exactly ninety degrees.**

ANSWER: right angle (accept right alone after "angle" is read)

(18) **During this geological period, the Sierra Nevadas formed and gymno-sperms replaced seed ferns as the dominant flora. Named for a European mountain range that contains the world's largest dinosaur tracks, this period included the bird-like (*) *Archaeopteryx* [ar-kee-op-teh-rix].** This period was dominated by megafauna like *Allosaurus*, *Stegosaurus* and huge sauropods like *Brontosaurus*. For ten points, name this Mesozoic period between the Triassic and Cretaceous.

ANSWER: Jurassic period

(19) **This thinker wrote a popular newspaper column under the pseudonym Silence Do-good, and used another false name when he published (*) *Poor Richard's Almanac*.** This politician created America's first volunteer fire department, and served as the first Postmaster General in the presidential cabinet. For ten points, name this founding father whose portrait appears on the one-hundred dollar bill.

ANSWER: Benjamin Franklin

(20) **In this novel, Emily de Thoux [duh TOO] meets Cassy and Emmeline after they scare a wealthy landowner to death. Eliza leaves Emily Shelby's home to save her son, Harry, in this novel. George helps search for Chloe's husband, who is (*) purchased from the family of Augustine St Clare in this novel, and who is beaten to death on the orders of Simon Legree.** For ten points, name this novel about a peaceful American slave, written by Harriet Beecher Stowe.

ANSWER: Uncle Tom's Cabin; or, Life Among the Lowly

Bonuses

(1) A modified type of this structure called a tableau [tab-low] is used in the simplex method for linear programming. For ten points each,

Name these mathematical objects that organize values into rows and columns.

ANSWER: matrix (accept matrices)

If you multiply matrix A times matrix B, you may or may not get the same answer as when you multiply B times A. Thus, matrix multiplication does *not* have this property.

ANSWER: commutativity (accept word forms like commutative)

Multiplying a matrix by this specific type of matrix will always be commutative because multiplying by this matrix does not change the original matrix. In the same way, multiplying any real number by the number one will return the original number because one is a “multiplicative” one of these.

ANSWER: identity matrix (accept multiplicative identity)

(2) In 1912, the Royal Albert Hall hosted an enormous benefit concert for the families of the musicians who played during a maritime tragedy. Answer the following about the concert, for ten points each.

The concert memorialized the band of this “unsinkable” White Star Line ship, which sank while sailing from England to America in 1912.

ANSWER: RMS Titanic

The concert included a performance of this composer’s *Funeral March*. This Polish composer also wrote the *Revolutionary Étude* and the *Minute Waltz*.

ANSWER: Frédéric Chopin (accept Frédéric François Chopin; accept Fryderyk Franciszek Chopin)

This British composer conducted part of the concert, which included a performance of this man’s *Enigma Variations*.

ANSWER: Edward Elgar (accept Sir Edward William Elgar)

(3) One of these objects is at the center of astronomical object 3C 273, which is the most distant object visible through a backyard telescope because it is brighter than all stars in its surrounding galaxy combined. For ten points each,

Name these astronomical objects that are so dense that not even light can escape from their event horizons.

ANSWER: black holes

3C 273 is one of these objects, the most luminous type of object in the universe. These objects are composed of an active galactic nucleus powered by a supermassive black hole.

ANSWER: quasars (accept quasi-stellar object and QSO)

Radio astronomer Maarten Schmidt confirmed the vast distance between quasars and Earth by measuring the high degree of this shift, an example of the Doppler effect.

ANSWER: redshift (do not accept or prompt on “blueshift”)

(4) A modern country named for this empire has its capital at Bamako. For ten points each,

Name this north African empire ruled by Sundiata Keita and Mansa Musa.

ANSWER: Malian Empire (accept Republic of Mali; accept Manden Kurufaba)

The Mali Empire was rich in gold and this mined, mineral resource that is essential for human life, and that is the most common food seasoning.

ANSWER: salt (accept table salt; accept rock salt; accept halite; accept sodium chloride or NaCl)

Mali traded salt and gold over this hot desert in northern Africa.

