



1. This protein is cross-linked by CH-domain proteins, and the Arp2/3 complex, cofilin, and band 4.1 are among the proteins that bind to this protein. It undergoes treadmilling, in which G monomers are attached to or detached from F filaments. This protein makes up eight to nine nanometer diameter cytoskeletal components called microfilaments. For 10 points, name this most abundant protein in eukaryotic cells, fibers of which slide across myosin fibers in muscle cells.

ANSWER: **actin**

003-11-44-05101

2. One character in this novel is revealed to be a criminal by the fleur-de-lis tattooed on her shoulder. Comic relief in this work is provided by the servants Planchet, Grimaud, and Bazin, who reappear in the sequels *Twenty Years After* and *The Vicomte of Bragelonne*. The central group of this work thwarts the machinations of Milady de Winter, who works with Cardinal Richelieu to manufacture scandal. For 10 points, name this novel by Alexandre Dumas in which D'Artagnan (dar-TAN-yuhn) joins the title group of Athos, Porthos, and Aramis.

ANSWER: *The **Three Musketeers*** [or *Les **Trois Mousquetaires***]

015-11-44-05102

3. One side of this war conducted the Bodo League massacres of hundreds of thousands of political prisoners, while the other side killed 41 prisoners of war in the Hill 303 massacre. One battle in this war, which was heavily criticized for contesting territory with little strategic value, was the Battle of Pork Chop Hill. For 10 points, name this war that ended with the separation of its namesake peninsula into North and South countries along the 38th parallel.

ANSWER: **Korean** War

088-11-44-05103

4. The receptors associated with G proteins cross this structure 7 times. The FRAP method quantifies how proteins move around this object, and proteins that span it are known as integral. Those proteins include ion pumps and ion channels that transport ions across this object, which is typically only permeable to small molecules that can diffuse through its lipid bilayer. For 10 points, name this organelle that separates a cell from its environment.

ANSWER: **cell membrane** [or **plasma membrane**; prompt on **membrane**]

003-11-44-05104

5. In 1790, Richard Arkwright designed this state's Slater Mill, the first textile mill in the U.S. This state's governor Samuel Ward King opposed its citizens' efforts to increase suffrage, sparking Dorr's rebellion. As a colony, it was the site of the decisive Great Swamp Fight during King Philip's War. The founder of this state was banished from the Massachusetts Bay Colony for his views, which included support for freedom of religion. For 10 points, name this state founded by Roger Williams that was first settled at Providence Plantations.

ANSWER: **Rhode Island**

015-11-44-05105

6. This figure had a notable temple at Epidarus, and his sons Podalirius and Machaon led a group of Thessalian ships during the Trojan War. His mother Coronis was killed in childbirth, resulting in him being raised by the centaur Chiron. In retaliation for his death, his father killed the Cyclops and was forced to work for Admetus. With his wife Epione he gave birth to Panacea and Hygeia, and he was killed after raising Hippolytus from the dead. For 10 points, name this physician from Greek mythology.

ANSWER: Asclepius

048-11-44-05106

7. This scientist discussed the music of the spheres concept in his book *Harmonices Mundi*. His namesake conjecture addresses the arrangement of spheres with the highest density. This scientist's best known set of namesake laws relate the semi-major axis of a planet's orbit to its orbital period and that every planet's orbit forms an ellipse with the sun at a foci. For 10 points, name this scientist, best known for proposing his namesake laws of planetary motion.

ANSWER: Johannes Kepler

088-11-44-05107

8. Congressman Kevin Brady asked the current holder of this position "will you step down?" One person in this position came up with a plan to incapacitate postwar Germany militarily. Another person in this position issued the Specie Circular. The first holder of this position was born in modern-day St. Kitts and Nevis, wrote the *Report on Manufactures*, and was killed in a duel. Timothy Geithner current holds, for 10 points, what Cabinet position first held by Alexander Hamilton, who urged the creation of a National Bank?

ANSWER: Secretary of the Treasury [or Treasury Secretary]

020-11-44-05108

9. One man from this country uploaded a video to youtube called "Knights Templar 2083" and also wrote *A European Declaration of Independence*. In July 2011 in this country, a car bomb went off outside the building holding the office of Jens Stoltenberg. The man responsible for that event in this country also went to Utoya and killed many people at a summer camp while dressed as a police officer. For 10 points, name this Scandinavian country where, on July 22, 2011, Anders Behring Breivik killed seventy-seven people.

