

LIMIT 2015: A Limit to Learning is a Dangerous Thing

Written by Lexington High School (Colin Cantwell, Kyle Doney, Reggie Luo, Gavin Mak, Duncan McCallum, Arjun Sarathy, Devin Shang), Hinsdale Central High School (Ankush Bajaj, Sunny Chen, Harrison Wang, James Zhou), and Victor Pavao

Edited by Rohan Nag and Jarret Greene

Tiebreakers

Tossups

In a work by this author, Ephraim is initially oblivious to the affair between his son Eben and Abbie Putnam. This writer also penned a play in which Cecil Lewis and Piet Wet-joen reconcile after having fought against each other during the Boer Wars. In that play, the Old Fool-osopher (*) Larry Slade discusses how he has buried his pipe dreams. In another play by this author of *Desire Under the Elms*, a foghorn interrupts a character's sleep and members of the dysfunctional Tyrone family argue over the course of an entire day. For 10 points, name this American playwright who wrote *The Iceman Cometh* and *Long Day's Journey Into Night*.

ANSWER: Eugene O'Neill <AB>

This man depicted a man with a funnel-hat trepanning a patient's skull, while a nun seated on the right balances a red book on her head in one painting. In another, this painter of *The Cure of Folly* showed a nun with a lute and other drunken people beneath a red flag with an Islamic crescent preparing to embark on a voyage. In addition to (*) *Ship of Fools*, this painter of the *Haywain* triptych portrayed a seated blue bird eating a man on the "hell" side of another painting. That painting features a pink fountain and Eve on its left side. For 10 points, name this painter of *The Garden of Earthly Delights*.

ANSWER: Hieronymus Bosch; accept: Jheronimus van Aken <VP>

This nation's southernmost province has an industry assembling televisions from kits at cities like Rio Grande. Import Substitution Industrialization originated in this country, which houses the Yacireta scheme on the Middle Parana River. (*) Patagonia was claimed by this nation in the 1880s, and the Chaco followed soon after. San Martin is one of the *villas miserias*, or squatter slums, in its capital on the River Plate. This nation controls the Pampas, and its capital is across from Uruguay. For 10 points, name this nation with a capital at Buenos Aires.

ANSWER: Argentina

This nation's military-industrial complex was called the 'steel eaters'. This nation's "second economy" was its black market in one period. Its Jews suffered the "Black Years" from 1948 to 1953. One man from this country denounced his successor in the "Postscript" to his political "Testament". One economic policy here made a class of Nepmen and another class depicted as pigs (*), who were later "liquidated", called kulaks. This nation hosted an "Industrialization Debate" from 1924 to 1928 and later had "special settlements" where prisoners were "executed by hunger" called gulags. For 10 points, name this nation of Bolsheviks once led by Stalin.

ANSWER: USSR or Soviet Union or United Soviet Socialist Republics; prompt on "Russia"

Quantum dots or nanoparticles can be attached to these compounds in a "meatball-spaghetti" structure. Isotactic versions of these compounds are crystalline, while atactic ones are often soft. One process connecting chains of these compounds makes them insoluble thermosets, and that process is (*) cross-linking. Their properties can be changed by adding light plasticizers. Silicones are unstable examples of these compounds, while one made of many isoprene subunits is an elastomer and is called rubber. For 10 points, name these molecules made of many monomers.

ANSWER: polymers

Bill Clinton's "constructive engagement" policy normalized relations with this country. This nation held Ambassadorial Talks with the US from 1955 to 1957 at Geneva. President Yahya Khan served as a secret intermediary between a US Ambassador and assistant Winston Lord, and this nation, facilitating "ping-pong diplomacy". One Communique argued that there were not (*) two of this country's governments and was between this country's Zhou Enlai and a President in 1972, and was called the Shanghai Communique. For 10 points, name this nation visited by Richard Nixon in "the week that changed the world".

