



UANL



UNIVERSIDAD AUTÓNOMA DE NUEVO LEÓN

PREPARATORIA 25 "DR. EDUARDO AGUIRRE PEQUEÑO"

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PORTAFOLIO EXTRAORDINARIO
(3ª, 4ª, 5ª y/o 6ª oportunidad)

UA: The Nature of Life



Semestre:	Tercero
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General Escobedo, NL, 10 de febrero 2024.

Sigue las instrucciones para entregar este portafolio impreso y completamente contestado. Valor del portafolio 40% Examen extraordinario 60%.

INSTRUCTIONS. According to the information from The Nature of Life read and answer every exercise from this workbook.

1. Theories of the Origin of the Universe

I. Read each sentence and fill the blank with the right information referent to the first topic from Stage 1.

1. _____, owing to the tension between the gravity and the cosmic constant the Universe has a weak equilibrium
2. _____, discovered a force called -cosmic constant- which allowed the Universe to be in a state of equilibrium, thus he postulated in his general theory of relativity between 1915 and 1916.
3. _____, in 1981 his theory establishes that in the first seconds of the explosion the Universe didn't expand at the speed it does in the present, but much faster in a manner we call exponential.
4. _____, in 1928 he discovered that the stillness of the Universe was mere appearance, and he used the Doppler Effect to explain the movement of the Universe.
5. _____, they calculated the loss of heat of the light emitted by the explosion, since the Big Bang to our days.
6. _____, he deduced that the Universe didn't collapse upon itself due to the fact that gravity was countered by a more powerful force originating from a great explosion that impulses all matter.
7. _____, they were critics of the Big Bang, they said that as the Universe expanded, new matter would be created; from this new matter galaxies would eventually form and would occupy the emptiness left by displaced galaxies.
8. _____, predicted that, starting from an infinitely dense and heated beginning of matter, which caused the great explosion, an enormous number of photons must have been released through the cosmos.

II. Complete the following comparative chart about the theories of the origin of the Universe.

Theory	Description
Big Bang Theory.	
Theory of the Oscillating or pulsating Universe.	
Theory of the Stationary State.	
Theory of the Inflationary State.	

1.2 Origin of Life

I. Read the next questions and underline the right answer.

1. Eon in which the Earth and Solar System originated, its primitive atmosphere is formed, reductive and anoxic, and the first seas and lakes.

a) Phanerozoic b) Proterozoic c) Hadean d) Archean

2. What was the name of the scientists that built a hypothetical model simulated the hydrosphere and the primary atmosphere?

**a) Stanley L. Miller and Harold Urey b) Alexander Rich and Leslie Orgel
c) James Watson and Francis Crick d) Jean Lamarck and Louis Pasteur**

3. He was the first naturalist who tried to offer an explanation on the origin of life, reformulating the ancient theory of spontaneous generation.

a) Alexander Oparin b) Carl Woese c) Joan Oró d) Jean Lamarck

4. Period in which continents reach a configuration similar to the current one. Diversification of all mammal and bird orders.

a) Tertiary b) Silurian c) Cretaceous d) Permian

5. Era in which the first breathing organisms appear. An intense global glaciation takes place, called Snowball Earth.

a) Paleoproterozoic b) Mesozoic c) Paleozoic d) Cenozoic

6. What was the name of the Alexander Oparin's hypothesis?

a) Primitive heterotroph soup b) Heterotroph hypothesis of the origin of life
c) Primary autotroph atmosphere d) Autotroph hypothesis of the origin of life

7. Period in which fishes appear. Invertebrates colonize and masses.

a) Tertiary b) Silurian c) Cretaceous d) Permian

8. Scientific who concluded that the organisms were unicellular and anaerobic, that must have risen starting from inorganic matter which transformed by a process of chemical evolution into organic molecules in the seas of primitive Earth.

a) Alexander Oparin b) Carl Woese c) Joan Oró d) Jean Lamarck

9. What were the initial components of the reducing atmosphere of primitive Earth?

a) CO₂, CH₄, NH₃ and H₂O b) OH, CH₃, N₄H₃ and H₂
c) H₂O, CH₄, NH₃ and H₂ d) O, CH₄, NH₃ and H₂O

10. Scientist who worked with hydrocyanic acid and synthesized adenine, one of the four nitrogenous bases.

a) Alexander Oparin b) Carl Woese c) Joan Oró d) Jean Lamarck

11. Scientist who combat the theory of the spontaneous generation because of its lack of evidence.

a) Stanley Urey b) Leslie Orgel c) Alexander Rich d) Louis Pasteur

12. He was one of the scientists to talk about the transition between organic matter and the first cells, that is, between live and the non-alive.

