

## Round 6

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### Tossups

(1) **The recently discovered F-type of this molecule lets stromatolites function in the infrared range, and the P680 one performs photolysis of water. Located in thylakoid membranes, this molecule contains a porphyrin ring with a central (\*) magnesium ion.** The absorption spectrum of this molecule peaks at red and blue wavelengths, and the autumn change in leaf color is due to the breakdown of it. For ten points, name this molecule that absorbs sunlight energy needed for photosynthesis and gives plants a green color.

ANSWER: chlorophyll

(2) **In 2017, this state's junior senator was controversially interrupted multiple times while questioning Attorney General Jeff Sessions. This state's Anna Eshoo was the first representative contacted by Christine (\*) Blasey Ford to discuss her allegations about Brett Kavanaugh; Eshoo then referred Ford to this state's senior Senator, Dianne Feinstein.** Kamala Harris represents, for ten points, what state that has 55 electoral votes, the most populous state in the US?

ANSWER: California

(3) **This president's policies were frequently blocked by the "Four Horsemen," a conservative block of the Supreme Court, and he failed in a controversial attempt to "pack" more justices on the Court. This man used bank holidays and (\*) new agencies like the Tennessee Valley Authority and WPA to fight the Great Depression.** For ten points, name this president who expanded the federal government through his New Deal policies while suffering from polio.

ANSWER: Franklin Delano Roosevelt (accept FDR; prompt on "Roosevelt" alone)

(4) **This god was honored with hymns called dithyrambs at the Lenaia festival, and he was obeyed by female followers, like Agave, who were called (\*) maenads.** This god rescued Ariadne after she was deserted by Theseus. The death of this god's mother, Semele, prompted Zeus to sew this god into his thigh, making him "twice-born." For ten points, name this Greek god of wine.

ANSWER: Dionysus (accept Bacchus until "Greek" is read)

(5) **This process generates granules in the photosphere of stars. The Nusselt number gives the transfer ratio of this process to conduction, and tectonic plates move because of this type of (\*) current in the mantle.** Atmospheric Hadley cells swap dry air for moist in the tropics through this process, and the "forced" type uses a blanket of hot air to cook food evenly in a namesake oven. For ten points, name this process that transfers heat by the motion of a fluid.

ANSWER: convection (accept word forms like convecting)

(6) **This novella’s protagonist is visited by a childlike figure who carries an extinguisher to control the flames on its head, and by a man in a green robe who is crowned with a holly wreath. This novel’s protagonist is warned by the chained-up ghost of Jacob (\*) Marley, and is told by the ghost of a holiday “Yet to Come” of the possible fate of Bob Cratchit’s son. For ten points, name this novella by Charles Dickens, in which Ebenezer Scrooge gives food to Tiny Tim’s family after he learns to appreciate the title winter holiday.**

ANSWER: A Christmas Carol

(7) **This note’s major key was used for George Bizet’s [zhorzh bee-zay’s] only symphony and Ravel’s *Bolero*. This note is the dominant of the key of F. Saint-Saens’ [san-sawn’s] *Organ* Symphony and Brahms’ first symphony start in this note’s minor key and finish in its major, as does Beethoven’s (\*) fifth symphony. This key’s major scale is played on all white keys on a piano. For ten points, name this note whose major key has no flats or sharps, and which is found one whole step below D.**

ANSWER: C (accept C major after “major” is read; accept c minor after “minor” is read; do not accept C sharp or C flat)

(8) **A German one of these political organizations grew out of the Spartacus League, which was co-founded by Rosa Luxemburg. These groups were once organized in the Third International, also known as the (\*) Comintern. Every member country within the Warsaw Pact was led by this type of political party, most of which lost power around 1990. For ten points, name this type of political party that ruled the Soviet Union.**

ANSWER: Communist parties (in Europe) (prompt on “political party” or similar non-specific terms; do not accept or prompt on “socialist party”)

