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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **State Championships 2015**  **Round 3**  **First Period, Fifteen Tossups** |

1. At the start of a play by this author, the sound of a jet leads a man to predict that the plane will crash into a dune. In another of his plays, an imaginary son dies while trying to avoid a porcupine. Lizards approach Nancy and Charlie on the beach in this author’s *Seascape.* One of this man’s plays has sections titled “Walpurgisnacht” (wahl-PUR-ges-nokt) and “Fun and Games.” In that play of his, “Bringing Up Baby” is played by Nick and Honey with their hosts, George and Martha. For 10 points, name this playwright of *Who’s Afraid of Virginia Woolf?*  
ANSWER: Edward **Albee** [Edward Franklin **Albee** III]

2. The macula densa (MAK-yoo-luh DEN-suh) stimulates this organ’s afferent (AH-fuh-rent) arterioles. GFR is estimated by measuring this organ’s creatinine (cree-AT-uh-neen) clearance rate. The proximal convoluted tubule narrows into this organ’s descending loop of Henle (HEN-lee), and its collecting ducts become water-permeable in the presence of anti-diuretic hormone. Its functional units are called nephrons. This organ lies beneath the adrenal gland and empties fluid into the ureters. For 10 points, name this paired organ that produces urine.  
ANSWER: **kidney**s [prompt on **nephron**s]

3. This country eradicated its pig population using the program PEPPADEP. Its onetime secret police force was called the Tonton Macoute (ma-COOT), which is named after a mythological bogeyman. This country, which was once led by the priest Jean-Bertrand Aristide (ah-ruh-STEED), was earlier dominated by the father and son dictators known as “Papa” and “Baby” Doc. For 10 points, name this Caribbean country once ruled by the Duvaliers (doo-VAH-lee-eyz), which shares an island with the Dominican Republic.  
ANSWER: **Haiti** [Republic of **Haiti**; or Republique d’**Haiti**; or Repiblik d’**Ayiti**]

4. A painting of this man was commissioned by William Bingham as a gift for the second Earl of Shelburne. Another painting of this man is in the background of the satirical painting *Daughters of Revolution* by Grant Wood. The Lansdowne portrait features this man and was painted by Gilbert Stuart. That painting of him was legendarily saved by Dolley Madison during the War of 1812. For 10 points, name this American hero who, in an 1851 Emanuel Leutze (LOYT-zuh) painting, is seen triumphantly standing in a boat, “crossing the Delaware.”  
ANSWER: George **Washington**

5. This city completely surrounds the borough of Mount Oliver, and its airport is located in nearby Moon Township. Its namesake university’s Cathedral of Learning towers over its Oakland neighborhood, and its historically African-American Hill District is the setting of several August Wilson plays. This city’s Duquesne (doo-KANE) Incline overlooks Three Rivers State Park, where the Ohio, Monongahela (muh-NAHN-guh-HEE-luh), and Allegheny Rivers meet. For 10 points, “yinzers” are residents of what “Steel City” in western Pennsylvania?  
ANSWER: **Pittsburgh**, Pennsylvania

6. This man is the namesake of an equation stating that a system’s degrees of freedom equals the number of chemical components minus the number of phases plus two. For an electrochemical cell, a quantity named for him is equal to minus the number of electrons transferred per mole times Faraday’s constant times the standard potential. That quantity named for him is equal to enthalpy minus temperature times entropy plus pressure times volume. For 10 points, what American chemist names a type of free energy that determines the spontaneity of reactions?  
ANSWER: Josiah Willard **Gibbs**

7. This film is removed completely from the so-called “Machete Order.” This film is the first appearance of Aurra Sing. A Brian Blessed-voiced character in this movie complains that humans “tink dey brains so big.” Keira Knightley plays a decoy in this film, which ends after a Zabrak (ZAA-braak) is cut in half and kicked into a shaft under the palace of Theed. This film introduced the terms “padawan” (PAH-duh-wahn) and “midichlorians” (MID-ee-CLORE-ee-unz). For 10 points, name this 1999 film which introduced Boss Nass and Darth Maul.  
ANSWER: ***Star Wars Episode I****: The Phantom Menace* [or *The* ***Phantom Menace***; do not prompt on “Star Wars”]