a) Alexander Oparin b) Carl Woese c) Joan Oró d) Jean Lamarck

13. Eon in which reptiles appear.

a) Phanerozoic b) Proterozoic c) Hadean d) Archean

14. Period in which the Supercontinent Pangea fragments. At the end of the period takes place the extinction of large dinosaurs.

a) Tertiary

b) Silurian

c) Cretaceous

d) Permian

15. Eon in which conditions appear for the rising of primeval soup and the world of RNA. Origin of life.

a) Phanerozoic

b) Proterozoic

c) Hadean

d) Archean

1.3 Evolution

I. Answer the questions below.

1. Is a conceptual image of genealogical relationships between species of one of various groups of plants, on one hand, or of animals, on the other hand

_____.

2. Write the three phases or results in species due to the biological processes of evolution.

_____.

3. What is paleontology?

_____.

4. He said that diet, climate and costumes were the three causes by which species could be modified.

_____.

5. What is the definition of evolution?

_____.

_____.

6. Scientists which Darwin was in touch reviewing their results got by their journey.

_____.

7. Write the three aspects referred by Darwin to explain evolution written in his book, *The Origin of the Species*?

_____.

8. What is a fossil?

_____.

_____.

9. What is a homologous character?

_____.

_____.

10. Explain the natural selection process by Charles Darwin.

_____.

_____.

11. How were people called when they believe in one or many events of divine creation and that didn't change?

_____.

12. Is the set of changes which occur during embryonic development of the individuals of a species, and those that continue taking place from birth until completing the adult stage:

_____.

1.4 Taxonomy

I. Do a draw to represent every kingdom and write a general characteristic for each one.

Kingdom_____	Kingdom_____
Characteristics:	Characteristics:
Kingdom_____	Kingdom_____
Characteristics:	Characteristics:

Kingdom_____

Characteristics:

II. Match the information below: Scientists and Ideas.

Scientists	Ideas
a. Carl Woese	() Created a new category called Super Kingdom: including Prokaryote Super Kingdom and Eukaryote Super Kingdom.
b. Jean Lamarck	() Created a system of three kingdoms of living beings.
c. Robert Whittaker	() Separated bacteria from the Protista, creating for them the fourth kingdom of cells without organelles: the Monera.
d. Haeckel	() Discovered the existence of a new taxonomic category superior to that of kingdom: the Domain.
e. Aristóteles	() Created a code of binomial nomenclature.
f. Edouard Chatton	() Used a classification method based on the presence or absence of a spinal column and cranium: vertebrates and invertebrates.
g. Lynn Margulis Karlene Schwartz	() Created the first system of scientific classification. He ordered the diversity of known animals in two large groups: <i>enaimos</i> (with red blood) and <i>anaimos</i> (without red blood).
h. Carlos Linneo	() Formalized the fifth kingdom of live which he called: Fungi.
i. Herbert Copeland	() Observed that the presence or absence of the nucleus was the most notorious characteristic of any cell.

2.1 Chemical energy and ATP

I. Do a draw to represent the adenosine triphosphate molecule and identify every part of it.

II. Make a synoptic table that includes the classification of living beings based on the source of energy production, this table must include the following concepts: heterotroph, autotroph, photoautotrophs, saprophytes, chemoautotrophs and parasites. (If necessary, attach your synoptic table made on notebook sheet, just after this page).

2.2 Photosynthesis

I. Answer the questions below about photosynthesis.

1. Why the photosynthesis and cellular respiration processes are so similar?

_____.

2. Is a set of waves with different characteristics, called spectrum

_____.

3. What's the difference between: ultraviolet rays A, B and C, visible range and infrared range?

_____.

4. What is a photosystem?

_____.

5. Write the general photosynthesis's equation.

_____.

II. Draw a chloroplast and identify, write its name and describe the next structures: grana, thylakoids, stroma, internal membrane and external membrane.

III. Complete the following chart with the dependent light reaction and independent light reaction information.

Type of reaction	In which part occurs	Reactives	Produces

Dependents			
Calvin cycle			

IV. Describe what happens in each Calvin-Benson cycle phase.

Phase	Description
Carbon fixation	
Synthesis of G3P	
RuBP regeneration	
Four carbon route or C4	

2.3 Cellular respiration

I. Read the next questions and underline the right answer.

1. It is the part of the cellular respiration process where reducing equivalents are generated that will help to complete the process.

