

IESO – Environmental Science Bee – Finals (HS)

Regulation Tossups

(1) **The trilobites emerged during this period, when the End Botomian and Dresbachian extinction events occurred, both of which may have been caused by changes in the carbon cycle or anoxia. This period, which was the first of the Paleozoic Era (+) and the Phanerozoic Eon, saw the emergence of most major animal phyla. This period ended due to volcanic activity which ushered in the (*) Ordovician period.** For the points, name this geologic period which witnessed an "explosion" of life.

ANSWER: **Cambrian** period (accept **Cambrian** Explosion)

(2) **According to this system, the entirety of New Zealand is labeled as "Cfb." The eastern sides of continents are often labeled as "Cfa" in this system, and this system uses the letter (+) "E" only when referring to tundras or ice caps. Global heating is causing more locations to shift towards areas classified as (*) "temperate" in this system from "continental" areas, signified with a D.** For the points, name this climate classification system named for a German-Russian climatologist.

ANSWER: **Köppen** climate classification (accept **Köppen**-Geiger climate classification)

(3) **This animal formed the *Hydrodamalis* genus with similar species named Takikawa and Cuesta. This animal, part of the sirenian order, was only found in the (+) Commander Islands off the coast of Kamchatka. These animals were first noted on the Great Northern Expedition of Vitus Bering, and shortly hunted to extinction thereafter for their thick blubber. The closest known relative to the (*) dugong is, for the points, what marine mammal, which went extinct in the 1700s and is named for a German naturalist?**

ANSWER: **Steller's sea cow** (or ***Hydrodamalis gigas***)

(4) **During the COVID-19 pandemic, a colorful section of Route 61 near this town called the "Graffiti Highway" was covered up with dirt. Journalist David DeKok wrote extensively about one environmental disaster in this town in the book *Unseen Danger*. (+) That disaster in this town began as an effort to clear a trash dump before Memorial Day in 1962. (*)** For the points, name this town in Columbia County, Pennsylvania, which was nearly abandoned due to an ongoing underground coal fire that is expected to burn for another 250 years.

ANSWER: **Centralia** (accept **Centralia** mine fire)

(5) **This principle is occasionally also named for William Castle. Assumptions of this principle include a lack of migration and random mating. (+) This principle can be summed with the equation "p-squared plus 2pq plus q-squared equals one," with p signifying dominant alleles and q indicating recessive ones. (*)** For the points, name this principle which states that the frequency of alleles will remain constant between generations in absence of evolutionary influences.

ANSWER: **Hardy-Weinberg** principle (accept **equilibrium**, **model**, **theorem**, or **law** in place of **principle**)

(6) **In 2023, water from this incident treated with the Advanced Liquid Processing System was gradually released into the Pacific Ocean, with no observed increase in local levels of tritium. This incident was caused by a wave which exceeded the (+) 18-foot seawall and 30-foot elevation of a facility operated by TEPCO. The events which caused this incident led to explosions in Units 3 and 4 and the (*) release of radiocaesium.** For the points, name this nuclear accident which followed a 2011 earthquake and tsunami in Japan.

ANSWER: **Fukushima** Daiichi nuclear accident

(7) **In 2022, the EPA announced that four of these compounds are now found in rainwater at levels which exceed the planetary boundary. DuPont factory workers in the Mid-Ohio Valley had blood levels of one of these compounds at (+) 20 times greater than normal levels. The term “forever chemicals” was first applied to these compounds found in (*) nonstick cookware.** For the points, name these ubiquitous chemicals in the environment, the first example of which was Teflon.