ANSWER: China or Republic of China or Qing Dynasty or People's Republic of China or PRC

One god evolved from a war god to this type of god and represented the high summer in Mesopotamian myth. To worship one god of this type, the Romans unburied an altar and then reburied it at the end of the Ludi Saeculares. The Egyptian god of this place is a (*) green-skinned man with a crook and flail, and was tricked into entering a box by his brother Set. Sisyphus was forced to constantly roll a boulder up a hill because he trapped a god of this type in his own chains. For 10 points name this type of god including Nergal, Osiris, and Pluto.

ANSWER: underworld or death <KD>

Endoscopes have pipes that produce these things at their ends. They are produced in two ways by dioptrics [dye-op-tricks] and catoptrics, and their dimensions define the conjugate ratio. These things appear at the apparent depth because of refraction, and spectral lines are them (*) made by a diffraction grating. Ray tracing with three solid or dashed principal rays has rays converging at these. They're not objects, but their height or distance define the linear magnification. These things can be reversed, inverted, or upright. Virtual ones cannot be projected, but real ones can. For 10 points, name these sources of light, which appear far away in flat mirrors.

ANSWER: images

In one poem by this author, the narrator "leant upon a coppice-gate" and describes "some blessed Hope" upon hearing the title creature "fling his soul." In a novel by this author of "The Darkling Thrush," the title character encounters a flock of pheasants and breaks all of their necks. That character created by this man is later (*) thrown in jail for murdering Alec. In another of this man's novels, Joop's revelation of an affair between the title character and Lucetta Templeman causes that wife of Donald Farfrae to have a seizure. That novel begins with Michael Henchard selling his wife and daughter for five guineas. For 10 points, name this author of *Tess of the d'Urbervilles* and *The Mayor of Casterbridge*.

ANSWER: Thomas Hardy <CC/JG>

Most members of this religion are 'twice born' and go through a stage of life as a 'celibate student' even if they're not intellectuals. Each follower of this religion has a "desired form" of God that they experience. This religion believes in progressively worse four ages called (*) yugas, of which the Iron Age is the current one. The 'Laws of Manu' describe three hedonistic goals that the *Mahabharata* disputes. In this religion, the dead mostly transmigrate into animals if they have bad karma. For 10 points, name this caste-based religion of India.

ANSWER: Hinduism

With Anton Seidl, this man arranged an orchestration of four earlier pieces by this composer that includes *Shepherd Boy* and *Notturmo*; that work by this man drew from his earlier collection of solo piano pieces such as *Wedding Day at* (*) *Troldhaugen*. This composer of the *Lyric Pieces* and *Lyric Suite* wrote a five-movement suite "in olden style" in honor of the playwright Ludwig Holberg. One part of a composition by this man begins with the flutes invoking a rising sun. For 10 points, name this Norwegian composer who included "Morning Mood" and 'In the Hall of the Mountain King' in his incidental music to *Peer Gynt*.

ANSWER: Edvard Grieg <JG>

The Piltdown hoax involved some of these objects. Australopithecines and Paranthropines had sagittal crests on some of these objects, while humans do not. These objects can become pneumatized, like they are in birds to assist flight. Prognathism refers to the relationship between 3 of these objects behind the (*) face. Their basic units are osteons, and mineralization makes them more inorganic. Sutures are wavy joints between these objects, and they are made of hydroxyapatite. For 10 points, name these objects, which comprise skeletons.

ANSWER: bones

In one novel by this author, Julie becomes alienated when she visits the homeland of her lover Abdu. In addition to *The Pickup*, this writer wrote a novel in which the protagonist moves in with Conrad before reflecting on the activism of her own father (*) Lionel. This author's most famous work ends with a character chasing after a helicopter and features a family who is forced to flee to the village of their black servant. For 10 points, name this South African Nobel laureate who wrote *The Burger's Daughter* and the controversial *July's People*.