(9) **The protagonist of this novel is disappointed to have broken his sister’s “Little Shirley Beans” record, but takes her to the Central Park Zoo so she can ride the carousel. This novel’s protagonist is beaten up by Maurice for hiring the prostitute (\*) Sunny, and reminisces about his brother’s poetry-scrawled baseball glove. DB, Allie, and Phoebe are the siblings of this novel’s protagonist, who is kicked out of Pencey Prep at the start of this novel. For ten points, name this novel about Holden Caulfield, written by JD Salinger.**

ANSWER: The Catcher in the Rye

(10) **The player must operate one of these vehicles for eight continuous hours to score one point in an unreleased Sega CD game starring Penn and Teller. Keanu Reeves and Sandra Bullock are forced to operate one of these vehicles that has a (\*) bomb planted on it in the film *Speed*. Players skydive out of one of these vehicles at the beginning of Fortnite matches. For ten points, name this type of vehicle that Ms Frizzle drives for “magic” field trips.**

ANSWER: bus (accept any specific type of bus, including Penn and Teller’s Desert Bus, the Battle Bus, and the Magic School Bus)

(11) **These structures often include a sahn, an enclosed courtyard with a fountain to allow visitors to perform wudu, a type of ritual cleansing. The tallest point on these structures is used by a (\*) muezzin to issue a call for prayer, and is called a minaret. These structures contain a raised platform called a minbar, from which sermons are delivered by imams. For ten points, name these centers of Islamic worship.**

ANSWER: mosque (accept masjid)

(12) **The katabatic type of this phenomenon is cooled by glaciers, and the Santa Ana and Chinook ones are extremely dry. Aeolian erosion results from this phenomenon, which is often absent in the horse latitudes and doldrums. An (\*) anemometer can be used to classify these on the Beaufort scale. In the US, prevailing westerly ones of these generated the Dust Bowl, and ones faster than 72 miles per hour are called “hurricane force.” For ten points, name these large air movements that blow from regions of high pressure to low.**

ANSWER: winds

(13) **The protagonist of a novel from what is now this modern country recites Ossian to his love interest prior to killing himself with Albert’s gun. In another novel from this modern country, Josef Knecht [NEKT] becomes Magister Ludi in the province of Castilia. The (\*) Sorrows of Young Werther and The Glass Bead Game are from this country, as is a work in which Mephistopheles makes a tragic deal with the title man, Faust. For ten points, name this country that is home to Herman Hesse [HESS] and Johann Wolfgang von Goethe [GUR-tuh].**

ANSWER: Germany (accept Federal Republic of Germany or Bundesrepublik Deutschland)

(14) **This man recounted having to give Hugh Auld his wages earned at a Baltimore shipyard in one of his autobiographies. This founder of the newspaper *The North Star* argued in favor of women’s suffrage at the (\*) Seneca Falls Convention, and asked “What, to a slave, is the Fourth of July?” in an 1852 speech. For ten points, name this abolitionist who described his life as a slave in *My Bondage and My Freedom* and a best-selling *Narrative of his life*.**

ANSWER: Frederick Douglass

(15) **A depiction of this scene by Salvador Dalí replaces the central object with a hypercube. Houses and a synagogue burn in the background of Marc Chagall’s *White* version of this scene. In Gauguin’s [goh-GAN’s] depiction of this scene, this event’s central figure stands on a small ledge with (\*) nails through his feet and hands. For ten points, name this biblical event, which in Gauguin’s painting shows the death of *The Yellow Christ*.**

ANSWER: crucifixion (accept The White Crucifixion; prompt on “Corpus Hypercubus”)

(16) **This country’s capital city is home to Ancon [an-CONE] Hill, an undeveloped jungle reserve surrounded by urban growth just northeast of the Bridge of the Americas. This country’s Gatun Lake was the largest man-made lake in the world when it was created in the early (\*) 20th century as part of a construction project that the French failed to complete. For ten points, name this Central American country where a canal connects the Atlantic and Pacific Oceans.**

ANSWER: Panama (accept Panama Canal)