8. Margaret Rousseau designed processes to mass-produce gasoline and this other thing. Dorothy Hodgkin proved that it has a four-member nitrogen-containing ring. A moldy cantaloupe brought to a facility in Peoria, Illinois inspired Howard Florey’s mass production of this thing in advance of D-Day. Beta-lactamases (LAK-tah-may-zez), like those found in hospital-acquired MRSA, degrade this thing. Like lysozyme (LAI-so-zaim), this thing was found to inhibit bacterial growth by accident. For 10 points, name this antibiotic discovered by Alexander Fleming.  
ANSWER: **penicillin**s [or **PCN**; or **pen**; or prompt on **antibiotic**s]

9. This quantity, divided by the vacancy rate, gives the tightness of the market. The Beveridge curve plots it against the vacancy rate. Milton Friedman theorized that if this value fell below its “natural” rate, or NAIRU (NAI-roo), inflation would increase. Okun’s law states that every percent increase in this rate is correlated with a two percent drop in GDP. The Bureau of Labor Statistics does not include discouraged workers in the official version of this quantity, which increases during recessions. For 10 points, name this fraction of people unable to find work.  
ANSWER: **unemployment** rate

10. In a novel by this author, Tito Melema marries the title daughter of Bardo de’ Bardi in Florence. In another novel by this author, Dunstan Cass dies by falling into a stone quarry. This author of *Romola* wrote about an old man who sees his stolen gold in the golden hair of a girl he eventually adopts, named Eppie. Edward Casaubon fruitlessly works on a *Key to All Mythologies* in this author’s massive “Study of Provincial Life” about Dorothea Brooke. For 10 points, name this pseudonymous English author of *Silas Marner* and *Middlemarch.*  
ANSWER: George **Eliot** [or Mary Ann **Evans**]

11. This man’s partners included chemist Samuel Andrews and Florida development pioneer Henry Flagler. An editorial cartoon shows him being chastised by future Major League Baseball Commissioner Kenesaw Mountan Landis during a trial in Indiana. This man, the founder of the University of Chicago, was attacked in a series of *McClure’s* articles by Ida Tarbell, which contributed to the breakup of his firm in 1911. For 10 points, name this patriarch of an American political dynasty who made his fortune as the principal owner of Standard Oil.  
ANSWER: John D. **Rockefeller** [John Davison **Rockefeller**, Sr.]

12. In many Native American traditions, the world is created by a grandmother goddess in the form of this animal. In West African folklore, all the stories in the world are given to one of these animals named Anansi (ah-NAHN-see). In Ovid’s *Metamorphoses*, a woman is transformed into one of these animals after depicting Zeus’s seduction of various women in a tapestry during a weaving contest with Athena. For 10 points, name the animal into which Arachne (aa-RAK-nee) is transformed.  
ANSWER: **spider**s

13. Opponents of this man joked that a concubine from Miletus (mil-EE-tuss) wrote his speeches. This lover of Aspasia (aa-SPAYZ-yuh) praised his city’s constitution as a model for the civilized world in a speech which promised to use public expenses to raise the children of fallen soldiers. This rival of Cimon (SAI-mahn) died of plague shortly after he gave a Funeral Oration for those men who died in the first year of the Peloponnesian (peh-loh-puh-NEE-zhun) War. For 10 points, name this pre-eminent statesman of Golden Age Athens.  
ANSWER: **Pericles**

14. In 2014, a new technique for performing this process was pioneered using the Keck Interferometer (INT-er-fuh-RAH-muh-ter) on the “Eye of Sauron.” The Wilson-Bappu effect can be used to perform this action on objects that are not subject to the use of RR Lyrae (LIE-ray) or Cepheid (SEF-ee-id) variables. A “ladder” for this process begins with parallax and extends through redshift for objects subject to Hubble’s Law. For 10 points, identify this process that gives a value in megaparsecs for some galaxies and gives one astronomical unit for the Sun.  
ANSWER: measuring the **distance** of astronomical objects [or equivalents such as determining **how far away** things in space are]