ANSWER: Nadine Gordimer <AB>

The climate of Apollo's Fountain helped Cyreneans breed these creatures, and the Lixites allegedly outran them. Laagers used these animals in a protective formation. Ukba ibn Nafi rode one of these into the Atlantic, and the Hittites made the world's oldest manual to train them. One people who lost the 1798 Battle of the Pyramids (*) primarily used these animals. Kanem-Bornu lacked gold, so they traded these animals for slaves during the Sayeh dynasty, and the Wolof got them from the Portuguese. Camels replaced these animals in the trans-Saharan trade, and chariots usually used them. For 10 points, name these equine animals.

ANSWER: horses

The muscles around this organ are only fast-twitch fibers. In galactosemia, galactose is reduced to galactitol in one part of this organ that is supported by two suspensory ligaments called zonule fibers. Mutations in the RB gene can cause cancers of this organ in kids. The sympathetic nervous system, when activated, (*) dilates a circular part of this organ, which has a limit of resolution of 0.1 nanometers. Lysozyme produced by the lacrimal glands cleans the surface of the sclera on this organ. Hyaluronic acid is a major part of the vitreous humor of this organ, which has rods and cones in its retina. For 10 points, name this organ that senses light.

ANSWER: eye(s)

One philosopher posited that "the act of eluding" prevented people from carrying out this action, and John Hardwig suggested in a 1997 essay that some people are obliged to do this action for the sake of their loved ones. In the Platonic dialogue *Phaedo*, Socrates states that this action is immoral by likening it to a (*) prisoner "who has no right to open the door of his prison and run away." Albert Camus described it as the "only one truly serious philosophical problem" in *The Myth of Sisyphus*. Emile Durkheim differentiated between egoistic and anomic forms of this action in a book titled after it. For 10 points, name this act of taking one's own life.

ANSWER: suicide; prompt on "dying" or similar answers <SC>

Late in this artist's career, he gave up art for chess, culminating in a performative game against John Cage called *Reunion*. This artist depicted nine "Malic Molds" in a work which features a chocolate grinder. One of this man's works used two giant panels of glass to depict an encounter between a bridge and her suitors. He was photographed by Man Ray wearing fur as his female alter ego, Rose Sélavy. This artist of *The Large Glass* had one of his works called (*) "an explosion in a shingle factory". The words "R. Mutt" are scrawled on his most famous "ready-made." For 10 points, name this Dadaist artist of *Nude Descending A Staircase, No. 2*, who used a urinal in his piece *Fountain*.

ANSWER: Marcel Duchamp <CC>

One emperor of this empire was succeeded by his son's Caracalla and Geta, but this dynasty was ended with the Crisis of the Third Century which broke this empire into three smaller empires until it was reunified. Rulers of this empire were protected by the Varangian Guard, which was made up of Vikings. The historian (*) Procopius wrote a "secret history" of this empire. This empire suppressed the Nika Riots, but fell in 1453 after Ottomans led by Mehmed II took its capital, Constantinople. For 10 points, name this empire that controlled what is now Greece, the Balkans, and Turkey.

ANSWER: (Eastern) Roman Empire or Byzantine Empire <KD>

Bonuses

Operons create polycistronic types of this molecule, which micro and silencing RNAs can inactivate at specific sequences. For 10 points each:

[10] Name this molecule, which is a type of RNA used in transcription that binds to ribosomes.

ANSWER: mRNA or messenger RNA

[10] Reverse transcriptase binds mRNAs to create these structures "of cDNA", while "genomic" ones are another type. These sets of cloned DNA fragments are inserted into vectors of choice to be preserved.

ANSWER: library or libraries

[10] Immediately before this process, mRNAs are polyadenylated, spliced, and tagged with 5' [5-prime] caps.

ANSWER: translation

For 10 points each--answer the following about French writer Marcel Pagnol:

[10] Pagnol's works "My Father's Glory" and "My Mother's Castle" were a part of his *Souvenirs d'enfance*, a work of this type. Jean-Jacques Rousseau's *Confessions* is another work of this type.

