s

of the following is a producer?

ree

raccoon

c. cockroach

d. human

_21. Which of the following is a process in the cell whereby glucose and oxygen produce carbon dioxide, water, and energy?

a. photosynthesis

b. cellular respiration

c. synthesis

d. decomposition

_22. Which of the following organisms would be found at the top of an energy pyramid?

a. alga

b. krill

c. leopard seal

d. killer whale

_23. Humans usually get the phosphorus that their bodies need from

a. eating plants and annuals that contain phosphorus.

b. mining.

c. food additives.

d. drinking water.

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American division **Grade 12** **E science**

1 How ecosystem works

Chapter 5

Section1, 2

Energy Flow in the Ecosystem , The cycling of materials

STUDENT'S NAME:……

Life depends on the sun

Photosynthesis: a process by which a plant uses sun light to make sugar molecules

Who are doing photosynthesis: Plants, Algae and some bacteria

$$6CO_2 + 6H_2O + Sunlight \xrightarrow{chlorophyll} C_6H_{12}O_6 + 6O_2$$

Carbohydrates: Energy rich molecules such as Glucose sugar $C_6H_{12}O_6$

Other organisms: They consume energy from carbohydrates.

Producer (autotrophic organisms): An organism that makes his own food

Consumers (Heterotrophic organisms): organisms that get energy by eating other organisms.

Decomposers: get their food by breaking down dead organisms

If a coyote eats a rabbit which eats clover which makes photosynthesis it means that all of them get energy from the sun

An exception to the rule:

In 1977 at the bottom of the ocean of the coast of Ecuador we discovered many living things (Worms, clams, crabs, mussels and barnacles) live near thermal vents in the deep ocean floor in total darkness (without photosynthesis), they get their energy from cretin kind of bacteria that use hydrogen sulphide to make their own food, Hydrogen sulphide is present in the hot water that escape from the cracks in the ocean floor

These bacteria are producers by chemosynthesis not photosynthesis and they provide other organisms in the deep ocean with food

M C Q :

14. What are the first organisms to colonize any newly available area called?
    a. climax species
    b. ferns
    c. pioneer species
    d. mosses

.15. Which of the following is a producer that breaks down rock?
    a. pioneer producer
    b. fungal species
    c. algae
    d. lichen

16. Humans are affecting the balance of the carbon cycle by
    a. burning fossil fuels.
    b. using carbonates at an alarming rate,
    c. using fertilizers.
    d. replanting the rain forests.

. 17. What is a pattern of change that occurs on a surface where an ecosystem has previously existed?
    a. primary succession
    b. secondary succession
    c. tertiary succession
    d. climax community

18. What do deep-ocean bacteria use to make their food?
    a. the sun
    b. hydrogen sulfide
    c. carbon dioxide
    d. sugar molecules

,19. Which of the following is an herbivore?
    a. cow
    b. lion

MATCHING

In the space provided, write the letter of the term or phrase that best matches the description.

A. photosynthesis
B. rabbit and coyote
C. fossil fuels
D. producers
E. food Web
F. consumers
G. atmospheric CO2
H. energy pyramid
I. algal bloom
J. atmospheric N2
K. food chain
L. old-field succession
M. nitrogen-fixing bacteria

l. Two types of consumers ----

2. A diagram showing the many feeding relationships that are in an ecosystem -----

3. The process in which energy from the sun is used by plants to make sugar molecules ------

4. Illustrates the loss 01 energy from one trophic level to the next --

5. Organisms that get their energy by eating other organisms --------

6. Stored carbon from the remains of plants and animals that died millions of years ago ---------

7. Organisms that make their own food ---------

8. Change that occurs on an abandoned farm ---------

9. A part of the carbon cycle ----------

10. Results from excessive use of fertilizers ---------

11. Organisms that transform atmospheric nitrogen into usable nitrogen compounds ----------

12. Part, of the nitrogen cycle ----------

13. Transfer of energy from one organism to another ---------

What Eats What in an Ecosystem

	Energy source	Examples
Producer	Makes its own food through photosynthesis or chemical sources	Grasses, ferns, cactuses, flowering plants, trees, algae, and some bacteria
Consumer	Gets energy by eating producers or other consumers	Mice, starfish, elephants, turtles, humans, and ants

Types of consumers in an ecosystem

	Energy source	Examples
Herbivore	Producers	Cows, sheep, deer, and grasshoppers
Carnivore	Other consumers	Lions, hawks, snakes, spiders, sharks, alligators, and whales
Omnivore	Both producers and consumers	Bears, pigs, gorillas, rats, raccoons, cockroaches, some insects, and humans
Decomposer	Breaks down dead organisms in an ecosystem and returns nutrients to soil, water, and air	Fungi and bacteria

Respiration: another name for breathing

Cellular respiration: The process of breaking down food to yield energy which occurs inside the cells of most organisms (during which cells absorb oxygen and use it to release energy from the food)

Equation of cellular respiration: just the opposite of the equation of photosynthesis

$$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$$

Brain teasing question: How do you think DDT gets to long Iceland near New York and Connecticut?

How do we use energy from cellular respiration?

