Grade 9

CONCEPTS OF LIFE SCIENCE

C-1 • UNITS 1-4

Based on the Alaska Science Standards
SC 1.1,2,3 SC 2.1,3 SC 3.1,3




FOR THE

Juneau-Douglas High School

Sealaska Heritage Institute

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Integrating Culturally Responsive, Place-Based Content with Language Skills Development for Curriculum Enrichment

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INTRODUCTION

Over the years, much has been written about the successes and failures of students in schools. There is no end to the solutions offered, particularly for those students who are struggling with academics. There have been efforts to bring local cultures into the classroom, thus providing the students with familiar points of departure for learning. However, most often such instruction has been limited to segregated activities such as arts and crafts or Native dancing rather than integrating Native culture into the overall learning process. Two core cultural values, *Haa Aaní,* the reference for and usage of the land, and *Haa Shagóon,* the tying of the present with the past and future, are known by both students and parents, and can be included in a curriculum that simultaneously provides a basis for self-identity and cultural pride, within the educational setting. This will provide a valuable foundation for improved academic achievement.

While the inclusion of Native concepts, values, and traditions into a curriculum provides a valuable foundation for self-identity and cultural pride, it may not, on its own, fully address improved *academic* achievement.

This program is designed to meet the academic realities, faced by high school students every day, using a developmental process that integrates *culture* with *skills* development. The values of *Haa Aaní* and *Haa Shagóon* are reinforced through the various activities in the program.

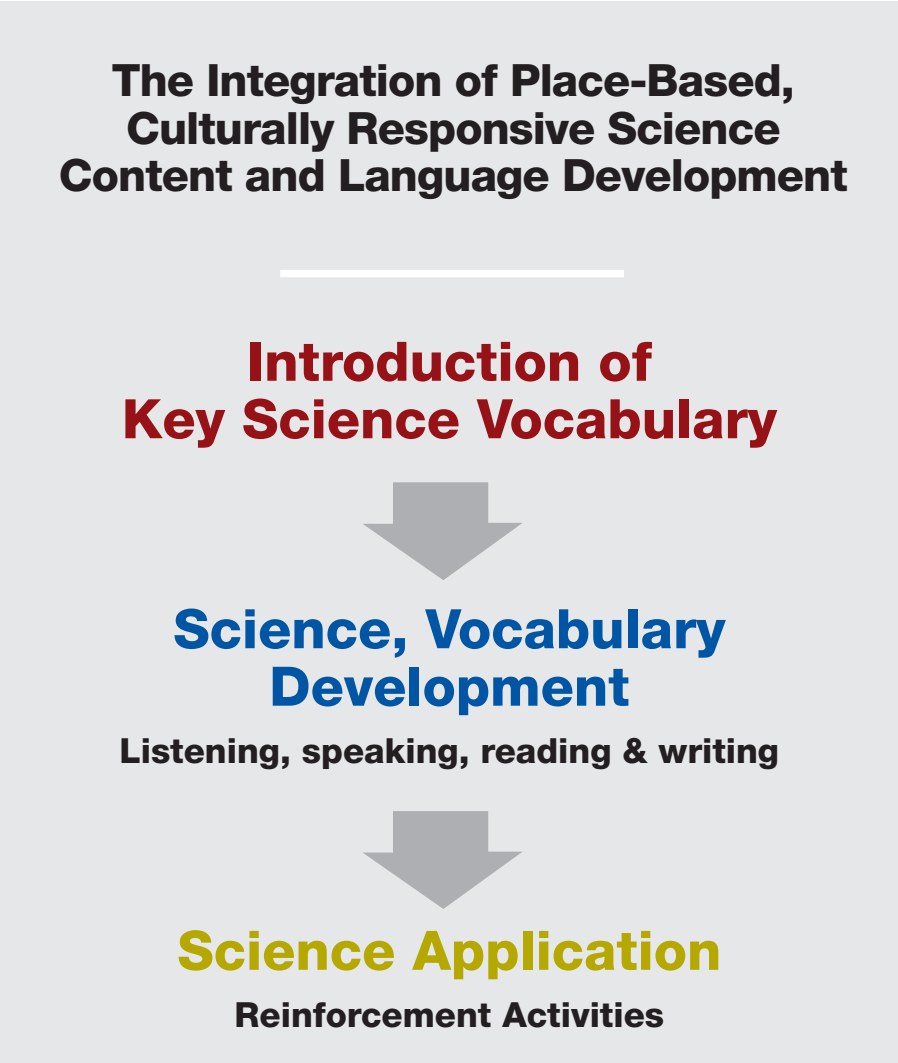
During science lessons, the students are exposed to new information and to key vocabulary that represent that information. While the students may acquire, through various processes, the scientific information, the vocabulary is often left at an exposure level and not internalized by them. Over time, this leads to *language-delay* that impacts negatively on a student's on-going academic achievement.

Due to *language delay*, many Native Alaskan high school students struggle with texts that are beyond their comprehension levels and writing assignments that call for language they do not have.

To this end, in this resource program, each key vocabulary word in science is viewed as a *concept*. The words are introduced concretely, using place-based information and contexts. Whenever possible, the concepts are viewed through the Native heritage cultural perspectives, thus reinforcing the value of *Haa Shagóon* and *Haa Aaní.* Using this approach, the students have the opportunity to acquire new information in manageable chunks; the sum total of which, represent the body of information to be learned in the science program.

When the key vocabulary/concepts have been introduced, the students are then taken through a sequence of listening, speaking, reading, and writing activities, designed to instill the vocabulary into their long term memories.

Finally, at the end of each unit, the students will participate in enrichment activities based on recognized and research-based *best practices*. By this time, the science information and vocabulary will be familiar, adding to the students' feelings of confidence and success. These activities will include *place-based* and *heritage culture* perspectives of the information learned.



The Developmental Language Process

The Developmental Language Process is designed to instill language into long term memory. The origin of the Process is rooted in the struggles faced by language-delayed students, particularly when they first enter school.

The Process takes the students/children through developmental steps that reflect the natural acquisition of language in the home and community. Initially, once key language items have been introduced concretely to the students, the vocabulary are used in the first of the language skills, Basic Listening. This stage in the process represents *input* and is a critical venue for language acquisition and retention. A baby hears many different things in the home, gradually the baby begins to *listen* to what he/she hears. As a result of the *input* provided through Basic Listening, the baby tries to repeat some of the language heard – this is represented by the second phase of the Process, Basic Speaking - the oral *output* stage of language acquisition.

As more language goes into a child's long-term memory, he/she begins to understand simple commands and phrases. This is a higher level of listening represented by the stage, Listening Comprehension. With the increase in vocabulary and sentence development, the child begins to explore the use of language through the next stage in the Process, Creative Speaking. All of these steps in the Process reflect the natural sequence of language development.

The listening and speaking skill areas represent *true* language skills; most cultures, including Alaska Native cultures, never went beyond them to develop written forms. Oral traditions are inherent in the listening and speaking skills.

However, English does have abstract forms of language in reading and writing. Many Native children entering kindergarten come from homes where language is used differently than in classic Western homes. This is not a value judgment of child rearing practices but a definite cross-cultural reality. Therefore, it is critical that the Native child be introduced to the concepts of reading and writing before ever dealing with them as skills areas. It is vital for the children to understand that reading and writing are *talk in print*.

The Developmental Language Process integrates the *real* language skills of listening and speaking with the related skills of reading and writing. At this stage in the Process, the students are introduced to the printed words for the first time. These abstract representations are now familiar, through the listening and speaking activities, and the relationship is formed between the words and language, beginning with Basic Reading.

As more language goes into the children's long-term memories, they begin to comprehend more of what they read, in Reading Comprehension.

Many Alaskan school attics are filled with reading programs that didn't work – in reality, any of the programs would have worked had they been implemented through a language development process. For many Native children, the printed word creates angst, particularly if they are struggling with the reading process. Often, children are asked to read language they have never heard.

Next in the Process is Basic Writing, where the students are asked to write the key words. Finally, the most difficult of all the language skills, Creative Writing, asks the students to write sentences of their own, using the key words and language from their long-term memories. This high level skill area calls upon the students to not only retrieve language, but to put the words in their correct order within the sentences, to spell the words correctly and to sequence their thoughts in the narrative.

A student's ability to comprehend well in listening and reading, and to be creatively expressive in speaking and writing, is dependent upon how much language he/she has in long-term memory.

The Developmental Language Process is represented in this chart:

It should be understood that these materials are not a *curriculum* - rather, they are resource materials designed to encourage academic achievement through intensive language development in the content areas.

These resource materials are *culturally responsive* in that they utilize teaching and learning styles effective with Native students. As the students progress through the steps of the Process, they move from a concrete introduction of the key vocabulary, to a symbolic representation of the vocabulary, and finally, to their abstract forms - reading and writing. This provides a format for the students to develop language and skills that ultimately lead to improved academic performance.

Alaska Content Standards for Science

A. Science as Inquiry and Process

A student should understand and be able to apply the processes and applications of scientific inquiry. A student who meets the content standard should:

1. develop an understanding of the processes of science used to investigate problems, design and conduct repeatable scientific investigations, and defend scientific arguments;
2. develop an understanding that the processes of science require integrity, logical reasoning, skepticism, openness, communication, and peer review; and
3. develop an understanding that culture, local knowledge, history, and interaction with the environment contribute to the development of scientific knowledge, and local applications provide opportunity for understanding scientific concepts and global issues.

B. Concepts of Physical Science

A student should understand and be able to apply the concepts, models, theories, universal principals, and facts that explain the physical world. A student who meets the content standard should:

1. develop an understanding of the characteristic properties of matter and the relationship of these properties to their structure and behavior;
2. develop an understanding that energy appears in different forms, can be transformed from one form to another, can be transferred or moved from one place or system to another, may be unavailable for use, and is ultimately conserved;
3. develop an understanding of the interactions between matter and energy, including physical, chemical, and nuclear changes, and the effects of these interactions on physical systems; and
4. develop an understanding of motions, forces, their characteristics and relationships, and natural forces and their effects.

C. Concepts of Life Science

A student should understand and be able to apply the concepts, models, theories, facts, evidence, systems, and processes of life science. A student who meets the content standard should:

1. develop an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution;
2. develop an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms; and
3. develop an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy.

D. Concepts of Earth Science
A student should understand and be able to apply the concepts, processes, theories, models, evidence, and systems of earth and space sciences. A student who meets the content standard should:

1. develop an understanding of Earth's geochemical cycles;
2. develop an understanding of the origins, ongoing processes, and forces that shape the structure, composition, and physical history of the Earth;
3. develop an understanding of the cyclical changes controlled by energy from the sun and by Earth's position and motion in our solar system; and
4. develop an understanding of the theories regarding the origin and evolution of the universe.

E. Science and Technology
A student should understand the relationships among science, technology, and society. A student who meets the content standard should:

1. develop an understanding of how scientific knowledge and technology are used in making decisions about issues, innovations, and responses to problems and everyday events;
2. develop an understanding that solving problems involves different ways of thinking, perspectives, and curiosity that lead to the exploration of multiple paths that are analyzed using scientific, technological, and social merits; and
3. develop an understanding of how scientific discoveries and technological innovations affect and are affected by our lives and cultures.

F. Cultural, Social, Personal Perspectives and Sciences
A student should understand the dynamic relationships among scientific, cultural, social, and personal perspectives. A student who meets the content standard should:

1. develop an understanding of the interrelationships among individuals, cultures, societies, science, and technology;
2. develop an understanding that some individuals, cultures, and societies use other beliefs and methods in addition to scientific methods to describe and understand the world; and
3. develop an understanding of the importance of recording and validating cultural knowledge.

G. History and Nature of Science
A student should understand the history and nature of science. A student who meets the content standard should:

1. develop an understanding that historical perspectives of scientific explanations demonstrate that scientific knowledge changes over time, building on prior knowledge;
2. develop an understanding that the advancement of scientific knowledge embraces innovation and requires empirical evidence, repeatable investigations, logical arguments, and critical review in striving for the best possible explanations of the natural world;
3. develop an understanding that scientific knowledge is ongoing and subject to change as new evidence becomes available through experimental and/or observational confirmation(s); and
4. develop an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base.

http://www.educ.state.ak.us/ContentStandards/Science.html

UNIT 1

Sealaska Heritage Institute

INTRODUCTION OF

Key Vocabulary

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Organisms

PLACE-BASED PERSPECTIVE

Show a picture of an animal and a plant. Have the students compare the two, telling how they are the same. Lead them to identify the fact they both are living things.

Write animal, plant, fungi, and bacteria on the board. Ask students to fill in the categories. Explain that *organisms* are living things.

HERITAGE CULTURAL PERSPECTIVE

Southeast Alaska is lush with natural *organisms*. This wealth of natural resources made life in Southeast Alaska comparatively easier than in other parts of the state. This allowed Native peoples the time to develop their arts and crafts to a high level.

Chromosomes

PLACE-BASED PERSPECTIVE

Compare a picture from a karyotype of a human without Down's Syndrome to a picture of a person with Down's Syndrome. Discuss the importance of one extra chromosome and how *chromosomes* organize DNA and proteins in cells.

HERITAGE CULTURAL PERSPECTIVE

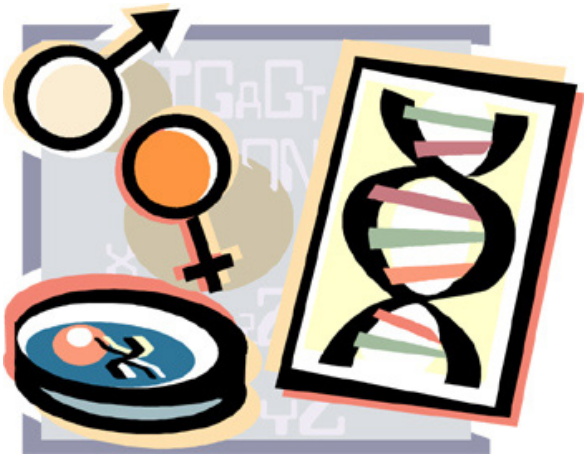
Native peoples were well aware of heredity and its impact on people. The clan system is an example of this knowledge.

DNA

PLACE-BASED PERSPECTIVE

Tell the students that a man was imprisoned for a crime he did not commit - "How did they determine that he was innocent?" Use this to introduce *DNA*.

Discuss how shows like CSI use DNA to help unravel investigations because each person's *DNA* is unique.



Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Inheritance

PLACE-BASED PERSPECTIVE

Show a picture of dogs with different spots and discuss how the *inheritance* of spots or no spots for puppies is from the parent dogs.

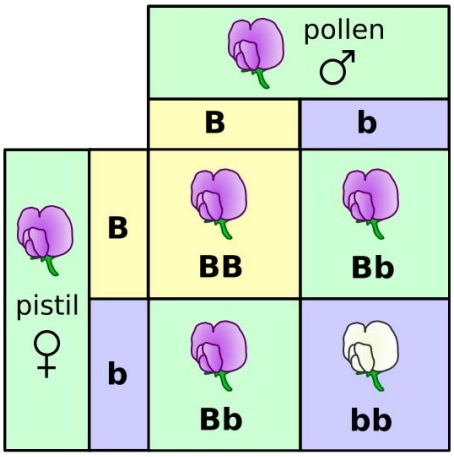
HERITAGE CULTURAL PERSPECTIVE

In the Native clan structure, sons and daughters *inherited* clan names from their mother's side of the family.

Punnett Squares

PLACE-BASED PERSPECTIVE

Discuss how blue eyes are a recessive color, but may appear in children of parents with brown eyes by completing a heterozygous cross on a *Punnet Square* on the board.



Evolution

PLACE-BASED PERSPECTIVE

Show pictures of cars and discuss the *evolution* of car technology over the years.

HERITAGE CULTURAL PERSPECTIVE

Native tools represent an *evolution* in technology. The tools were improved as other raw materials became available.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Fossils

PLACE-BASED PERSPECTIVE

At the front of the class, make imprints in Play-Do "*fossils*". Use a disposable pipette to inject pre-mixed plaster. Use this to introduce the process of *fossilization*.

HERITAGE CULTURAL PERSPECTIVE

Fossilized shellfish have been found in mountainous areas of Southeast Alaska.

Geologic

PLACE-BASED PERSPECTIVE

Put the words fossil, geyser, earthquake, and volcano on the board. Ask the students what the words have in common. Use the discussion to introduce that *geologic* means relating to geology or geologic timescale.

HERITAGE CULTURAL PERSPECTIVE

The Taku Inlet is a good example of a *geological* form created by a glacier. Moraines are another landform created by glacial action. Rivers have also formed gorges, and deltas.

To Record

PLACE-BASED PERSPECTIVE

Show the students the vocabulary pictures from this unit. Have them discuss the contents of the picture. Lead them to suggest, that the person is *recording* information.

HERITAGE CULTURAL PERSPECTIVE

Traditionally, oral *records* were kept on everything. Historical *records* are kept in names, stories, songs, and at.óow (belongings).

Language Skills

Language & Skills Development

LISTENING

Use the activity pages from the Student Support Materials.

Does it Fit?

Mount the vocabulary illustrations on the chalkboard. Provide each student with writing paper and a pen. Point to an illustration and say a sentence. If the sentence you say goes with the illustration, the students should make checkmarks on their papers. However, if the sentence you say does not go with the illustration, the students should make an "X" on their papers. Repeat this process with other illustrations and sentences. Rather than having the students write their responses, you may have them "clap" for sentences which do not go with illustrations and "nod" for sentences which do go with the illustrations you point to.

SPEAKING

Calendar Bingo

Before the activity begins, prepare a page that contains a calendar page (complete with days and dates). Provide each student with a copy of the calendar page. Also, provide each student with 10 small markers. Each student should place the markers on different dates on his/her calendar page. Mount the vocabulary illustrations on the chalkboard. Call a student's name and say a date in the month. If a marker is not on the date you named, he/she should say a complete sentence about a vocabulary illustration you point to. However, if a marker is on the date you called, he/she may "pass" to the next player. Repeat this process until all students have participated. You may wish to provide each student with more than one marker for this activity.

READING

Use the activity pages from the Student Support Materials.

Mixed-up Sentences

Before the activity begins, prepare a number of "mixed-up sentences," relating to the concept being studied and using the sight words. Write the mixed-up sentences on the chalkboard. Call upon individual students to read the sentences, saying the words of the sentences in their correct order. An alternative approach to the one above is to have the mixed-up sentences written on sentence strips. Group the students into two teams. Show the first player in each team one of the mixed-up sentences. The first player to correctly read the sentence with the words in their correct order wins the round. Repeat until all players have participated. Rather than having the players merely read the mixed-up sentences, you may wish to lay the sentence strips on the floor at the front of the classroom. Place two pairs of scissors beside the sentence strips. When you say "Go," the first player in each team must rush to the scissors, select one of the sentence strips and cut each word out. Then, the player must rearrange the words to create the sentence. Repeat until all players have played. Of course, this activity can also be done as an *activity sheet* with the students.

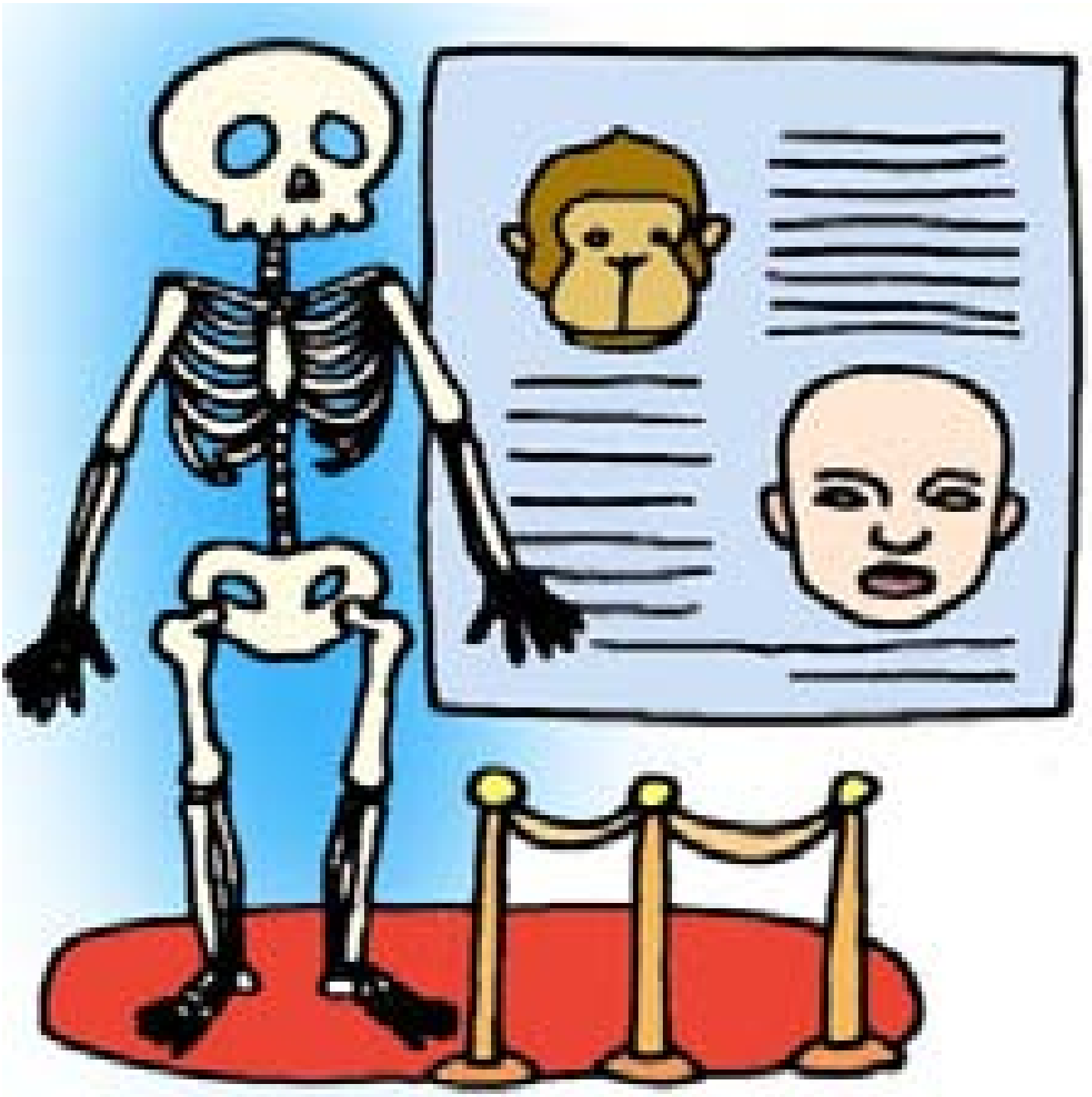
WRITING

Use the activity pages from the Student Support Materials.