(17) **Graham’s law states that the square root of this quantity for a gas is inversely proportional to its rate of effusion. The dalton is a unit of this quantity, and another unit for this quantity appears in the denominator of the formula for (\*) molality. Stoichiometry [stoh-ih-kee-ah-meh-tree] requires finding the molar form of this quantity for compounds, and isotopes of an element differ in this type of number, equal to the sum of each atom’s protons and neutrons. The amu [A-M-U] is the standard chemistry unit of, for ten points, what quantity that can also be measured in grams?**

ANSWER: molar mass (accept molecular mass; accept molecular weight until “molality”)

(18) **In 1993, the British newspaper *The Independent* published a positive personal relations story about this man's efforts to build a rural highway in Sudan using mujahideen labor. A controversial polio vaccination program was used by the (\*) CIA to gain intelligence on this man. Operation Neptune Spear targeted this man, who was killed in Abbottabad, Pakistan in 2011 by Navy SEALs. For ten points, name this leader of Al Qaeda and mastermind of the 9/11 attacks.**

ANSWER: Osama bin Laden

(19) **A character in this novel misses her cue to come on stage during a pageant in which she is dressed as a ham. A recluse in this novel is rumored to have stabbed his father with a pair of scissors. In this novel, (\*) Tom Robinson is accused of rape by Bob and Mayella Ewell, and is defended by the protagonist's father, Atticus. Boo Radley rescues Jem in, for ten points, what novel about the coming of age of Scout Finch, written by Harper Lee?**

ANSWER: To Kill a Mockingbird

(20) **A mathematician from what is now this country names a formula for calculating the area of a cyclic quadrilateral, given its side lengths. Centuries before the invention of calculus, the power series expansions for sine and cosine were developed by the (\*) Kerala school in this country. The decimal number system first appeared in the 7th century in, for ten points, what country where Brahmagupta wrote about mathematical innovations, like zero, in Sanskrit?**

ANSWER: India

## Bonuses

(1) Alison Bechdel's autobiographical work *Fun Home* is an example of this style of book. For ten points each,

Name this style of book, in which a story is told through comic book-style panels of pictures and words.

ANSWER: graphic novel (accept graphic memoir)

In this graphic novel, Art Spiegelman describes his father's experiences during the Holocaust. In this novel, Nazis are portrayed as cats stalking Jews, whom Spiegelman characterizes as the title animals.

ANSWER: Maus

In this two-part autobiographical graphic novel, Marjane Satrapi describes growing up in Iran during the Islamic Revolution in the 1980s.

ANSWER: Persepolis

(2) This Enlightenment thinker wrote about proper methods of education in a work that included the "Profession of Faith of a Savoyard Vicar," a defense of religious thought that angered both Protestants and Catholics. For ten points each,

Name this French philosopher and author of *Émile* [ay-MEEL] who wrote that "man is born free, but everywhere is in chains" to open his most famous work.

ANSWER: Jean-Jacques Rousseau

Rousseau's [roo-SOH's] best known work is titled for this philosophical concept, the implicit agreement between people and their government in which some personal freedom is given up in exchange for protection of other rights.

ANSWER: social contract (accept contrat social; accept On the Social Contract; or, Principles of Political Rights; accept Du contrat social; ou Principes du droit politique)

Rousseau's *Social Contract* argued in favor of democracy and against the idea that this type of ruler was divinely empowered to rule; Rousseau's work thus inspired the French Revolution.

ANSWER: monarch (accept kings and/or queens; accept descriptions of royalty and other equivalents)

(3) Answer these questions about the principles of green chemistry, for ten points each.

A major goal of green chemistry is the use of agricultural byproducts to generate non-hazardous types of these chemicals that dissolve the solute in a solution. Water is often called the "universal" one of these substances.

ANSWER: solvents

Many green chemists are developing totally sustainable ways of generating this engine fuel from vegetable oils. Algae and waste grease from cooking can also be processed into this fuel.

ANSWER: biodiesel (prompt on "diesel")

Green chemistry promotes the use of wood vinegar as a safe alternative to synthetic types of these chemicals like DDT. Rachel Carson's book *Silent Spring* and the 1984 Union Carbide disaster in India both concerned this type of chemical.