1- Carry out daily activities (walk, breath, read, think, or play)
2- Make more body tissues (growing)

3- fight diseases

N.B even producers use cellular respiration to obtain energy

Energy transfers

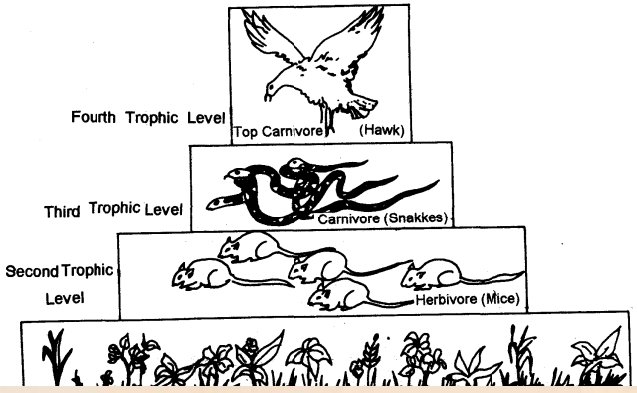
We can trace the transfer of energy by studying food chains, food webs, and trophic levels

Food chain: a sequence in which energy is transferred from one organism to the next as each organism eats another organism

Food web: shows many feeding relationships that are possible in an ecosystem

Trophic level: each step in the transfer of energy through a food chain or food web

Each time energy is transferred from one organism to another 90% is lost as heat (producing new cells, regulating body temp., moving around, etc) and 10% moves to the next trophic leve



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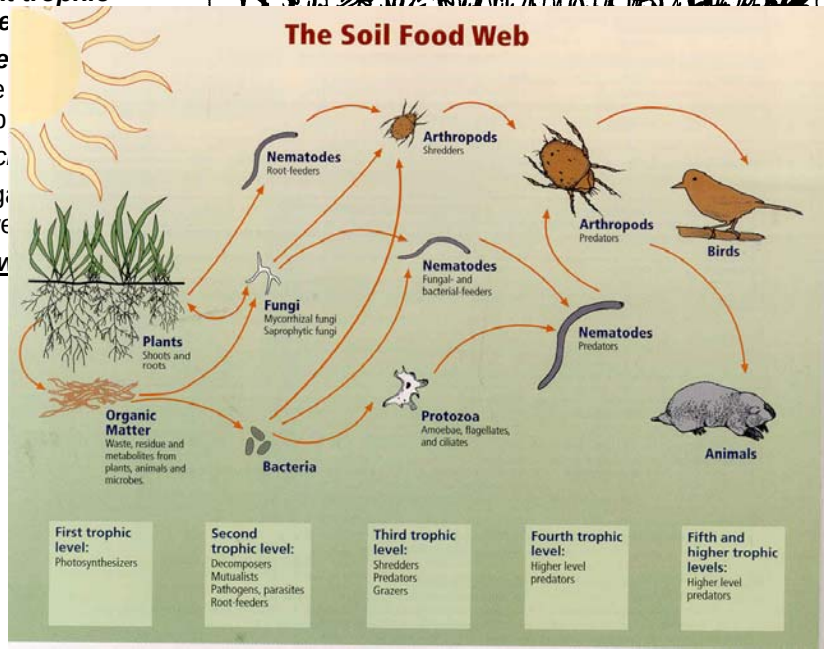

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Section 1 Review

1- Describe how energy is transferred from one organism to another
2- Describe the role that producers play in an ecosystem
3- Explain the difference between an herbivores and an omnivore.
4- Compare energy transfer in a food chain to energy transfer in a food web

CRITICAL THINKING

1- Interpreting graphics look at the food web. What feeding relationships does the nematodes and arthropods have?

2- Inferring relationships Read the paragraph under the heading, “Trophic level” in this section. Could more people be supported by 20 acres of land if they ate only plants instead of both plants and animals? Explain your answer. (READING SKILLS)

d. ***Examples of tall slow growing dominant trees:*** Oaks, hickories, beeches and maples.

10. ***Primary succession again:***
    a. It may happen due to a volcano as we mentioned before or on a glacier retreats or any other area that was not supporting life before.
    b. It takes much longer periods than secondary succession because it may start even without a soil, It can take from hundreds to thousands of years just to produce fertile soil naturally.
        i. ***Example of primary succession:***

1. A glacier melts.
2. An area of bare rocks are exposed
3. bacteria and lichen will be the 1st pioneers because they can live without soil on the bare rocks
4. ***Lichen:*** colorful, flaky patches that you can see on trees or rocks, they are producers that is actually composed of 2 species:
    a. A fungus which absorbs water and nutrients from the rocks.
    b. An algae which perform photosynthesis
5. As the growth of the lichen breaks down the rocks, also water can freeze and then thaw in cracks which increase rock cracking.
6. Soil slowly accumulates as dust particles in air are trapped in the cracks
7. Dead remains of lichen and bacteria also accumulate in the cracks.
8. Mosses may later grow larger and break more rocks.
9. When mosses die they decay and add nutrients to the soil
    c. You can also see primary succession in the side walks or building when you see mosses, weeds or lichen coming out of a crack.

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5.2 Recycling, (the cycling of materials)

2 How ecosystem works

Chapter 5

Section2, 3

The nitrogen cycle, phosphorus cycle, how ecosystem change

STUDENT'S NAME:……

Carbon cycle

Carbon: an essential component of proteins, fats, and carbohydrates which make the entire living organism

Carbon cycle: a process by which carbon cycles between the atmosphere, land, water and organisms

Short term carbon cycle:

1- -when producers capture CO_2 from air and make photosynthesis it converts it into carbohydrates.
2- Consumers eat producers and convert some of the carbohydrates to CO_2 in air again. (During cellular respiration)
3- Even producers who make photosynthesis also release some CO_2 to the atmosphere through cellular respiration.