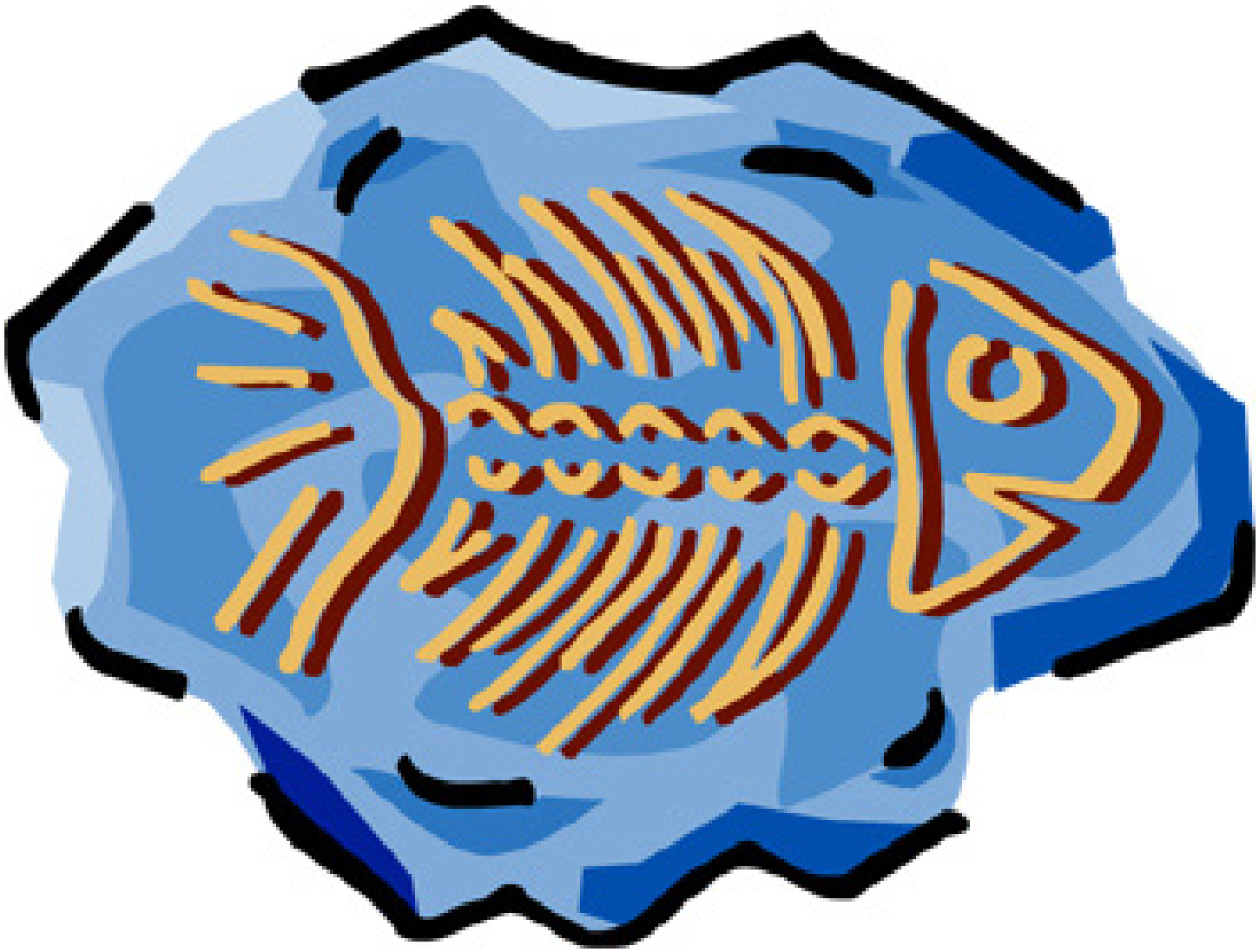
The Other Half

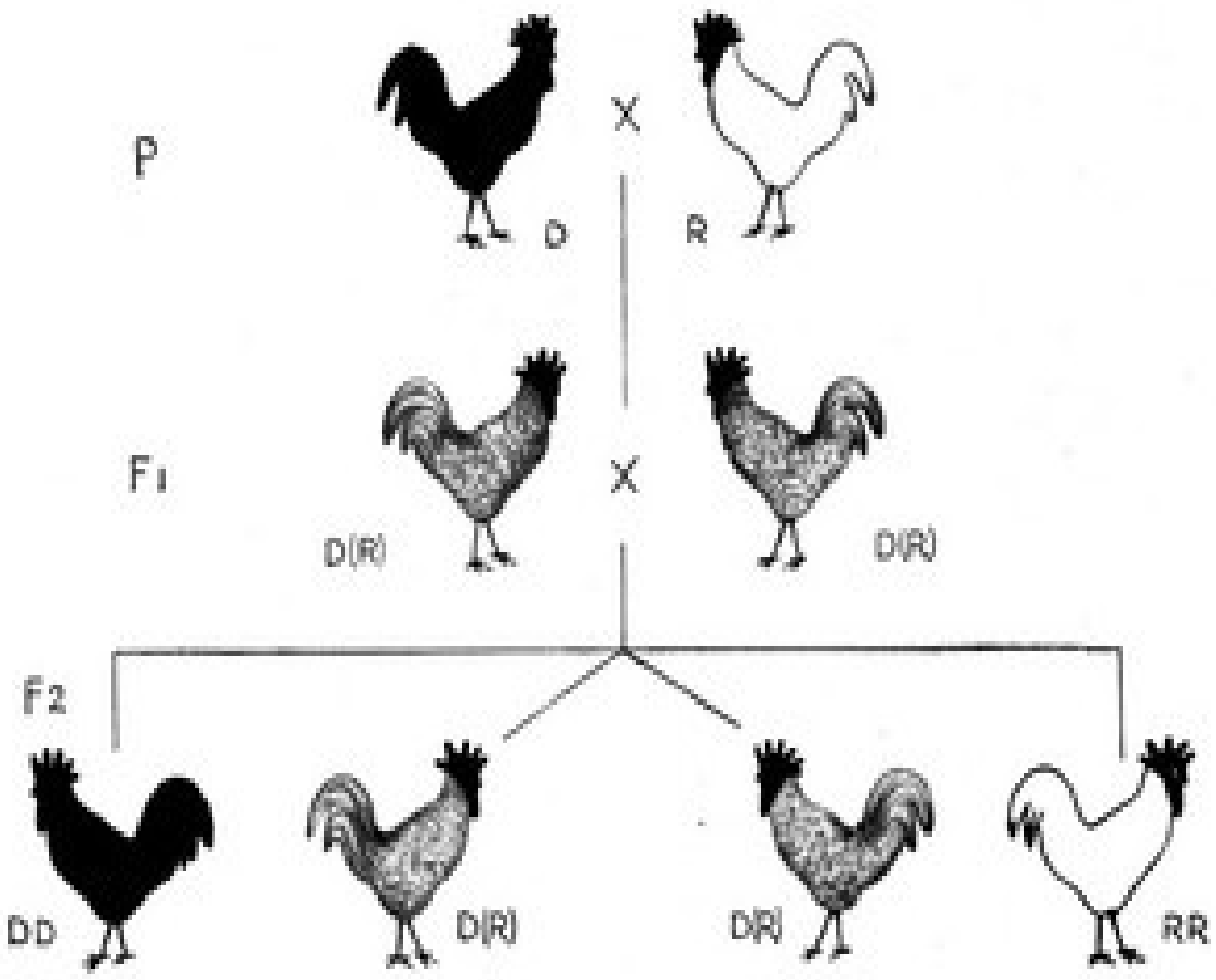
Cut each of the sight words in half. Give each student a sheet of writing paper, a pen and one of the word-halves. Each student should glue the word-half on his/her writing paper and then complete the spelling of the word. You may wish to have enough word-halves prepared so that each student completes more than one word. Afterwards, review the students' responses.

Vocabulary Images

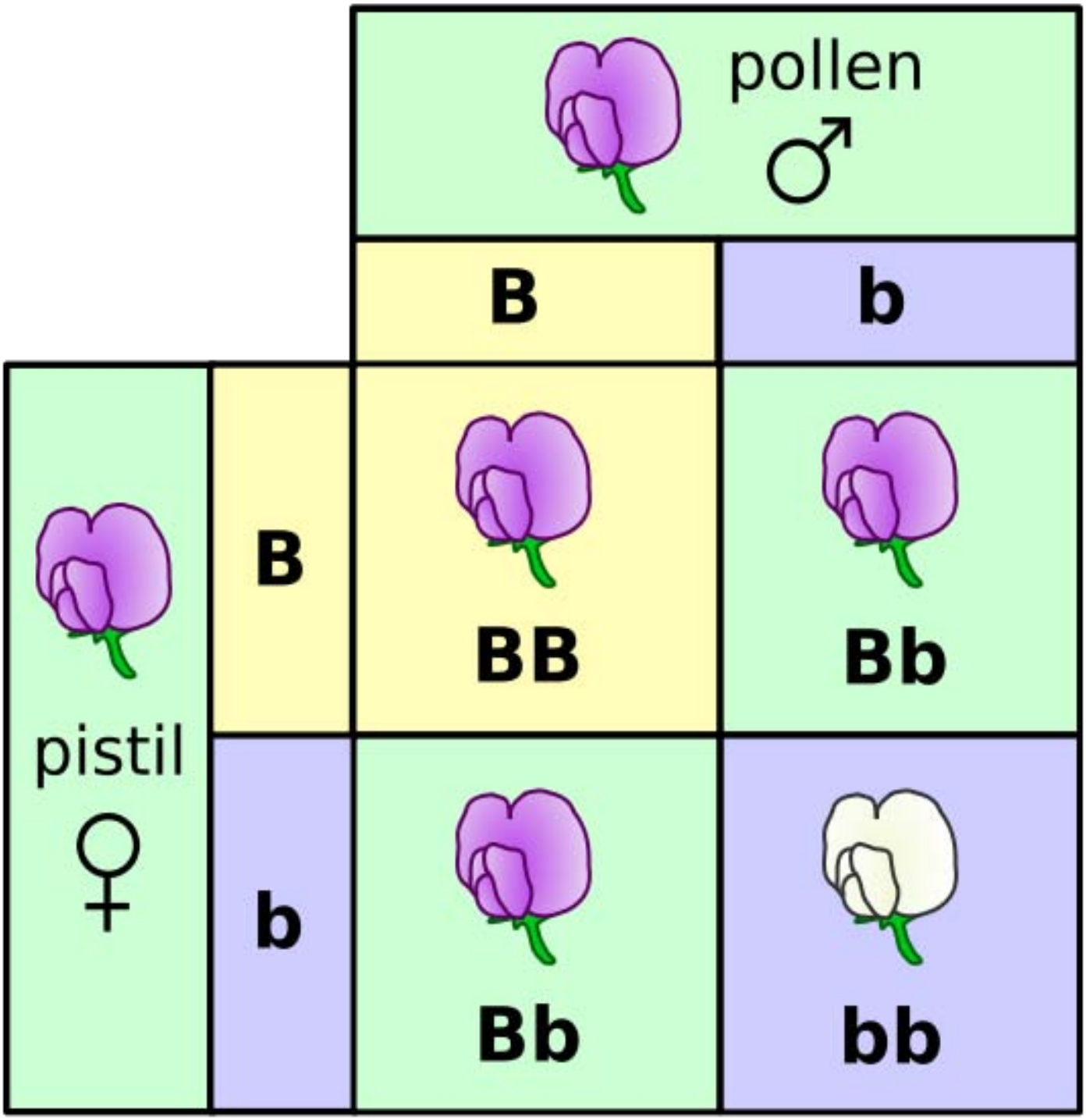


fossil
fossils





MENDELIAN INHERITANCE IN ANDALUSIAN FOWLS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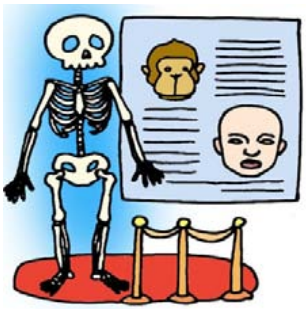
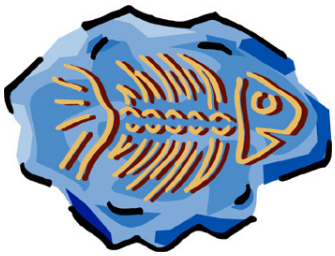
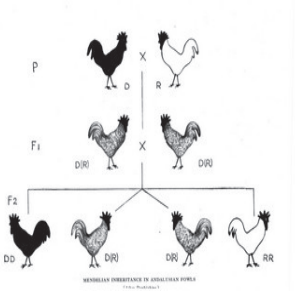
STUDENT SUPPORT MATERIALS

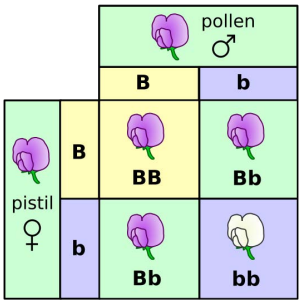
Listening

Say these words to the students - they write the numbers of the words under the pictures.
(1) inheritance (2) DNA (3)geologic (4) punnett square (5) record (6) probabilities (7) trait
(8) organisms (9) evolution (10) chromosomes (11) pattern (12) fossils









True Or False?

Read the following sentences to the students. The students should write "true" or "false" for each of the sentences.

1. It is difficult to record the sounds of birds without a device designed for the task.
2. Tropical rainforests have more organisms than deserts.
3. Chromosomes are membranes that protect the cell from damage.
4. DNA has recently been used to clear people of charges they were previously found guilty of.
5. Red hair is a trait of Irish Setters.
6. There is a 1 in 6 probability that a tossed six-sided die will result in a 3.
7. There is no pattern in plaid shirts.
8. When Billy gave his bike to Sally, she inherited it.
9. A punnett square can be constructed to solve questions of inheritance.
10. Bacteria becoming adapted to antibiotics is not an example of evolution.
11. Ancient volcanic rocks are examples of fossils.
12. Geologic evidence supports the theory that continents move about on the surface of the Earth.

Answers

1. T, 2. T, 3. F, 4. T, 5. T, 6. T, 7. F, 8. F, 9. T, 10. F, 11. F, 12. T

STUDENT SUPPORT MATERIALS

Sight Words

DNA

chromosomes

organisms

patterns

probabilities

trait

inheritance

punnett squares

evolution
fossils
geologic
record

STUDENT SUPPORT MATERIALS

Reading

Word Find

P C I G O L O E G V L S V P

R K W Y V K H X Y D E R A Q

O X Y L B P T S X M M T C E

B R M Z W K D M O G T N W R

A R G G K R K S N E M E R A

B L N H O W O I R R V V D U

I R I C Y M M N N L K O Q Q

L Y E S O X S A D N W L K S

I R Q R S Q R G Q R L U K T

T T H H P O Z R D N A T R E

I C R K T J F O K T R I V N

E C N A T I R E H N I O K N

S N T J I W H X P H V N R U

X D C G R T J T H T C C B P

chromosomes

dna

evolution

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geologic

inheritance

organisms

patterns

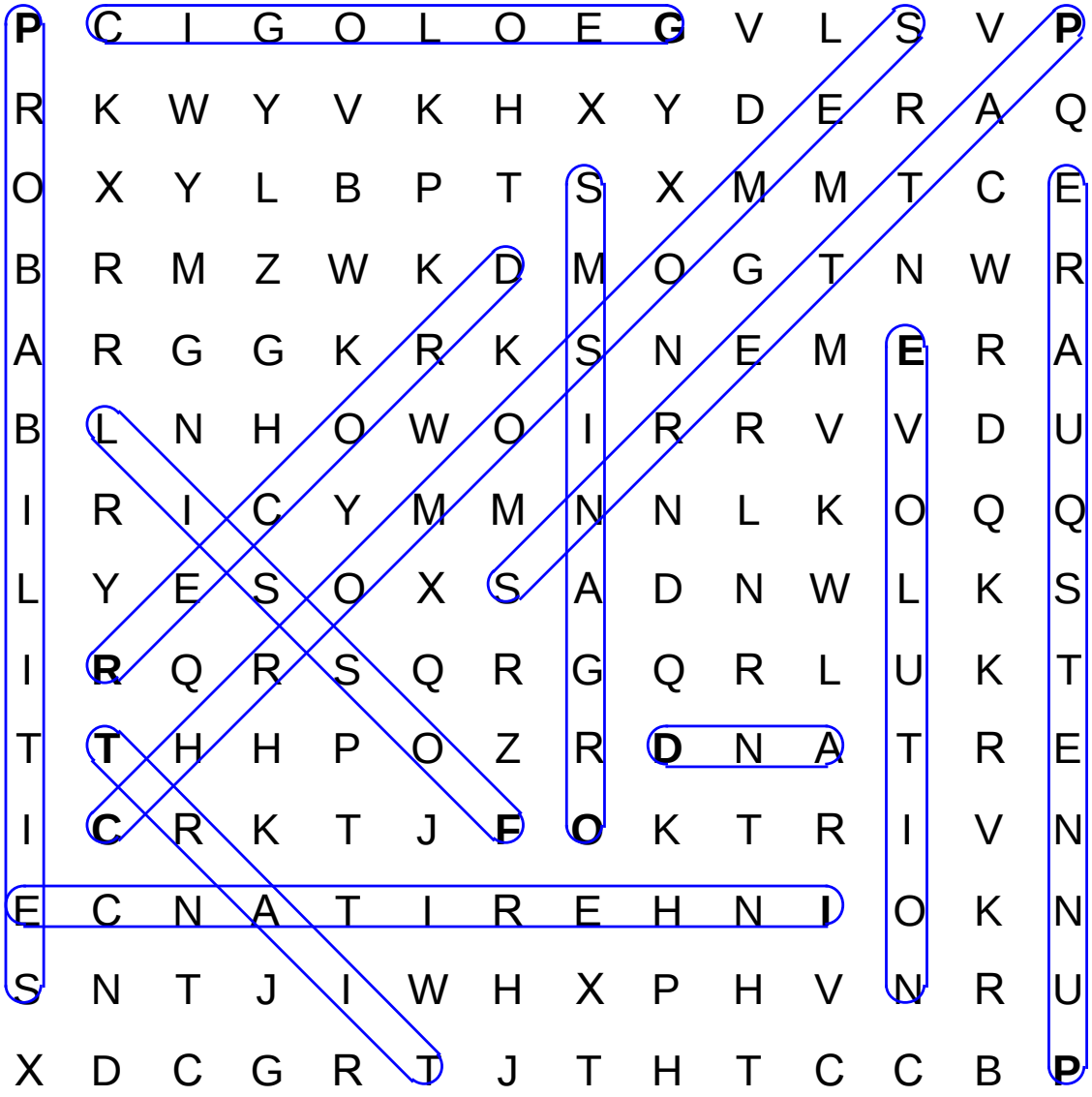
probabilities

punnetsquare

record

trait

Word Find Solution



Find The Word

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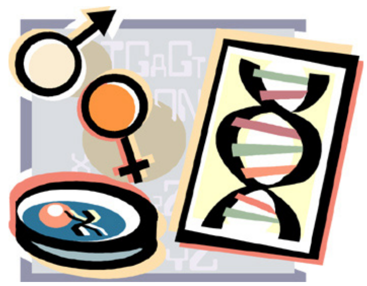

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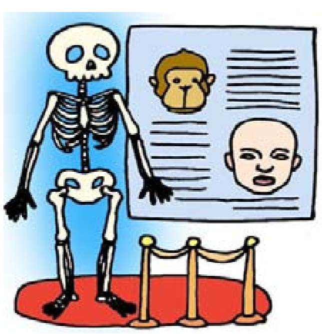

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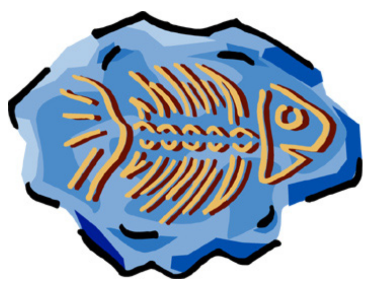

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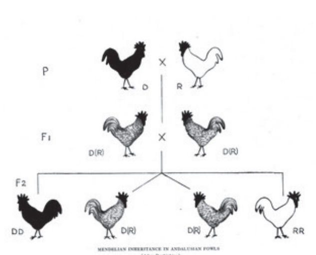

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Find The Word

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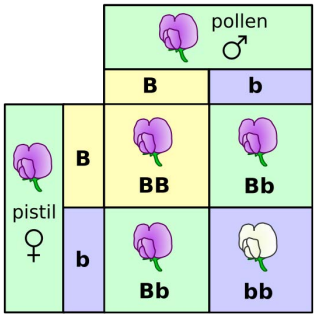

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Sentence Halves

Have the students write the numbers/letters for sentence halves that match.