ANSWER: pesticides (accept insecticides)

(4) In a poem about these animals, one of them “dips his wing / in the orange sun rays / and dares to claim the sky.” For ten points each,

Name this animal. One of these animals “sings / with a fearful trill / of things unknown / but longed for still” in a poem that declares “I know why the caged” one of these animals “sings.”

ANSWER: bird (accept I Know Why the Caged Bird Sings; accept the caged bird and/or the free bird)

*I Know Why the Caged Bird Sings* is the title of both a poem and an autobiography by this American poet of “On the Pulse of Morning.”

ANSWER: Maya Angelou (accept Marguerite Annie Johnson)

Maya Angelou recited “On the Pulse of Morning” at one of these events in 1993. At one of these events for John F. Kennedy in 1961, Robert Frost was scheduled to recite his poem “Dedication,” but recited “The Gift Outright” instead.

ANSWER: presidential inauguration (prompt on any answer that includes “president” and the suggestion of a ceremony)

(5) The Greeks referred to this man as Ozymandias. For ten points each,

Name this “great” Egyptian pharaoh who defeated the Nile “Sea People” and claimed a victory at the 1274 BCE Battle of Kadesh.

ANSWER: Ramesses the Great (accept Ramesses II)

The “Sea People” were allies of these people, who fought Ramesses the Great at the Battle of Kadesh. The empire of these people was largely based in modern Turkey.

ANSWER: Hittites

The Battle of Kadesh is generally agreed to be the largest battle of forces using this wheeled, horse-drawn vehicle.

ANSWER: war chariots

(6) Give the following about rectilinear polygons, which are usually drawn such that all of their sides are either horizontal or vertical, for ten points each.

Like all polygons, rectilinear polygons can be classified by this adjective if every line segment between two points on their edges stays within the interior of the polygon. Polygons without this quality are called concave.

ANSWER: convex

Every interior angle in a convex rectilinear polygon is this type of angle, with a measure between that of an acute and an obtuse angle.

ANSWER: right angle (accept 90 degree angle; accept pi over 2 radian angle)

Tracing movement in this form of geometry will create a rectilinear polygon, because this type of distance is defined by movements parallel to the Cartesian axes, as you would see while driving a car in a city.

ANSWER: taxicab geometry

(7) Answer the following about Pablo Picasso, for ten points each.

Picasso co-founded this geometric and fragmented style with Georges Braque. Many of his works were in the “analytic” and “synthetic” forms of this style.

ANSWER: **cubism** (accept word forms like **cubist**)

This early cubist painting by Picasso depicts five angular, nude woman. The faces of two of the figures in this painting are inspired by African masks.

ANSWER: Les **Demoiselles d’Avignon** [lay day-mwah-ZELLS dah-veen-YAWN] (accept The Young **Women of Avignon**)

Before his cubist phase, Picasso went through this “period” in his work, which was characterized by cool tones and depressing themes. *The Old Guitarist* is a painting from this period.

ANSWER: **Blue** Period

(8) In 1754, this man surrendered over 300 men to Louis Coulon de Villiers, the only military surrender of his career. For ten points each,

Name this Virginian who, decades later, led the Continental Army during the American Revolution.

ANSWER: George **Washington**

Washington’s surrender was one of the precursors to this conflict. This war, the North American theater of the Seven Years’ War, was named for the pair of opponents faced by the British and their colonial allies.

ANSWER: **French and Indian** War (prompt on “Seven Years’ War” before it is read)

After taking thirty-one casualties in a small skirmish, Washington surrendered this hastily-built fort to the French.

ANSWER: Fort **Necessity**

(9) This astronomer determined that the Andromeda Nebula was not actually a nebula. For ten points each,

Name this American astronomer, the namesake of a low-orbit telescope launched in 1990, and of a law that relates the redshift of objects in space to their distance from an observer.

ANSWER: Edwin Powell **Hubble**

The Andromeda Nebula was actually one of these systems, outside the Milky Way. This term describes a rotating collection of billions of stars with a black hole at its center, and can have a spiral or irregular shape.