ANSWER: Sahara (accept as-sahra al-kubra)

(5) This literary character travels through India, Hong Kong, and the United States, but is described as “one of those English gentlemen who are wont to see foreign countries through the eyes of their domestics.” For ten points each,

Name this fictional adventurer who lets his French servant, Passepartout [pas-par-too], do most of the legwork as they circumnavigate the globe as quickly as possible.

ANSWER: Phileas Fogg

Phileas Fogg was created by this French author of adventure novels like *Journey to the Center of the Earth* and *Twenty Thousand Leagues Under the Sea*.

ANSWER: Jules Verne (accept Jules Gabriel Verne)

Phileas Fogg is the protagonist of this Jules Verne novel, in which he wins a bet against London’s Reform Club by completing the title achievement.

ANSWER: Around the World in Eighty Days (accept Le tour du monde en quatre-vingts jours)

(6) Answer these questions about Odin’s quest for knowledge, for ten points each.

Odin traded one of these body parts to be able to drink magical water that would give him wisdom.

ANSWER: eye

Odin gave his eye to this god so that he could drink the water of wisdom. After this god was decapitated, Odin magically kept his head alive as a source of advice.

ANSWER: Mimir (accept Mim)

Seeking even more wisdom, Odin hung himself from the world-tree Yggdrasil [IGG-drah-zil] with his spear to gain knowledge of these symbols, which were used for writing and fortune telling.

ANSWER: runes (prompt on “letters” or “alphabet”)

(7) You've decided to buy a DNA testing kit and get your genealogical profile. Answer these questions about the process, for ten points each.

Before the company can sequence the DNA in your saliva sample, this process is used to amplify the DNA. This process uses a thermal cycler and *Taq* [tack] polymerase enzyme.

ANSWER: **PCR** (accept **polymerase chain reaction**)

The company can trace your matrilineal ancestry using DNA from your mitochondria. If you are male, your father's line can be traced using this chromosome.

ANSWER: **Y** chromosome

Since 2012, companies can look for variants in genes like SPAG17 and TTF1 to determine what percentage of your DNA was inherited from this other humanoid species that went extinct about forty thousand years ago.

ANSWER: **Neanderthals** (accept ***Homo neanderthalensis***)

(8) This American poet's works, such as "I'm Nobody! Who are you?" usually lack official titles, and are instead known by their first lines. For ten points each,

Name this reclusive poet, nicknamed the "Belle of Amhurst," who wrote "I felt a funeral in my brain" and "A narrow Fellow in the Grass."

ANSWER: Emily **Dickinson** (accept Emily Elizabeth **Dickinson**)

The first lines of one Emily Dickinson poem say, "Because I could not stop for [this thing] - / He kindly stopped for me." The poem describes a carriage ride to a grave with this concept and "Immortality."

ANSWER: **death** (accept **Because I could not stop for Death -**)

In another poem by Dickinson, this animal's "Blue - uncertain stumbling Buzz" breaks up "the Stillness in the Room." The title and first line of the poem says, "I heard [this animal] buzz - when I died."

ANSWER: **fly** (accept **I heard a Fly buzz - when I died -**)

(9) Answer the following about the landmark interstate commerce case *Gibbons v. Ogden*, for ten points each.

The monopoly in *Gibbons v. Ogden* was ruled unconstitutional by this highest American judicial body. At the time of the judgement, this body was led by Chief Justice John Marshall.

ANSWER: **Supreme Court** of the United States (accept **SCOTUS**)

In *Gibbons v. Ogden*, the Supreme Court ruled against a monopoly of these specific vessels, which were used for shipping and transit through the rivers of New York state in the 1800s.

ANSWER: **steamboats** (accept **steamships**; prompt on "boat" or "ship")

This American entrepreneur, nicknamed "Commodore," worked as a steamboat captain and business manager for Gibbons, and combatted other steamboat monopolies before building a railroad empire.

ANSWER: Cornelius **Vanderbilt**

(10) This author developed his most famous argument over time, from its original use in *Discourse on the Method* to a modified version in *Meditations on First Philosophy*. For ten points each,

Name this seventeenth-century French philosopher who famously concluded “Cogito ergo sum,” [koh-gee-toe ayr-goh soom] or “I think, therefore I am.”