1. If you record your progress in your exercise program,
2. Plants, animals, fungi and bacteria
3. The chromosomes of bacteria
4. The genetic material for all organisms, except a few viral particles,
5. Human traits include bipedal walking,
6. Weather forecasters attach
7. There are many patterns of
8. Sally's old-age years were likely to be free of major medical issues
9. A genetic counselor will likely construct a
10. Evolution does not occur rapidly, but
11. Fossils are evidence
12. Strange as it may seem, evidence that ancient organisms resided in the ocean
13. All scientists record

A. color vision, and hands with 5 digits each.

B. a probability to the expected chance of rainfall.

C. their findings diligently.

D punnett-square to answer questions regarding possible genetic outcomes.

E. tiles to choose from when laying a floor.

F rather occurs over thousands, and millions, of years.

G. that creatures unlike those found today lived on Earth in the past.

H are circular and not contained in a nucleus.

I. are all organisms.

J. can be found on Mt. Everest due to geologic processes.

K. due to her inheritance of long-lived genes.

L consists of DNA.

M. you can go back and check your records to see how you've improved.

Answers
1/M 2/I 3/H 4/L 5/A 6/B 7/E 8/K 9/D 10/F 11/G 12/J 13/C

Word & Definition Match

Have the students write the word numbers on their matching definitions.

made of molecules of DNA	*evidence that details the past*	*Scientific Theory explaining the origin of species*	*A branch of mathematics, dealing with chance*
A natural or chance marking, configuration, or design	*Any evidence found preserved geologically*	*A single living plant, animal, bacteria or virus*	*genetic traits that an offspring obtains from parents*
found in the chromosomes inside every cell	*A graphical represention*	*any phenotypically expressed gene*	*relating to geology*

1. organisms	2. chromosomes	3. DNA	4. trait	5. probabilities
6. patterns	7. inheritance	8. punnett squares	9. evolution	10. fossils
11. geologic	12. record			

Which Belongs?

Have the students circle/identify the word that is correct for each sentence.

1. Unfortunately, the adventurer forgot to record/select his thoughts during his trip, so he could not document his trip as well as he had planned.
2. Living entities on planet Earth are referred to as chromosomes/organisms.
3. Chromosomes/traits are where information about how we look can be found in a cell.
4. DNA/Inheritance is found in all living cells.
5. We inherit the traits/evolution of our parents.
6. Jimmy was confident asking Sally out – he felt that the probability/natural selection was high that she would accept his invitation.
7. Natural selection/patterns of periodic rapid diversification of species can be seen in the fossil record.
8. Heredity/Inheritance refers to genetic traits that a person gains from their ancestors.
9. A punnett square/probability for a cross involving only one trait consists of 4 squares.
10. The process by which species have changed over time is referred to as natural selection/evolution.
11. Impressions of feathers, mineralized bones and plants are referred to as geologic/fossils.
12. Geologic/record evidence of Earth's dynamic past (plate movements) is the fact that earthquakes occur.

Answers

1. record
2. organisms
3. chromosomes
4. DNA
5. traits
6. probability
7. patterns
8. inheritance
9. punnett square
10. evolution
11. fossils
12. geologic

What's The Answer?

Have the students read the questions and then select the correct answer for them. They should fill-in the appropriate circles, beside the answers of their choice.

1) It is good to record your findings so that:

(a) Others can see your results
(b) You forget what you did
(c) you have no record of what you did

2) Organisms are:

(a) Any plant, animal, fungus, bacteria, or protist living on Earth;
(b) Any substance found where living things are found;
(c) Composed of atoms.

3) Chromosomes, which consist of DNA, are:

(a) Not found in bacteria;
(b) Found in any biological organism;
(c) Found outside the nucleus in animal cells, but not plants.

4) DNA:

(a) Is short of deoxyribonucleic acid;
(b) Consists of single strands in most organisms;
(c) Can't be isolated from organisms, but is known to exist.

5) When breeding puppies of a specific type, breeders:

(a) Pay particular attention to the DNA of the animals;
(b) Are concerned with the chromosomes exhibited by animals;
(c) Are concerned with the traits exhibited.

6) Parents worried about what deleterious traits they might pass on to their children:

(a) Can consult genetic counselors who will calculate probabilities of inheritance;
(b) Can consult genetic counselors who will determine evolution of inheritance;
(c) Can consult genetic counselors who will predict DNA patterns.

7) Patterns of heredity:

(a) Can sometimes be seen when lineages of royalty are examined;
(b) Can be seen when examining the traits of two unrelated persons;
(c) are usually obvious, as nearly all traits can be seen by the naked eye.

8) A genetic counselor would not use a punnett square to:

(a) Predict what would happen when a color-blind mother and a normal seeing father had children;
(b) Show various outcomes among children;
(c) Determine what a mother's DNA looked like.

9) The evolution of species:

(a) Is not occurring any longer on our planet;
(b) May have occurred in the past, but there is little evidence to support this contention;
(c) Is supported by a mountain of evidence and the only theory that explains observations scientists have gathered regarding species.

10) Which of the following is not considered a fossil useful for examining the history of life on the planet:

(a) Petrified wood;
(b) Impressions of feathers;
(c) Coal.

11) Which of the following is not true? A timeline that shows when various life forms evolved is:

(a) Called a geologic time scale;
(b) Based on both relative and absolute dating of rocks and sediments that fossils are found in;
(c) Not possible given that we don't know when any particular species arose.

12) A scientist:

(a) Rarely records information;
(b) Records information during an experiment and afterwards in a paper that details his work;
(c) Relies mostly on verbal communication to convey findings and records of his work.

13) Which field of genetics is most useful to a forensic investigator?

(a) The Human Genome project – where the entire human genome of about 20 people was determined;
(b) The development of probes that identify specific DNA sequences in a large number of people;
(c) Work associated with determining stock identification of salmon.

14) Natural selection is:

(a) The process by which some organisms live to pass on their DNA and others do not based on their ability to survive in a given environment;
(b) The process by which some organisms are eliminated by natural events such as hurricanes and thus are not able to pass on their DNA;
(c) The process by which some organisms are favored by natural disasters such as hurricanes and thus are able to pass on their DNA.

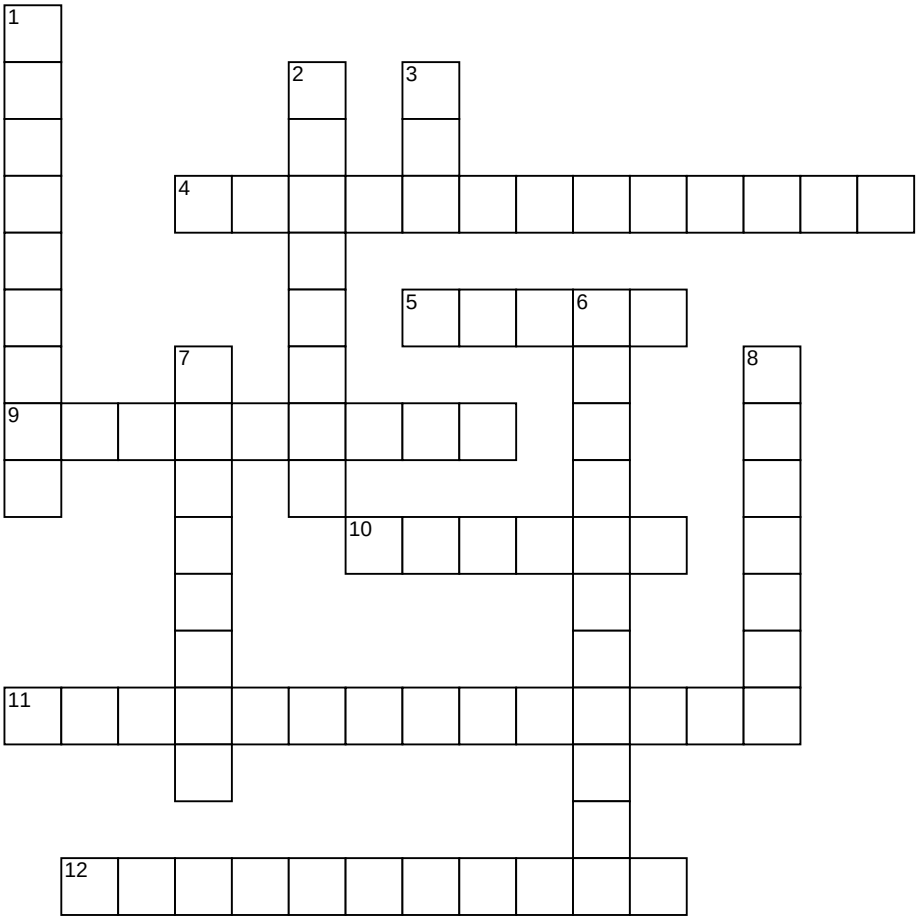
Answers
1. a, 2. a, 3. b, 4. a, 5. c, 6. a, 7. a, 8. c, 9. c, 10. c, 11. c, 12. b, 13. b, 14. a

STUDENT SUPPORT MATERIALS

Writing

9th C-1 Concept Of Life Science

Unit 1



ACROSS

4 are the branch of mathematics dealing with chance.
5 refers to any (phenotypically) expressed gene.
9 a single living plant, animal, bacteria or virus.
10 refers to evidence that details the past.
11 graphical representation used to determine the probability of an offspring expressing a particular genotype.
12 are made of molecules of DNA and proteins call histones.

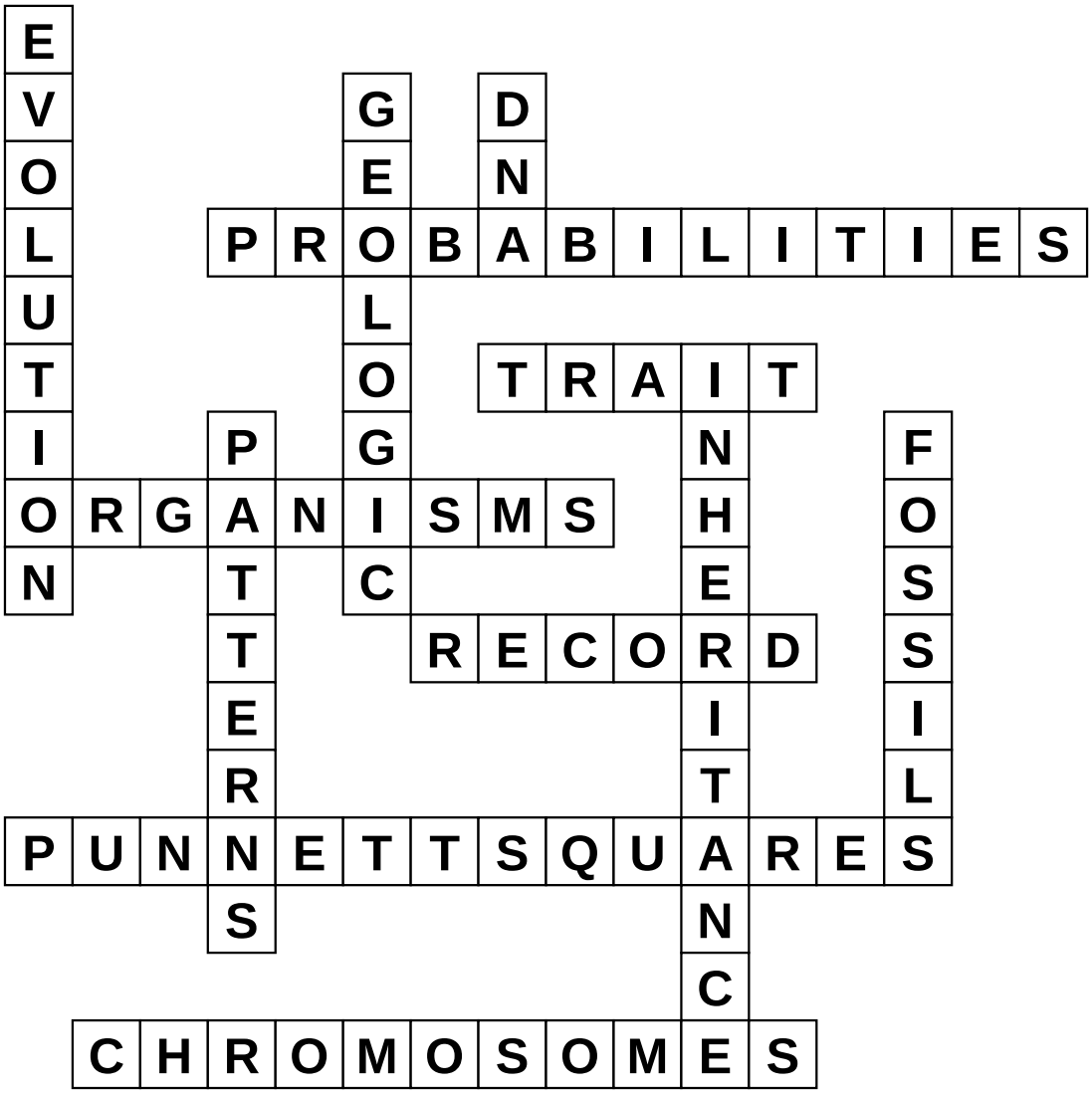
DOWN

1 the Scientific Theory that explains the origin and history of species, and the mechanisms of how species have changed over time.
2 relating to geology or a geologic timescale.
3 the abbreviation for deoxyribonucleic acid.
6 the genetic traits (or DNA) that an offspring obtains from parents.
7 a natural or chance marking, configuration, or design.
8 any evidence found preserved geologically.

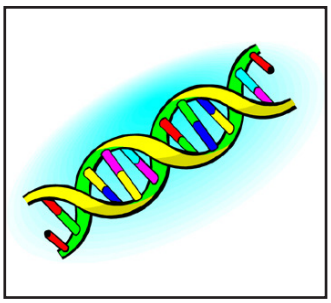
9th C-1 Concept Of Life Science

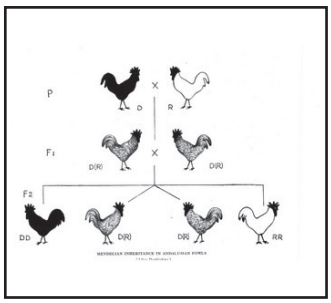
Unit 1

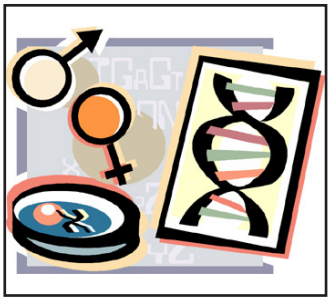
Solution:

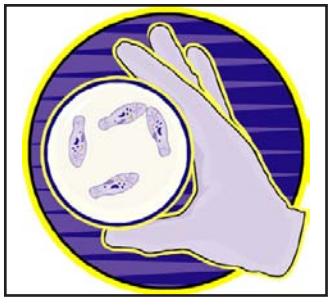


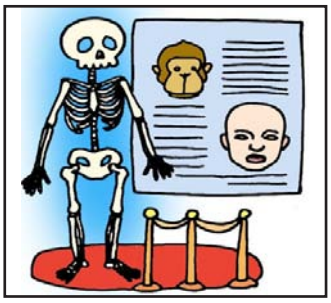
Write The Words!

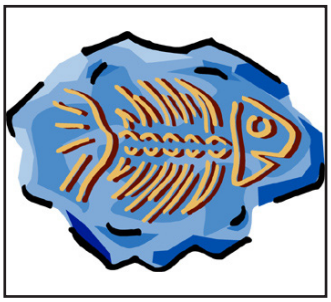


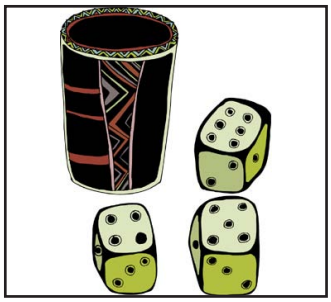


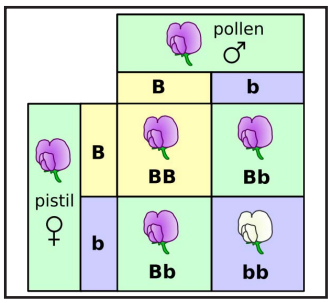












Write the Words!

Complete The Sentence

Have the students write the key words in the blanks.

1. The geologic history of the earth is _____ in rocks of the earth's crust.

2. Biodiversity refers to the number of _____ on this planet.

3. A person with three _____ at the 21st position has Down's Syndrome.

4. The TV show CSI – which highlights forensic investigations – often shows a person guilty by showing that it was their blood at the scene; this is done by examining the ____ of the person.

5. Hitler was under the misguided impression that certain human ____, specifically blonde hair and blue eyes, were better than others.

6. Casinos are always trying to shoo those who can count cards and understand _____ out the door as they lose less often than those who do not.

7. Investigators look for _____ of behavior of those they are trying to arrest so that they can predict where they might strike next.

8. Jimmy _____ a big nose and baldness from his father.

9. A quick way to figure out the likelihood of a certain inherited condition is to fill out a ____ _____.

10. The theory of ____ is supported by a mountain of evidence, and despite constant scrutiny, continues to become increasingly supported as scientists examine the history and inter-relatedness of life on our planet.

11. When people think of dinosaurs, they often think of the large assembled skeletons that we call ____.

12. Different sediment layers of the Grand Canyon are ___ evidence that the plateau was once under ocean water!

Answers

1. recorded, 2. organisms, 3. chromosomes, 4. DNA, 5. traits, 6. probabilities, 7. patterns 8. inherited, 9. punnett square, 10. evolution, 11. fossils, 12. geologic

Creative Writing Activity Page

Have the students write sentences of their own, using the key words from this unit. When the students' sentences are finished, have them take turns reading their sentences orally. The students should say "Blank," for the key words; the other students must name the "missing" words. You may wish to have the students write the "definitions" for the key words.

organisms

chromosomes

DNA

trait

probabilities

patterns

inheritance

punnett squares

evolution

Creative Writing Activity Page

Have the students write sentences of their own, using the key words from this unit. When the students' sentences are finished, have them take turns reading their sentences orally. The students should say "Blank," for the key words; the other students must name the "missing" words. You may wish to have the students write the "definitions" for the key words.

fossils

geologic

to record

Creative Writing Activity Page

Have the students write sentences of their own, based on the picture below. When finished, have each student read his/her sentences to the others.

STUDENT SUPPORT MATERIALS

Reinforcement Activities

Give student five Post-it Notes of one color and five Post-it Notes of a different color. Have them walk around the room and put one color on organic things that are alive or once alive and one color on inorganic objects. Walk around room and discuss where the Post-it Notes were placed.

Using two large 8X10” envelopes, label one prokaryote and the other eukaryote. Inside the prokaryote envelope, place a string tied in a loop to represent the chromosome. Inside the eukaryote envelope, put a letter size envelope labeled nucleus containing 23 strings cut at different lengths to represent human chromosomes.

Purposes: Students will understand the sequence of geological events that are the basis for scientific and historical timelines.

Students will collect soil/sand that contains fossil. Students will be able to draw conclusions about the geologic history of the area.

From the work of S. Marino

Geologic Timeline & Fossils

☐ **Activities**

- Ask students how scientist and historian keep track of time and when events happen (especially events that happened long ago).
- What evidence was used to develop the geologic timeline? Discuss fossil history and carbon dating.
- Students will use the materials provided to create a geologic timeline putting in order important events. This activity can be done in pairs or small groups.
- Many areas in Southeast Alaska have fossils within the soil and blue clay. This clay is evidence that the area was once covered by the ocean.
- Locate an area where you can find blue clay.
- Have students dig some samples. If sieves are available they can be used to sort fossils and separate them from the debris.
- Take samples back to the classroom and look at it under the microscope. Students should draw what they observe under the microscope.
- Students should respond to the following prompts: "How do the fossils found reveal how this land has changed?" and "Is it possible to determine when these changes occurred- does the geologic timeline help?"

☐ Materials

- Information on geologic history.
- Rulers/meter stick
- Colored pencils
- Craft paper, 1' by 10' (one for each group)
- Shovels
- Sieves (optional)

Microscopes

Purposes: Understand the idea of cell theory. Discover some of the smallest forms of life swimming in our local waters.

From the work of S. Marino

Cell Theory

☐ **Activities**

- Facilitate student discussion on the effectiveness of the six characteristics of living things. Where do they fit; where do they not fit?
- Present the idea of cell theory: All living things are made up of cells. How does this newer theory fit with the six characteristics?
- Take a field trip to some local areas to gather water samples. Students are to collect a small amount of water including some of the substrate. Have them label where the sample was collected from.
- Examine the samples for microscopic life. Students should draw a picture of the organisms they find and what power they were located under. Challenge: have students identify the organism they have found.
- Wrap up the lesson by giving students an opportunity to share some of the interesting organisms they discovered.
- Discuss how cell theory fits with living things. Have them consider viruses, or looking for life on Mars.

☐ Materials

- Microscopes
-
- Slides and cover slips
- Pipettes or eye droppers
- Books on protazoa
- Website: http://www.microscopy-uk.org.uk/index.html?http://www.microscopy-uk.org.uk/pond/protozoa.html

Unit Assessment

Unit 1 Quiz

Grade 9, C1, Unit 1 Quiz

1. A single living plant, animal, bacteria or virus is called a/an..._____.

2. DNA is the abbreviations for
[ ] a. Dylohydroxide Nucleic Acid
[ ] b. DeoxyriboNucleic Acid
[ ] c. None of the above
[ ] d. option d

3. DNA at its most basic level, is the blueprint of an organism's genetic make-up.
[ ] a. True
[ ] b. False

4. DNA is found in the chromosomes inside every cell in your body.

5. DNA _____pass on characteristics which are inherited from one generation to the next.
[ ] a. can
[ ] b. cannot

6. The man's black hair and brown eyes are known as personal _____.
[ ] a. traits
[ ] b. trades
[ ] c. traces

7. Card games, casino games, Bingo are all games that deal with chance. The branch of mathematics that deals with chance is called_____.
[ ] a. high stakes.
[ ] b. calculus.
[ ] c. probability.