ANSWER: Kingdom of Norway [or Kongeriget Norge]

023-11-44-05109

10. A group of characters in this novel marvel over a letter by Bill Tenner published in a pulp magazine shown to them by Whit. One character is tormented by the idea that his friend will not return from a brothel by the black stable-hand Crooks. That character crushes small animals by petting them too hard and is pursued by a lynch mob after accidentally killing Curley's wife. For 10 points, name this short novel featuring George Milton and Lennie Small, a work of John Steinbeck.

ANSWER: *Of Mice and Men*

014-11-44-05110

11. In a network, implementing this situation can cause slowdown, known as Braess' paradox. Adding a probability element creates the "trembling hand" example, and they can be found by finding the row and column maxima in a payoff matrix. Chicken has three of them, with one involving mixed strategies, while the stag hunt and prisoner's dilemma has only one. For 10 points, identify this situation from game theory in which no player can gain anything by changing their strategy unilaterally, named for a Princeton mathematician.

ANSWER: Nash equilibrium

048-11-44-05111

12. This man wrote a work in which King Mark is set to marry a woman whose handmaid is Brangane. In that work by this man, the two title characters are brought together by a love potion, with the final aria, "Liebestod," describing their erotic death. He wrote a series of works featuring characters like Siegfried and Brunhilde which ends with the opera *Twilight of the Gods*. For 10 points, name this German composer of *Tristan und Isolde* and the opera cycle *The Ring of the Nibelung*.

ANSWER: Richard (ree-kard) **Wagner** [or Wilhelm Richard **Wagner**]

052-11-44-05112

13. The protagonist of this novel refuses to join the Good Citizen's League before befriending a liberal politician whom he had publicly spoken against named Seneca Doane. After a camping trip in Maine, the protagonist's best friend shoots his wife Zilla. The protagonist neglects social custom after Paul Riesling's imprisonment, though his wife Myra's illness leads him to return to outward conformity. For 10 points, name this novel about a Zenith real estate broker named George, a work of Sinclair Lewis.

ANSWER: **Babbitt**

014-11-44-05113

14. She co-authored, with James Baldwin, a work based on a recording of a conversation the two had entitled *A Rap on Race*. This person's best known book was criticized due to its methodology by Derek Freeman; featured a foreword written by her advisor, Franz Boas; and was controversial due to its representations of the sexualized transition to adulthood of young people on the island of Tau. For 10 points, name this anthropologist who wrote *Coming of Age in Samoa*.

ANSWER: Margaret **Mead**

088-11-44-05114

15. Pressure and viscosity are an intensive example of this for a thermodynamic system. The change in enthalpy and entropy are both extensive examples of this along with isochoric-isothermic potential. The change in Helmholtz and Gibbs free energies is an example of this kind of function. Work is not an example since one calculates it using initial and final conditions. For 10 points, name this kind of function that depends only on the current conditions of the system.

ANSWER: **state** function [or **state** variable or **state** quantity]

135-11-44-05115



1A. This theory builds on Alfred Wegener's theory of continental drift. What is this theory that explains the motion of the Earth's crust?

ANSWER: **plate tectonics**

1B. Heap, bubble, and quick are types of what algorithms in computer science that arrange the elements of a list?

ANSWER: **sorting**

2A. One of the defining illnesses associated with this disease is Kaposi's sarcoma. Identify this disease caused by HIV.

ANSWER: **AIDS** [or **acquired immune deficiency syndrome** or **acquired immunodeficiency syndrome**]

2B. What team named former third baseman Robin Ventura its new manager after the 2011 season, and has a roster featuring Mark Buehrle and Paul Konerko?

ANSWER: Chicago **White Sox** [prompt on **Chicago**]

3A. This is a 10-second computation question. If a star b equals a times the quantity 2 plus b, then what is 2 star 7?

ANSWER: **18**

3B. This is a 10-second computation question. What is the mode of the following data set: 2, 2, 3, 3, 3, 4, 4, 4, 4?

ANSWER: **4**

4A. What Greek dramatist wrote of Strepsiades burning down the Thinkery in *The Clouds* and of the planned utopia of Cloud Cuckoo Land in *The Birds*?