15. A person with this position uses his left-handedness to hide a dagger on his right thigh, and then stabs an obese king to the point of making him defecate. Another person with this position is shown a wet fleece on a dry floor and a dry fleece on a wet floor on two consecutive mornings. The only woman to hold this position is Deborah. Another of these leaders uses a donkey’s jawbone to slay a Philistine army but loses his strength when Delilah cuts off his hair. For 10 points, name these Israelite leaders that include Ehud (eh-HOOD), Gideon, and Samson.  
ANSWER: **Judge**s [or **shofet**; or **shoftim**]

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **State Championships 2015**  **Round 3**  **Directed Round** |

1A. Water molecules have what non-linear geometry, characterized by bond angles between 104 and 109.5 degrees?  
ANSWER: **bent**

1B. What John Keats poem concludes by asking “do I wake or sleep?” and addresses the title bird as a “light-winged Dryad of the trees?”  
ANSWER: “**Ode to a Nightingale**”

2A. Name the secret police that attempted to assassinate Wolfgang Welsch by feeding him thalium-laced hamburgers and was known as the “Sword and Shield of the Party.”  
ANSWER: **Stasi** [**Sta**ats**si**cherheit; or **Ministry for State Security**; or **Ministerium fur Staatssicherheit**]

2B. What operation from calculus is often described as the slope of a function at a single point, or the instantaneous rate of change?  
ANSWER: **derivative** [or **differentiation**]

3A. This is a 20-second calculation question. Suppose that in a blind taste test, 13 out of 20 people preferred Brand A to the generic brand, and 12 out of 20 different people preferred Brand B to the generic brand. If a person who preferred the generic brand is randomly selected, what is the probability that the person was asked to test it against Brand A?  
ANSWER: **7/15**

3B. This is a 20-second calculation question. What is the range of the function y = x squared + 2?  
ANSWER: **2, infinity** [or **2 to infinity**]

4A. What French philosopher argued in favor of rationalism using the example of a melting ball of wax in the second section of his *Meditations on First Philosophy*?  
ANSWER: René **Descartes**

4B. What largest lake in Europe is found in northwestern Russia near Saint Petersburg and is drained by the Neva River?  
ANSWER: Lake **Ladoga** (lah-DOH-guh) [or **Ladozhskoye** (LAH-dohv-skey-uh) ozero]

5A. *Salmonella*, *E. coli*, and other bacterial species designated as “bacilli” (bah-SEE-lee) have what general shape?  
ANSWER: **rod** [or synonyms such as **cylinder**, or **straight**, or **stick**]

5B. What Romanian sculptor went to court after U.S. Customs officials refused to classify his abstract sculpture *Bird in Space* as art?  
ANSWER: Constantin **Brancusi**

6A. What Chicana author wrote the novel *The House on Mango Street*?  
ANSWER: Sandra **Cisneros**

6B. What man, the first African to win the Nobel Prize in Literature, depicted the ritual suicide of Elesin in his play *Death and the King’s Horseman*?  
ANSWER: Wole **Soyinka** [Akinwande Oluwole **Soyinka**]

7A. What Klaus Teuber board game has players trade resources to build settlements and cities on a namesake island, and is popular in the Green Bay Packers locker room?  
ANSWER: *The* ***Settlers of Catan*** [or *Die* ***Siedler von Catan***]

7B. What English-language animal is called “lapin” (lah-PENG) in French, “conejo” (koh-NAY-hoh) in Spanish, “Kaninchen” (kah-NEEN-shen) in German, and “usagi” (ooh-SAH-gee) in Japanese?  
ANSWER: **rabbit**s [or **bunn**y or other equivalents; or **hare**s]

8A. This is a 30-second calculation question. An amplitude-modulated sine wave is created by multiplying sine of 2 pi f1 t by the quantity 1 plus sine of 2 pi f2 t. This expression can be written equivalently as a sum of three sine functions with different periods. What are the periods of those three functions, in terms of f1 and f2?  
ANSWER: **1 over f1**, **1 over** quantity **f1 plus f2**, and **1 over** quantity **f1 minus f2**

8B. This is a 30-second calculation question. The height of a right cylinder is equal to its radius. What is the smallest possible length of the radius, given that the cylinder’s surface area is an integer multiple of pi square units?  
ANSWER: **1/2** units [or **0.5** units]

