1. One of this man's works ends with a defiant choral rendition of "Schema Yisroel" and is titled $A$ Survivor from Warsaw. Theodor Adorno championed the work this man, author of the essay "Brahms The Progressive." His wrote a string sextet based on a Richard Dehmel poem, and portrayed a pantomime character using sprechstimme in another work. His students include (*) Anton Von Webern and Alban Berg. For 10 points, name this composer of Transfigured Night and Pierrot Lunaire, who founded the Second Viennese School and developed the twelve-tone system. ANSWER: Arnold Schoenberg
2. This thinker compared experimenters to ants and dogmatists to spiders, concluding that the true philosopher should emulate the bee. He wrote a novel about a group of Europeans who find the college Salomon's House on the island of Bensalem. This author of (*) The New Atlantis argued that thinkers should purge themselves of the "Idols of the Theater" in a book outlining the scientific method. For 10 points, name this 17th-century philosopher, who wrote the Novum Organum. ANSWER: Francis Bacon
3. One author from this country wrote a play about the Chief Liquidator of the Liquidation Office, Hugo Pludek. Another author from this country depicted female butterflies in The Insect Play and wrote a play featuring Helena Glory of the Humanity League. The author of The Garden Party, Vaclav (*) Havel, would later become President of this nation and oversee the Velvet Divorce. For 10 points, name this country which is home to the author of Rossum's Universal Robots, Karel Capek, with a capital at Prague.
ANSWER: Czech Republic [prompt on "Czechoslovakia"]
4. One method for doing this is co-named for the inventor of the pentomino. That method is Rice-Golomb and is based on RLE algorithms. One algorithm for this that is gaining support is LZMA. One of the earliest techniques is named for Huffman. For some media like pictures, (*) lossy types as opposed to lossless schemes are used. The DEFLATE algorithm is used to create a common end product of this process, a zip file. For 10 points, name this process of making files smaller. ANSWER: information compression [accept word forms; or file compression; or data compression; prompt on encoding]
5. At one point in this battle, troops trying to harvest food in Simeon Barber's wheat field were ambushed. British forces held the Balcarres Redoubt but lost the Breymann Redoubt. One of Daniel Morgan's riflemen mortally wounded General Simon Fraser during this battle, and Benedict Arnold was wounded in the leg. This battle included fighting at $\left({ }^{*}\right)$ Bemis Heights and Freeman's Farm. For 10 points, name this 1777 battle in which troops led by Horatio Gates defeated British General John Burgoyne in New York, sometimes known as the "Turning Point of the Revolution."
ANSWER: Battles of Saratoga [prompt on Battle of Freeman's Farm before mentioned; prompt on Battle of Bemis Heights before mentioned]
6. This quantity remains constant in the Joule-Thomson effect. It equals internal energy plus the product of pressure and volume. The Gibbs Free Energy is given by this quantity minus the product of temperature and entropy. For a multi-step reaction, it can be calculated independently of the pathway and is equal to the sum of its changes in each step according to (*) Hess's Law. It is positive for an endothermic reaction. For 10 points, name this "heat content" of a thermodynamic system, symbolized capital $H$.
ANSWER: enthalpy [accept $\underline{\mathbf{H}}$ until it is read; do not accept or prompt on "lowercase 'h'"]
7. Two of these creatures can be seen in the foreground beside some musicians in Paolo Veronese's The Wedding at Cana, while another painting depicts one with rapidly moving feet. In addition to that work by Giacomo Balla that shows its "dynamism," this animal can also be seen moving through snow on the left side Hunters in the Snow. A white one stands near a grave in (*) The Burial at Ornans while a small brown one stands between the married couple in The Arnolfini Wedding. For 10 points, name these animals which C.M. Coolidge depicted playing poker.