ANSWER: **galaxy** (accept **galaxies**)

Hubble classified galaxies using a Y-shaped diagram named for this acoustical device. The two prongs of this diagram separate the barred and unbarred spiral galaxies.

ANSWER: **tuning fork** diagram

(10) Some characters in this novel change a long-held slogan from “four legs good, two legs bad” to “four legs good, two legs better.” For ten points each,

Name this novel about the growing dictatorship of Napoleon, an allegory of Soviet Russia that plays out in a barnyard, written by George Orwell.

ANSWER: Animal Farm

In *Animal Farm*, this horse adopts the personal mantra “I will work harder” as he works tirelessly to build a silo.

ANSWER: Boxer

This elderly pig gives a speech that inspires the animals’ rebellion, but his death begins the power struggle between Napoleon and Snowball.

ANSWER: Old Major

(11) Answer the following about water in the life of Jesus, for ten points each.

As a young adult, Jesus was submerged in the Jordan River by this man, the son of Elizabeth who was sent to “prepare the way” for Jesus.

ANSWER: Saint John the Baptist (prompt on “John”)

At his mother’s request, Jesus performed this feat, his first miracle, during the wedding at Cana.

ANSWER: turning water into wine (accept descriptions)

Jesus gathered his disciples from around this sea, where he demonstrated his ability to walk on water.

ANSWER: The Sea of Galilee (accept Kinneret; accept Kinnereth; accept Lake of Gennesaret; accept Lake Tiberias)

(12) In 2018, the Internet exerted enough pressure to make this musical experience happen, but it wasn’t that much different from the original version. For ten points each,

Name this song, whose speaker notes that “It’s gonna take a lot to drag me away from you” before blessing the rains in the title place.

ANSWER: (Weezer’s cover of Toto’s) “Africa”

The Internet campaign to get Weezer to cover “Africa” began with a tweet to this lead singer of Weezer.

ANSWER: Rivers Cuomo

Weezer’s music video for “Africa” doesn’t feature Rivers Cuomo; instead, Cuomo is played by this singer of numerous polka covers and parody songs like “White and Nerdy.”

ANSWER: Alfred Matthew “Weird Al” Yankovic (accept either underlined portion)



(13) This body of water cuts into a US state, creating the Olympic Peninsula to its west. For ten points each,

Name this sound, which is connected to the Pacific Ocean via the Strait of Juan de Fuca. Its water reaches the cities of Tacoma and Olympia.

ANSWER: Puget Sound

Puget Sound cuts into this US state in the Pacific Northwest, giving Seattle a coastline.

ANSWER: Washington

This highest mountain in Washington, and in and all of the Cascades, poses a massive volcanic threat to Tacoma and other cities on Puget Sound.

ANSWER: Mount Rainier

(14) The 1988 case of *Newman v. Quigg* concerned the US Patent Office's automatic rejection of a new type of DC motor when its inventor claimed it was one of these devices. Answer the following about Newman's machine, for ten points each.

Newman claimed his motor had a mechanical output greater than the electrical energy it took in, making it one of these impossible machines that are supposed to run forever.

ANSWER: perpetual motion machine (accept perpetuum mobile; accept over-unity device)

Newman's perpetual motion machine cannot function because it violates both conservation of energy and this other law of physics. This law states that in a closed system, disorder must increase while the energy available for work must decrease.

ANSWER: second law of thermodynamics (accept law of entropy)

Other unsuccessful inventors have tried to patent machines they claim run on this type of magnetic particle, which cannot exist in classical physics according to Gauss's law. This particle would be the magnetic analog of a point electrical charge.

ANSWER: magnetic monopole

(15) This man famously crossed the Rubicon to take control of Rome. For ten points each,

Name this Roman "dictator-in-perpetuity" who was killed on the Ides of March.

ANSWER: Gaius Julius Caesar (prompt on Caesar)

Prior to becoming dictator of Rome, Julius Caesar fought a group of people from this region, now a part of France. His victory at the Battle of Alesia solidified Roman control of this region.