9A. What humorous literary device, named for a warden at Oxford, is the shuffling around of the first letters of words in a sentence?  
ANSWER: **spoonerism**

9B. What State Department official was convicted of perjury after Whittaker Chambers’s Pumpkin Papers proved that he lied about being part of a Communist spy ring?  
ANSWER: Alger **Hiss**

10A. Name the South Dakota location where 7th Cavalry troops led by James Forsyth massacred over two hundred Lakota in 1890 after the deaf Black Coyote refused to give up his rifle.  
ANSWER: **Wounded Knee** Creek [or **Wounded Knee** Massacre]

10B. Name the country which has been ruled by a military junta since a May 2014 coup against Prime Minister Yingluck Shinawtra (YEEN-luck SEE-nuh-waht) and her “redshirt” followers.  
ANSWER: **Thailand** [Kingdom of **Thailand**; or Ratcha Anachak **Thai**]

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **State Championships 2015**  **Round 3**  **Third Period, Fifteen Tossups** |

1. This instrument joins the piano in August Wilhelm’s arrangement of the second movement of J.S. Bach’s third orchestral suite. Bach wrote three sonatas and three partitas for this instrument. Giuseppi Tartini’s *Devil’s Trill Sonata* is a piece for this instrument. A set of four concertos for this instrument joins sonnets about a barking dog, sleeping drunkards, and a thunderstorm. The title of the *Air on the G String* refers to this instrument, which is the soloist in Antonio Vivaldi’s *The Four Seasons*. For 10 points, name this smallest string instrument.  
ANSWER: **violin**s

2. Leaders of this regime were evacuated to Sigmaringen (ZIG-muh-ring-in) after authorizing the internment of Jews at a bicycle racetrack and the Drancy camp. During Operation Torch, an admiral of this government, Darlan (dar-LAHN), agreed to help the Allies fight German troops in North Africa. This government adopted the slogan “Work, Family, Fatherland” under Prime Minister Pierre Laval (lu-VAHL). For 10 points, name this collaborationist French government that was led by Philippe Petain (peh-TAHN) during World War II.  
ANSWER: **Vichy** France [or **French State**; or **Etat Francais**]

3. A woman in this play seeks asylum from a king whose infertility she promises to end. A character in this play dies when he embraces his daughter, who goes into convulsions after putting on a new robe. This play’s title character escapes in a chariot drawn by a dragon sent by her grandfather, the sun god Helios. The title character of this play avenges herself on her fickle husband by murdering their children in addition to Creon and Glauce (GLAO-kay). For 10 points, name this Greek tragedy about the wife of Jason, by Euripides (yur-IP-uh-deez).  
ANSWER: ***Medea***

4. In *Don Giovanni*, “Là ci darem la mano” (LAH chee da-REM la MAH-noh) is a duet for a baritone and this type of voice, two of which sing the Flower Duet in Léo Delibes’s *Lakmé*. “When I am laid in Earth” is an aria for this vocal range. The aria “Der Hölle Rache” (dair HOH-luh RAH-kuh) is sung by the Queen of the Night, who possesses the coloratura type of this voice. This vocal range belongs to Maria Callas and the title characters of *Madama Butterfly* and *Carmen*. For 10 points, name this highest-pitched female voice.  
ANSWER: **soprano**s [or lyric **soprano**s; or coloratura **soprano**s]

5. This man was drafted into the NBA after his Mountain West Conference team was knocked out of the Sweet 16 by Connecticut in 2011. A gold logo incorporating this man’s initials and nickname, derived from his large hands, appears on the “Claw” line of sneakers. In 2014, this player became only the second man to miss the All-Star team but win the NBA Finals MVP award, after he led Tony Parker and Tim Duncan to a victory over the Heat. For 10 points, name this small forward, now in his fifth year with the San Antonio Spurs.  
ANSWER: Kawhi **Leonard** [Kawhi Anthony **Leonard**]

6. Ohno’s law concerns the conservation of this structure in placental mammals. Dosage compensation downregulates these structures through the process of lyonization (LAI-uhn-uh-zay-shun). Only one of these structures is present in Turner syndrome, and two or more of them are present in Klinefelter’s disease. Some of them are packaged into inactive Barr bodies. Hemophilia and red-green colorblindness are linked to recessive mutations in these structures. For 10 points, name these sex chromosomes present in both women and men.  
ANSWER: **X** chromosome [prompt on **sex chromosome**s until it is read]