ANSWER: dogs
8. This man responded to The Twelve Articles in his Against the Murderous and Robbing Hordes during the Peasants' War. This man's response to the papal bull Exsurge Domine led to his hiding for a year in Wartburg Castle after he took part in the Diet of Worms. The work of Johann Tetzel in (*) Wittenberg led this man to write a disputation on the choice of the Catholic Church to sell indulgences. For 10 points, name this writer of the Ninety-five Theses who started the Protestant Reformation. ANSWER: Martin Luther
9. One poem by this man, subtitled "A Philosophical Poem," is about a fairy named Queen Mab. This author wrote a drama in which Demorgon helps in the overthrow of Jupiter in a work which was inspired by a similarly titled tragedy written by Aeschylus. This author of Prometheus Unbound wrote a work about a "traveler from an antique land" who saw "two vast and trunkless legs of stone stand in the desert." Another of his poems asks, "if winter (*) comes, can spring be far behind?" For 10 points, name this English Romantic poet of "Ozymandias" and "Ode to the West Wind." ANSWER: Percy Bysshe Shelley
10. An offshoot of the Latter Day Saints in this state spawned a figure who called himself one of its city's namesake 'Jesus," William W. Davies. Indian conflicts in this state included those against Nisqually chief Leschi and chief Kamiakin. It is home to the cities of Pasco, Richland, and Kennewick, which make up its 'Tri-Cities." This state is home to such peaks as Mt. Adams and Mt. Baker, as well as the town of (*) Walla Walla. For 10 points, name this state, home to cities like Everett and Redmond, in which companies such as Boeing, Microsoft, and Starbucks were founded.
ANSWER: Washington state
11. The relative susceptibility of this agent to the MF59 adjuvant has caused some controversy. The classic example of antigenic shift concerns their mixture. They bind to a cell as a result of the interactions of sialic (SAHY-al-ick) acid and the proteins hemagglutinin (HEEM-uhg-gloot-in-in) and neuraminidase (NYOOR-uh-min-uh-dase). From the family orthomyxoviridae (AWR-thuh-micks-oh-veer-ih-day), their "A" subtype, not "B" or "C," contains the (*) H1N1 strain. For 10 points, name these viruses that cause a disease with "Spanish," "avian," and "swine" types. ANSWER: influenza viruses [accept ortomyxoviridae before mentioned]
12. This man wrote "We are Nature, long have we been absent" in "We Two, How Long We Were Fool'd." This poet discusses "the armies of those I love" in one poem, and he recalled when "the great star early droop'd in the western sky" and asserted that "our fearful trip is done" in two poems memorializing Abraham (*) Lincoln. For 10 points, name this American poet who wrote "When Lilacs Last in the Dooryard Bloom'd" and "O Captain! My Captain!" as well as a poem that begins "I celebrate myself," "Song of Myself," in his Leaves of Grass.
ANSWER: Walt Whitman
081-10-23-14113
13. One form of this deity slew a foe with a thousand arms using an axe, while another form of this deity with the aspect of a fish saved Manu and therefore all of humankind. A third form of this deity had the aspect of a tortoise and participated in the churning of the ocean, while a fourth form of this deity is the namesake of a story told by Valmiki. Those forms, known as this deity's (*) avatars, also include Krishna, who advises Arjuna in the Bhagavad Gita. For 10 points, name this member of the Trimurti known as the preserver who is contrasted with Brahma and Shiva.
ANSWER: Vishnu
040-10-23-14114
14. This author wrote about residents' disdain for a renowned craftsman upon receiving his corpse in "The Sculptor's Funeral," which was published in this author's collection The Troll Garden. This author also chronicled Thea Kronborg's quest to become an opera star in The Song of the Lark, and wrote a novel narrated by Jim Burden from Black Hawk, Nebraska, My (*) Antonia. Another novel by this author details the love of Carl Linstrum for the protagonist Alexandra Bergson. For 10 points, name this American author who wrote about frontier life in such novels as $O$ Pioneers!.
ANSWER: Willa Cather
081-10-23-14115
15. The winning side of this conflict was led by man who previously served in the Rif War. The Abraham Lincoln Brigade was active in this war. One commander in this war coined the phrase the "fifth column." This conflict was preceded by the abdication of King Alfonso XIII and Primo de Rivera. It saw Republican forces defeated by the (*) fascist Falange (fah-LAHN-hay) movement, both of whom were supported by European powers like the Soviet Union and Nazi Germany. For 10 points, name this conflict that saw the bombing of Guernica and the rise of Francisco Franco.