ANSWER: autobiography; prompt on "Memoir"

[10] In Pagnol's Provençal novel *Jean de Florette*, the title character possesses this physical trait, which he shares with other characters in literature such as Dr. Doofenshmirtz and Quasimodo.

ANSWER: hunchback or kyphosis

[10] In Victor Hugo's *The Hunchback of Notre Dame*, Quasimodo's adopted father is this man, an archdeacon who commands the hunchback to kidnap Esmeralda.

ANSWER: Claude Frollo; accept either underlined name <JZ/JG>

When this event happens, Hindus and Muslims will shave a child's head. For 10 points each:

[10] Name this process, which in Christianity occurs with a naming, dedication, and a baptism.

ANSWER: giving birth or delivering a baby; be lenient and accept word forms and synonyms

[10] In this religion, the mother is separated from the husband for 7 or 14 days depending on the gender of the child. This religion believes in a soul, but not life, before birth.

ANSWER: Judaism

[10] In this country, new mothers have "30-day confinement periods" to recover, and receive gifts after that "full moon" day when they reunite with their children along with their extended families.

ANSWER: China or PRC

Answer some questions related to classical music with nationalist themes, for 10 points each:

[10] The Kalevala factors heavily in this Finnish composer's works, such as *The Swan of Tuonela* and *Kullervo*. This composer of *Finlandia* famously destroyed his 8th symphony.

ANSWER: Jean Sibelius

[10] This man's 7th symphony opens with an "invasion theme" and was premiered amid shelling during the siege of Leningrad, for which it is named. Other works by this Russian composer include the opera *Lady Macbeth of the Mtsensk District*.

ANSWER: Dimitri Shostakovich

[10] In one of his most famous works, Heitor Villa-Lobos attempted to fuse the music of Bach with the traditional and popular music of this country, which created both the samba and bossa nova.

ANSWER: Brazil <JG>

This school of psychology disliked Wilhelm Wundt's elementism, so they chose the molar approach over the molecular approach. For 10 points each:

[10] Name this holistic school, which Wertheimer and Kohler belonged to. It means "configuration" or "form" in German, and its members studied consciousness.

ANSWER: gestalt

[10] The phi phenomenon discovered by Wertheimer is a light that appears to be doing this. Zeno's paradox and Parmenides' reality both involve the lack of this phenomenon.

ANSWER: movement or motion; accept all word forms

[10] Gustav Fechner, the founder of psychophysics, also created the experimental version of this field, which Kierkegaard named the stage that most people live their lives in for, before the ethical stage.

ANSWER: aesthetics

Phoenicians from this city helped build Solomon's fleet and built Carthage. For 10 points each:

[10] Name this city that Alexander the Great captured in 332 BC after trying to make a sacrifice to Heracles at its main temple.

ANSWER: Tyre

[10] This Phoenician region famous for its cedar trees included the ports of Byblos, Sidon, and Tyre. A murex snail used to make Phoenician purple dye was common here.

ANSWER: Lebanon

[10] These people who lived south of Lebanon introduced grapevines and olive trees to the Levant and held a monopoly on metalsmithing. Their power was concentrated in the Pentapolis.

ANSWER: Philistines

The manifesto of this art movement was written by the poet Filippo Tommaso Marinetti and declared that this group glorified war and racecars while wanting to "demolish" libraries, museums and feminism. For 10 points each:

[10] Name this movement of which the painter of *Dynamism of a Dog on a Leash*, Giacomo Balla, was a member. The leading member of this movement in Russia was Natalia Goncharova.

ANSWER: Futurism or Futurismo

[10] Futurist works in this medium include *Unique Forms of Continuity in Space* and *Development of a Bottle in Space*, both of which were pieces by Umberto Boccioni.

ANSWER: Sculpture

[10] Futurism originated during the 20th century in this country. Many of this country's futurists initially supported Benito Mussolini.

ANSWER: Italy or Italian Republic or Italia or Repubblica Italiana <DS>

Answer some questions about authors who wrote about gardens, for 10 points each.