ANSWER: **Aristophanes** (air-ih-STOFF-uh-nees)

4B. What city, the site of the Watts Riots, was again incensed with racial tension after the police beating of Rodney King?

ANSWER: **LA** [or **Los Angeles**]

5A. This is a 20-second computation question. If Evan has made 15 out of 21 field goals, how many consecutive field goals must he make to raise his average to 80 percent?

ANSWER: **9**

5B. This is a 20-second computation question. If a drawer contains seven red socks and six blue socks, what is the probability of drawing at random a pair of blue socks? Express your answer as a fraction in lowest terms.

ANSWER: **5/26**

6A. What type of animal studied by a lepidopterist (leh-pid-DAHP-tehr-ist) names a type of effect in which a small change in one part of system can cause a much larger change elsewhere?

6B. His ballet *The Ruins of Athens*, based on a Kotzebue play, features a famous "Turkish March". Name this German composer of the ballet *The Creatures of Prometheus*.

ANSWER: Ludwig von **Beethoven**

7A. This is a 30-second computation question. Find all values for x on the interval x is between 0 and 2π , inclusive, that satisfy: $2 \sin^2 x + \sin x - 1 = 0$.

ANSWER: $\{\pi/6, 3\pi/2, 11\pi/6\}$ [or x equals $\pi/6, 3\pi/2,$ and $11\pi/6$; do not prompt on partial answer]

7B. This is a 30-second computation question. The corners of a square with side length 2 units are the centers of four circles each with radius 1 unit. What is the area of the space inside the square but outside the circles? Express your answer in terms of π .

ANSWER: $4 - \pi$ units [or **four minus pi** units]

8A. What Hindu spring festival sees the throwing of *abir*, a colored powder?

ANSWER: **Holi**

8B. What language, which does not have diphthongs, is an official language of Kenya and Uganda and is spoken by over 100 million people in East Africa and on island chains in the Indian Ocean?

ANSWER: **Swahili**

9A. Which poet and literary critic introduced the idea of the objective correlative in his essay "Hamlet and His Problems," which was collected in *The Sacred Wood*.

ANSWER: Thomas Stearns **Eliot**

9B. What only vulnerable body part of a Greek hero did Paris fatally wound with an arrow, as foretold by said hero's mother, Thetis?

ANSWER: Achilles' **heel**

10A. Which major Mexican pre-Colombian civilization produced the life-size basalt statue *The Wrestler* and was known for creating colossal stone heads?

ANSWER: the **Olmecs** [or los **Olmecas**]

10B. What movie featured the villain Lots-O'-Huggin' Bear, whose maniacal leadership at Sunnyside Day Care causes issues for Woody and Buzz Lightyear?

ANSWER: **Toy Story 3** [do not accept or prompt on "Toy Story"]



1. Early in this man's reign, his chief minister was targeted by a civil war known as the Fronde. This ruler was served by one minister who reformed the methods for collecting the taille. That minister of finance was Jean-Baptiste Colbert. This monarch issued the Edict of Fontainebleau, which revoked the Edict of Nantes. This ruler, who was served by Cardinal Mazarin, moved his court from Paris to his palace at Versailles. For 10 points, name this French king whose rule of 72 years led to his nickname of the "Sun King."

ANSWER: **Louis XIV** of France [or **Louis the Great**; or **Louis the Grand Monarch**; or **Louis le Grand Monarque**; prompt on **Louis**]

023-11-44-05117

2. This province's Haida Gwaii was formerly known as the Queen Charlotte Islands and is separated from the rest of the province by the Hecate Strait. Prince Rupert and Prince George are cities in this province. The Fraser River runs through this province. This province is bordered by the Yukon Territory to the north and Alberta to the east. For 10 points, name the westernmost Canadian province, whose cities include Victoria and Vancouver.

ANSWER: **British Columbia**

140-11-44-05118

3. One poem by this man includes the repeated line "HURRY UP PLEASE ITS TIME" in one section. One of his narrators states "In the room the women come and go talking of Michelangelo" and begins by saying "Let us go then, you and I." The section "The Burial of the Dead" opens the poem by this man which begins "April is the cruellest month." For 10 points, name this American modernist poet of "The Love Song of J. Alfred Prufrock" and "The Waste Land."