ANSWER: Spanish Civil War [prompt on partial answer]
16. One player on this pro team was benched in 2010 for repeatedly making choke gestures at Golden State's Reggie Williams. In the 2009-10 season, one of this team's rookies became the first Israeli-born NBA player, and this team's leading scorer became the fourth rookie in NBA history to average twenty points, five assists, and five rebounds per game. Paul (*) Westphal coaches this franchise, whose players include DeMarcus Cousins, Omri Casspi, and Tyreke Evans. For 10 points, name this NBA franchise that plays its home games in California's capital city.
ANSWER: Sacramento Kings [accept either]
17. One man with this surname had a speech describing his most notable action drafted by Charles Bohlen. Another man with this surname went to Japan to investigate charges of racism in the U.S. military. That man with this name also won the case Murray v. Pearson. Another man with this surname presided over the case (*) McCulloch v. Maryland and was Chief Justice during the establishment of judicial review. For 10 points, give this surname shared by Supreme Court Justices John and Thurgood, as well as the formulator of recovery plan for Europe after World War II.
ANSWER: Marshall
18. That the transition rate is only dependent on the square of the matrix of the Hermitian operator between initial and final states is known as this man's "golden rule." This namesake of the one hundredth element also names particles that can each occupy only one quantum state at a time, in contrast to (*) bosons, and those particles are described by a statistical system named for this man and Dirac. The namesake of a particle accelerator "lab" in Illinois, for 10 points name this Italian-born physicist who created the first sustained nuclear chain reaction.
ANSWER: Enrico Fermi
081-10-23-14119
19. This thinker collected his lectures at Bordeaux in "Pedagogical Evolution in France," and one of his works makes a distinction between the sacred and the profane while analyzing Aboriginal totemism. This uncle of Marcel Mauss posited that primitive societies exhibit mechanical solidarity in another work. This author of The Elementary Forms of Religious Life and The (*) Division of Labor in Society also wrote book describing the anomic, altruistic, and fatalistic forms of the title action. For 10 points, name this French sociologist who wrote Suicide.
ANSWER: David Émile Durkheim
20. This artist's The Honeysuckle Bower shows him with his wife, Isabella Brant. Nicodemus agitatedly bites a white cloth at the top of another work by this man, who also painted a conflict on a bridge in Battle of the Amazons. The Exchange of Princesses and The Apotheosis of Henry IV are part of this artist's Marie de Medici cycle, and in a well known work, the pale corpse of (*) Christ is removed after the Crucifixion. For 10 points, name this Flemish Baroque painter of the Descent from the Cross, known for painting heavy nude women.
ANSWER: Sir Peter Paul Rubens
21. According to legend, this city was founded by a brother of Schek and Khoryv who was also the sister of Lybid, and the city now bears a version of his name. It was captured by Oleg, the ruler of a neighboring city, which began its rise as a regional power. Its prince Vladimir I oversaw its mass conversion to Christianity, while a later ruler, Yaroslav the Wise, appointed its first bishop, Hilarion. Those leaders were a part of its namesake (*) Rus state. For 10 points, name this city on the Dnieper River, now the capital of Ukraine.
ANSWER: Kiev
040-10-23-14122
22. One type of these compounds are brassinosteroids. Another type of these compounds regulates dormancy, and another is responsible for apical dominance. A separate type of these substances induces shoot formation. Another type of these compounds was discovered by Eiichi Kurosawa and is called (*) gibberellins, a surplus of which can cause foolish seedling disease. One variety of these compounds regulates fruit ripening. For 10 points, name this class of compounds that also includes abscisic acid, ethylene, and auxins, which are responsible for regulating growth in certain non-animal organisms. ANSWER: plant hormones [prompt on partial answer]

081-10-23-14123
23. This figure transformed the nymph Caenis into a male warrior who was killed after being pounded into the ground by centaurs, and with Tyro this figure fathered Neleus and Pelias. Along with Aegeus, this immortal fathered Theseus, and also fathered Arion after mating with his sister Demeter in the form of a stallion. This god of horses sent King Minos the bull that became the father of the minotaur, and also sought revenge on (*) Odysseus for killing another of his sons, the Cyclops Polyphemus, by increasing the length of his journey home by causing a massive storm that shipwrecked him. For 10 points, name this Greek god of the sea.