- a) Glycolysis b) Krebs's cycle c) ETC d) Fermentation**

2. It is considered as the initiator molecule of the entire process of cellular respiration.

- a) Pyruvate b) Coenzyme A c) Acetyl CoA d) Glucose**

3. Type of respiration that takes place where there is no oxygen around.

- a) Anaerobic b) Prokaryote c) Aerobic d) Natural**

4. Is the process where the glucose and oxygen transform into water and carbon dioxide thanks to their cellular conditions.

- a) Fermentation b) Lactic fermentation
c) Cellular respiration d) Photosynthesis**

5. They are the pathways that are responsible to synthesizing from simple molecules other more complex ones.

a) Anabolic

b) Metabolic

c) Catabolic

d) Anoxic

2.4 Fermentation

I. Answer the questions below about photosynthesis.

1. What is the main source of energy for microorganisms and higher organisms?

_____.

2. Type of respiration that consists in the cell getting energy from substances without oxygen also called -fermentation-.

_____.

3. Type of cellular respiration carried out by the mitochondria, that uses oxygen to get energy from the glucose.

_____.

4. Fermentation process is carried out by this microorganism:

_____.

5. Write why the fermentation process is so important.

_____.

_____.

_____.

Stage 3. Communities and Ecosystems

3.1 Levels of Ecological Organization

I. Read each sentence and fill the blank with the right information referent to the first topic from Stage 3.

1. _____, is the group of individuals of the same species that coexists in a particular place.

2. _____, are the great type of natural ecosystems associated with the different climatic regions of the planet.

3. _____, is each living being, each organism has particular morphological, physiological and behavioral traits.

4. _____, is an open system made up of biotic communities and their abiotic environment, which maintain an exchange of matter and energy.

5. _____, is a branch of Biology that studies the relationship between organisms and their environment.

6. _____, it's the amount of matter and energy stored per unit area in the bodies of organisms, and it can be of two types: primary production and secondary production.
7. _____, describes the spatial arrangement of individuals in a population, which can be uniform, random and aggregate.
8. _____, it refers to the way in which populations are distributed in space, and has two components: horizontal structures and vertical structures.
9. _____, variables that estimate how many organisms are added or subtracted from a population: emigration rate, immigration rate, mortality and birth rate.
10. _____, denotes what percentage of individuals or biomass each species contributes to the interior of community

3.2 Biotic and Abiotic Factors

I. Match both columns: Concept-Description.

Concept	Description
1. Resources.	() Is a complex set of multiple factors that surround and affect the health, performance, abundance, survival and diversity of living beings.
2. Amensalism.	() One of the populations does not affect the other, so the interaction is not reciprocal but a unidirectional effect is established.
3. Abiotic factor.	() Are sudden or chronic events that damage or kill organisms and affect the conditions and resources of a place, which causes colonization spaces to open up for other living beings.
4. Environment.	() It is an abiotic condition that affects organisms in coastal lagoons and desert areas, since its high concentration prevents plants from taking up water.
5. Competence.	() When one population has a negative effect on the other, but B doesn't harm or benefit A.
6. Disturbances.	() If the effect is positive for one and negative for other.
7. Neutralism.	() If the effect that both populations have is negative for both this interaction is established.
8. Salinity.	() Both populations benefit from the relationship.
9. Ecological interaction.	() Is one that has its origin from the non-living components of the ecosystem.
10. Biotic factor.	() Are the physical and chemical factors of the environment to which organisms respond differentially.
11. Predator.	() Is the bidirectional relationship between two individuals or populations that affect their performance,

	fertility, survival and population size in positive or negative way.
12. Commensalism.	() Is one in which living beings and products they produce are involved.
13. Conditions.	() Are elements of the environment that, when used or consumed by an organism or group of organisms for their benefit , reduce their availability for another living being or for another population.
14. Mutualism.	() When two populations are not damaged or benefit, it is said there is a non-existent interaction.

3.3 Producers and Consumers

I. Draw of a food web with 10 living beings and identify with a red line a food chain with 4 trophic levels. (attached your worksheet just after this page).

II. Answer the following questions about Producers and consumers.

1. What is the name of the linear scheme by which food passes from one organism to another?

2. is defined as the number of times that food energy passes from one living being to another.

3. What is a trophic network?

4. What is the name of all organisms or groups of organisms that produce tissues from any process?

5. What is a secondary producer?

3.4 Energy Flow in Ecosystems

I. Complete the following vocabulary.

1. Calorie:

2. Joule:

3. Biomass energy:

4. Food pyramid:

5. Gross primary productivity:

3.5 Cycles of Matter

I. Do a flowchart with every cycle of matter: water, carbon, phosphorus and nitrogen; and add information about each one of them. (If is necessary, attached your worksheet just after this page).