ANSWER: Thomas Stearns **Eliot**

014-11-44-05119

4. This ruler was the target of the Infernal Machine plot. This leader organized a boycott of British products under the Continental System. While his forces were victorious at the Battle of Borodino, the losses were significant enough to stop this man's invasion of Russia. This leader died after being exiled to the island of Saint Helena, where he was sent after returning to power for the Hundred Days after an exile to Elba. For 10 points, name this Emperor of France who lost at the Battle of Waterloo.

ANSWER: Napoleon **Bonaparte** [or **Napoleon I**]

088-11-44-05120

5. This painting can be found opposite its artist's *La Disputa* in the Stanza della Segnatura, where it appears below a tondo reading "Causarum Cognitio". In the right background of this work, its artist appears as Apelles. Michelangelo is depicted as Heraclitus in this work, the central figures of which carry copies of *Timaeus* and the *Nicomachean Ethics*. For 10 points, name this painting by Raphael which depicts a discussion between Plato and Aristotle in the title learning establishment.

ANSWER: *The **School of Athens*** [or ***Scuola di Atene***; accept ***Causarum Cognitio*** or ***Knowledge of Causes*** until the former is read]

135-11-44-05121

6. While campaigning for his current office, this man was criticized for his Regent University thesis, in which he called working women “detrimental to the family.” In that election, this man defeated an opponent he had defeated in the attorney general race four years earlier, Creigh Deeds. In 2010 he proposed privatizing state-owned liquor stores, a plan the House of Delegates refused to consider in the 2011 session. For 10 points, name this successor to Tim Kaine, the current governor of Virginia.

ANSWER: Robert "Bob" **McDonnell**

121-11-44-05122

7. Nonstandard examples of these molecules have a sulfur atom replaced with selenium. They can be sorted into glucogenic or ketogenic depending on how they are broken down, and the inability to break down branched-chain ones causes maple syrup urine disease. There are 20 standard ones, several of which were produced in the Urey-Miller experiment. They are polymerized by ribosomes and contain both a carboxy and amine group. For 10 points, name these building blocks of proteins.

ANSWER: **amino acids**

048-11-44-05123

8. This leader was deposed and imprisoned by a Communist military junta called the Derg. He came to power after spearheading religious reforms under Empress Zewditu. This man was known as the Lion of Judah, partially for speaking out against the Italian invasion of his country in the 1930s. This ruler traced his line back to King Solomon, and became an important figure in the Rastafari religion after his death. For 10 points, name this Emperor of Ethiopia from 1930 to 1974.

ANSWER: Haile **Selassie I**

015-11-44-05124

9. In this novel, the protagonist's sick and pregnant wife allows her boss Connor to seduce her in an attempt to save her job. After that wife, Ona, dies in childbirth, the protagonist deals criminally with the safecracker Jack Duane prior to finding salvation at a gathering of socialists. This novel about Jurgis Rudkus was instrumental in the passage of the Pure Food and Drug Act. For 10 points, name this novel which exposed the meatpacking industry, written by Upton Sinclair.

ANSWER: *The* **Jungle**

014-11-44-05125

10. The type II variant of these objects sees the production of elements heavier than iron. The type Ia form of these objects occurs when a white dwarf exceeds 1.4 solar masses, known as the Chandrasekhar (chan-DREH-suh-kar) limit. These objects are formed from the collapse of an aging star, rapidly increasing its temperature and energy, and the remnants of these objects form a neutron star. The Crab Nebula was formed from one of these events observed in AD 1054. For 10 points, name these large stellar explosions.

ANSWER: **supernova**

064-11-44-05126

11. This author responded to the hedonism of the Rubaiyat in a poem that begins, "Grow old along with me! The best is yet to be." "Rabbi Ben Ezra" is one of this poet's "dramatic monologues." Another of his monologues concludes as the speaker points to a statue of Neptune by Claus of Innsbruck. The speaker of that poem claims his wife's heart was "too soon made glad" and implies that he murdered her. For 10 points, name this Victorian poet of "My Last Duchess."