ANSWER: Poseidon

1. This artist painted a now lost depiction of the Battle of Cascina that was to be displayed opposite Da Vinci's painting of the Battle of Anghiari. For 10 points each:
[10] Name this Renaissance artist who may be better known for painting the ceiling of the Sistine Chapel. ANSWER: Michelangelo di Lodovico Buonarroti Simoni
[10] This Michelangelo fresco on a Sistine Chapel wall depicts the second coming of Christ and the rise of the souls of mortals.
ANSWER: The Last Judgment
[10] The Last Judgment includes a self portrait of Michelangelo as this saint, who holds a knife in his right hand and his flayed skin in his left.
ANSWER: St. Bartholomew
2. One variant of this device was developed by Carey Foster. For 10 points each:
[10] Name this device, a type of "bridge" used to determine the value of an unknown resistance.
ANSWER: Wheatstone bridge
[10] A Wheatstone bridge is able to determine the value of a resistance by use of the two circuit laws named after this German, one of which states that the amount of current flowing into a node must equal the amount leaving.
ANSWER: Gustav Kirchoff
[10] The first of Kirchoff's laws implies conservation of this quantity, whose time derivative is current. ANSWER: electric charge [prompt on current if a team answers before the question is completed]
3. The title structure is owned by Hugh Crain, and its servants include an elderly couple named the Dudleys. For 10 points each:
[10] Name this novel in which John Montague inquires into which supernatural occurrences are happening inside the title residence, eventually leading to Eleanor Vance's death in a car crash.
ANSWER: The Haunting of Hill House
[10] The Haunting of Hill House was written by this author of The Sundial and We Have Always Lived in the Castle.
ANSWER: Shirley Jackson
[10] Jackson is best remembered for this short story in which Tessie is stoned to death following a ceremony in which she is selected to be sacrificed.
ANSWER: "The Lottery"
4. Although he was somewhat successful at the Battle of Borodino, this ruler had earlier lost to Napoleon at Friedland and signed the Treaty of Tilsit with him. For 10 points each:
[10] Name this Russian czar whose mysterious death has led some to believe he faked his death and became either a monk or a hermit.
ANSWER: Alexander I [or Aleksandr Pavlovich; or Alexander the Blessed; prompt on Alexander] [10] Alexander I came to the throne when this father of his was assassinated in 1801 after reigning for only five years.
ANSWER: Paul I [or Pavel Petrovich]
[10] Paul was the son of this Empress of Russia, the wife of Peter III who favored Grigory Potemkin.
ANSWER: Catherine the Great [or Catherine II of Russia; or Yekaterina Alekseyevna; or Yekaterina
Velikaya; prompt on Catherine; prompt on Yekaterina]
083-10-23-14204
5. The derivative of a function $f$ of $x$ is defined as this as $h$ goes to zero of $f$ of $x$ plus $h$ minus $f$ of $x$ divided by h. For 10 points each:
[10] Name this value that a function approaches as its input approaches a given point.
ANSWER: limit
[10] If a function at $x$ is equal to its limits from both the left and the right, the function is said to be this at x.

ANSWER: continuous
[10] Name the two Greek letters used in the standard definition of a limit on real valued functions.
ANSWER: epsilon and delta [accept in either order]
001-10-23-14205
6. One painting by this woman depicts her painting while in a wheelchair, the result of a streetcar accident. For 10 points each:
[10] Name this Mexican painter whose self-portraits depict her unibrow.
ANSWER: Frida Kahlo de Rivera [or Magdalena Carmen Frida Kahlo y Calderón]
[10] Kahlo was married for a time to this other Mexican artist, who was commissioned by Nelson
Rockefeller to create the work Man at the Crossroads.
ANSWER: Diego María Concepción Juan Nepomuceno Estanislao de la Rivera y Barrientos Acosta y Rodríguez
[10] Man at the Crossroads was one of Rivera's works in this style, which was also frequently used by fellow Mexicans José Orozco and David Siqueiros.
ANSWER: murals
023-10-23-14206
7. This President created the Strategic Defense Initiative, which was nicknamed Star Wars. For 10 points each:
[10] Name this President who was in office for most of the 1980s and who asked Mikhail Gorbachev to tear down the Berlin Wall.
ANSWER: Ronald Wilson Reagan
[10] This Press Secretary under Reagan was paralyzed during John Hinckley, Jr.'s, assassination attempt, leading to a bill requiring background checks for gun purchases being named for him.