Long term carbon Cycle:

1- carbon may be converted to carbonates (It make the hard part of the Skelton and shells (which are not broken easily)
2- Through millions of years carbonate deposits change to lime stone rocks (lime stone is the largest sinks or reservoirs of carbon on earth)
3- Some carbohydrates change in the body of the living organism to fats, oils or any other energy rich compounds.
4- The carbon of these compounds may be released to the soil or air after the organism dies
5- These compounds may be converted under the soil to fossil fuels (Cool, Oil or natural gas). Fossil fuels are carbon storing compounds came from plants and animals died millions of years ago

How humans affect the carbon cycle

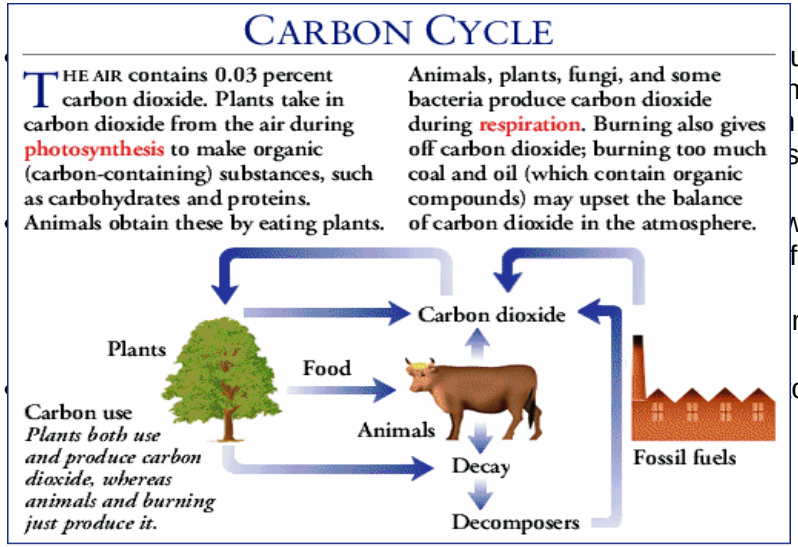
1- Cars, Factories and power plants use fossil fuels to operate and they release a huge amount of CO_2 to air.
2- In year 2000 vehicles produced $^1/_3$ of all CO_2 emitted in USA
3- About 6 billion metric tons of carbon are released yearly as CO_2
4- Natural burning of wood or forest fires combined with the burning of fossil fuels make up that huge 6 billion tons
5- About ½ of that CO_2 accumulates yearly in the atmosphere.
6- Increased CO2 leads to global worming (increase in temperature of earth's atmosphere).

What about the rest of CO_2

Scientists believe that over a billion metric tons of CO_2 dissolve into the ocean and plants probably absorb the rest.

d. After the eruption plants start to colonize the volcanic debris forming the **pioneer species.**
e. **Pioneer species:** the 1st organism who newly available area and begin the process of ecological succession.
f. Over the years the pioneer species will make it possible for other species to habituate the same ecosystem.
g. If a new ecosystem is formed it will be called a climax community
h. **A climax community:** a final and stable community.

8. ***Fire and secondary succession*:**
   a. Natural fire caused by lightning are a necessary part of secondary succession.
   b. Some species of trees such as Jack pine can disperse the seeds only after exposing to intense heat of a fire
   c. Minor forest fire remove accumulation of brush and deadwood that could cause a huge fire
   d. Some animals depend on occasional fires because they feed on the vegetation that sprouts after a fire has cleaned the land.
   e. This is why foresters allow natural fires (unless of course if it threatened the humans or the properties)
9. ***Old field succession:***
   a. When a farm land is abandoned , grasses and weeds grow , the pioneer grass produces seeds and cover a larger area.
   b. After a while:
      i. taller plants such as perennial grasses grow and shade the area keeping light away from the pioneer shorter plants
      ii. Long root of taller plants grow and absorb more water depriving shorter pioneer plants from water.
      iii. Pioneer plants die due to the lack of water and sunlight.
   c. ***Succession continue:*** trees will repeat the same action with tall plants, Finally slow growing trees take over the area from the previously mentioned trees and the climax returns to the original climax of the land before farmers cut the trees to cultivate it for the 1st time (this succession took about a century)



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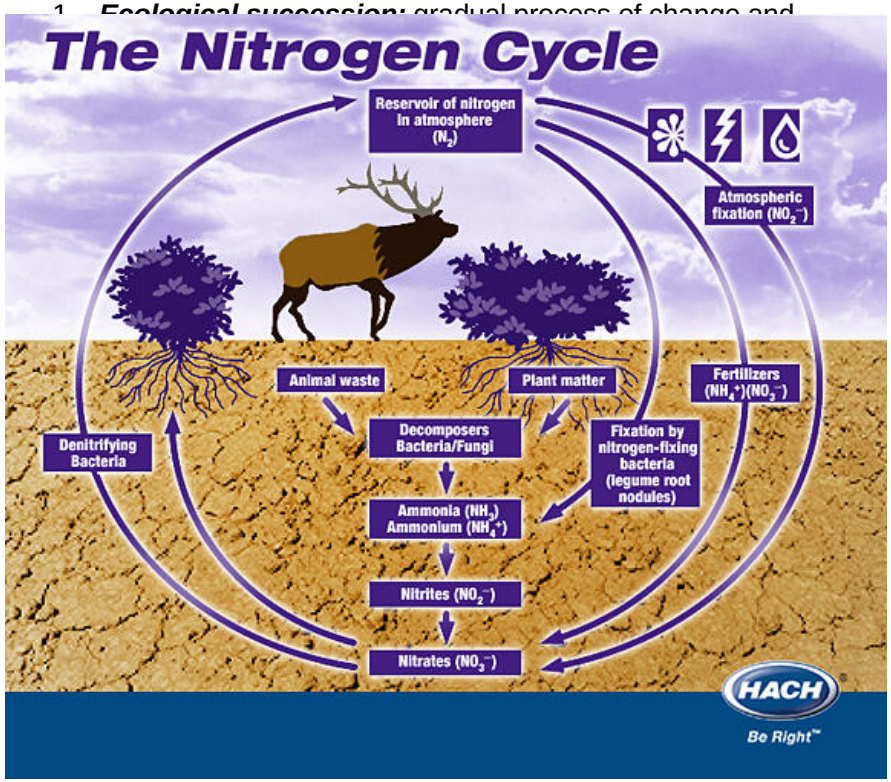
Ecological succession