7. During this war, peacekeeping associations called “clubmen” attempted to protect civilians. *The Agreement of the People* was written during this war by a group which participated in the Putney debates. Prince Rupert won the Battle of Edgehill at the beginning of this war. Thomas Fairfax led the winners of this war at the Battle of Naseby (NAZE-bee), which, like the Battle of Marston Moor, was won by the New Model Army. For 10 points, name this war in which the “roundheads” under Oliver Cromwell defeated King Charles I.  
ANSWER: **English Civil** War

8. In an AC circuit, voltage leads current by ninety degrees in these devices. When they are combined in a circuit with a voltage source and a resistor, the current will exponentially increase from zero. The energy stored in them is proportional to current squared. A parameter describing these devices is calculated as the flux linkage divided by current. They are represented by a coil on circuit diagrams. Their strength is represented by L and measured in henries. For 10 points, identify these circuit elements that oppose changes in current.  
ANSWER: **inductor**s

9. A long-running dispute over these places focused on the use of their occupants to fight wildfires and the “2-for-1 credits” system employed here. Proposition 47, passed in November 2014, sought to reduce the population of these places, which were ruled illegally overcrowded by the Supreme Court in 2011’s *Brown v. Plata.* These places received new residents following the 1994 passage of the U.S.’s first “three strikes” law. For 10 points, identify these places, including San Quentin, where people convicted of crimes go in the Golden State.  
ANSWER: **prison**s in **California** [or obvious equivalents such as **California prison**s; prompt on partial answer]

10. In a novel by this author, Florence’s briefcase is absentmindedly picked up by Keith Neudecker in the World Trade Center, leading to an affair between the two. His novella *Pafko at the Wall* was originally the prologue of a novel about the garbage manager Nick Shay. The protagonist of one of his novels teaches Hitler Studies at The-College-on-the-Hill. This author of *Falling Man* and *Underworld* described the “Airborne Toxic Event” in a novel about Jack Gladney. For 10 points, name this American author of *White Noise*.  
ANSWER: Don **DeLillo** [Donald Richard “Don” **DeLillo**]

11. This deity curses all crows to turn from white to black when he hears that Ischys (ISS-kiss) is sleeping with his lover Coronis. When one of his lovers dies from being hit in the head by a discus, this god memorializes him with the hyacinth flower. He spends a year working for Admetus, and curses Cassandra so that her gift of prophecy is never believed. This god pursues a nymph until she turns into a laurel tree after both he and that nymph, Daphne, are struck by Cupid’s arrows. For 10 points, name this son of Leto, the twin brother of Artemis.  
ANSWER: **Apollo**

12. The Kainji (kye-IN-jee) Dam produces energy from this country’s chief river. William Baikie explored the Benue (BEN-way) River, which enters this country from Cameroon. A river delta in this country is home to the oil-producing city of Port Harcourt. This country’s Igbo (EEG-boh) people formed the breakaway region of Biafra. In 1991, this country moved its capital inland to Abuja (uh-BOO-juh) from its largest city, Lagos (LAA-gohs). For 10 points, name this most populous country in Africa.  
ANSWER: **Nigeria** [Federal Republic of **Nigeria**]

13. This function gives a horizontal shift under a Laplace (luh-PLOSS) transform. Gaussian functions include this function of negative x squared, which is impossible to analytically integrate. The nth term of this function’s Taylor series is x to the n over n factorial. This function solves the differential equation y prime equals y. As n goes to infinity, this function of x is one plus x over n, all to the n. Its graph has a y-intercept of 1 and a horizontal asymptote (AA-sim-toat) at 0. For 10 points, name this inverse of the logarithm, which often involves the number e.  
ANSWER: **exponential** function [or **e to the x**]