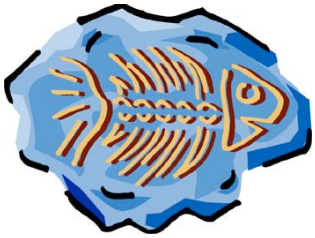
8. When there are markings that occur either by chance or by nature, that create a design, they are known as _____.

9. Your hair and eye color and the size of your feet are genetic traits are your inheritance from your parents.

10. Punnett Squares are...
[ ] a. a landmark in NYC
[ ] b. graphical representation used to determine probability of an offspring
[ ] c. the interior shape of the chromosome that carries the DNA

11. The Scientific Theory that explains the origin and history of species, and the mechanisms of how species have changed over time is called evolution.

12. Look at the three illustrations below. One of them represents FOSSILS. Another represents GEOLOGIC, and another, TO RECORD. Label each correctly by writing the correct word, on the line above the illustration.



C1, Unit 1, Concepts of Life Quiz

1. A single living plant, animal, bacteria or virus is called a/an...Organism.

2. DNA is the abbreviations for
[ ] a. Dylohydroxide Nucleic Acid
[x] b. DeoxyriboNucleic Acid
[ ] c. None of the above
[ ] d. option d

3. DNA at its most basic level, is the blueprint of an organism's genetic make-up.
[x] a. True
[ ] b. False

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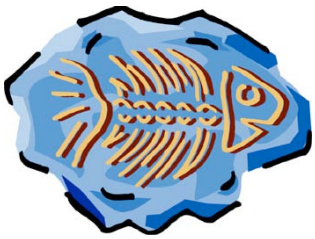
12. Look at the three illustrations below. One of them represents FOSSILS. Another represents GEOLOGIC, and another, TO RECORD. Label each correctly by writing the correct word, by the illustration.

geologic

Record



fossils

UNIT 2

Sealaska Heritage Institute

INTRODUCTION OF

Key Vocabulary

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Genetics

PLACE-BASED PERSPECTIVE

Show a picture of a person with dwarfism and discuss how *genetics* dictates a person's growth.

HERITAGE CULTURAL PERSPECTIVE

Arranged marriages were designed to maintain the clan system and to prevent intermarriage with close relatives. This practice implies an understanding of *genetics* from one generation to the next.

Heredity

PLACE-BASED PERSPECTIVE

Discuss with students the example of the European royal family's high incidence of hemophilia. Use this example to introduce *heredity* and how a recessive disease can become prolific in one lineage due to inbreeding.

HERITAGE CULTURAL PERSPECTIVE

There is a strong belief that children inherit special talents from their ancestors. This is reflected in the concept of *Haa Shagóon* which ties the past, the present and the future generations together.

Natural Selection

PLACE-BASED PERSPECTIVE

If a giraffe "stretched" it's neck to get leaves, it would not have offspring with longer necks. *Natural selection* requires mutation. Mutants that are able to survive by finding food or not becoming food live to pass on their genes. So the mutant giraffes born with slightly longer necks were able to get to leaves that other shorter neck giraffes could not get; they passed on their genes as the shorter neck giraffes went extinct.

HERITAGE CULTURAL PERSPECTIVE

Alaska wild salmon are a good example of *natural selection*. This is evidenced in the life cycle of the salmon - only the strong survive to return to their home stream.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Characteristics

PLACE-BASED PERSPECTIVE

Show the students the picture from this unit for characteristics. Have them determine how the picture relates to different *characteristics*.

HERITAGE CULTURAL PERSPECTIVE

Species of salmon have different *characteristics* based on their environment. This can include varying sizes, color, and taste.

Phyla/Divisions

PLACE-BASED PERSPECTIVE

Locate 3 different types of cookies. Mix three or four cookies from each container together. Have the students determine how the cookies could be classified. Group the cookies together according to their types. Use this to introduce the classification of *phyla/divisions* in a kingdom.

HERITAGE CULTURAL PERSPECTIVE

The wide variety of berries in Southeast Alaska is an example of a *phylum*. Other *phyla* can be identified in fish, animals and other plants.

Reproductive

PLACE-BASED PERSPECTIVE

Show the gender symbols for male and female. Discuss how different organisms have different *reproductive* strategies, including asexual and sexual.

HERITAGE CULTURAL PERSPECTIVE

In some communities, dogs were bred for specific purposes such as dog teams, packing, protection, and hunting.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Kingdom

PLACED-BASED PERSPECTIVE

Write the following headings on the board: *Monera, Protista, Fungi, Plantae, and Animalia*. Have the students name members for each of the five *kingdoms*. The students should realize that in the future, with research becoming more and more refined, there may eventually be more than five kingdoms in nature (e.g., viruses are not yet considered a classification).

HERITAGE CULTURAL PERSPECTIVE

Southeast Alaska is a good example of a natural kingdom.

Function

PLACE-BASED PERSPECTIVE

On the board, draw a set of human teeth and a bird's gizzard - have the students compare the *functions* of the two (both are used to break-up foods). Use this to introduce other *functions* to the students.

HERITAGE CULTURAL PERSPECTIVE

In Southeast Alaska, strategically placed hemlock branches *function* as a way to harvest the herring roe.

Physiological

PLACE-BASED PERSPECTIVE

Show a picture of a body builder and discuss how a person's *physiological* features may be affected by lifting weights.

HERITAGE CULTURAL PERSPECTIVE

Traditionally, maternal uncles would take the young men each morning into the cold winter waters to strengthen them. An example of this is in the *Strong Man Story* (R. and N. Dauenhauer).

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Systems

PLACE-BASED PERSPECTIVE

Show the students a picture of a stereo system or other type of system. Direct the students' attention to the parts of the *system*. Use this to introduce *systems* in science.

HERITAGE CULTURAL PERSPECTIVE

There was a variety of traditional *systems* including traps, snares, weapons, transportation forms and tools.

Circulatory

PLACE-BASED PERSPECTIVE

Show a picture of a blood transfusion - lead the students to tell the purpose of blood transfusions - relate this to the *circulatory* system of the human body.

HERITAGE CULTURAL PERSPECTIVE

When the uncles took their nephews into the cold winter waters, they would strike the young men with alder branches to stimulate their *circulation*.

Excretory

PLACE-BASED PERSPECTIVE

Show the students a picture of a car with an exhaust pipe. Have them tell the purpose of the exhaust - relate this to the *excretory* systems of humans and animals.

HERITAGE CULTURAL PERSPECTIVE

Human urine is known to be an effective anti-bear repellant. To safeguard a hunting camp, hunters would urinate around the camp's perimeters.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Digestive

PLACE-BASED PERSPECTIVE

Dissolve a cookie in water as the students watch. Use this to introduce the *digestive* system of the human body. Have the students identify foods that are readily *digested* by humans and others that are difficult to *digest*.

HERITAGE CULTURAL PERSPECTIVE

Fish oils and seal oil are used to aid in the *digestion* of foods.

Respiratory

PLACE-BASED PERSPECTIVE

Show a picture of a bottle of nasal spray to represent the importance of breathing with the *respiratory* system.

HERITAGE CULTURAL PERSPECTIVE

Traditionally, Native peoples of Southeast Alaska believed that the earth breathed. This was evidenced by vapors moving from the earth upwards. In areas where ground water wells up in the ocean and rivers, the clear cold water is high in oxygen. This attracts salmon and results in large gatherings of salmon in those areas.

Language Skills

Language & Skills Development

LISTENING

Use the activity pages from the Student Support Materials.

Definition Match

Provide each student with three blank flashcards. Each student should then write the numbers I to 3 on his/her cards - one number per card. When the students' number cards are ready, mount the vocabulary illustrations on the chalkboard. Point to one of the illustrations and say three definitions for it. The students should listen carefully to the three definitions you say - only one of the definitions should be correct for the illustration you pointed to. The students should then hold up their number cards to indicate which definition goes with the illustration. Repeat this process with other illustrations and sets of definitions. **Use the mini-illustrations, from the Student Support Materials.**

SPEAKING

Calendar Bingo

Before the activity begins, prepare a page that contains a calendar page (complete with days and dates). Provide each student with a copy of the calendar page. Also, provide each student with 10 small markers. Each student should place the markers on different dates on his/her calendar page. Mount the vocabulary illustrations on the chalkboard. Call a student's name and say a date in the month. If a marker is not on the date you named, he/she should say a complete sentence about a vocabulary illustration you point to. However, if a marker is on the date you called, he/she may "pass" to the next player. Repeat this process until all students have participated. You may wish to provide each student with more than one marker for this activity.

READING

Use the activity pages from the Student Support Materials.

Illustrated Sentences

Before the activity begins, prepare a number of sentences on sentence strips related to the concept being studied. Mount the sentences on the chalkboard. Provide each student with illustrating paper and supplies. Each student should then select ONE of the sentences to illustrate. The students should attempt to illustrate the contents of the sentences clearly. When the illustrations are completed, collect and mix them together. Give two students each an illustration (not the ones they did). When you say "Go," the students should attempt to match the illustrations with the sentences on the chalkboard.

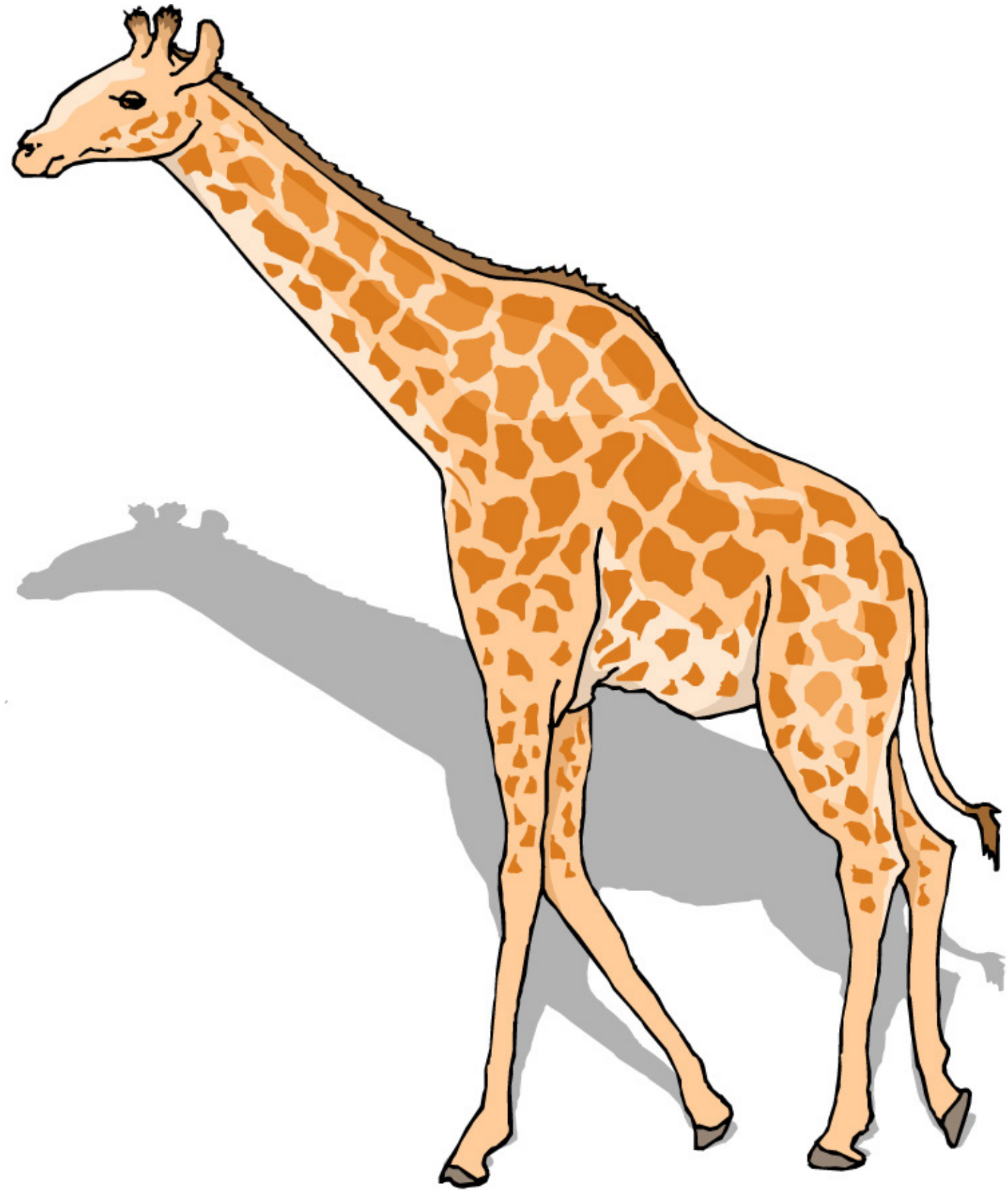
WRITING

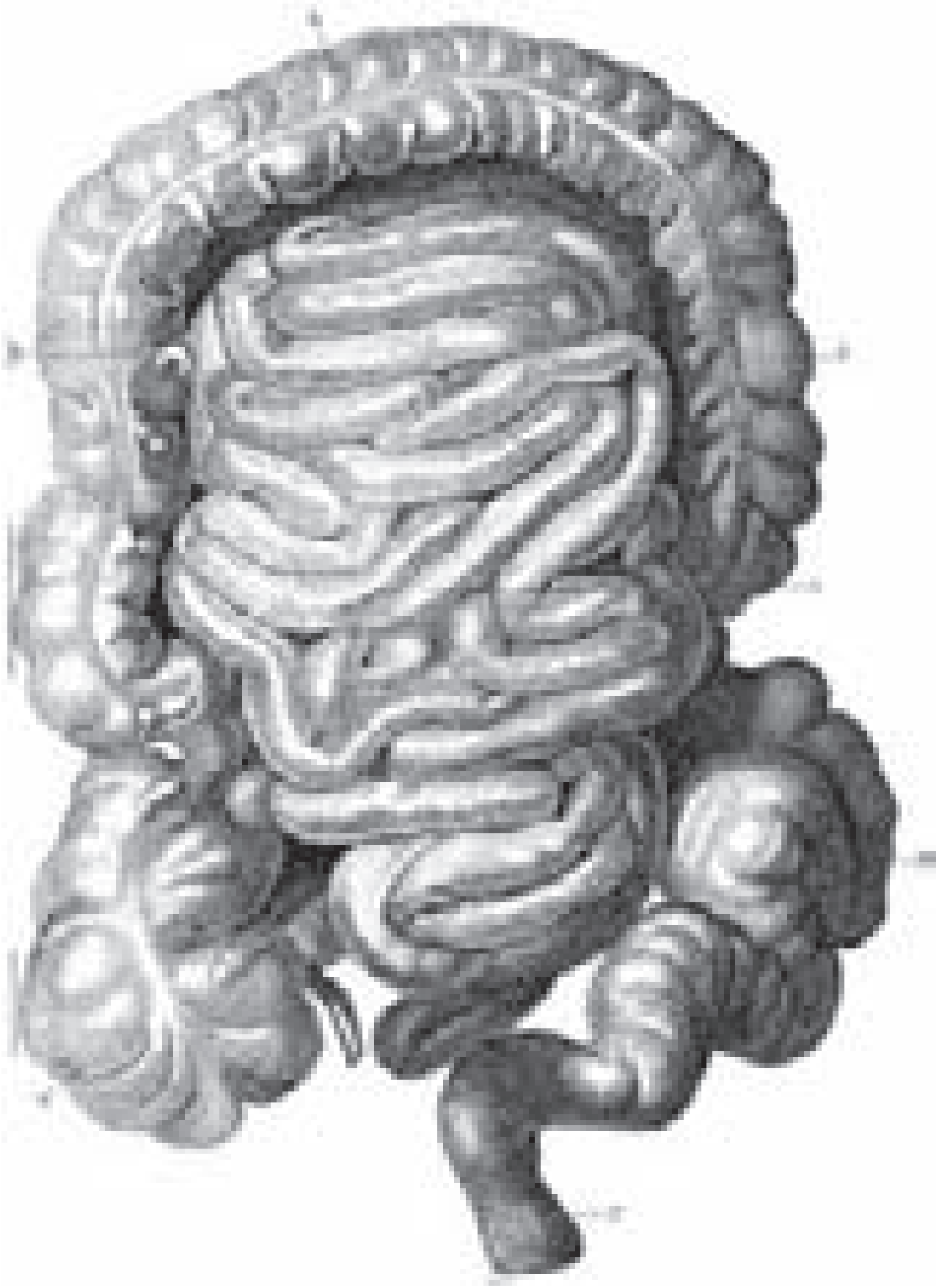
Use the activity pages from the Student Support Materials.

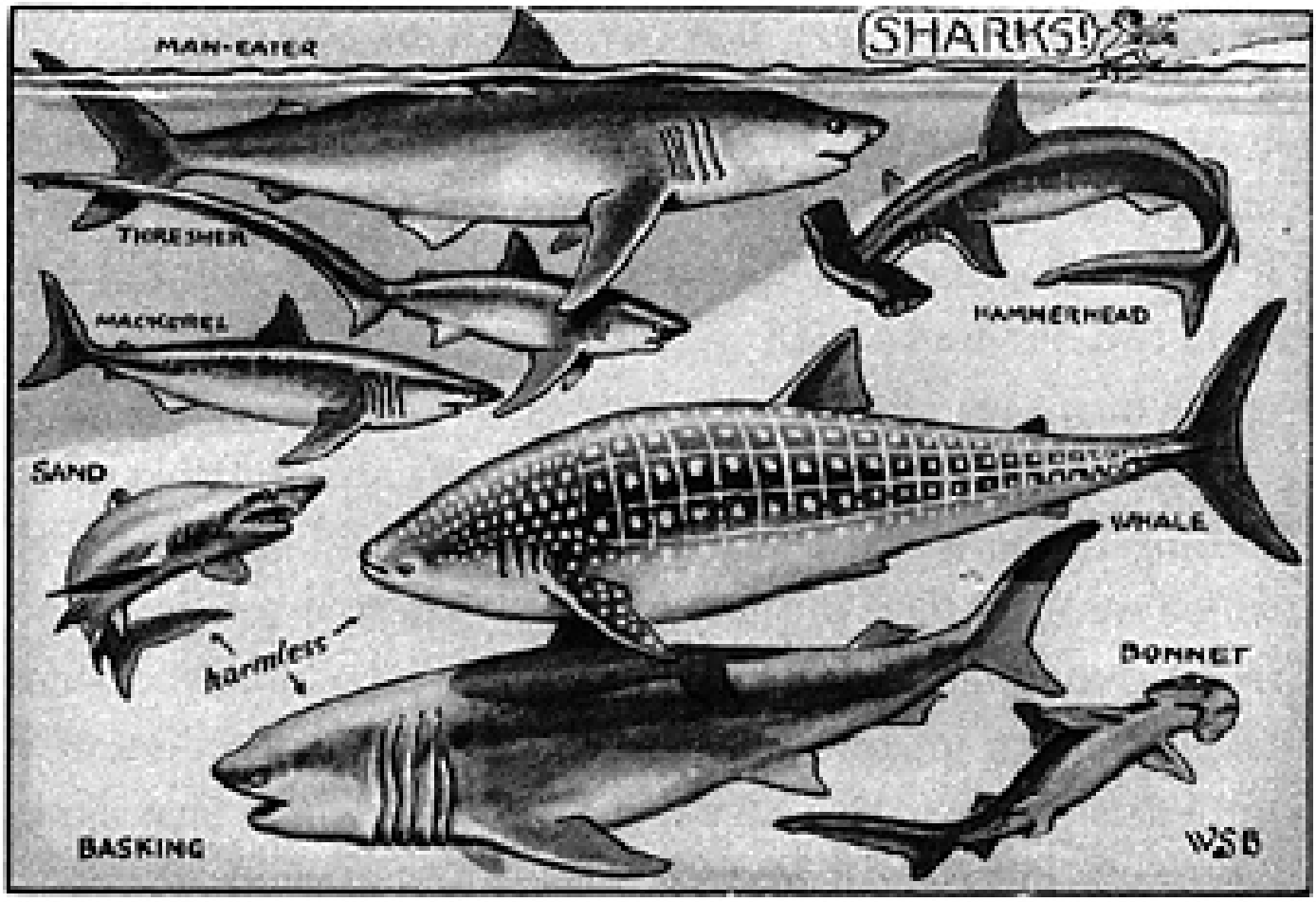
Sentence Build

Group the students into two teams. Give each team a long strip of writing paper and a felt pen. When you say "Go," the first player in each team must write the first word of a sentence (any word), for example, "The." The second player must add another word, for example, "characteristics." The players should continue in this way until a complete sentence has been created, word by word, using as many words as possible from this unit. Repeat.