ANSWER: **PFAS** (or **Per- and polyfluoroalkyl substances**; prompt on “forever chemicals”)

(8) **The population of the volcano type of this animal is threatened by droughts in eastern Mexico. Lake Xochimilco [[soh-chee-MEEL-koh]] and Lake Chalco are the only remaining habitats of this animal, which was formerly common in the (+) Anahuac region. This animal, often confused for mudpuppies, is known for its ability to regenerate parts of its brain and heart tissue. Closely related to the (*) tiger salamander, this is, for the points, what endangered amphibian with an Aztec name, which often appears to be smiling?**

ANSWER: **axolotl** [[ak-suh-LAH-tull]] (or **Ambystoma mexicanum**; accept volcano **axolotl**; prompt on "salamander")

(9) **This quantity appears in the denominator for the logistic Verhulst equation for population growth. Species that live at densities close to this quantity often have long lifespans and fewer offspring. (+) and are contrasted with R-strategists. A population's birth rate equals its death rate at this quantity, where its growth (*) levels off.** For the points, name this quantity symbolized K, the maximum population size that can be sustained by a specific environment.

ANSWER: **carrying capacity** (accept **K** or **K**-selection before read)

(10) **Upon this river's shores is the Southerly Wastewater Treatment Plant, which identified a certain brown film on this river. This river was once described as a place where people (+) "decayed" rather than drowned, and its water was described as "oozing" by Time Magazine. Carl Stokes attempted to resolve this river's oil slicks, which caught on (*) fire multiple times.** For the points, name this once extremely toxic American river which flows through Cleveland, Ohio.

ANSWER: **Cuyahoga** River (be lenient on pronunciation)

(11) **One scholar noted that even without this man's most noted work, his books like *The Power of Movement in Plants* and solution to the formation of coral atolls would have made him famous as a geologist. The (+) Huxley-Wilberforce debate argued over a proposition this man outlined in such texts as *The Descent of Man* and his journal of a voyage aboard the HMS (*) *Beagle*. For the points, name this English scientist whose book *On the Origin of Species* essentially founded the science of evolution.**

ANSWER: Charles **Darwin** (or Charles Robert **Darwin**)

(12) **This work references research by Lonnie Thompson and how core drilling in ice can determine how much of a certain gas was in the air when the snow fell. This work presents the Keeling Curve. (+) showcasing the increasing pattern of carbon dioxide in the atmosphere. The presenter of this film states that global warming is "really not a (*) political issue, so much as a moral one." For the points, name this 2006 American documentary film in which former vice president Al Gore discusses climate change.**

ANSWER: An **Inconvenient Truth**

(13) **This figure was known for leading opposition to the creation of a reservoir within the Hetch Hetchy valley, after which he camped with Theodore Roosevelt. This man, who became a rival to the conservationist Gifford Pinchot, names a set of (+) woods in Marin County. This co-founder of the Sierra Club is nicknamed the "Father of the National Parks." (*) For the points, name this Scottish-born American preservationist, known for his activism concerning Yosemite National Park.**

ANSWER: John **Muir**

(14) **An amendment to this deal was named after Doha and established a second commitment period beginning in 2013. Though the U.S. signed this agreement, its non-ratification by Congress was due to the passage of the (+) Byrd-Hagel Resolution. This treaty, which was agreed upon by 160 countries, laid the groundwork for the (*) Paris Agreement in 2016. For the points, name this 1997 international treaty which aimed for countries to reduce their greenhouse gas emissions, named after a city in Japan.**

ANSWER: **Kyoto** Protocol (or **Kyōto** Giteisho)

(15) **The readings of these devices help predict fog formation in valleys and frost risk for crops. Wetland restoration projects use these devices to monitor habitat suitability for amphibians. (+) These instruments help detect favorable conditions for bark beetle infestations in forests, and cave preservationists use these instruments to prevent speleothem deterioration. (*) For the points, name these instruments used in meteorological science to measure atmospheric moisture content.**

ANSWER: **hygrometers**

(16) **This fiber's manufacturing creates carbon disulfide pollution that has poisoned workers in Asian garment districts. The viscose process used to make this material (+) generates toxic zinc and hydrogen sulfide. Fast fashion's dependence on this material has accelerated clear-cutting of old-growth trees, and this regenerated cellulose fiber fills landfills due to its quick disposal in (*) throwaway clothing. For the points, name this semi-synthetic textile made from wood pulp, marketed as "artificial silk."**