1. ***Ecological succession:*** gradual process of change and



Nitrogen cycle

1- All organisms need nitrogen to build proteins,
2- Proteins are used to build new cells.
3- Nitrogen makes up 78% of the gases in the atmosphere.
4- Most organisms cannot use atmospheric nitrogen; it must be altered, or fixed, before organism can use it.
5- The only organisms that can fix atmospheric nitrogen into chemical compounds are a few species of bacteria known as ***nitrogen-fixing bacteria***. All other organisms depend upon these bacteria to supply nitrogen. Nitrogen-fixing bacteria are a crucial part of the

6- ***Nitrogen cycle***, a process in which nitrogen is cycled between the atmosphere, bacteria and other organisms. Bacteria take nitrogen gas from the air and transform it into molecules that living things can use.
7- **Nitrogen-fixing bacteria live** within nodules on the roots of plants called legumes.
8- ***Legumes*** include beans, peas, and clover.
9- The bacteria use sugar provided by the legumes to produce nitrogen-containing compounds such as nitrates.
10- The excess nitrogen fixed by the bacteria is released into the soil.
11- Some nitrogen-fixing bacteria live in the soil rather than inside the roots of legumes.
12- Plants that do not have nitrogen-fixing bacteria in their roots get nitrogen from the soil.
13- Animals get nitrogen by eating plants or other animals, both of which are sources of usable nitrogen.

Decomposers and the nitrogen cycle:

- In the nitrogen cycle, nitrogen moves between the atmosphere and living things.
- After nitrogen cycles from the atmosphere to living things, nitrogen is again returned to the atmosphere with the help of bacteria.
- These decomposers are essential to the nitrogen cycle because they break down wastes, such as urine, dung, leaves, and other decaying plants and animals and return the nitrogen that these wastes and dead organisms contain to the soil.

- If decomposers did not exist, much of the nitrogen in ecosystem would be stored in wastes,
- Corpses and other parts of organisms. After decomposers return the nitrogen to the soil,
- Bacteria transform a small amount of the nitrogen into nitrogen gas, which then returns to the atmosphere and completes the nitrogen cycle.
- Once nitrogen enters an ecosystem, most of it stays within the ecosystem, cycles between organisms and the soil, and is constantly reused.

The Phosphorus Cycle

Phosphorus is an element that is a part of many molecules that make up the cells of living organisms. For example, phosphorus is an essential material needed to form bones and teeth in animals.
Plants get the phosphorus they need from soil and water, while animals get their phosphorus by eating plants or other animals that have eaten plants. The phosphorus cycle is the movement of phosphorus from the environment. This cycle is slow and does not normally occur in the atmosphere because phosphorus rarely occurs as a gas.
phosphorus may enter soil and water in a few ways. When rocks erode, small amounts of phosphorus dissolve as phosphate in soil and water. Plants absorb phosphates in the soil through their roots. In addition, Phosphorus is added to soil and water when excess phosphorus is excreted in waste from organisms and when organisms die and decompose. Some phosphorus also washes off the land and eventually ends up in the ocean. Many phosphate salts are not soluble in water, so they sink to the bottom of the ocean and accumulate as sediment.
Fertilizers and the nitrogen and phosphorus cycles

- People often apply fertilizers to stimulate and maximize plant growth.
- Fertilizers contain both nitrogen and phosphorus.
- The more nitrogen and phosphorus that is available to a plant, the faster and bigger the plant tends to grow.
- However, if excessive amounts of fertilizers are used, the fertilizers can enter terrestrial and aquatic ecosystem through runoff.
- Excess nitrogen and phosphorus in an aquatic ecosystem or nearby waterway can cause rapid and overabundant growth of algae, which result in an algal bloom.

_____ 8. Plants, algae, and some bacteria capture solar energy.

9. Energy is transferred from one organism to another.

Solar energy drives a series of chemical reactions.

Other organisms consume carbohydrates found in plants, ome bacteria.

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Practice makes perfect

3 How ecosystem works

Chapter 5

Exercises

Revision Questions (Active Reading + creative thinking)

STUDENT'S NAME:……

ANALOGIES

Mark the letter of the pair of terms that best completes the analogy shown. An analogy is a relationship between two pairs of words or phrases written as a : b :: c : d. The symbol : is read "is to," and the symbol :: is read "as."

1. Producer: consumer::
a. car: driver
b. factory : shopper
c. deer: wolf
d. photosynthesis: decomposition

2. Herbivores: omnivores::
a. photosynthesis: respiration
b. elephant: ocean
c. fruit: bird
d. deer: bear

3. Carbon dioxide: carbon cycle ::
a. fertilizer : phosphorus cycle
b. atmospheric nitrogen : nitrogen cycle
c. decomposers : carbon cycle
d. limestone : carbon cycle

4. Deep ocean: hydrogen sulfide::
a. sunlight: deep ocean
b. darkness: sunlight
c. surface : carbon dioxide
d. photosynthesis: sunlight

5. Oxygen: cellular respiration ::
a. cup: saucer
b. carbon dioxide : photosynthesis
c. plants: adaptation
d. needle : thread

6. Climax forest: clear-cut forest::
a. plants: animals
b. food web : food chain
c. sun : fire
d. full: empty

INTERPRETING OBSERVATIONS

1. Plants, algae, and some bacteria capture …… during photosynthesis.
a. solar energy c. carbon dioxide
b. carbohydrates d. organisms

2. The chemical reactions driven by solar energy require
a. carbon dioxide and water. c. organisms and water.
b. plants and algae. d. carbon dioxide and sugar molecules.

3. During photosynthesis, plants make
a. carbohydrates. c. water.
b. carbon dioxide. d. None of the above

4. Where does the production of carbohydrates in a plant take place?
a. in the carbohydrates c. in the ecosystem
b. in the leaves d. in the stems

VOCABULARY DEVELOPMENT

Read each question and write the answer in the space provided.