ANSWER: **Robert Browning** [prompt on **Browning**]

080-11-44-05127

12. One theory of this force states that it exists as a spin network, which leads to the idea that space is quantized. The LIGO project is designed to detect "waves" of this force that is responsible for a kind of redshift. The velocity required to overcome this force is known as the escape velocity. The potential energy due to this force is directly proportional to an object's height. Weight is equal to the mass times the acceleration due to, for 10 points, what force that generally keeps your feet on the ground?

ANSWER: **gravity**

003-11-44-05128

13. While sleepwalking, this character's husband puts her in a coffin and murmurs that his wife is dead. She gives birth to a child she names Sorrow, who dies shortly afterwards. After revealing a previous affair, this character is abandoned by her husband, Angel Clare. This "Pure Woman Faithfully Represented" is executed for murdering Alec, who may have raped her. For 10 points, name this Thomas Hardy character supposedly descended from the noble d'Urbervilles.

ANSWER: **Tess** Durbeyfield [or Tess **Durbeyfield**]

080-11-44-05129

14. The West branch of this river rises in Schoharie Country, while the East branch includes the Pepacton Reservoir. The Foul Rift are rapids in this river. Tocks Island was the location for a dam on this river, but it was never built. Tributaries of this river include the Neversink and Schuylkill (SCHOOL-kul) Rivers. Cities on this river include Wilmington, Trenton, and Philadelphia. For 10 points, name this river which empties into the Atlantic Ocean after flowing past New Jersey and a namesake state.

ANSWER: **Delaware River**

140-11-44-05130

15. This video game series' protagonists include Jake Murphy of the *Infiltrator* release and Jimmy Patterson, who was in the first game of this series as well as one subtitled *Frontline*. This series of games featured titles set in World War II until a 2010 release, with player characters such as Dante Adams and "Rabbit," was set in Afghanistan. For 10 points, name this series of first-person-shooter video games with games subtitled "Airborne," "European Assault," and "Rising Sun."

ANSWER: **Medal of Honor**

088-11-44-05131



1. During this event, Count Emicho and William the Carpenter attacked Jews at Mainz. Afterwards, Godfrey of Bouillon (BOO-yown) and Baldwin I became kings of a newly created state. Walter the Penniless and Peter the Hermit led groups of untrained peasants during this event. It began at the Council of Clermont where a crowd chanted "God wills it!", and it culminated in a bloody massacre of Muslims and Jews at Jerusalem. For 10 points, name this expedition to the Holy Lands launched in 1095 by Pope Urban II, which was the earliest of its type.

ANSWER: **First Crusade**

052-11-44-05132

2. An experiment using a ballistic type of this object can be run to figure out the speed of a bullet. With a large angle, a double type of this object will exhibit chaotic motion. The period of a simple one of these objects is equal to two pi times the square root of this object's length over the acceleration of gravity. For 10 points, name these objects that could in ideal situations display simple harmonic motion and which often consist of a mass on a string swinging from a fixed point.

ANSWER: **pendulums**

023-11-44-05133

3. Decimus Burton and Richard Turner built the Palm House at this city's Kew Gardens. The Jubilee Gardens in Lambeth is home to this city's ferris wheel known as the Eye. Four lions surround Nelson's Column in the center of this city's Trafalgar Square. This city, home to Regent's Park and Hyde Park, contains the boroughs of Mayfair and Soho. Westminster Abbey, Buckingham Palace, and Big Ben are located in this city, through which the Thames flows. For 10 points, name this capital of England and the U.K.

ANSWER: **London**

124-11-44-05134

4. One character in this novel quotes the line "hug me till you drug me" from a popular song while attempting to seduce another character. In this novel featuring Bokanovsky groups, another character rejects the arguments of the resident World Controller Mustapha Mond. That character whips Lenina Crowne after he is taken from a reservation by the Alpha Plus citizen Bernard Marx. This novel concludes with the suicide of John the Savage. For 10 points, name this dystopian novel by Aldous Huxley.

ANSWER: **Brave New World**

014-11-44-05135

5. James Callender accused this man of fathering the children of his slave Sally Hemings. He advocated for the end of slavery in his *Notes on the State of Virginia* and established freedom of religion in Virginia. This president eliminated the whiskey tax, fought the Barbary pirates, and made the Louisiana Purchase. This first secretary of state and second vice president wrote "that all men are created equal" For 10 points, name this third president who penned the Declaration of Independence.

ANSWER: Thomas **Jefferson**

124-11-44-05136