ANSWER: René **Descartes**

The statement “cogito ergo sum” is written in this language. Descartes [day-cart] first wrote the statement in French because he feared that using this language would reach fewer people.

ANSWER: **Latin** (do not accept or prompt on “Italian” or “Roman”)

Descartes’s *Discourse on the Method* revolutionized philosophy by promoting this concept as a starting point. Descartes notes that he never accepts anything as true until he clearly knows it to be true. In other words, this term describes people who question or doubt things that other people accept.

ANSWER: **skepticism** (accept word forms like **skeptic**)

(11) In theory, a meta-material super-lens could be used to see a nano-machine at work because the lens has a negative value for this quantity. For ten points each,

Name this optical quantity, the ratio of light’s speed in a vacuum to its speed in a medium. This quantity is about 1.33 for water and 2.42 for diamond.

ANSWER: **index of refraction** (accept **refractive index**; prompt on “n;” do not accept or prompt on “reflection”)

For a light wave at the boundary of two media, this law states the ratio of the sine of angle of incidence to the sine of angle of refraction equals the reciprocal ratio of the indices of refraction.

ANSWER: **Snell’s law** (accept **Snell-Descartes law**)

At the boundary between air and a polished silver surface, Snell’s law predicts that 95% of incident light will experience this phenomenon instead of refraction. This phenomenon explains why you can see yourself in a mirror.

ANSWER: **reflection**

(12) Romantic poet Robert Burns wrote about people with this nationality “wha hae wi’ Wallace bled” and “wham Bruce has aften led.” For ten points each,

Name this European nation, Burns’s homeland, whose dialect he used to write about schemes that “gang aft agley.”

ANSWER: **Scottish** (accept **Scots** English; accept **Scotland**; accept **Alba**)

Burns wrote “the best-laid schemes o’ [these creatures] an’ men / gang aft agley” in a poem addressed to one of these small mammals when he “[Turned] Her Up in Her Nest With the Plough.”

ANSWER: **mouse** (accept **To a Mouse**)

Burns also used the Scots dialect to write this poem, often sung at New Year’s, which asks “should auld acquaintance be forgot / and never brought to mind?”

ANSWER: **Auld Lang Syne**

(13) In this game series, bells can be used to purchase items and pay off your mortgage. For ten points each,

Name this video game series, whose newest release, *New Horizons*, came out in March 2020. This game series allows players to create their own home and interact with anthropomorphized villagers.

ANSWER: Animal Crossing (accept Doubutsu no Mori [doh-boo-tsoo noh moh-ree])

This racoon-like, anthropomorphic loan shark owns and mortgages the player's home in the *Animal Crossing* games. This adorable slum-lord is the namesake of a fan-run *New Horizons* trading website.

ANSWER: Tom Nook (accept Nookazon; accept Tanukichi)

Because of its multiplayer capability, *New Horizons* depends heavily on player trading. In 2020, this actor, who played Frodo Baggins in *The Lord of the Rings*, made waves by politely selling his turnips on another player's island.

ANSWER: Elijah Wood

(14) Answer the following about one of the three “Grand Dames” [grahn dahmz] of a nineteenth-century French art movement, Berthe Morisot [bayr-tuh moh-ree-soh], for ten points each.

Morisot was part of this French art movement. This movement focused on painting *en plein air* [ahn plah-nayr] and using broad, sketch-like brush strokes to capture the movement and natural lighting of scenes like *Waterlilies* and Morisot's *Grain Field*.

ANSWER: Impressionism (accept word forms like Impressionist movement)

This Impressionist gave the movement its name with his painting *Impression: Sunrise*. He also painted many *Waterlilies* floating near a green, Japanese-style bridge.

ANSWER: Claude Monet (accept Oscar-Claude Monet or Claude Oscar Monet; do not accept or prompt on “Manet”)

Morisot captured an outdoor scene of a woman and a little girl standing by the railing of one of these architectural features, looking out over Paris.

ANSWER: balcony (accept Woman and Child On the Balcony)

(15) Give the following about Spanish Florida for ten points each.