14. This language was used to write a visionary poem in which the speaker converses with the cross on which Jesus was crucified, entitled “The Dream of the Rood.” A longer poem in this language is found in the Nowell Codex, and includes a scene in which Unferth gives a sword to his rival. That poem in this language ends with a battle against a dragon in Earnaness (ER-nuh-ness), and is named for a king of the Geats (GAY-ats) who helps Hrothgar (huh-ROTH-gahr) by killing the monster Grendel. For 10 points, name this language used to write *Beowulf.*  
ANSWER: **Old English** [or **Anglo-Saxon**; prompt on **English**]

15. Skirmishes during this battle attempted to take land near the Dunker Church. Ambrose Burnside’s corps suffered major casualties while trying to take a bridge during this battle. Prior to this battle, two soldiers discovered battle plans known as Special Order 191 wrapped around some cigars. While disappointed in George McClellan’s failure to press his advantage after this battle, Abraham Lincoln issued the Emancipation Proclamation. For 10 points, name this Civil War battle in Maryland, the bloodiest single-day battle of the war.  
ANSWER: Battle of **Antietam** [or Battle of **Sharpsburg**]

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| High School Academic Pyramid Questions | **VHSL Scholastic Bowl**  **State Championships 2015**  **Round 3**  **Tiebreaker/replacement questions** |

1. Weevils were introduced to this non-American body of water in an attempt to curb an overgrowth of water hyacinth. Thousands of corpses once flowed into this body of water from the Kagera (kah-GARE-uh) River. The Owen Falls Dam is located on this lake’s main outflow, and the Ssese (SAY-say) Islands are located in its northwest. John Speke (SPEAK) discovered this lake in 1858 on his quest to find the source of the Nile. For 10 points, name this African lake shared by Kenya, Uganda, and Tanzania, that is named for a British queen.  
ANSWER: Lake **Victoria**

2. An opera from this country features a chorus that does nothing but count beats and sing solfege (SOL-fej). An operatic character from this country proclaims that “News has a kind of mystery.” A composer from this non-France country adapted Voltaire’s *Candide* into an operetta that includes the aria “Glitter and be gay.” The soprano lullaby “Summertime” opens an opera from this country titled *Porgy and Bess*. For 10 points, name this home country of the title character in John Adams’s *Nixon in China*.  
ANSWER: **United States** of America [or **US**A; or **America**]

3. This leader quoted St. Paul in a speech nicknamed the “Sermon on the Mound.” This politician faced off with Arthur Scargill during a miner’s strike and rose to power after James Callaghan’s (CALL-uh-han’s) government faced the “Winter of Discontent.” The IRA tried to kill this leader in the Brighton hotel bombing. This prime minister was succeeded by John Major and was in power during the Falklands War. For 10 points, name this Conservative prime minister of the U.K., known as the “Iron Lady.”  
ANSWER: Margaret **Thatcher** [Margaret Hilda Roberts **Thatcher**]

4. The opening passage of this collection describes a time when the young sun has run a half course in the Ram, and Zephyrus breathes into every holt and heath. In this collection, a woman named Alison describes a rapist who avoids execution by discovering from an old crone that women desire sovereignty over their husbands. Its first story details the rivalry between Arcite (ar-KEE-tay) and Palamon. This collection’s characters include the Wife of Bath and the Knight. For 10 points, name this collection of Middle English verse tales written by Geoffrey Chaucer.  
ANSWER: *The* ***Canterbury Tales***

5. A tensor representing this quantity is named for Cauchy (COW-shay) and can be represented in two dimensions by Mohr’s circle. This quantity is measured in units of pressure, such as pascals. When this quantity exceeds a material’s yield strength, plastic deformation occurs. This quantity divided by a dimensionless quantity gives the Young’s modulus of a material, according to a form of Hooke’s Law. This quantity is often plotted on a curve with strain. For 10 points, name this quantity that measures the forces that cause a material to deform.  
ANSWER: mechanical **stress**

What lake formed by the Hoover Dam on the Colorado River in both Nevada and Arizona is the largest reservoir in the United States?  
ANSWER: Lake **Mead**

This is a calculation question. A genetic mutation affects twenty-five percent of the population. Ninety percent of those with the mutated gene develop a disease, while ten percent of those without the mutated gene develop it. Given that a person suffers from the disease, what is the probability that person has the gene mutation?  
ANSWER: **75** percent [or **3/4**]