5. Energy-rich molecules that organisms use to carry out daily activities are

6. The process by which a plant uses sunlight to make sugar molecules is called

SEQUENCING INFORMATION

One reading skill is the ability to sequence information, or to logically place items or events in the order in which they occur.

Sequence the statements below to show the steps in the process of energy production and consumption. Write "1" on the line in front of the first step, "2" on the line in front of the second step, and so on.

_____ 7. Photosynthesis produces carbohydrates.

17. Explain how a clover is part of the carbon, nitrogen, and phosphorus cycles.

Section: Energy Flow in Ecosystems

Read the passage below and answer the questions that follow.

Energy from the sun enters an ecosystem when a plant uses sunlight to make sugar molecules by a process called *photosynthesis.* During photosynthesis, plants, algae, and some bacteria capture solar energy. Solar energy drives a series of chemical reactions that require carbon dioxide and water. The result of photosynthesis is the production of sugar molecules known as *carbohydrates.* Carbohydrates are energy-rich molecules which organisms use to carry out daily activities. As organisms consume food and use energy from carbohydrates, the energy travels from one organism to another. Plants produce carbohydrates in their leaves. When an animal eats a plant, some energy is transferred from the plant to the animal. Organisms use this energy to move, grow, and reproduce.

IDENTIFYING MAIN IDEAS

One reading skill is the ability to identify the main idea of a passage. The main idea is the main focus or key idea. Frequently a main idea is accompanied by supporting information that offers detailed facts about main ideas.

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

Read the following passage, and then answer the questions below.

Your family is considering buying a house near a nature preserve that has been established to maintain a portion of the original ecosystem. You attend a meeting in which the developer is explaining the plans for the project. One woman in the audience complains that she does not like the natural prairie grasses on the nature preserve. She wants the grasses removed and replanted with an imported grass. A man in the audience suggests that exotic animals on the preserve would make it more beautiful. One woman proposes that the developer construct a playground in the center of the preserve and build a paved road to it she wants picnic tables set up throughout the preserve for family picnics.

7. What would be your response to the woman who wants to replace the native grasses?

……
……
……

8. What would be your response to the man who wants exotic animals placed on the site?

……
……
……

9. What would be your response to the woman who wants to put a playground on the site?

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AGREE OR DISAGREE

Agree or disagree with the following statements, and support your answer.

10. There would be no life on Earth without the sun.

11. Our activities do not affect the carbon cycle.

12. A severe drought in a grassland will reduce the number of consumers in the entire energy pyramid.

REFINING CONCEPTS

The statements below challenge you to refine your understanding of concepts covered in the chapter. Think carefully, and answer the questions that follow.

13. Explain why the difference between primary and secondary succession is not always clear.

14. Explain what you think would happen to the phosphorus, carbon, and nitrogen cycles if the sun were to burn out.

15. Energy pyramids are useful for describing the energy losses in a food chain. Describe an energy pyramid for a group of organisms in your area.

16. Explain the importance of lichens to primary succession.

MULTIPLE CHOICE

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

n is used to describe a linear sequence in which energy is from one organism to the next?

veb b. food chain

c level d. energy pyramid

ganism is likely to be in the bottom trophic level in a food chain?

d seal b. alga c. krill d. killer whale

9. What is the ultimate source of energy for almost all organisms except those living deep in the ocean near a thermal vent?

a. producers b. consumers c. the sun d .bacteria

JO. What are organisms that eat both plants and animals called?

a. herbivores b. carnivores c. omnivores d. autotrophs

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Again Practice makes perfect

4 How ecosystem works

Chapter 5

Exercises

Revision Questions (Active Reading + creative thinking)

STUDENT'S NAME:.....

Section: The Cycling of Materials

Read the passage below and answer the questions that follow.

When we burn fossil fuels, we release carbon into the atmosphere. The carbon returns to the atmosphere as carbon dioxide. Cars, factories, and power plants rely on these fossil fuels to operate. In the year 2000, vehicles were the source of one-third of all carbon dioxide emitted in the United States. All together, about 6 billion metric tons of carbon a year are released into the atmosphere as carbon dioxide. Natural burning of wood or forest fires combined with the burning of fossil fuels make up this 6 billion metric tons. About half of this carbon dioxide remains in the atmosphere, so over a period of years, the amount of carbon dioxide in the atmosphere has steadily increased. Increased levels of carbon dioxide may contribute to global warming, which is an overall increase in the temperature of the Earth. What happens Lo the carbon dioxide that, is not absorbed by the atmosphere? Scientists estimate that over a billion metric tons of carbon dioxide dissolves into the ocean, which is a carbon sink. Plants probably absorb the remaining carbon dioxide.

IDENTIFYING MAIN IDEAS

One reading skill is the ability to identify the main idea of a passage. The main idea is the main focus or key idea. Frequently a main idea is accompanied by supporting information that offers detailed facts about main ideas.

Read each question and write the answer in the space provided.

1. What do most cars, factories, and power plants rely on to operate?

2. In what form does carbon return to the atmosphere after it is released from the burning of fossil fuels?

3. One-third of the United States' carbon consumption is used to operate what?

2. **Finding Locations** Which region has the highest percentage of carbon dioxide output? the lowest?

3. Making Conclusions Why do you think developed regions have a higher output of carbon dioxide?

4. Making a Hypothesis What might explain the fact that although Australia is developed, it has *the* lowest percentage of carbon dioxide output?

Section: Energy Flow in Ecosystems

MATCHING

Write the letter of the term or phrase that best matches the description.