Spanish Florida originally included much more than modern-day Florida; it extended north into this state that borders Florida on the Atlantic coast.

ANSWER: Georgia

The first European to reach Florida was this Spanish conquistador, who, according to legend, was searching for the Fountain of Youth.

ANSWER: Juan Ponce De León

The Spanish founded this city in Florida in 1565, making it America's oldest city.

ANSWER: Saint Augustine

(16) This ruler was the son of Pepin the Short, and his territory was divided between his three grandsons after the death of his son, Louis the Pious. For ten points each,

Name this Medieval king who was crowned Holy Roman Emperor in the year 800.

ANSWER: **Charlemagne** (accept **Charles the Great**; accept **Carolus Magnus**; accept **Charles I**; prompt on “Charles” or “Carolus”)

Charlemagne began his rule as the king of these European peoples, who had been united by the Edict of Paris.

ANSWER: **Franks** (accept **Frankish** people; do not accept or prompt on “France” or “French”)

Charlemagne was crowned Holy Roman Emperor by Pope Leo III **[third]** on this Christian holiday.

ANSWER: **Christmas** Day

(17) This Sanskrit epic contains the *Bhagavad Gita*, in which a god reminds a prince of his royal duties during the Kurukshetra War. For ten points each,

Name this ancient Indian classic attributed to Vyasa.

ANSWER: **Mahabharata**

The *Mahabharata* is important to this Indian religion. Gods of this religion, including Indra and Brahma, interact directly with the story.

ANSWER: **Hinduism** (accept **sanatana** dharma)

This Hindu preserver god appears in the *Mahabharata* as his avatar Krishna, who advises Arjuna in the *Bhagavad Gita*.

ANSWER: **Vishnu**

(18) In a novel by this author, the student Ras-kol-ni-kov murders Lizaveta and Alyona in Saint Petersburg. For ten points each,

Name this Russian author who also described the lives of Ivan, Alexei, and Dmitri in *The Brothers Karamazov*.

ANSWER: Fyodor **Dostoevsky** (accept Fyodor Mikhailovich **Dostoevsky**)

Raskolnikov commits his double murder in this novel by Fyodor Dostoevsky. In this novel, inspector Porfiry Petrovich provokes Raskolnikov to confess.

ANSWER: **Crime and Punishment** (accept **Prestupléníye i nakazániye**)

After being convicted of the murders, Raskolnikov is sentenced to punishment in this frozen, far-north region of Russia.

ANSWER: **Siberia** (accept **Sibír**)

(19) Perfectly elastic collisions and negligible particle volume are two of the assumptions made in the kinetic theory of these substances. For ten points each,

Name this state of matter whose molecules are in constant, random motion, but with much greater separation between particles than in a liquid.

ANSWER: gases

Using kinetic theory, it is possible to derive Fick's laws of this process, in which gas particles spread out from an area of high concentration to an area of lower concentration.

ANSWER: diffusion (do not accept "effusion")

While kinetic theory assumes an ideal gas, this equation models real gases using a and b parameters to correct for intermolecular attraction and particle volume, respectively.

ANSWER: Van der Waals equation

(20) In 2007, the Supreme Court ruled against Lilly Ledbetter when she sued Goodyear over this type of discrimination. For ten points each,

Name this type of discrimination that affected Ledbetter's pay at Goodyear. The pay gap caused by this type of discrimination has held steady over the last decade at roughly eighty-four cents to the dollar.

ANSWER: gender discrimination (accept sex discrimination or sexism; accept "being discriminated against because she is female" and equivalents)

The Supreme Court ruled that Lilly Ledbetter's claim was invalid because it had been too long since the discrimination against her had occurred, and thus her claim had violated this type of statute.

ANSWER: statute of limitations

Ledbetter lost her argument that the one-hundred-eighty day statute of limitation should be triggered by each paycheck in which she was discriminated against. The Supreme Court rejected that argument, but it was adopted into law by the Lilly Ledbetter Fair Pay Act of 2009, which was signed by this Democratic president.

ANSWER: Barack Obama (accept Barack Hussein Obama)