Vocabulary Images



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THRESHER
MACKEREL
HAMMERHEAD
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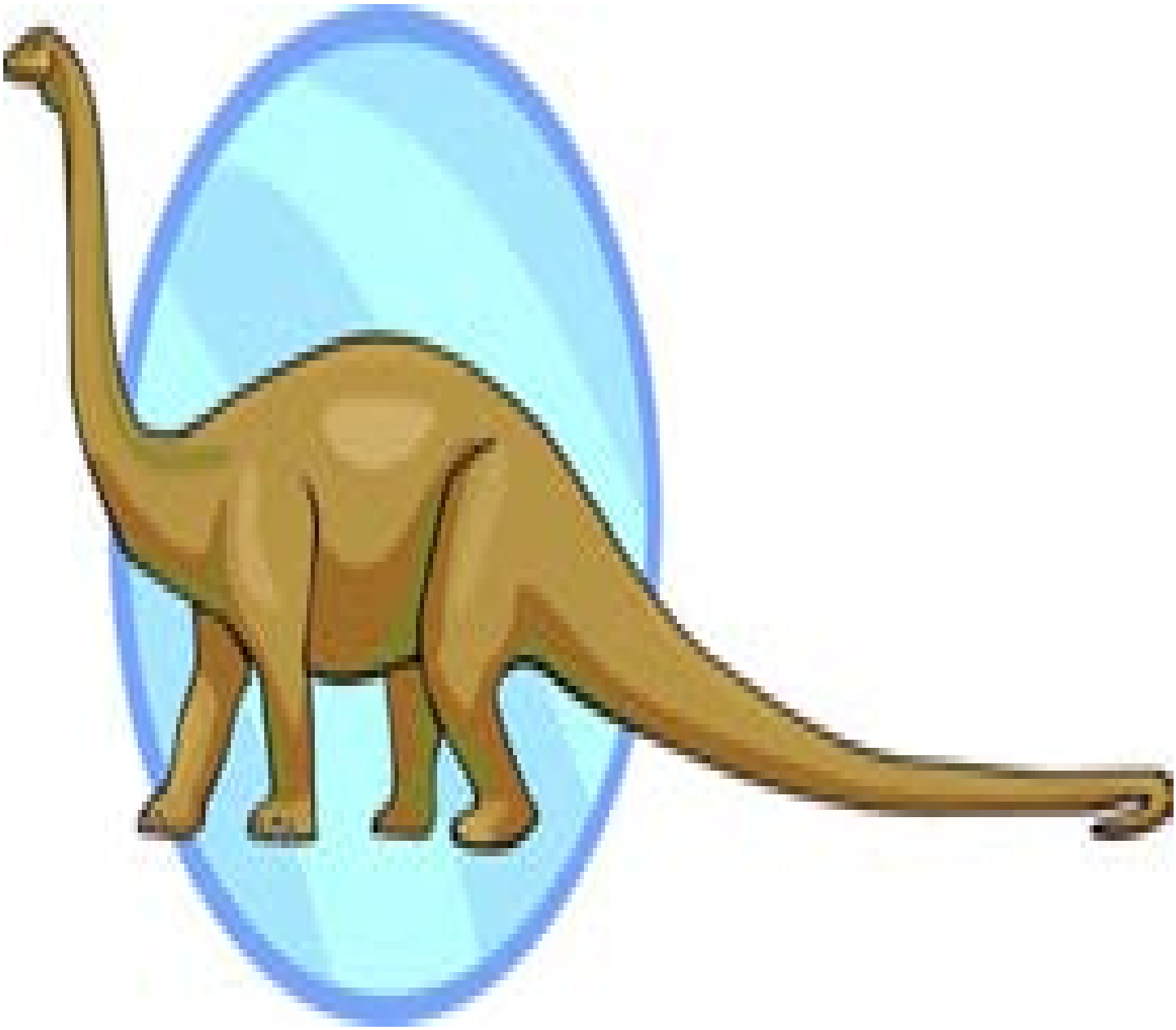
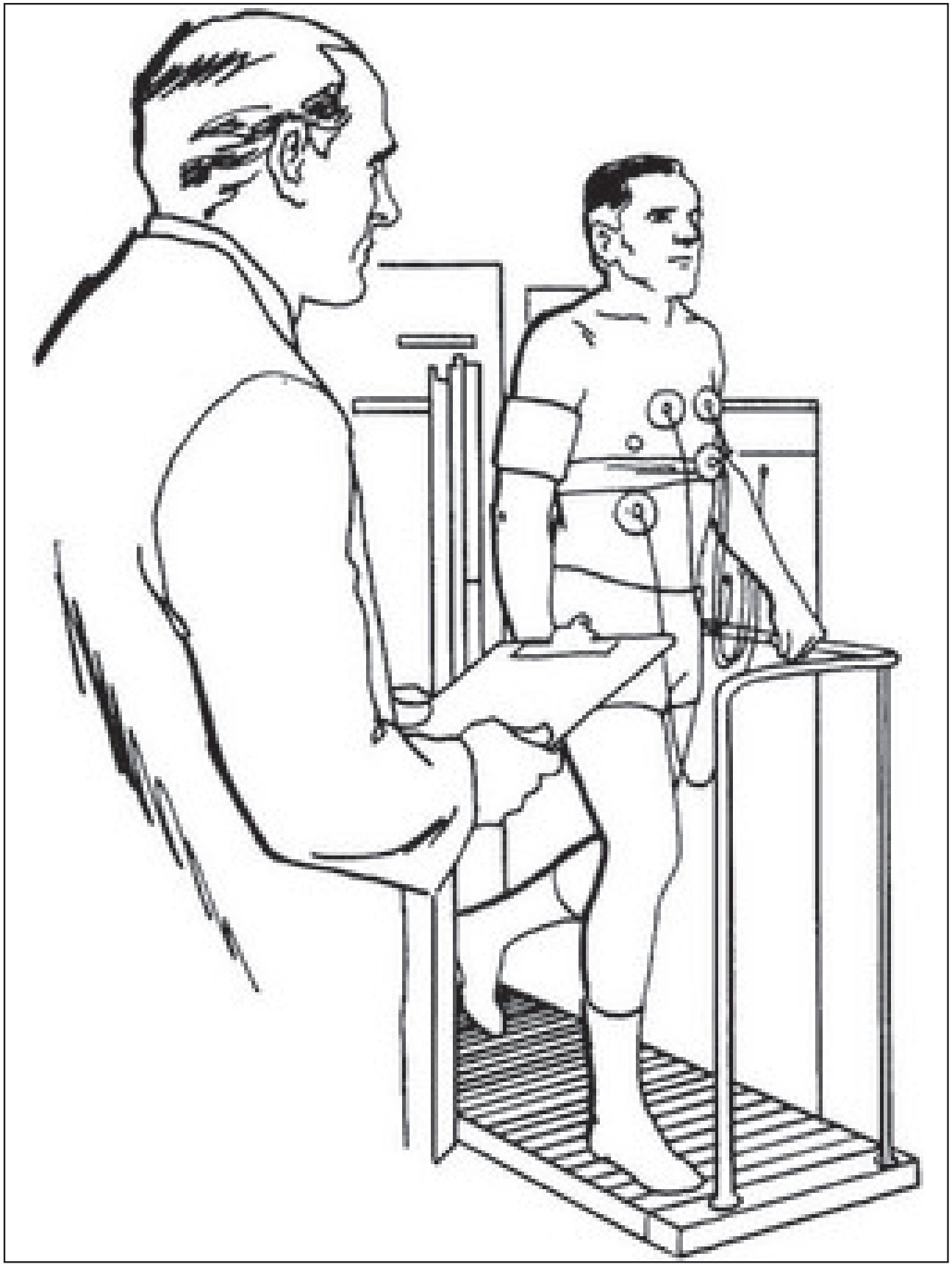
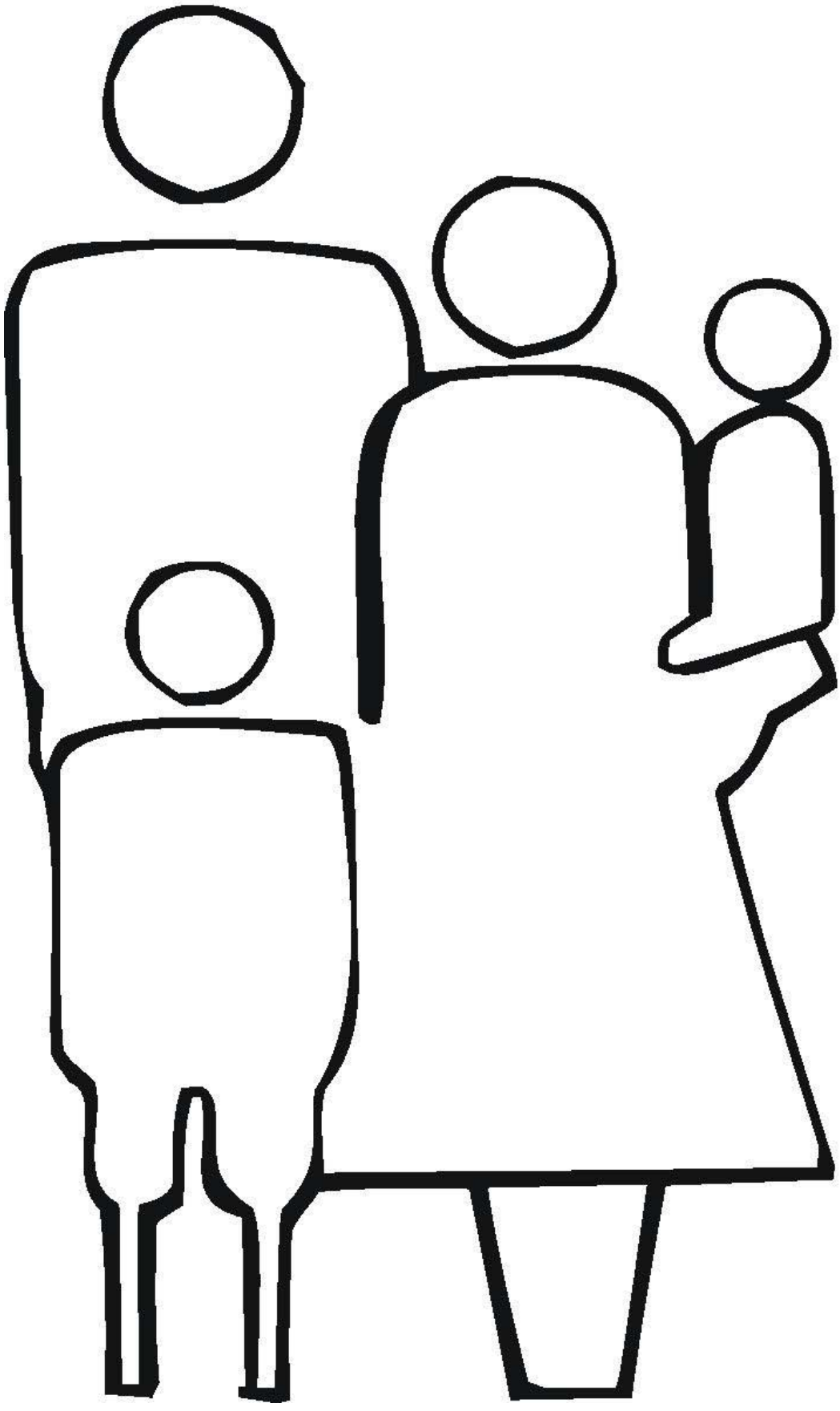
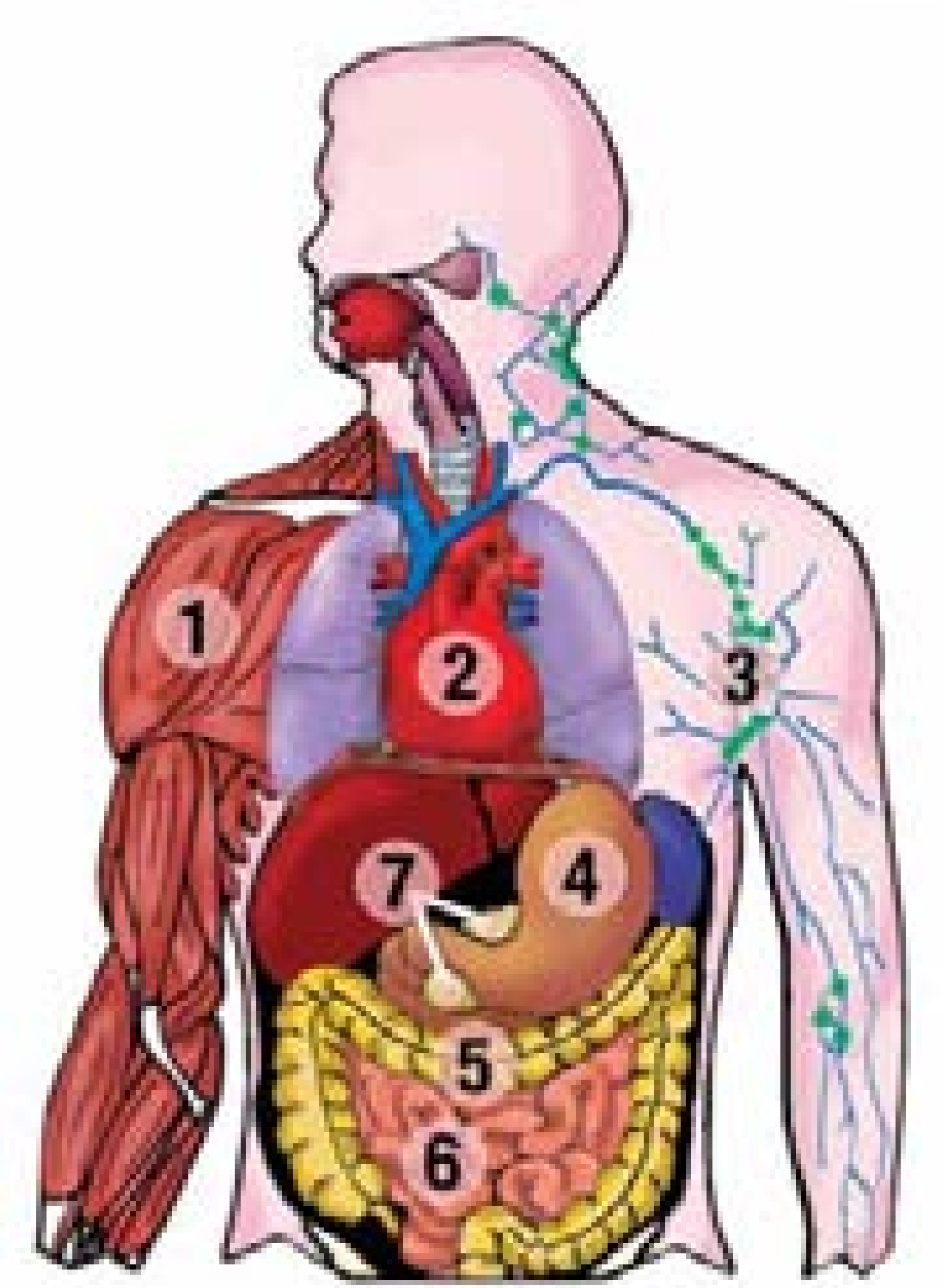
WHALE
harmless
BONNET
BASKING
WSB





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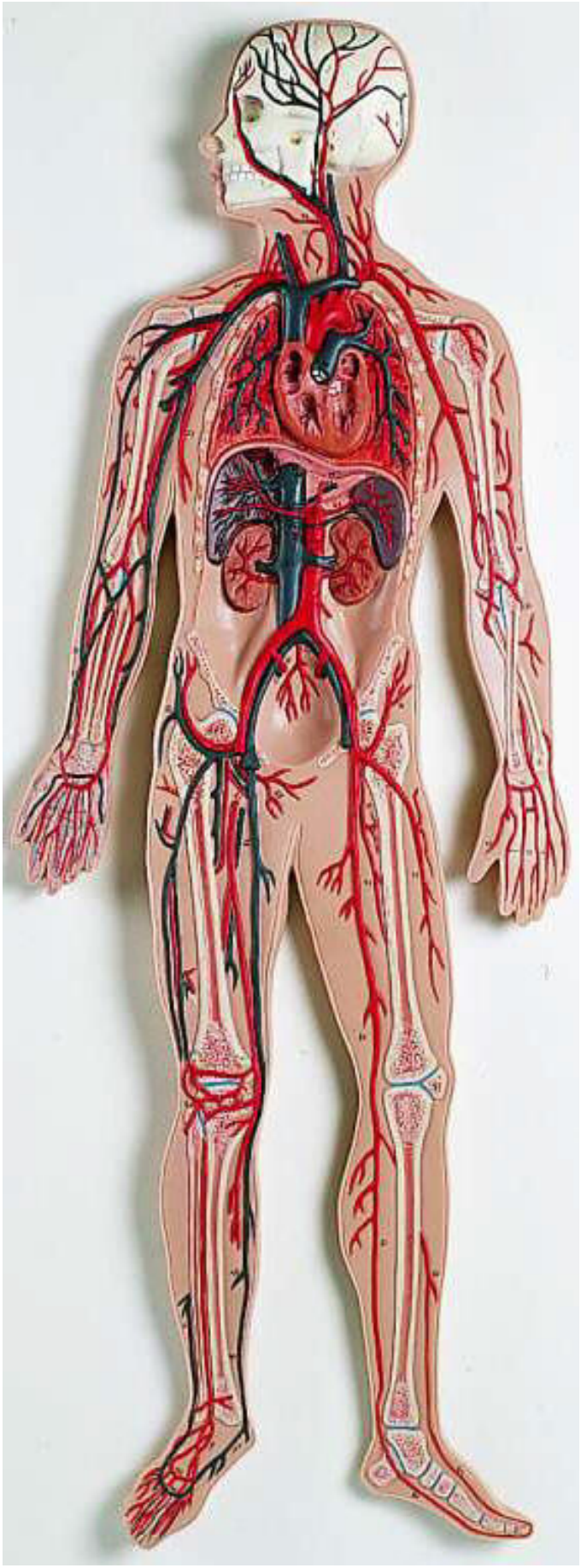

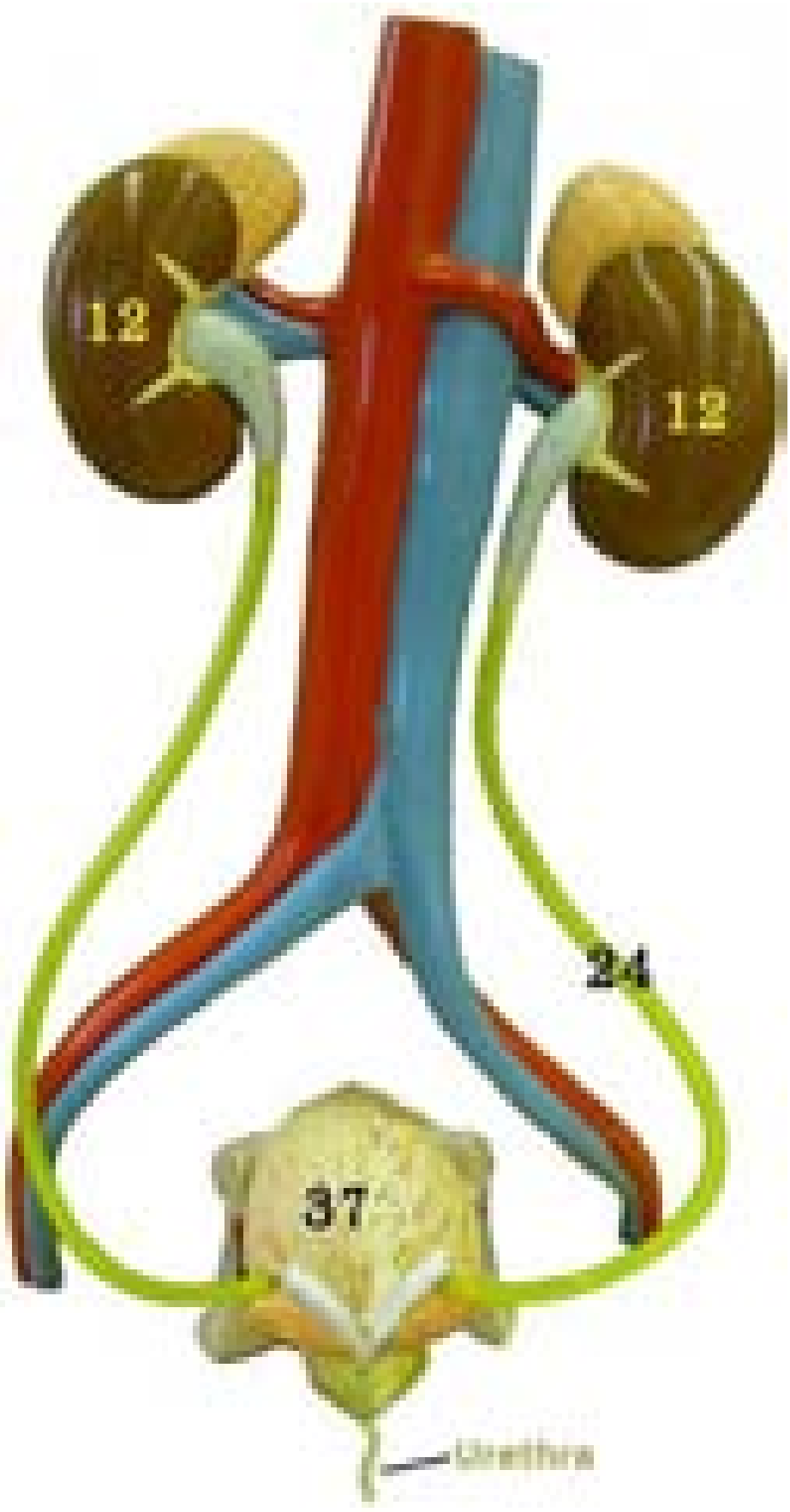
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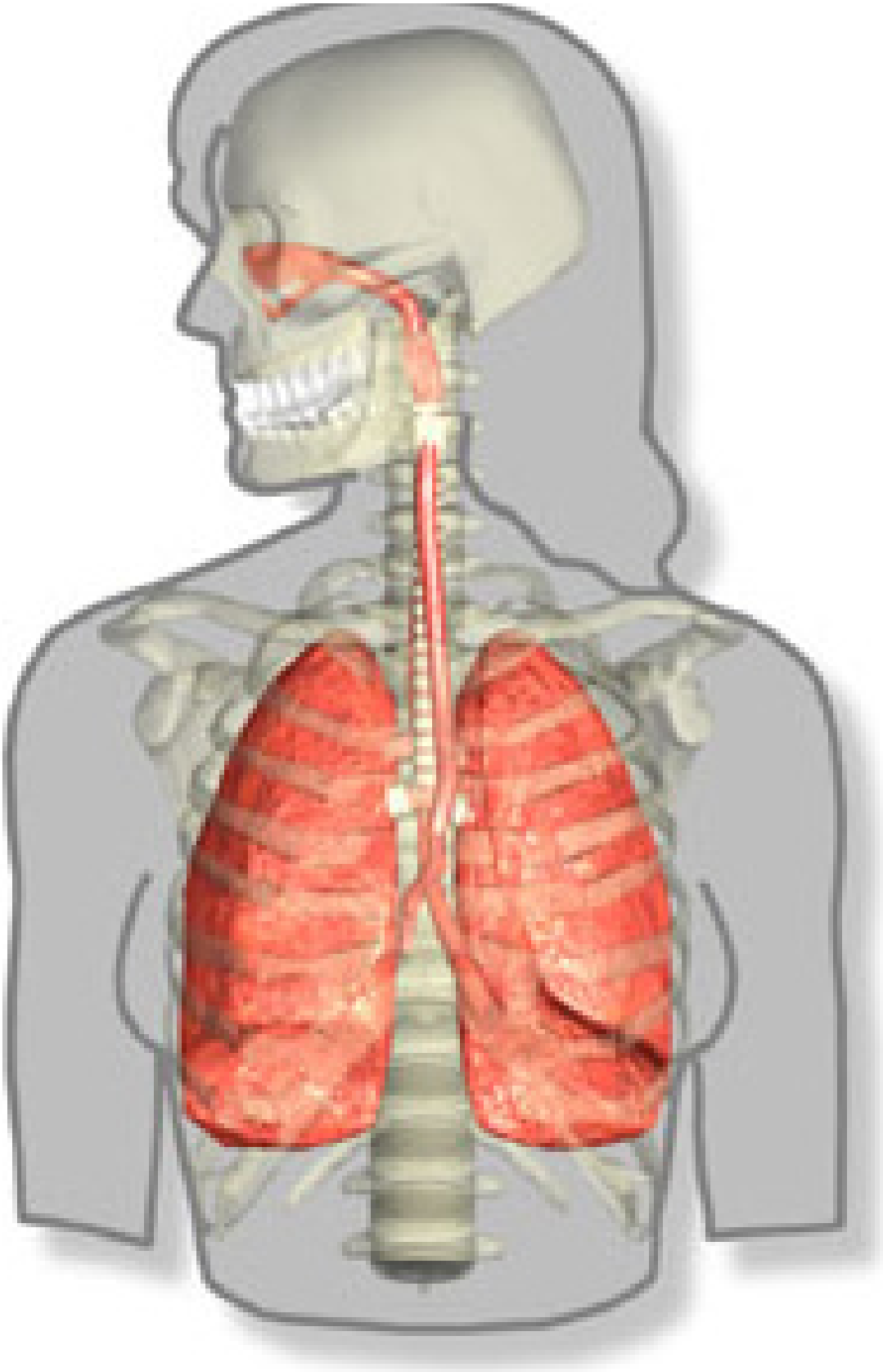
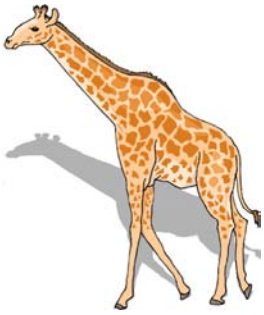
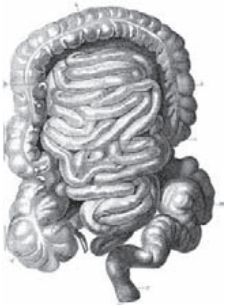