1. an organism that makes its own food
2. the process of breaking down food to yield energy
3. organisms that get their energy by eating other organisms
4. the process in which plants make sugar molecules from sunlight
5. consumers that get their food by breaking down dead organisms
6. the many feeding relationships possible in an ecosystem

a. cellular respiration
b. decomposer
c. producer
d. consumer
e. photosynthesis
f. food web

14. What happens after a farmer abandons a field and the stages of old-field succession take place?

4. How many tons of carbon are released into Earth's atmosphere every year?

5. Why does the author mention the United States in the fourth sentence?

VOCABULARY DEVELOPMENT

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

_____ 6. Global warming

a. is carbon dioxide that dissolves into the ocean.
b. is an overall increase in the temperature of Earth.
c. is caused by natural burning of wood and forest fires.
d. makes up half of Earth's atmosphere.

_____ 7. Which of the following statements is true about fossil fuels, carbon, and carbon dioxide?

a. Carbon dioxide returns to the atmosphere as carbon when fossil fuels are burned.
b. Fossil fuels return to the atmosphere as carbon dioxide when carbon is burned.
c. Carbon returns to the atmosphere as carbon dioxide when fossil fuels are burned.
d. none of the above

gases, especially carbon dioxide. Harmful levels of carbon dioxide are emitted into the air by car exhaust, power plants, and other human

RECOGNIZING CAUSE AND EFFECT

Read each question and write the answer in the space provided.

Use **the** map above to answer the questions **below**.

8. What three things cause carbon to be released into the atmosphere as carbon dioxide?

9. What is one effect of increased levels of carbon dioxide in the atmosphere?

Section: How Ecosystems Change

Read the passage below and answer the questions that follow.

Another example of secondary succession is *old-field succession*, which occurs when farmland is abandoned. When a farmer stops cultivating a field, grasses and weeds quickly grow and cover the abandoned land. The pioneer grasses and weeds grow rapidly and produce many seeds to cover large areas.
Then, over lime, taller plants such as perennial grasses grow in the area. These plants shade the ground, which keeps light from the shorter pioneer plants. The long roots of the taller plants also absorb most of the water in the soil and deprive the pioneer plants of adequate water to survive. The pioneer plants soon die from lack of sunlight, and water. As succession continues, the taller plants are deprived of light and water by growing trees. Finally, slower-growing trees such as oaks, hickories, beeches, and maples take over the area and block out the sunlight to the smaller trees. After about a century, the land can return to the climax community that existed before the farmers cleared it to plant crops.

IDENTIFYING MAIN IDEAS

One reading skill is the ability to identify the main idea of a passage. The main idea is the main focus or key idea. Frequently a main idea is accompanied by supporting information that offers detailed facts about main ideas.

Read each question and write the answer in the space provided.

1. What type of succession is old-field succession?

2. Summarize what happens to a field when a fanner stops cultivating it.

VOCABULARY DEVELOPMENT

Read each question and write the answer in the space provided.

3. What key terms are used in this passage?

4. Define the terms you identified in the previous question.

SEQUENCING INFORMATION

One reading skill is the ability to sequence information, or to logically place items or events in the order in which they occur.

Sequence the statements below to show the steps in old-field succession. Write "1" on the line in front of the first step, *"2"* on the line in front of the second step, and so on.

_____ 5. Taller plants grow in the area and shade the ground.

_____ 6. A climax community exists.

_____ 7. Pioneer grasses and weeds grow and produce many seeds.

_____ 8. A farmer stops cultivating a field.

_____ 9. Trees grow and shade the taller plants.

_____ 10. The taller plants die.

_____ 11. The pioneer plants die.

_____ 12. Slower-growing trees shade the smaller trees.

RECOGNIZING CAUSE AND EFFECT

Read each question and write the answer in the space provided.

13. What causes pioneer grasses and weeds that have grown in an abandoned field to die?

Is This the Father or the Son?

Actually both! The father is looking towards your right with his chin resting on his chest and the son is looking away from you over his left shoulder. Notice how the nose of the father forms the chin of the son!

Is This a Sax Player or Woman?

Actually both! A sax player in profile in black and a woman in shadow looking directly at you

Can You Build This?

I doubt it very much. Use it and offer an extraordinary prize to the person who can build it!

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American division Grade 12 E science

5 How ecosystem works

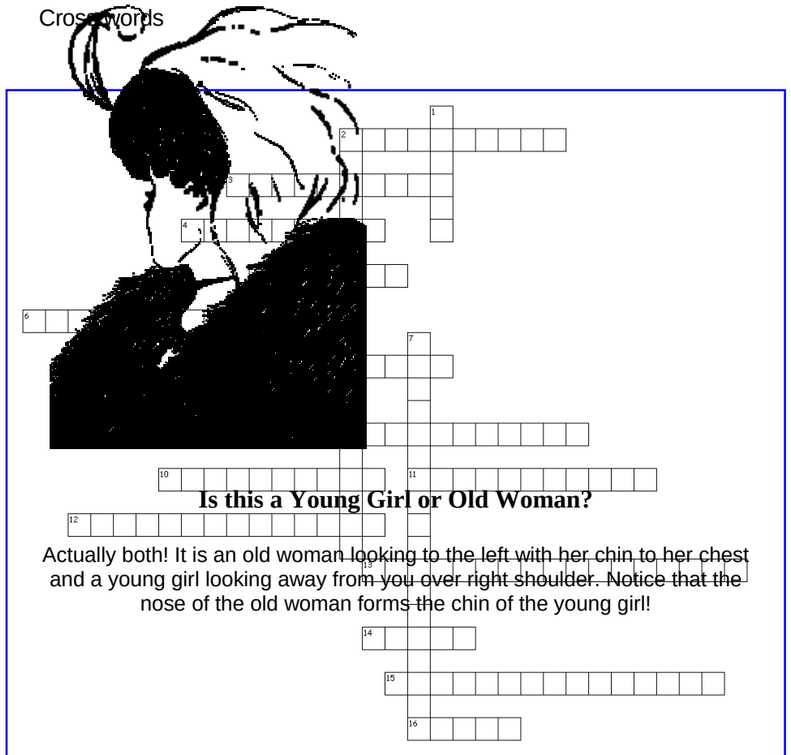
Chapter 5

Section1,2, 3

E. science can be fun .. Let's play and study at the same time

STUDENT'S NAME:……..