3.6 Ecological Niche and the Role of Ecological Interactions

I. Read each question below, choose and underline the correct answer.

1. The process in which two unrelated lineages become morphologically similar to each other

a) Ecological equivalents b) Niche c) Evolutionary convergence d) Habitat

2. Sometimes, in different regions, organisms of different species that occupy similar ecological niches are presented.

a) Ecological equivalents b) Niche c) Evolutionary convergence d) Habitat

3. Denotes the physical space in which a group of organisms lives and is found

a) Ecological equivalents b) Niche c) Evolutionary convergence d) Habitat

4. Within a community or an ecosystem, each species of organisms that lives there has a different role.

a) Ecological equivalents b) Niche c) Evolutionary convergence d) Habitat

5. This activity prevents species from competing for available resources in the ecosystem.

a) Fundamental niche b) Partition of resources c) Promedial niche d) Gause principle

6. Two species with the same ecological niche cannot coexist, since, share exactly the same resources and coexist under the same terms; so that one species will end up displacing the other.

a) Fundamental niche b) Partition of resources c) Promedial niche d) Gause principle

7. Is the multidimensional space of conditions and resources that potentially occupies a group of organisms in absence competitors and predators.

a) Fundamental niche b) Partition of resources c) Promedial niche d) Gause principle

8. Denotes the multidimensional space of resources and conditions that each group of organisms actually occupies in the presence of two interacting agents.

a) Fundamental niche b) Partition of resources c) Promedial niche d) Gause principle

3.7 Factors that Determine the Climate

I. Match both columns: Concept-Description.

Concept	Description
1. Precipitation	() The conditions that the atmosphere has in a moment given and in a particular place.
2. Latitude	() Wind is the horizontal movement of air masses, which are produced by differences in air density.
3. Climate	() Indicates the amount of heat energy accumulated in the air.
4. Wind direction and speed	() It is the percentage of water vapor that contains a unit of air volume.
5. Atmospheric pressure	() It is the amount of water that falls, either in liquid form or solid from the atmosphere to Earth.
6. Altitude	() Denotes the weight exerted by the mass of rain on a surface unit.
7. Weather	() Describes the percentage of sky that is covered by clouds.
8. Vegetation	() It is the height that reaches a place on Earth from sea level.
9. Temperature	() It is the angle at which place on the planet is presented with respect to the equator line, and goes from 0° to 90°.
10. Continentality	() Areas near the sea or bodies of water experience greater precipitation and are more humid than areas within continents or away from bodies of water.
11. Climatology	() Vegetation emits steam by evapotranspiration that increases air humidity and cloud formation, which regulates temperature variation.
12. Relative humidity	() Refers to the average state of the conditions of the atmosphere that characterize a region over a long period of time
13. Solar radiation	() Discipline responsible to study the climate.
14. Cloudiness	() The marine currents that affect the western Coasts of the continents come from the poles and are cold and desiccant, while the Eastern Coasts are bathed by warm and humid currents from the equator that facilitate abundant rainfall.
15. Marine currents	() It is the amount of light energy coming from the sun that hits the earth's surface.

3.8 Ecosystems of Mexico

I. Read each question below, choose and underline the correct answer.

1. It is an ecosystem dominated by thorny trees and deciduous trees. It develops in semi-arid dry climates at a temperature that varies from 17°C to 29°C and with precipitation between 350 and 2000 mm.

a) Grassland b) Spiny forest c) Xerophilous scrub d) Temperate forest

2. Include pine forest, oak and cypress; the leaves of these trees withstand very cold temperatures. This type of forest is found in the mountainous regions of the country that have a humid and subhumid temperate climate with rains in summer and with a cold winter.

a) Grassland b) Spiny forest c) Xerophilous scrub d) Temperate forest

3. Located in semi-arid climate zones, its altitude of between 1100 to 1500 m.a.s.l. They prevail in areas whose temperature varies from 12°C to 20°C, and have a precipitation range of 300 to 600 mm.

a) Grassland b) Spiny forest c) Xerophilous scrub d) Temperate forest

4. It is a type of vegetation dominated by small-leaved shrubs and succulent plants, although they can coexist with deciduous trees less than 4 m high. It comes in areas of desert and semi-arid climates that have a rainfall of less than 700 mm, with temperatures between 12°C and 26°C, with an extensive dry season.

a) Grassland b) Spiny forest c) Xerophilous scrub d) Temperate forest

5. They are formed by the dissolution of the rocks and have stalactites, stalagmites and columns, as well as other calcium carbonate concretions.

a) Grottoes b) Anquihalinas caves c) Lava tubes d) Ice caves

6. Flooded caves that open to the surface by the cenotes and that maintain water with different degrees of salinity, which depends on its proximity or remoteness with the sea.