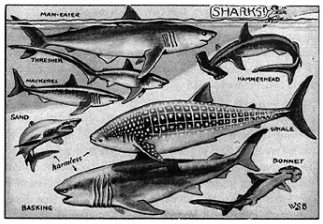
STUDENT SUPPORT MATERIALS

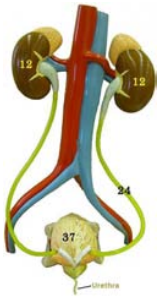
Listening

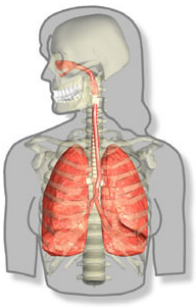
Say these words to the students - they write the numbers of the words under the pictures.
(1)phyla (2)respiratory (3)excretory (4) systems (5)circulatory (6)reproductive (7)digestive
(8)function (9)kingdom (10)psysiological (11)characteristic (12)divisions
(13)genetics (14)heredity 15) Natural Selection

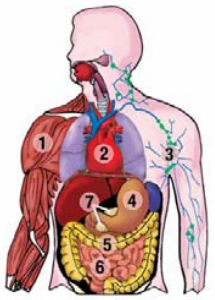








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True or False?

Read the following sentences to the students. The students should write "true" or "false" for each of the sentences.

1. A characteristic of Legos is that they fit together.
2. Plantae, Animalia, and Fungi are all names of phyla.
3. Divisions represent major branches of plants but not animals.
4. All animals have a specific name called a Kingdom.
5. The function of a spring in a car is to provide for wheel travel over bumps.
6. The fight or flight reflex is a physiological effect of fear.
7. Individual cells in the body that perform a specific function are referred to as systems in the body.
8. Blood travels through the circulatory system in the human body.
9. Fecal material exits the body through the excretory system of the body.
10. Indigestion is a problem we sometimes experience in the digestive system.
11. Obtaining oxygen through the skin like a small flatworm is characteristic of organisms that have no respiratory systems.
12. Bacteria that multiply by dividing have very effective reproductive systems.
13. A professor of genetics studies plant growth in response to fertilizers.
14. There is evidence that a higher risk of breast cancer may be hereditary.
15. Choosing the tastiest looking apple in a grocery store is an example of natural selection.

Answers
1. T, 2. F, 3. T, 4. F, 5. T, 6. F, 7. T, 8. F, 9. F, 10. T, 11. T, 12. F, 13. F, 14. T, 15. F

STUDENT SUPPORT MATERIALS

Sight Words

genetics

heredity

characteristics

natural selection

phyla

divisions

kingdom

function

physiological systems circulatory

excretory

digestive

respiratory

reproductive

STUDENT SUPPORT MATERIALS

Reading

Word Find

N C B M O D G N I K R Q J N D L V
R E H B T Z I G P E D N K I P A N
T V F A F L R G S J N D V T M C O
P I T K R Y N P E T B I X Y L I I
M T B V L A I J P S S L T M R G T
M C P Z M T C P L I T L W Q V O C
M U P N O D C T O Q G I J C K L E
N D Q R K L N N E N L J V N N O L
E O Y F N L S R L R G T K E P I E
X R I V M L T Y B Y I N L S H S S
C P G T G E N E T I C S M X Y Y L
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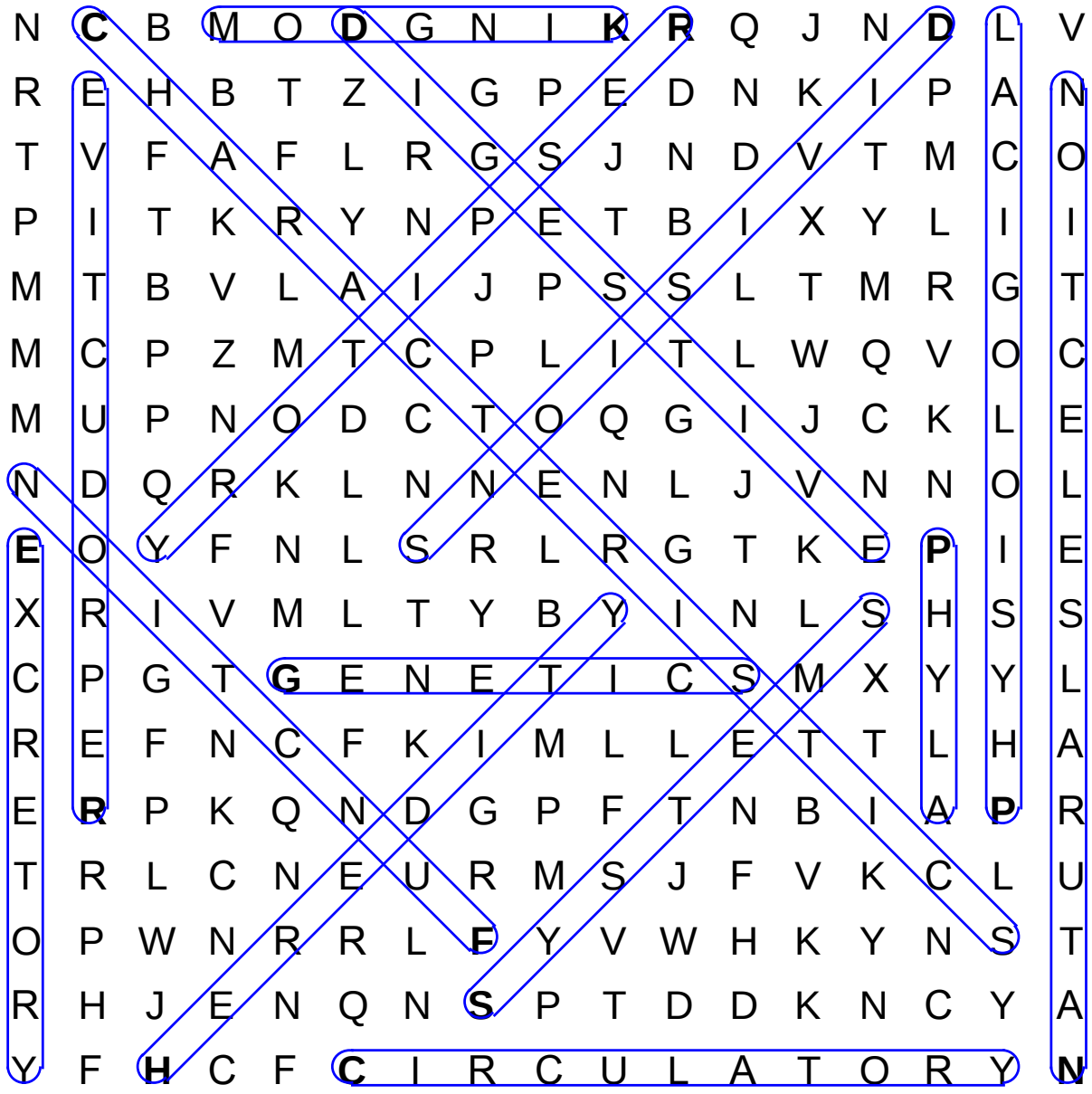
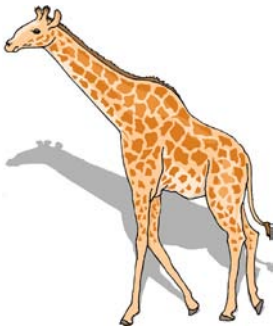
T R L C N E U R M S J F V K C L U
O P W N R R L F Y V W H K Y N S T
R H J E N Q N S P T D D K N C Y A
Y F H C F C I R C U L A T O R Y N

Characteristics
Circulatory
Digestive
Divisions
Excretory
Function
Genetics
Heredity
Kingdom
Natural Selection
Phyla
Physiological
Reproductive
Respiratory
Systems

Word Find Solution



Find The Word



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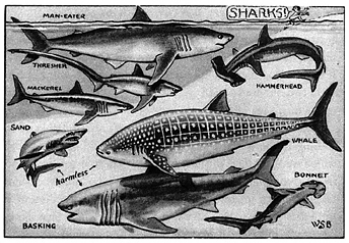

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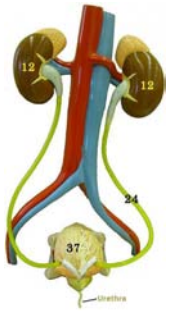

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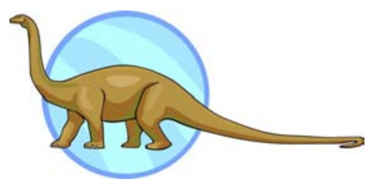

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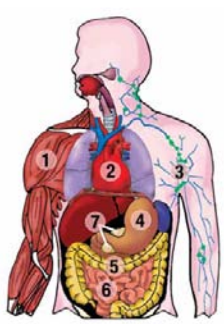

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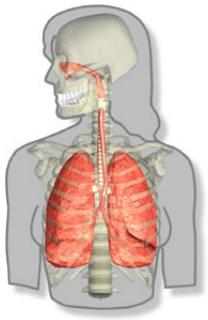

genetics
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reproductive

Match The Halves

Have the students write the numbers/letters for sentence halves that match.

1. Copper is an excellent material for
2. Although strange to imagine, invertebrates like tunicates,
3. A major Division of plants consists
4. Currently, there are 5 Kingdoms, and a group called Protista
5. The function of a cell membrane
6. Becoming addicted to smoking is a
7. The human body has many systems,
8. Whereas the circulatory system of a clam includes no vessels,
9. Vertebrates excrete nitrogenous wastes
10. A sponge has no digestive system and
11. Blockage of the respiratory system
12. Puberty marks a number of changes,

A. of flowering plants.

B. each taking care of major biological functions such as digestion and movement.

C. physiological effect of the drug nicotine.

D. home water pipes because of its soft and non-corrosive characteristics.

E. including the maturation of reproductive organs.

F. that include organisms likely from several other Kingdoms.

G. is to allow passage of some compounds into the cell, but not others.

H. that of a squid does.

I. results in suffocation.

J. using kidneys.

K. and humans are in the same phyla!

L. must digest all food inside its cells.

Answers
1/D 2/K 3/A 4/F 5/G 6/C 7/B 8/H 9/J 10/L 11/I 12/E

Word & Definition Match

Have the students write the word numbers on their matching definitions.

deals with transmission and inherited characteristics	*relating to the action of a drug when given to a healthy person*	*functions in digestion*	*Equivalent to phyla*
A taxonomic level used to classify organisms	*relating to the exchange of gases in organisms*	*A special quality that helps indentify a person or thing*	*responsible for excreting waste*
refers to collection of organs that performs a function in an organism	*second broadest classification of organisms*	*transmission of the physical qualities of parents to their offspring*	*the act of making copies*
process by which some species survive while others become extinct	*pertaining to a circulation*	*the task a particular cell, enzyme, tissue, organ or system completes so that life can continue*	

1. genetics	2. heredity	3. natural selection	4. characteristics	5. phyla
6. divisions	7. kingdom	8. function	9. physiological	10. systems
11. circulatory	12. excretory	13. digestive	14. respiratory	15. reproductive

Which Belongs?

Have the students circle the words that belong in the sentences.

1. A characteristic/function of vertebrates is that they have a backbone to support the body and protect the nerve cord.

2. A major division/phyla of animals includes the chordates.

3. Plant kingdoms are often broken up into divisions/systems.

4. The function/system of the diaphragm muscles is to expand and compress the lungs during breathing.

5. Falling asleep when anesthesia is administered during surgery is a respiratory/physiological response.

6. A system/function consists of numerous components working in harmony together.

7. The heart, arteries, veins, and capillaries comprise the excretory/circulatory system in a human.

8. Planarians lack an excretory/digestive system and nitrogenous wastes diffuse into the water surrounding them.

9. The excretory/digestive system includes the stomach.

10. The respiratory/digestive system of fishes includes gills.

11. Organisms that reproduce sexually have a circulatory/reproductive system.

Answers
1. characteristic, 2. phyla, 3. divisions, 4. function, 5. physiological, 6. system
7. circulatory, 8. excretory, 9. digestive, 10. respiratory, 11. reproductive

What's The Answer?

Have the students read the questions and then select the correct answer for them. They should fill in the appropriate circles beside the answers of their choice.

1) Characteristics of birds do not include:

(a) Hollowed bones and feathers;
(b) Lungs that are fed by numerous air-sacs continually;
(c) Bladders that store urine.

2) Which of the following taxon is directly below that of Kingdom when talking about the classification of animals:

(a) Phyla;
(b) Division;
(c) Characteristics.

3) Which of the following taxon is generally used only when talking about plants?

(a) Phyla;
(b) Division;
(c) Characteristics.

4) A multi-cellular animal must:

(a) Rely on specialized cells that perform specific functions and systems to distribute nutrients;
(b) Have each of its cells perform all the functions of life since there is no transport of materials about the body;
(c) Generally rely on diffusion of nutrients from one cell to another since there is no means of transporting nutrients about the body.

5) Each of these is a physiological effect except:

(a) Blurred vision when eye drops are added by an optometrist;
(b) Blurred vision when the eye is injured;
(c) Blurred vision during a snowstorm due to low visibility.

6) Systems in an animal:

(a) Consist of individual cells;
(b) Consist of multiple cells organized into tissues;
(c) Consist of organs – which themselves consist of specialized tissues, which are in turn comprised of specialized cells.

7) The circulatory system of a human does not:

(a) Move lymph fluid about the body;
(b) Include arteries, veins, and capillaries;
(c) Include a 4-chambered heart.

8) The excretory system of a human body removes:

(a) Fecal material
(b) Nitrogenous wastes
(c) Both fecal and nitrogenous wastes.

9) Organic compounds are broken down into individual absorbable components in the:

(a) Digestive system;
(b) Excretory system;
(c) Circulatory system.

10) The respiratory system of a fish:

(a) Is less efficient than that of a human lung;
(b) Is less efficient than that of a tapeworm that relies on diffusion of oxygen into its body;
(c) Must be more efficient than that of a human because there is less oxygen per volume in water compared to air.

11) The fundamental drive for all species on Earth is:

(a) to reproduce;
(b) to consume food;
(c) to exist.

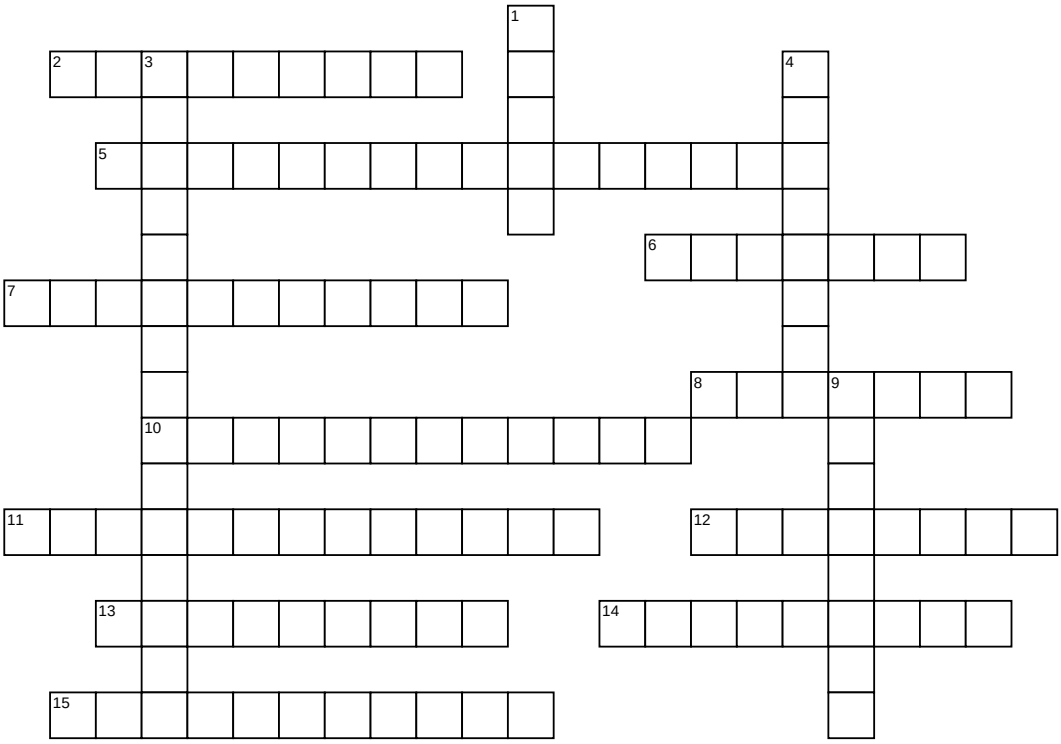
Answers
1. c, 2. a, 3. b, 4. a, 5. c, 6. c, 7. a, 8. b, 9. a, 10. c, 11, a

STUDENT SUPPORT MATERIALS

Writing

9th C-1 Concept of Life Science

Unit 2



ACROSS

2 It is responsible for the elimination of the nitrogenous waste products of metabolism as well as other non-useful nitrogenous materials.
5 is the process by which some species of animals and plants survive and others become extinct.
6 refers to a collection of organs that perform a function in an organism.
7 Of or pertaining to a circulation, especially to the circulatory system.
8 the second broadest classification of organisms.
10 the act of reproducing new individuals biologically or the act of making copies.
11 relating to physiology or relating to the action of a drug when given to a healthy person, as distinguished from its therapeutic action.
12 transmission of the physical and physical qualities of parents to their offspring.
13 of, relating to, or functioning in digestion.
14 taxonomic level used to differentiate plants.
15 relating to the exchange of gases in organisms.