ANSWER: Gaul

This chief of the Arverni people was the greatest Gallic belligerent and lost at the Siege of Alesia. This man was later paraded through Rome and strangled to death.

ANSWER: Vercingetorix [ver-sin-get-or-ix]

(16) In one myth, this god dresses up as Freyja at a wedding to retrieve his stolen weapon from the giant Thrym [thrimm]. For ten points each,

Name this wielder of the hammer Mjolnir [mee-YOLL-neer], the Norse god of thunder.

ANSWER: Thor (accept Donar)

In the *Prose Edda*, Thor loses a wrestling match to Elli, who is the personification of this state of being, since no one can avoid this state of being.

ANSWER: old age (accept any description of becoming elderly; do not accept or prompt on “death”)

At Ragnarök, Thor will kill and be killed by this creature. This creature is so large that its body wraps around the Earth.

ANSWER: Jörmungandr [YOHR-mun-gahn-durr] (accept Midgard Serpent or World Serpent)

(17) This composer’s final opera was based on Tolstoy’s *War and Peace*. For ten points each,

Name this composer who adapted a fairy tale into his opera *The Love For Three Oranges* and wrote ballets based on *Romeo and Juliet* and *Cinderella*.

ANSWER: Sergei Sergeyevich Prokofiev

Prokofiev is best known for this narrated work, which uses different instruments to represent characters such as the bird, the cat, and a duck that gets swallowed alive by one of the title characters.

ANSWER: Peter and the Wolf (accept Pétya i volk)

This largest standard woodwind instrument represents the grandfather in *Peter and the Wolf*. This double-reed instrument is usually held diagonally when played.

ANSWER: bassoon

(18) In a novella by this man, a town declines to intervene in the death of Santiago Nassar, though they are all aware of his impending murder. For ten points each,

Name this Colombian author of *Chronicle of a Death Foretold*, *One Hundred Years of Solitude*, and a novel about a love triangle between Florentino, Fermina, and Doctor Urbino.

ANSWER: Gabriel Garcia Marquez (prompt on partial last name)

Florentino, Fermina, and Doctor Urbino appear in a Garcia Marquez novel titled for *Love in the Time of* this illness, which Doctor Urbino strives to eradicate. This illness is spread through contaminated drinking water.

ANSWER: cholera (accept Love in the Time of Cholera; accept cólera or El amore en los tiempos del cólera)

The Garcia Marquez novel *One Hundred Years of Solitude* follows the rise and fall of the Buendia family in the town of Macondo, which depends on a plantation that grows bunches of these tropical, tree-grown fruits.

ANSWER: bananas

(19) By 1940, one-third of Queen Victoria's male descendants are known to have inherited this disease. For ten points each,

Name this genetic illness in which blood does not properly clot, leading to excessive bleeding after even mild injuries.

ANSWER: **hemophilia**

Most cases of hemophilia are sex-linked because the mutation is carried on this chromosome. Females possess two of this chromosome and males have one paired with a Y-chromosome.

ANSWER: **X**-chromosome

A less common sex-linked disorder is hypo-phospha-temia, also known as the dominant type of this bone disease. Children with this disease cannot absorb vitamin D, resulting in short stature and painful, bowed legs.

ANSWER: **rickets**

(20) For ten points each, name the following infamous civil rights court cases.

This 1857 case ruled that blacks were not allowed to sue in federal court because they were not, and could not be, U.S. citizens.

ANSWER: **Dred Scott** v. Sanford (accept **Dred Scott** v. Sandford)

This 1896 Supreme Court case confirmed the legality of the "separate but equal" doctrine in a decision with one dissenter, John Marshall Harlan, who noted that this case would eventually be as infamous as *Dred Scott*. This case was overturned for public schools by *Brown v. Board*.

ANSWER: **Plessy** v. Ferguson

This 2013 Supreme Court case struck down the Voting Rights Act of 1965's formula for determining whether states need to have their redistricting maps pre-cleared by the federal government. Attorney General Eric Holder was the defendant in this case, which was brought by an Alabama county.

ANSWER: **Shelby** County v. Holder