[10] This author began his poem "The Garden" with the lines "How vainly men themselves amaze / To win the palm, or oak or bays," though he may be better known for writing "To His Coy Mistress."

ANSWER: Andrew Marvell

[10] Hugo gains a high post within the Liquidation Office after attending the title event in this Czech author's play *The Garden Party*. This man's other works include *The Memorandum*.

ANSWER: Vaclav Havel

[10] Laura is sent with a basket of leftovers to the Scott's house at the end of "The Garden Party," a short story written by Katherine Mansfield, an author from this country. Another author from here, Keri Hulme, included a glossary of Maori terms in her novel *the bone people*.

ANSWER: New Zealand <JG>

This nation named King Haakon VII land and owns Svalbard, which is the site of a global seed bank. For 10 points each:

[10] Name this nation with a capital at Oslo.

ANSWER: Norway

[10] Norway's province of Finnmark and Svalbard abut the Barents Sea, which has rich deposits of oil and is directly above this latitudinal mark around the globe.

ANSWER: Arctic Circle

[10] These zones are within a 200-mile distance from a nation's coast, and nations have sovereignty within them. Norway and Russia contest the Barents Sea with these zones in the Barents Sea.

ANSWER: **Exclusive Economic Zones** or **EEZs**; prompt on “**territorial waters**”

The Livingston Code attempted to reform these places, which were actually reformed by Dorothea Dix. For 10 points each:

[10] Name these institutions. The Auburn and Pennsylvania systems were ways of housing their residents.

ANSWER: **prisons** or **jails**

[10] This reformer tried to prevent youths at the Hull House from going to jail by setting up a juvenile court system in Chicago. She became President of the National Conference of Charities and Corrections in 1909.

ANSWER: Jane **Addams**

[10] Addams and the Progressives practiced this religio-social doctrine along with race progress in Westside. It reformed behaviour, helped “true democracy”, and was stated in *The Subjective Necessity for Social Settlements*.

ANSWER: **Christian humanitarianism**; accept word forms

At the end of the novel in which it appears, a member of this family named Rose of Sharon breastfeeds a starving man. For 10 points each:

[10] Name this Okie family that includes Tom, who becomes a fugitive after killing a man who murders Jim Casey during a strike at a peach orchard in California.

ANSWER: **Joad** family

[10] The Joad family appears in *The Grapes of Wrath*, a novel written by this author. This man also wrote *Cannery Row* and *Of Mice and Men*.

ANSWER: John **Steinbeck**

[10] Steinbeck allegorized the story of Cain and Abel through Cal and Aron, two members of this family from *East of Eden*. At the end of that novel, Cal is forgiven by this family’s patriarch, Adam, with the word “Timshel.”

ANSWER: **Trask** family <JG>

Pyotr Stolypin’s ‘wager on the strong’ sought to enrich these kinds of places, which were called *mir* in Russian. For 10 points each:

[10] Name these units governed by *zemstvos*, or local councils, after most of their inhabitants, who were serfs, were emancipated in 1861. They were smaller than towns or cities.

ANSWER: **villages**

[10] This movement, which recruited many ex-serfs, was influenced by Mikhail Bakunin’s “Reaction in Germany”, and was the impetus behind the Narodniki that assassinated Alexander II.

ANSWER: **nihilists** or **nihilism**

[10] This revolutionary founded the Bolsheviks and led them through the Russian Revolution. Earlier, he had read works by the nihilist Chernyshevsky.

ANSWER: Vladimir Ilyich Ulyanov **Lenin**

This architectural movement became popular at the turn of the 20th-century, with the aim of increasing civic pride through an emphasis on urban aesthetics. For 10 points each:

[10] Name this movement that sought to improve urban areas with the construction of parks and gardens as well as Beaux Arts-style buildings.

ANSWER: **City Beautiful** movement

[10] One example of a city constructed with City Beautiful principles is this wealthy suburb of Miami, which has maintained its City Beautiful features through famously strict zoning.