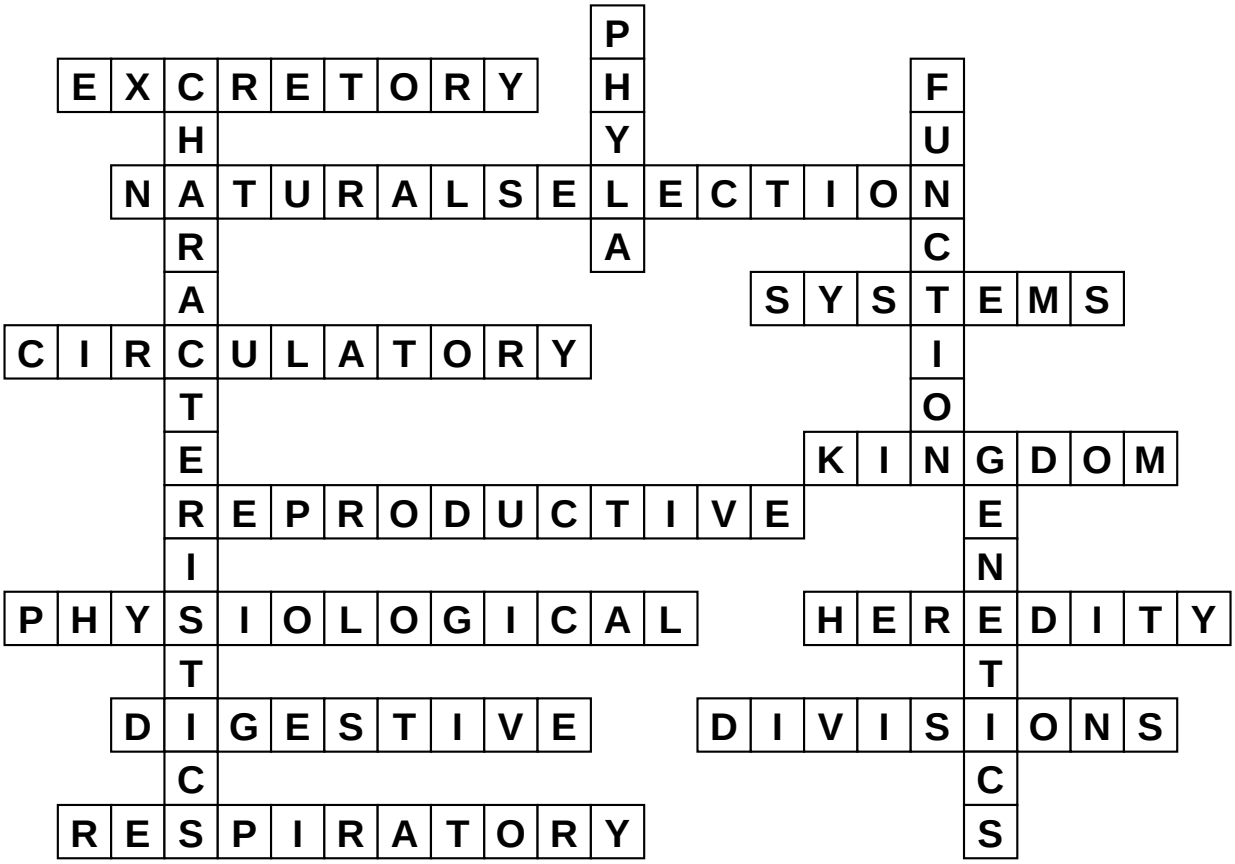
DOWN

1 A major taxonimic level used to classify organisms.
3 a special quality or feature that helps to identify a person or thing.
4 the task that a particular enzyme, cell, tissue, organ, or system completes so that life can continue.
9 the branch of biology that deals with the transmission and variation of inherited characteristics.

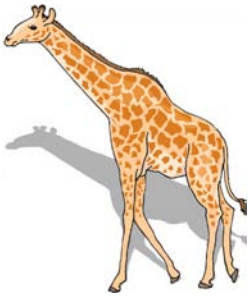
9th C-1 Concept of Life Science

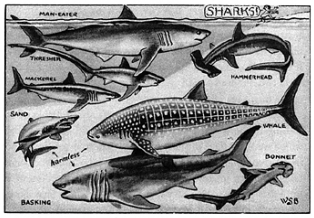
Unit 2

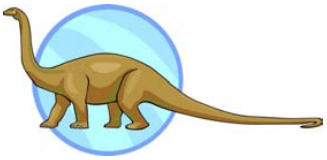
Solution:



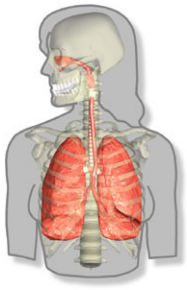
Write The Words

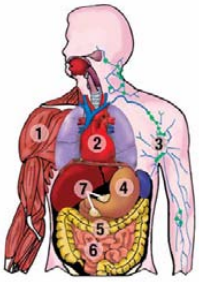






Write The Words





Complete The Sentence

Have the students write the key words in the blanks.

1. One _____ of a crab is the presence of two large claws.

2. All organisms are classified according to Kingdom first, and then into smaller groups called ____.

3. It is important to make _____ of organisms so that we can understand relationships between them more easily.

4. The highest taxa, or grouping of organisms, is the _____.

5. The ____ of an ear is to gather information via sound waves.

6. Different drugs have different ____ effects on different animals; for example, carfentenol in small amounts will kill a human – but will only sedate a mountain goat.

7. The _____ system of our body includes the heart, veins, and arteries.

8. It is a happy day for parents when a young toddler masters his/her ____ system and no longer needs diapers!

9. Sponges have no intestines, stomach, or any other organ we associate with the ____ system.

10. Luckily, Sally had her scuba gear so that her ___ system was not deprived of air when she was under water!

11. Because of their great capacity for _____, mice will quickly fill a house if not eliminated.

Answers
1. characteristic, 2. phyla, 3. divisions, 4. kingdom, 5. function, 6. physiological,
7. circulatory, 8. excretory, 9. digestive, 10. respiratory, 11. reproduction

Creative Writing Activity Page

Have the students write sentences of their own, using the key words from this unit. When the students' sentences are finished, have them take turns reading their sentences orally. The students should say "Blank" for the key words; the other students must name the "missing" words. You may wish to have the students write the "definitions" for the key words.

genetics

heredity

natural selection

characteristics

phyla

divisions

kingdom

function

physiological

Creative Writing Activity Page

Have the students write sentences of their own, using the key words from this unit. When the students' sentences are finished, have them take turns reading their sentences orally. The students should say "Blank," for the key words; the other students must name the "missing" words. You may wish to have the students write the "definitions" for the key words.

systems

circulatory

excretory

digestive

respiratory

reproductive

Creative Writing Activity Page

Have the students write sentences of their own, based on the picture below. When finished, have each student read his/her sentences to the others.

STUDENT SUPPORT MATERIALS

Reinforcement Activities

Students choose an important subsistence species in their local area (eg salmon or deer) and describe the ecosystem in which it lives. They should also describe the factors which limit its population.

Take students outside to record the living and non-living components of the ecosystem around the school. After coming back inside, list the students' observations on the board.

Tell the students that there will be an M&M lab today. Pass out M&Ms to only 2/3 of the class. Explain that only 2/3 of the class will be able to do the lab because the number of M&Ms are the limiting factor. After discussing the impact of limiting factors, pass out M&Ms to the remaining 1/3 students.

Divide the class into two large groups. Ask one group to make as many paper airplanes as possible in two minutes. Ask the other group to make as many paper swans as possible in two minutes. After the two minutes, see who has made more and discuss how the group that made the most had a greater productivity.

Give the students graph paper. Have them outline a 10 X 10 square that represents a field. The blank squares are grass needed for mice to eat. Draw circles to represent the mice. Draw Xs to represent foxes that will eat the mice.

Students need to figure out the carrying capacity of this "grass plot" based on the following rules. There must be three times as many blank squares as circles so the mice have enough grass seed to eat. There must be five times as many mice as foxes so the foxes have enough mice to eat. Challenge students to calculate the carrying capacity for the most mice and foxes that the "field" can support.

Leaves

Materials:

- 1 bean seedling
- 1-2 fleshy leaves
- Microscope
- Slides and coverslips
- Scalpel

Methods:

- Carefully cut a cross section of one of the fleshy leaves. Mount it on the microscope slide and look at it under the microscope. Draw what you see.

- Label any veins and chloroplast you see on the drawing.

- Carefully peel the bottom layer from the leaf. It should be virtually clear in color. Mount it to a slide and look at it under the microscope. Locate a stomata. Label the stomata, guard cells, and chloroplasts.

Flowers and Seeds

Materials:

- 1 lily
- 1 daisy
- 2 different flowers
- A variety of seeds soaked in water
- 2 pictures of pollinators
- Magnifying glass
- Microscope
- Slides and coverslips
- Scalpel
- Medicine dropper
- Water
- Resource book/text book

Methods:

- Take the lily and cut it in half length wise. Draw what you see (you may want to use a magnifying glass).

- Label the sepals and the petals.

- The male structures are known as the stamen. Label the following parts of the stamen: anther, filament, pollen.

- The female structures are known as the pistil. Label the following parts of the pistil: style, stigma, ovules, and ovary.

- Take the daisy and mount one of the tiny yellow pieces from the center to a microscope slide and look at it under the microscope (you may want to cut it in half lengthwise). Draw what you see.

- Label any parts you can identify.

- Take a look at the seeds that are available. Draw four different seeds and label them as monocot or dicot.

Plant Vocab

Slap Happy Game Instructions and Clues

Instructions:

- Copy the vocabulary cards on the accompanying sheet to card stock. Cut the cards out. Keep each set separate with a small elastic band.
- Each pair of students should receive a set of cards.
- They should set up these cards face up between them.
- You will read a clue.
- The student (from each pair) who puts their finger on the correct answer first puts the card on their pile.
- The student with the most cards in their pile at the end is the winner.

1	Contains the reproductive structures of higher plants.	flower
2	Process where plants create their own food.	photosynthesis
3	These pigments die in the fall leaving behind beautifully colored leaves.	chlorophyll
4	Male reproductive product of higher plants.	pollen
5	The opening on leaves that lets in CO_2 and out O_2.	stomata
6	$C_6H_{12}O_6$	sugar
7	Where they baby plant is contained in higher plants.	seed
8	The tissue that water goes up in the plant.	xylem
9	Process where sugars are broken down to release energy.	respiration
10	Structure where photosynthesis happens.	Chloroplast
11	These increase the surface area of roots so more water can be absorbed.	Root hairs
12	This is the dark ring on a cross section from a tree.	Winter wood

Winter Wood	**Root Hairs**	**Chloroplast**
Respiration	**Xylem**	**Seed**
Sugar	**Stomata**	**Pollen**
Chlorophyll	**Photosynthesis**	**Flower**

Winter Wood	**Root Hairs**	**Chloroplast**
Respiration	**Xylem**	**Seed**
Sugar	**Stomata**	**Pollen**
Chlorophyll	**Photosynthesis**	**Flower**

Unit 1: What does living in Southeast Alaska mean to me?
Native Heritage Family Tree Worksheet – *Have the students fill-in their family tree*

1990-200__

Student Name:
Tribal Affiliation(s):

Clan:
House:
Village/Kwáan:

Other Ethnicity:

MGGM =Maternal Great Grandmother
MGGF= Maternal Great Grandfather
PGGM=Paternal Great Grandfather
PGGF=Paternal Great Grandfather

Mother's Name:
Tribal Affiliation(s):
Clan:
House:
Village/Kwáan:

Other Ethnicity:

1970-1990

Father's Name:
Tribal Affiliation(s):
Clan:
House:
Village/Kwáan:

Other Ethnicity:

Grandmother's Name:

Tribal Affiliation(s):

Clan:
House:

Other Ethnicity:

Grandfather's Name:

Tribal Affiliation(s):

Clan:
House:

Other Ethnicity:

1950-1970

Grandmother's Name:

Tribal Affiliation(s):

Clan:
House:

Other Ethnicity:

Grandfather's Name:

Tribal Affiliation(s):

Clan:
House:

Other Ethnicity:

1920-1950

MGGM	PGGF	MGGM	PGGF	MGGM	PGGF	MGGM	PGGF

Unit Assessment

Unit 2 Quiz

C1, Unit 2, Concepts of Life Quiz

1. The actual transmission of the physical qualities we receive from our parents, and pass on to our offspring, and the law by which living beings tend to repeat characteristics from one generation to the next is called...

    a. physiology.
    b. breeding.
    c. inheritance.
    d. heredity.

2. When we refer to the special physical qualities or features that humans have help us identify one person from another, we are referring to their physical characteristics.

    a. True
    b. False

3. The scientific study that deals with heredity and the variation of inherited traits among related organisms is called _____

4. The branch of biology that deals with our physical characteristics, such as the color of our eyes, the size and shape of our body, who we look like, the variation and transmission of characteristics is called....

    a. inheritance.
    b. genetics.
    c. geneaology.
    d. psychology.

5. Which of the following is an example of Natural Selection?

    a. a black lab for hunting birds
    b. a siamese cat with unusual coloring
    c. a giraffe with a long neck to reach branches for food
    d. a thorough bred horse for racing

6. _____ is the term used for the main subdivision of a taxonomic kingdom, grouping together all classes of organisms that have the same body plan.

7. Look at the three illustrations below. You will see one for Phyla, one for Divisions, and one for Kingdom. Write the correct label by the illustration that best represents it.

    Illustration for Kingdom For Phyla For Divisions

8. The task that a particular enzyme, cell, tissue, organ, or system completes so that life can continue is known as its _____

9. As you know, a system refers to collection of organs that perform a function in an organism. Below you see the illustrations of four systems in your body. Label each one.

10. A collection of organs that perform a function in an organism is called a _____

11. When a species of animals has babies and reproduces itself biologically, it is known as the representative system.
    a. True
    b. False

12. Define and illustrate the nervous system in the space below.

13. Physiology is the study of all the internal functions of an organism.
    a. True
    b. False

C1, Unit 2, Concepts of Life Quiz Answer Key

1. The actual transmission of the physical qualities we receive from our parents, and pass on to our offspring, and the law by which living beings tend to repeat characteristics from one generation to the next is called...

    a. physiology.
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2. When we refer to the special physical qualities or features that humans have help us identify one person from another, we are referring to their physical characteristics.

    a. True
    b. False

3. The scientific study that deals with heredity and the variation of inherited traits among related organisms is called *genetics.*

4. The branch of biology that deals with our physical characteristics, such as the color of our eyes, the size and shape of our body, who we look like, the variation and transmission of characteristics is called....
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    b. genetics.
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    a. a black lab for hunting birds
    b. a siamese cat with unusual coloring
    c. a giraffe with a long neck to reach branches for food
    d. a thorough bred horse for racing

6. *Phyla/phylum*is the term used for the main subdivision of a taxonomic kingdom, grouping together all classes of organisms that have the same body plan.

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    Illustration for Kingdom For Phyla For Divisions

    Kingdom Phyla Divisions

8. The task that a particular enzyme, cell, tissue, organ, or system completes so that life can continue is known as its *function.*

9. As you know, a system refers to collection of organs that perform a function in an organism. Below you see the illustrations of four systems in your body. Label each one.

10. A collection of organs that perform a function in an organism is called a *system.*

11. When a species of animals has babies and reproduces itself biologically, it is known as the representative system.
    a. True
    b. False

12. Define and illustrate the nervous system in the space below.

13. Physiology is the study of all the internal functions of an organism.
    a. True
    b. False

UNIT 3

Sealaska Heritage Institute

INTRODUCTION OF

Key Vocabulary

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Immune

PLACE-BASED PERSPECTIVE

Show a picture of a flu shot and discuss how the dead or inactive proteins in the flu shot build up a person's *immune* system by building antibodies against those particular proteins.

HERITAGE CULTURAL PERSPECTIVE

Devil's Club is commonly used to protect the human *immune* system. Also, there is a belief that Devil's Club can protect one's property by having it in the home. The Devil's Club is often positioned in vital locations of the home.

Endocrine

PLACE-BASED PERSPECTIVE

Show a glass of milk and discuss with students how warm milk helps people go to sleep. The *endocrine* system is similar in that the hormones released can make people tired or, like coffee, can make people hyper.

HERITAGE CULTURAL PERSPECTIVE

Traditional foods, such as fish and seal oils, game meats, fowl, and plants helped to keep a person's system healthy.

Musculoskeletal

PLACE-BASED PERSPECTIVE

Show a picture of a runner and discuss the importance of the *musculoskeletal* system to be able to coordinate the movement of the runner and absorb the impact of the person's weight as they run.

HERITAGE CULTURAL PERSPECTIVE

Day-to-day traditional life encouraged the development and maintenance of a person's *musculoskeletal* health.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Integuments

PLACE-BASED PERSPECTIVE

Show the students a hard boiled egg. Carefully remove the shell, drawing their attention to the membrane between the shell and the egg. Use this to introduce *integuments.*

HERITAGE CULTURAL PERSPECTIVE

Wildlife hides and pelts have always been used for practical purposes, especially clothing. Sometimes the hairs were left on the skins and at other times, they were removed.

Life Cycles

PLACE-BASED PERSPECTIVE

Show a *life cycle* of a frog and discuss that an organism is born, grows older, reproduces and dies.

HERITAGE CULTURAL PERSPECTIVE

Salmon represent an excellent example of a *life cycle* in Southeast Alaska.

Diversity

PLACE-BASED PERSPECTIVE

Ask students, "Who has a cat." Ask them to describe their cat for the class. After several cats have been described, discuss how the order Felis has much *diversity* within its species.

HERITAGE CULTURAL PERSPECTIVE

The traditional diet of Natives in Southeast Alaska represents a *diversity* of food sources.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Development

PLACE-BASED PERSPECTIVE

Discuss how a person's *development* is from a baby to a child to an adolescent to an adult.

HERITAGE CULTURAL PERSPECTIVE

Traditionally stages of human *development* were marked with specific practices. For example, young women who reached puberty and women who were pregnant, were isolated from the rest of the community. Young men were turned over to their maternal uncles for training around the age of twelve.

To Be Linked

PLACE-BASED PERSPECTIVE

Conduct a survey with the students involving their colors of hair and eyes. Have them indicate who else in their families possess the same traits. Use this to introduce *linked* to the students as it relates to heredity.

HERITAGE CULTURAL PERSPECTIVE

While Southeastern Alaskan Native groups are linguistically diverse, some are *linked* culturally and physically.

To Transfer

PLACE-BASED PERSPECTIVE

Show the students a ladle. Have them tell you the uses of the ladle. Lead them to understand that the ladle can be used to *transfer* soup from a pot to individual bowls. Use this analogy to represent the *transfer* of physical characteristics from one person to another.

HERITAGE CULTURAL PERSPECTIVE

Traditionally, most items were *transferred* from one location to another by boat. Packing was another mode of transferring items.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Transformation

PLACE-BASED PERSPECTIVE

Ask what butterflies, Superman, and Transformers have in common. Use this to introduce the concept of *transformation*.

HERITAGE CULTURAL PERSPECTIVE

Natural transformations in Southeast Alaska are many-fold and dynamic. This includes all forms of wildlife. Virtually all Native stories include an element of *transformation*.

Organ System

PLACE-BASED PERSPECTIVE

Explain to students about how it is important that the space shuttle has a life support system, an ignition system, an electrical system, and a computer system that all work together to make the shuttle work properly. Use this to introduce the concept that *organ systems* in living organisms are dependent on working together for life. All systems go.

HERITAGE CULTURAL PERSPECTIVE

The story *The Raven That Dived into the Blowhole of the Whale,* tells of the *organ system* of the whale.

Nervous System

PLACE-BASED PERSPECTIVE

Show the students an oven mit and have them tell its use. Lead them to suggest that the oven mit protects a persons hand from heated objects. Use this to introduce *the nervous system* to the students.

Show the vocabulary picture from this unit to the students.

HERITAGE CULTURAL PERSPECTIVE

Traditionally, Native shamans would create medicines from local materials to treat the *nervous system.* Also, people would use chanting and fasting as means of improving their nervous systems.

Language Skills

Language & Skills Development

LISTENING

Use the activity pages from the Student Support Materials.

Locomotive

Have the students stand in a straight line in the center of the room. Each student should place his hands on the shoulders of the student in front of him/her. Mount an illustration on each of the four walls in the classroom. Tell the students that when they hear one of the four vocabulary words (for the four illustrations on the walls), they should step in that direction - while still holding onto the shoulders of the players in front of them. Say the four words a number of times; the students should step towards the illustrations as they are named.

SPEAKING

Visual Memory

Mount the vocabulary illustrations on the chalkboard. The students should look carefully at the illustrations. Then, have the students close their eyes. Remove one of the illustrations from the chalkboard and place it to the side. The students should then open their eyes and identify the "missing illustration." Continue in this way until all of the illustrations have been removed. Another way to conduct this activity is to do the reverse. In this case, prepare two or three extra sets of vocabulary illustrations. Mount a number of illustrations on the chalkboard. The students should look carefully at the illustrations. Then, have the students close their eyes. Add another illustration to the chalkboard. The students should open their eyes and identify the "new illustration." This activity (and the previous form of the activity) may be done in team form. In this case, the first player to identify the new or missing illustration wins the round.

READING

Use the activity pages from the Student Support Materials.

Choose Your Side

Make a long masking tape line on the floor. Have the students stand on the line in single file, facing you. Prepare *true* and *false* sentences on sentence strips, related to the concept being studied. Designate one side of the line for "true" and the other side for "false." Hold up a sentence strip. The students should read the sentence silently and then hop to the appropriate side of the line. For example, if the statement is "false," they should hop to the "false" side of the line. Repeat until the students have responded to all of the sentences.