ANSWER: **rayon** (accept **viscose** before read; prompt on "sabra silk" or "cactus silk")

(17) **In 2019, one of these programs accidentally created sturdlefish, a hybrid between Russian sturgeon and American paddlefish. Animals raised in these programs often exhibit decreased survival instincts. The term (+) "extinct in the wild" generally refers to species that are still extant in these programs but not in natural habitats. (*) For the points, name these programs by which humans help wild animals reproduce to rebuild endangered populations.**

ANSWER: **captive breeding** (accept clear-knowledge equivalents, including just "zoos")

(18) **This figure provided voiceovers for a film called *The Year Earth Changed on how wildlife responded to the COVID-19 Pandemic*. This person also featured in *Extinction: The Facts* and (+) *The Truth About Climate Change* is noted for his advocacy against population growth. This man is perhaps most well-known for his *Planet Earth* and (*) *Life* series. For the points, name this British biologist and broadcaster known for his narrations of nature documentaries.**

ANSWER: David **Attenborough** (or David Frederick **Attenborough**)

(19) **Events that may have contributed to this period include the 1257 Samalas eruption in Indonesia and the eruption of the Billy Mitchell volcano in Papua New Guinea. This period included the Maunder Minimum, which saw very low (+) sunspot frequency. The Grindelwald Fluctuation of increased glacial expansion occurred during this period, which followed the (*) Medieval Warm Period. For the points, name this period of depressed temperatures which lasted from roughly 1300 to 1850.**

ANSWER: **Little Ice Age** (accept **LIA**; prompt on "Ice Age")

(20) **This process has induced swarms of minor earthquakes near disposal wells. This method creates methane migration pathways that can contaminate aquifers and release greenhouse gases, and this method's (+) high water demands have depleted aquifers in drought-prone regions. Toxic fluid used in this procedure contains sand-like materials called proppants (*) to keep breakages open. For the points, name this extraction technique which injects high-pressure fluids to crack underground rock formations.**

ANSWER: **fracking** (or **hydraulic fracturing**)

(21) **These chemicals were first detected in the atmosphere by James Lovelock using electron capture devices. The Montreal Protocol was instituted to phase out the use of these chemicals, of which (+) freon is the most common example. These chemicals react with an atmospheric allotrope of oxygen in the stratosphere, (*) producing oxygen gas and free radicals. For the points, name this class of chemicals that were once used as aerosols, which created the hole in the ozone layer.**

ANSWER: **CFCs** (or **chlorofluorocarbons**)

(22) **Pollution caused by this company was the basis of a 2009 documentary titled *Crude*. Lawyer Steven Donziger is known for his lawsuits against this company as part of a scandal which has been described the (+) "Amazon Chernobyl." This company has faced controversy for its management of the Lago Agrio oil field in Ecuador, which it inherited from (*) Texaco after they dumped toxic waste there. For the points, name this second-largest American oil company behind ExxonMobil.**

ANSWER: **Chevron** Corporation

(23) **In 2013, New Zealand released Honshu White Admiral butterflies to counter an invasive species of this plant from Japan, though that species is also marketed as groundcover under the name "Hall's Prolific." This plant's "black twinberry" species is considered (+) vulnerable in Manitoba. This plant's invasiveness in the midwest has likened it to kudzu, but unlike kudzu, this plant of the genus (*) *Lonicera* is a common garden ornament. For the points, identify this fragrant plant named for the edible sweet nectar in its flowers.**

ANSWER: **honeysuckle** (accept **Lonicera** before read)

(24) **This work was mocked by the essay "The Desolate Year" and was inspired in-part by a letter from its author's friend, Olga Huckins, to the *Boston Herald*. This book was republished in 1994 with an introduction by (+) Al Gore. This book takes its title from the John Keats ballad "La Belle Dame sans Merci," describing a time in which (*) "no birds sing." For the points, name this 1962 book by Rachel Carson about the dangers of excessive use of the insecticide DDT, leading to its eventual ban by the EPA.**