ANSWER: **Coral Gables**, Florida

[10] One landscape architect who incorporated City Beautiful principles into his work was Frederick Law Olmsted Jr., the son of the famous architect who, with Calvert Vaux, designed this massive park in Manhattan.

ANSWER: Central Park <JG>

Appel and Haken solved this problem by simplifying its original statement into a computable amount of cases. For 10 points each:

[10] Name this theorem that describes the lower bound on the number of colors necessary to fill in a map.

ANSWER: four-color map theorem

[10] The number of colors needed to color any surface depends on this other number. The Gauss-Bonnet theorem shows that this number is equal to two minus two times the genus.

ANSWER: Euler characteristic

[10] This surface with chromatic number seven has Euler characteristic zero, since its genus is one, meaning it has one hole. It is notably not a coffee mug.

ANSWER: torus; accept donut <HW>

The title character of this poem falls in love with a German named Julia, and it introduced a certain type of Romantic hero. For 10 points each:

[10] Name this long narrative poem that follows the title traveler as he passes from Spain and Portugal to Italy and Greece.

ANSWER: Childe Harold's Pilgrimage

[10] Childe Harold's Pilgrimage is a work by this flamboyant English poet of Manfred and "She Walks in Beauty," who died while in Greece fighting in that country's war of independence

ANSWER: Lord (George Gordon) Byron

[10] The first cantos of this "epic satire" by Byron were published in 1819. This poem follows the adventures of the title libertine, who breaks up the marriage of Don Alfonso and Dona Julia.

ANSWER: Don Juan <JG>

This empire's military included the first corps of engineers for bridging rivers and helping soldiers swim. For 10 points each:

[10] Name this empire, ruled by kings like Shalmaneser and Sargon II, which worshipped Ashur as its main god and had a capital at Nineveh.

ANSWER: Assyria

[10] The Persian forces that conquered Assyria, as well as later Parthians were from this modern-day country west of Iraq.

ANSWER: Iran

[10] Cyrus the Great's Persian army united Iran by conquering these peoples, who had earlier allied with the Babylonians to overthrow the Assyrians. Their territory north of the Zagros mountains included Ecbatana.

ANSWER: Medes

This colorimetric law works when the spectral width of the light source is much greater than the monochromator spectral bandpass. For 10 points each:

[10] Name this law, abbreviated $E=abc$, which measures the absorbance of a sample solution with a spectrophotometer.

ANSWER: Beer's law or Beer-Lambert law

[10] The c in Beer's law is this quantity. At high levels of this quantity, solutions do not obey Beer's law.

ANSWER: concentration

[10] The quality of the results from Beer's law can be described by this general ratio, which is low when the resolution of the monochromatic light source is high, and can be improved by averaging spectra.

ANSWER: signal-to-noise ratio; both underlined parts required; prompt on either one

Incans believed that this event occurred after Viracocha emerged from Lake Titicaca. For 10 points each:

[10] Name this event, which, according to the Book of Genesis, happened over seven days.

ANSWER: **creation of the world**; accept word forms and equivalents

[10] Viracocha's son is this Incan sun deity. According to most sources, he is the father of Manco Capac and Mama Occlo.

ANSWER: **Inti**

[10] This material was believed by the Incans to be the sweat of Inti. The Norse goddess Iduna guarded objects made of this material that granted the gods eternal youth.

ANSWER: **gold**

These particles are called resonance particles and name a therapy generically called 'particle therapy'. For 10 points each:

[10] Name this class of particles, including baryons and mesons, that interact strongly, weakly, and electromagnetically, which are made of quarks, antiquarks, and/or gluons.

ANSWER: **hadrons**

[10] The four forces are mediated by this process in which virtual particles and gauge bosons are created during particle interactions.

ANSWER: **exchange**

[10] This classification of all elementary particles depicts particles, their spins, their symbols, and interactions. It includes electromagnetism, the strong force, and the weak force, but not gravity.

ANSWER: **Standard Model**