ANSWER: James Scott Brady
[10] As part of Operation Urgent Fury under Reagan, the United States invaded this island and deposed the recently established government of Hudson Austin.
ANSWER: Grenada
8. Though it is used in the household, it should never be mixed with bleach because it can cause toxic chloramines (KLOR-uh-meens). For 10 points each:
[10] Name this compound with formula $\mathrm{NH}_{3}$.
ANSWER: ammonia
[10] Ammonia is produced industrially using this process that fixes nitrogen into ammonia by combining nitrogen and hydrogen in the presence of an iron.
ANSWER: Haber-Bosch process
[10] The ammonia molecule is found in this molecular geometry, which allows the nitrogen atom to be rapidly inverted.
ANSWER: trigonal pyramidal
081-10-23-14208
9. Its four characters include Hamm, who cannot stand, and his servant Clov, who cannot sit. For 10 points each:
[10] Name this play, itself named after the final part of a chess game, which also includes Hamm's parents Nagg and Nell.
ANSWER: Endgame
[10] This other tragicomedy features the protagonists Vladimir and Estragon, but not the title character, who never shows up.
ANSWER: Waiting for Godot
[10] Endgame and Waiting for Godot are both plays by this man who won the Nobel Prize in Literature in 1969.

ANSWER: Samuel Beckett
081-10-23-14209
10. Although Priam ("PRY"-um) fought against their invasion of Phyrgia (FRIJ-ee-uh), they became his allies in the Trojan War. For 10 points each:
[10] Name these warrior women of Greek mythology led by Hippolyta (hi-POL-i-tuh). They lent their name to South America's longest river.
ANSWER: Amazons [or Amazonians]
[10] This Amazonian queen accidently slew her sister Hippolyta (hi-POL-i-tuh) while deer-hunting. So, she joined the fight at Troy, where Achilles mourned after killing this woman.
ANSWER: Penthisilea
[10] Penthisilea (PEN-thih-SIL-ee-uh), like all the Amazon women, cut or burnt off this body part to more easily throw spears.
ANSWER: right breast [accept obvious equivalents; prompt partial answer]

079-10-23-14210
11. It ruled until it was replaced by the Meiji Government in 1868. For 10 points each:
[10] Name this final shogunate of Japan, whose namesake period is also known as the Edo period.
ANSWER: Tokugawa Shogunate
[10] This powerful lord of the Sengoku period that preceded the Tokugawa Shogunate is known as Japan's second great unifier, after Oda Nobunaga and before Tokugawa Ieyasu.
ANSWER: Toyotomi Hideyoshi (note the first name is the required family name)
[10] Toyotomi's son, Toyotomi Hideyori, lost to Tokugawa Ieyasu at this 1600 battle that was fought in a mountain pass and marked the beginning of the Tokugawa Shogunate.
ANSWER: Battle of Sekigahara
12. This award is named for a man who coached football, baseball, and basketball at Georgia Tech. For 10 points each:
[10] Name this trophy awarded to the most outstanding player in college football.
ANSWER: Heisman Trophy
[10] This winner of the 2007 Heisman is currently a quarterback for the Denver Broncos. In college, he played for Florida.
ANSWER: Timothy Richard Tebow
[10] This 1985 Heisman winner was named an All-Star in both football and baseball. In the NFL, he was running back for the Los Angeles Raiders.
ANSWER: Vincent Edward "Bo" Jackson
024-10-23-14212
13. This verse form typically contains a kigo, or season word. For 10 points each:
[10] Name this verse form which contains seventeen syllables in three lines.
ANSWER: haiku
[10] This author of Narrow Road to the Deep North was a master of the haiku form.
ANSWER: Matsuo Basho [or Matsuo Kinsaku]
[10] The haiku is based on the hokku, which is the opening part of this type of collaborative poetry.
ANSWER: renga
024-10-23-14213
14. It is the largest freshwater lake in the world, by surface area. For 10 points each, [10] Name this great lake on whose shores lie the cities of Thunder Bay and Duluth.
ANSWER: Lake Superior
[10] The primary outflow of Lake Superior is this river which itself feeds into Lake Huron.
ANSWER: St. Marys River
[10] A famous predator-prey study was conducted on this island in Lake Superior, the namesake of a national park with wildlife populations that include moose and wolves.