ANSWER: **Silent Spring**

(25) **Thomas Lovejoy of this organization created the concept of debt-for-nature swaps. The Living Planet Report is published by this organization, which engaged in a (+) dispute over an initialism with World Wrestling Entertainment. Using a (*) panda in its logo is, for the points, what non-governmental organization dedicated to environmental protection?**

ANSWER: **World Wide Fund** for Nature (accept **World Wildlife Fund**; also accept **WWF**)

(26) **Wangari Maathai of this country established the Green Belt Movement to plant trees. This country contains most of Lake Turkana, (+) which was impacted by the construction of another country's Gilgel Gibe Three Dam on the Omo River. This country pioneered ivory burning to discourage elephant poaching, protected within its Tsavo East National Park and (*) Maasai Mara Preserve. For the points, name this country where a rhinoceros sanctuary is found in Nairobi National Park.**

ANSWER: Republic of **Kenya** (or Jamhuri ya **Kenya**)

(27) **Donald Trump objected to the construction of these devices offshore of a Scottish golf course partly for environmental reasons. Pile-driving to create offshore "farms" of these devices causes underwater noise pollution, and the creation of (+) blades for these devices from fiberglass take up a large volume of space in landfills due to their hollowness. These devices have been criticized for their impacts on migrating birds who (*) collide with them. For the points, name these devices which harness moving air to generate power.**

ANSWER: **wind** turbines

(28) **The polarized form of this phenomenon can cause mayflies to lay their eggs in dangerous locations like blacktops. This phenomenon inhibits zooplankton feeding behavior, contributing to (+) algal blooms. Glare and sky glow are forms of this phenomenon, which can disrupt migration patterns of nocturnal animals by being (*) confused with lunar cycles. For the points, name this phenomenon in which the excessive visible electromagnetic radiation in a city prevents stars from being visible.**

ANSWER: **light pollution** (prompt on "sky glow" or "glare" before each is respectively read; prompt on "artificial light")

(29) **The dried stalks of these plants provide winter shelter for beneficial insects, while their pollen supports over 150 bee species. These plants' root systems form dense mats that can prevent soil erosion while extending up to (+) eight feet deep. These heliotropic plants exhibit phototropism during growth, though mature specimens generally face east. (*) For the points, name these tall yellow members of genus *Helianthus* that produce edible seeds high in oil content.**

ANSWER: **sunflowers** (accept *Helianthus annuus*)

(30) **One of these biomes includes nearly all of Uruguay and is one of the main three divisions of the Pampas. Grasses in these biomes survive their yearly dry-season wildfires by storing water in their roots. The (+) Sudanian example of these biomes is separated from the Sahara by the Sahel, and they exhibit sparse tree cover and form a transition zone between (*) deserts and rainforests. For the points, name this grassland biome home to zebras, giraffes, and lions.**

ANSWER: **savanna** (accept **prairie**; prompt on "grassland" or "woodland"; prompt on "shrublands")

Extra Questions

(1) **This animal's "Amur" subspecies has been protected within Korea's DMZ. This animal, though typically known for its rosettes, can have black coloring, (+)** particularly common within peninsular Malaysia. This animal, with the scientific name *Panthera pardus*, has been disputed as being more closely related to the lion or the (*) similarly-colored jaguar. For the points, name this large, spotted cat which can be found in Asia and Africa.

ANSWER: **leopard**s (or **Panthera pardus**)

(2) **An international agreement for distributing water from this river in an efficient manner is known as Minute 319. In 1905, this river overran the banks of an irrigation canal, creating the Salton Sea. The (+)** "Law of the River" regulates the usage of this river's water in seven western states, and due to excessive agricultural use, this river no longer flows into the (*) Gulf of California. For the points, name this threatened river of Mexico and the United States which flows through the Grand Canyon.

ANSWER: **Colorado** River (prompt on "Lake Mead" before read)