Crosswords



Is this a Young Girl or Old Woman?

Actually both! It is an old woman looking to the left with her chin to her chest and a young girl looking away from you over right shoulder. Notice that the nose of the old woman forms the chin of the young girl!

Communities and Biomes

Across

2. Orderly, natural changes, and species replacements that take place in ecosystem communities over time.
3. Portion of the marine biome that is shallow enough for sunlight to penetrate.

See the Queen!

Stare at the left image of the negative Queen for about 30 seconds without moving your eyes too much and then quickly move your vision to stare at the blank white box. See the Queen in normal vision?

Is This an Eskimo or an Indian?

Actually both! It is an Indian looking towards the left and an Eskimo with his back to you looking into a cave. Notice that the nose of the Indian forms the left arm of the Eskimo!

4. Biome composed of large communities covered with grasses and similar small plants.
5. Coastal body of water, partially surrounded by land, in which freshwater and saltwater mix.
6. A stable mature community that undergoes little or no change in species over time.
8. Biome that surrounds the north and south poles; treeless land with long summer days and short periods of winter sunlight.
9. Portion of the shoreline that lies between high tide and low tide lines.
10. Layer of permanently frozen found that lies underneath the topsoil of the tundra.
11. Portion of the marine biome that is too deep for sunlight to penetrate.
12. Any biotic or abiotic factor that restricts the existence, numbers, reproduction, or distribution of organisms.
13. Colonization of new land by pioneer organisms that is exposed by avalanches, volcanoes, or glaciers.
14. Group of ecosystems with the same climax communities.
15. Biome composed of forests of broad-leaved hardwood trees that lose their foliage annually.
16. Biome just south of the tundra; characterized by a northern coniferous pine, fir, hemlock, and spruce trees and acidic, mineral-poor topsoil.

Down

1. Arid region with sparse to almost nonexistent plant life; the driest biome.

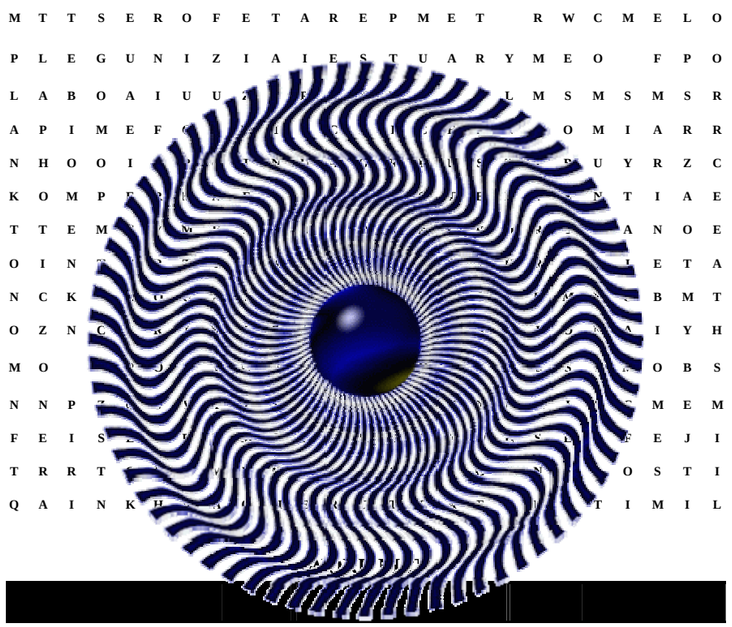
2. Sequence of community changes that take place after a

PERMAFROST | PLANKTON | PRIMARY SUCCESSION

7. TEMPERATE FOREST | TROPICAL RAINFOREST | TAIGA

TUNDRA

Communities and Biomes



APHOTIC ZONE | AQUATIC BIOMES | BIOME

CLIMAX COMMUNITY | COMMUNITY | DESERT

ESTUARY | FRESHWATER BIOME | GRASSLAND

INTERTIDAL ZONE | LIMITING FACTOR | MARINE BIOMES

Moving and Shimmering?

Look at this illusion for a while and it will appear to be shimmering and moving. Of course it isn't. Also, follow the outermost groove and watch it change from a groove to a hump as you go around the wheel!

n is Okay

But Studying comes 1st

And it's a great success to make studying FUN

For more details mrayman@mrayman.com

Dr. Nermien Ismail Schools

American division **Grade 12** **E science**

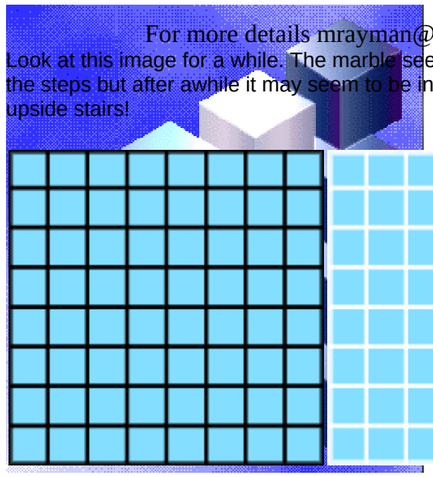
4 How ecosystem works

Chapter 5

Section1,2, 3

E. science can be fun... Scientific eye tricks (optical illusions)

STUDENT'S NAME:……



Look at this image for a while. The marble seems to be on the wall behind the steps but after awhile it may seem to be in the foreground of a set of upside stairs!