a) Grottoes b) Anquihalinas caves c) Lava tubes d) Ice caves

7. It includes evergreen tropical forest and sub-deciduous tropical forest. It is distributed in areas with rains throughout the year or during the summer, where the annual rainfall is greater than 1000 mm. Trees are evergreen.

a) Mesophilic mountain forest b) Cold forest c) Dry tropical rainforest d) Tropical rainforest

8. Also known as foggy forest. It is located at altitudes between 800 and 2400 m.a.s.l, in areas with humid temperate climates with rains throughout the year with temperatures of between 12°C and 23°C.

a) Mesophilic mountain forest b) Cold forest c) Dry tropical rainforest d) Tropical rainforest

9. Trees are deciduous leaves. It occurs in sub-humid tropical climate with a very rainy and dry seasons. It has a temperature between 20°C and 29°C, and a very varied precipitation, ranging from 300 to 1800 mm.

a) Mesophilic mountain forest b) Cold forest c) Dry tropical rainforest d) Tropical rainforest

10. Are ecosystems located in areas where water flows from rivers into the sea. They have variable salinity.

- a) Open sea b) Estuaries c) Gallery forest d) Mangroves**

11. Grow on the shores of bays, coastal lagoons and beaches without waves, which keep trees of salt-tolerant mangroves.

- a) Open sea b) Estuaries c) Gallery forest d) Mangroves**

12. Are far from the coasts, are distributed differentially according to depth, since the sun's rays only penetrate the surface layer.

- a) Open sea b) Estuaries c) Gallery forest d) Mangroves**

13. Known as riverine forest, with evergreen trees which develop on the banks of rivers.

- a) Open sea b) Estuaries c) Gallery forest d) Mangroves**

14. Located on the seabed, where the organisms remain fixed, digging or sliding on the top of it.

- a) Tulars b) Coral reefs c) Benthic ecosystem d) Marine ecosystem**

15. They have salty water. Marine ecosystems are coral reefs, estuaries, open sea, sandy coast, rocky coast and benthic ecosystems.

- a) Tulars b) Coral reefs c) Benthic ecosystem d) Marine ecosystem**

Stage 4. Biodiversity and Sustainability

4.1 Biodiversity

I. Read each sentence and fill the blank with the right information referent to the first topic from Stage 4.

1. We can define _____ as the variety of ways in which life is expressed on our planet.

2. _____ are those species native to certain regions where they grow and develop normally.

3. The _____ basically refers to the fact that organisms of the same species differ from each other

4. _____ are species whose presence and work are unique and essential for the functioning of ecosystems of which they are part, and can create, maintain or destroy habits.

5. The _____ is the variety of species that live relatively small areas

6. The _____ are those that are accidentally or intentionally introduced into ecosystems to which they do not belong, generating various consequences.

7. The _____ consists of a series of action that aim to partially or totally recover the structure and the functioning of ecosystems that have been degraded, damaged or destroyed, almost always as a result of human activities.
8. The _____ refers to the elimination of tree vegetation from forest.
9. _____ are species that have a central role in the ecosystems in which they live, which despite not being abundant, have a very important effect on their environment.
10. The _____ is when we evaluated the total number of species that inhabit region.
11. The _____ is the result of deforestation, then ecosystems lose their integrity.
12. _____ allows specie to acclimatize to the conditions of the environment it experiences.

4.2 Biodiversity in Mexico

I. Draw to represent Mexico as a megadiverse country.

4.3 Environmental Impact

I. Match both columns: Concept-Description.

Concept	Description
1. Pollutants	() The atmosphere produces this phenomena, which dampens temperature changes.
2. Ecological footprint	() Toxic substances and environmental conditions are that, upon reaching high levels, alter the original conditions of ecosystems and damage organisms
3. Greenhouse effect	() Consists of a modification of this liquid, usually as a result of human activities, which makes it inappropriate for human or animal consumption.
4. Soil contamination	() Is a concept that has been proposed to measure the effect that human beings have on the environment when using the land for the production of fibers and food
5. Pollution	() Is the presence and accumulation of external components that may be of physical, chemical or biological origin, which affect the health of natural ecosystem.
6. Water pollution	() Consists of the accumulation of toxic substances and components in the soil, which have the effect of degrading their quality

4.4 Sustainability

I. Answer the following questions.

1. What is the sustainable development?

_____.

2. What is the sustainability?

_____.

3. What is the ecological sustainability?

4. What is the economic sustainability?

5. What is the social sustainability?

Elaboró MDEMS. Janay Emmanuel Carrillo Colón/Revisó Secretaría Académica