ANSWER: Isle Royale National Park
040-10-23-14214
15. The music for this ballet contains variations on the Shaker hymn "Simple Gifts." For 10 points each: [10] Name this ballet with music by Aaron Copland that takes place in 19th century Pennsylvania. ANSWER: Appalachian Spring
[10] This woman choreographed Appalachian Spring and a piece set to music by Zoltan Kodály, Lamentation.
ANSWER: Martha Graham
[10] Graham was undoubtedly inspired by this early 20th century dancer. Her affinity for long scarves caused her death in an automobile accident.
ANSWER: Isadora Duncan
16. For 10 points each, name some things about roads in board or card games.
[10] In this game, roads cost a brick and a wood to build, and they may be placed on the border between two adjacent hexes. In addition, two points are awarded to the player with the longest road.
ANSWER: The Settlers of Catan
[10] This game, which centers on the placement of tiles to construct a medieval French town, uses roads to separate fields, but points can also be scored by placing a piece as a thief on a road when that road is completed.
ANSWER: Carcassone
[10] This French card-based game is played as a race, possibly to the namesake title distance. Types of cards include hazards, remedies, safeties, and distances.
ANSWER: Mille Bornes
17. Some celebrants of this holiday may hold seders, though this is not the festival most commonly associated with those meals. For 10 points each:
[10] Name this Jewish holiday, itself named for the day it falls on, which commemorates the New Year of the Trees, as opposed to the new calendar year celebrated on Rosh Hashanah.
ANSWER: Tu Bishvat
[10] Jewish seders are more commonly held during this other spring holiday that celebrates the Hebrews' exodus from Egypt after the Egyptians' affliction with the Ten Plagues.
ANSWER: Passover or Pesach
[10] Eating leavened bread is forbidden for the eight days of Passover; instead, Jews eat this unleavened bread, a piece of which is hidden after the Passover meal for use as the afikomen.
ANSWER: matzah
081-10-23-14217
18. This husband of Teresa Cascajo governs his promised island for a week. For 10 points each:
[10] Name this squire who appears in a Spanish novel whose first part was published in 1605.
ANSWER: Sancho Panza [accept either]
[10] This is the novel in which Sancho Panza appears. It was written by Miguel de Cervantes and notably includes its title character jousting with windmills.
ANSWER: El Ingenioso Hidalgo Don Quixote de la Mancha
[10] Cervantes also wrote this pastoral novel based on Jorge de Montemayor's Diana.
ANSWER: La Galatea
001-10-23-14218
19. For 10 points each, answer the following about transmembrane proteins.
[10] These transmembrane proteins let polar substance or ions diffuse through the membrane. Ones that let ions through are often voltage-gated.
ANSWER: channel proteins [accept ion channels]
[10] This special kind of channel protein allows water to diffuse into and out of the cell.
ANSWER: aquaporins
[10] Other transmembrane proteins, such as the sodium-potassium pump, use this ATP-requiring process by which molecules are moved across the membrane against a concentration gradient.
ANSWER: active transport
003-10-23-14219
20. It officially reversed many of the terms of the Proclamation of 1763 . For 10 points each, [10] Name this 1789 piece of legislation that provided for the creation of a namesake territory, free of slavery, west of the Appalachian Mountains.
ANSWER: Northwest Ordinance
[10] The first state to be created out of the Northwest Territory was this one, which was done so via the Enabling Act of 1802.
ANSWER: Ohio
[10] The Ordinance also indirectly led to this battle at which the forces of Anthony Wayne decisively defeated a Native American coalition including Blue Jacket and Little Turtle.
ANSWER: Battle of Fallen Timbers
040-10-23-14220
21. Near the end of this novel, the protagonist meets a group of wandering intellectuals led by Granger and works on memorizing the Book of Ecclesiastes. For 10 points each:
[10] Name this 1953 novel which focuses on the fireman Guy Montag and his job of burning books. ANSWER: Fahrenheit 451
[10] The story "Rocket Summer" begins the collection The Martian Chronicles, which was written by this American author of Fahrenheit 451.
ANSWER: Ray Douglas Bradbury
[10] Taking its title from Macbeth, this other Bradbury work sees Will and Jim explore a mysterious carnival which is owned by the heavily-tattooed Mr. Dark.
ANSWER: Something Wicked This Way Comes