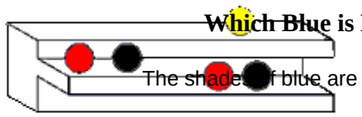
Can You Stack These Blocks?

I doubt very much if you can stack blocks like this! Use it and offer an extraordinary

his?

ou can
offer an
the
it!

Which Blue is Brighter?

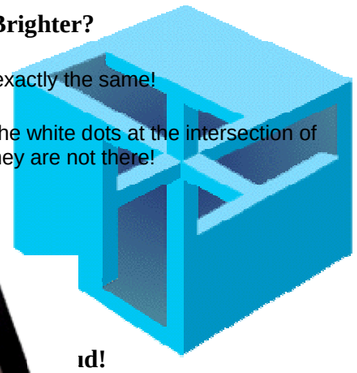


The shades of blue are exactly the same!

Also, there is an added illusion here, see the white dots at the intersection of the black lines in the right hand image? They are not there!

Can You Build These Shelves?

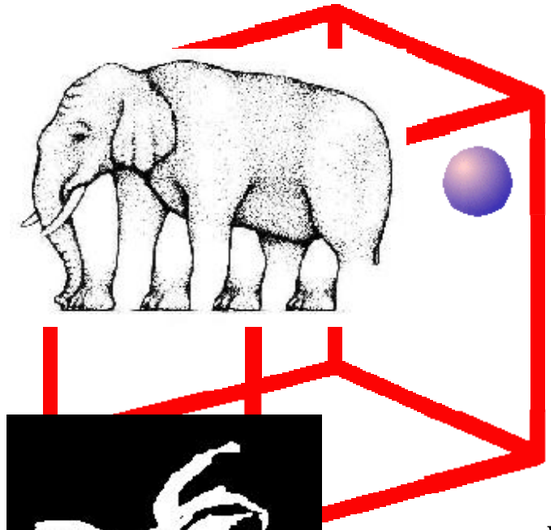
I doubt very much if you can build this! Use it and offer an extraordinary prize to the person who can build it!



ıd!

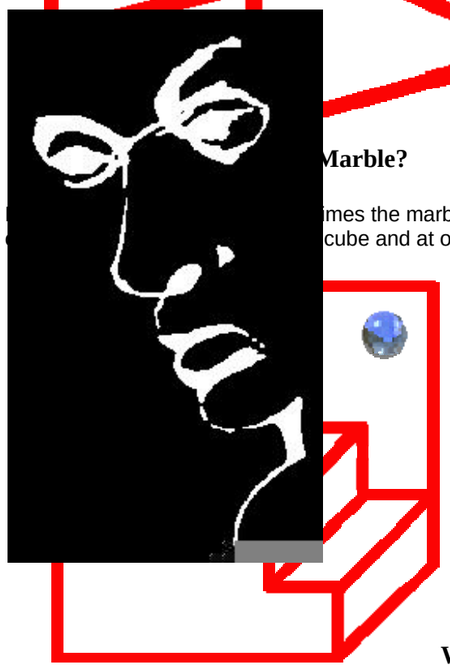
l in the Bush", right?

ys a bird in **the the** Bush!



Where is the Marble?

imes the marble seems to be inside the cube and at other times behind the cube!



Where is the Marble?

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For more details mrayman@mrayman.com

Check out the Elephant's Legs!

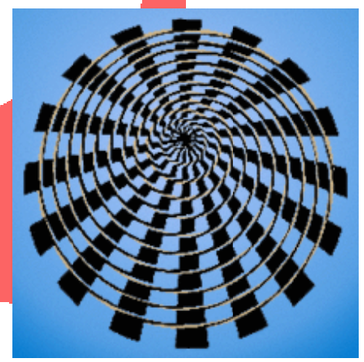
I wonder how this elephant walks!

What a Cool Profile!

It is actually the word "Liar" standing on end with the "r" at the bottom!

Is This Really a Spiral?

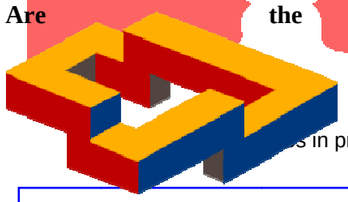
Actually, no, it is a lot of concentric circles! Take your finger or a pencil and follow the lines!



Can You Climb These Steps?

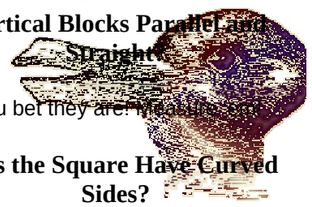
Which step is the bottom step and which is the top?

Are the



s in pro

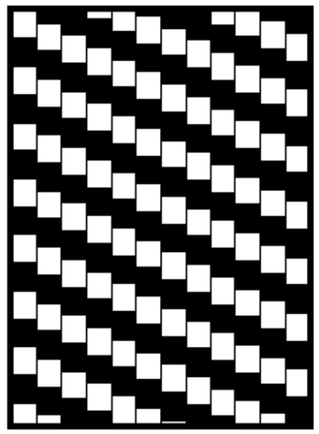
Vertical Blocks Parallel and Straight?

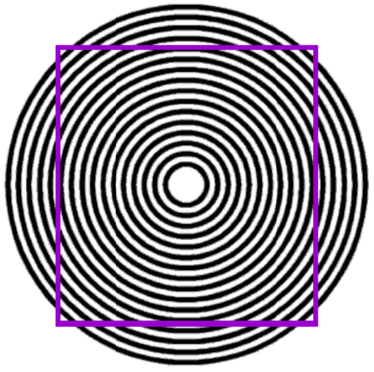


You bet they are! Measure and

Does the Square Have Curved Sides?

Which Soldi





Not at all! They are perfectly straight!

For more details mrayman@mrayman.com