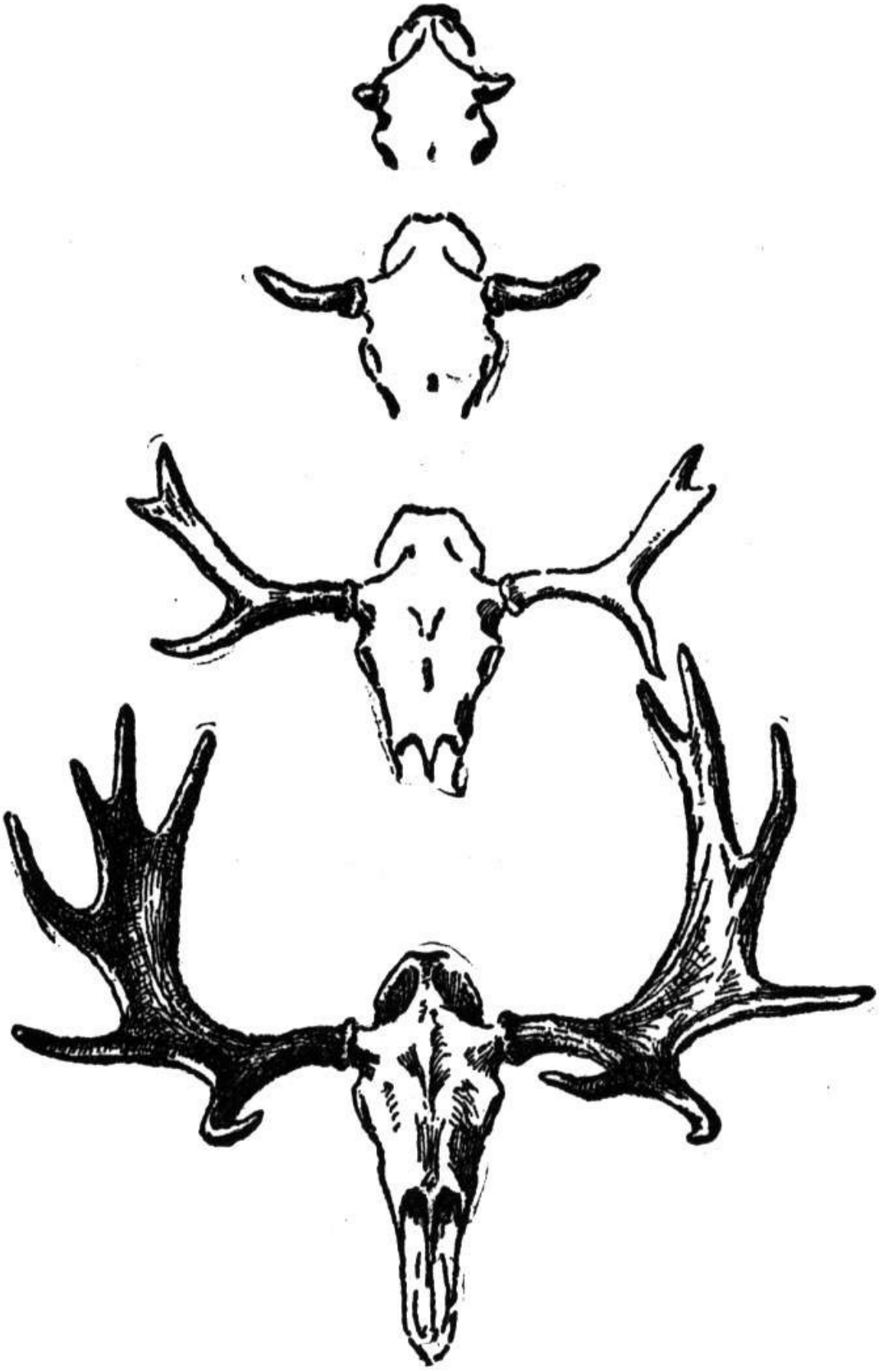
WRITING

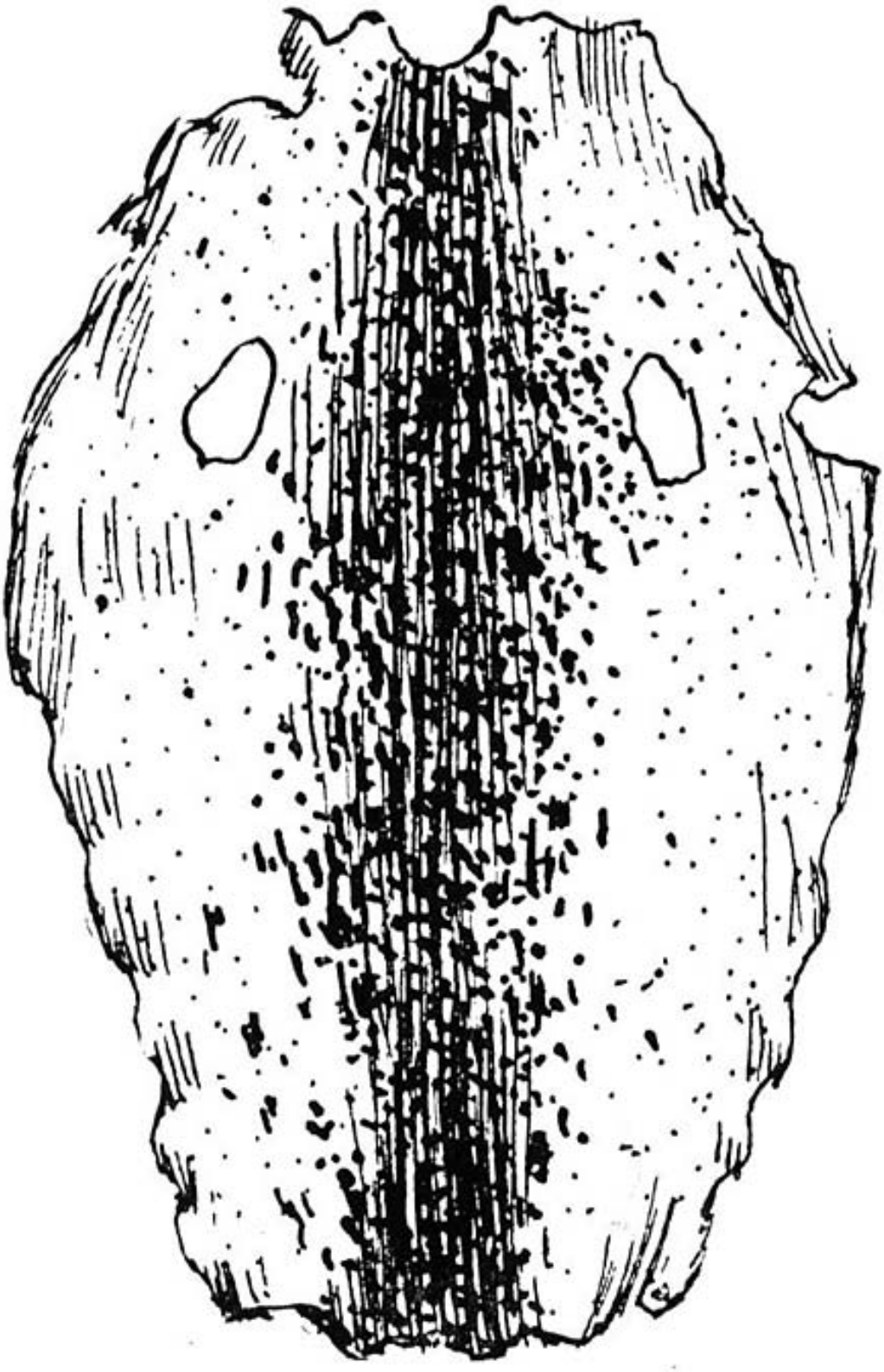
Use the activity pages from the Student Support Materials.

Writing

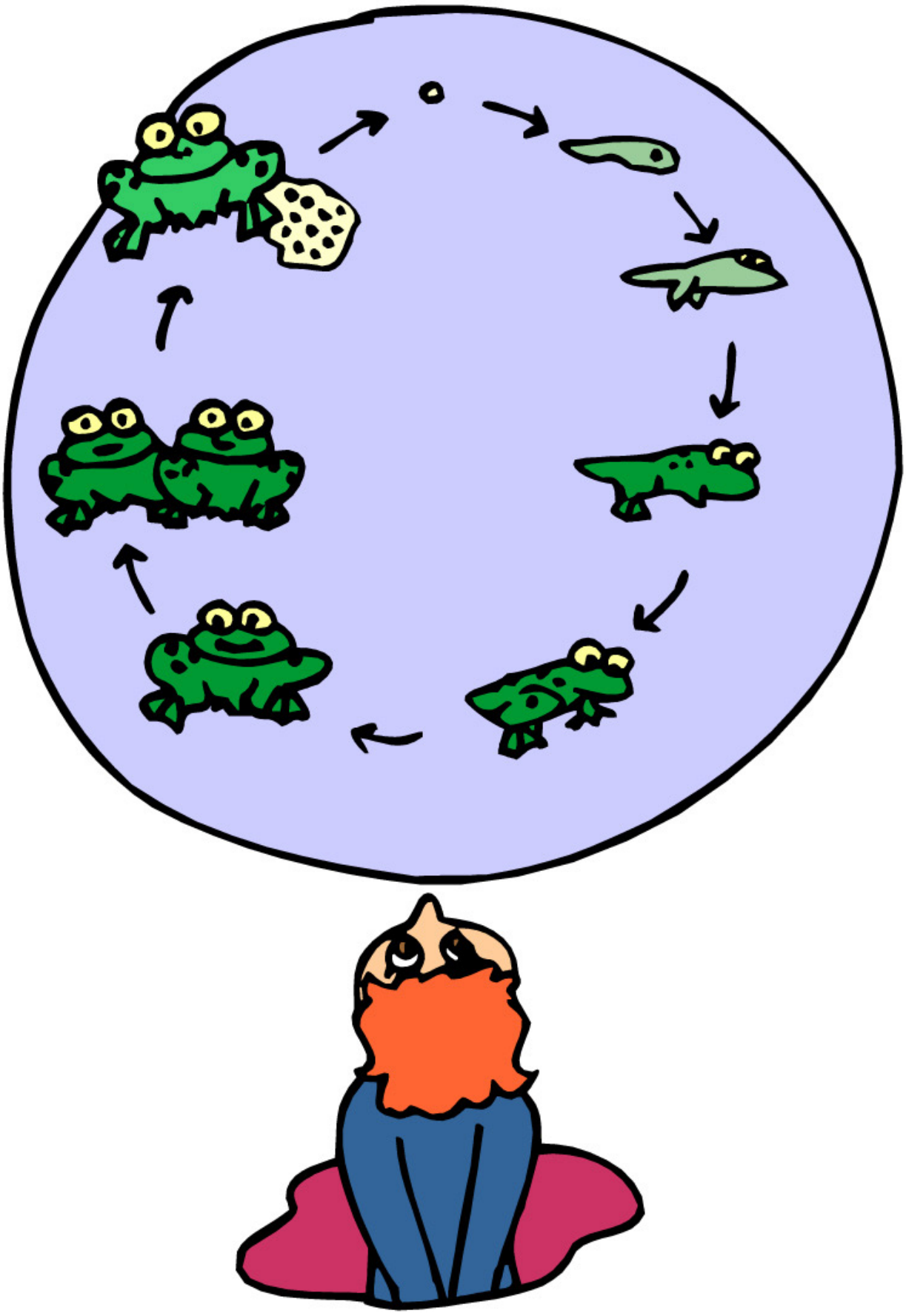
Prepare a copy of the "Morse Code" for each student. Spell a sight word, using the dots and dashes for the letters of the word. The students should write the dots and dashes that you say on their sheets of paper. After a letter has been said in this way, the students should make slashes on their papers to separate the letters. When the word has been completely spelled using the Morse Code, the students should use their charts to determine the word you spelled. Rather than saying the words "dot/dash," you may wish to use the light of a flashlight or sound effects for this process.

Vocabulary Images

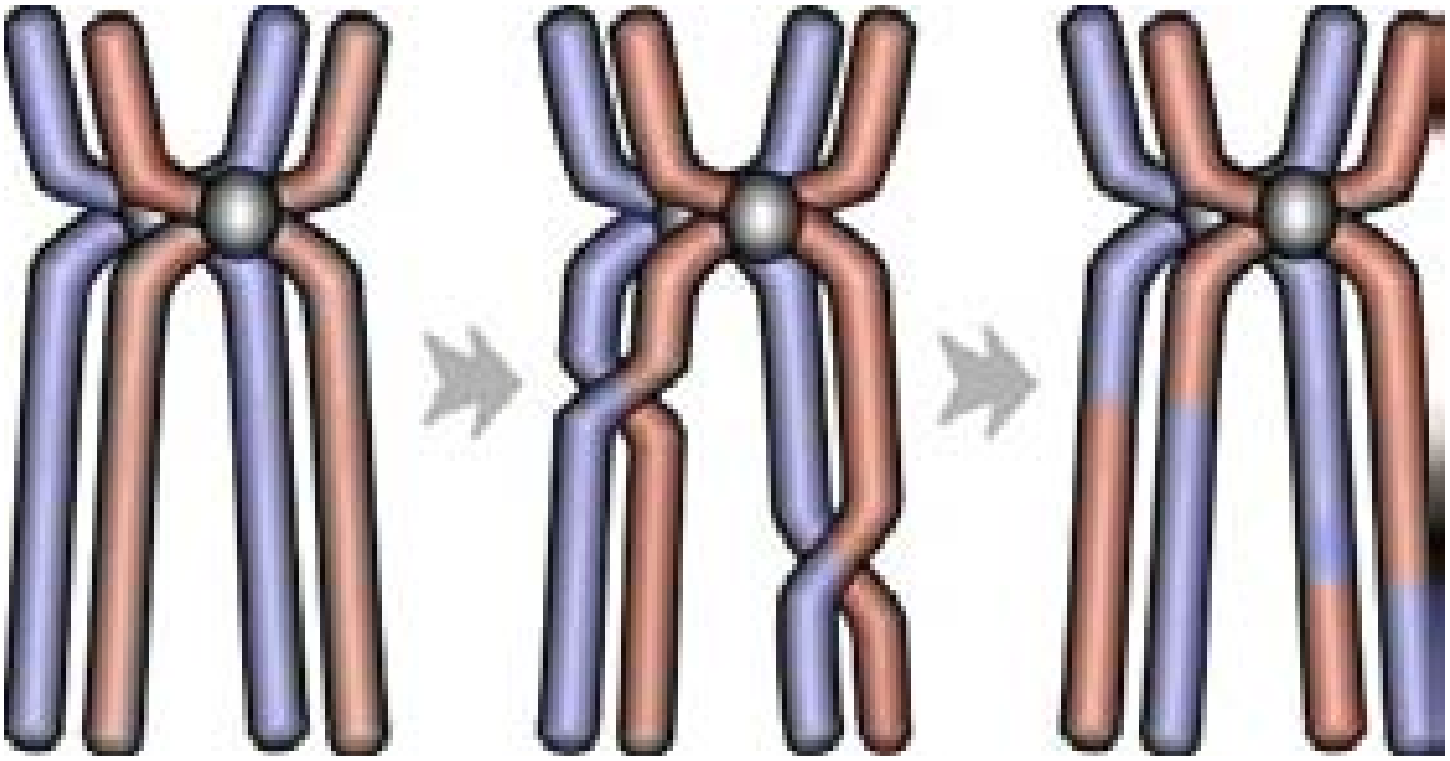


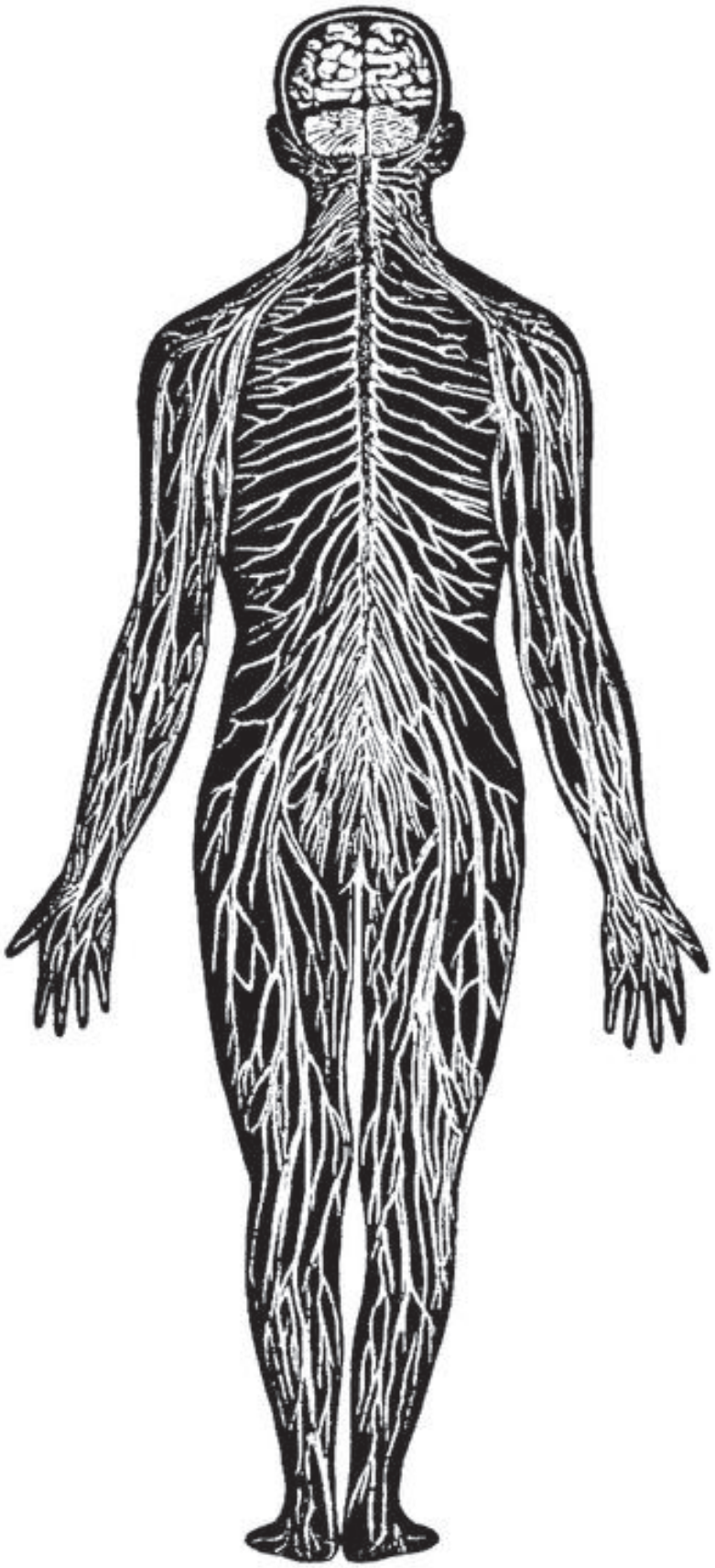


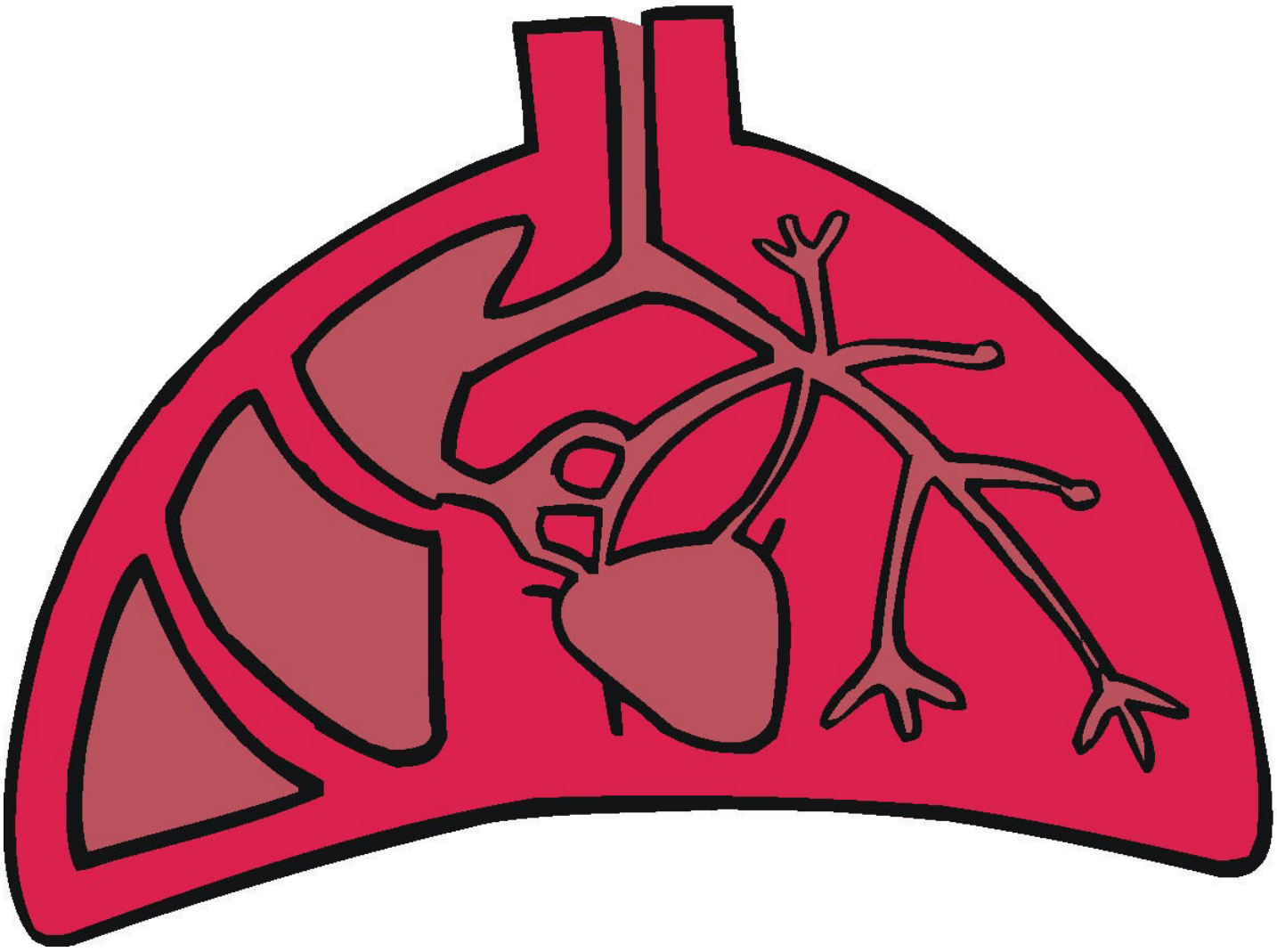
"Blue Back"



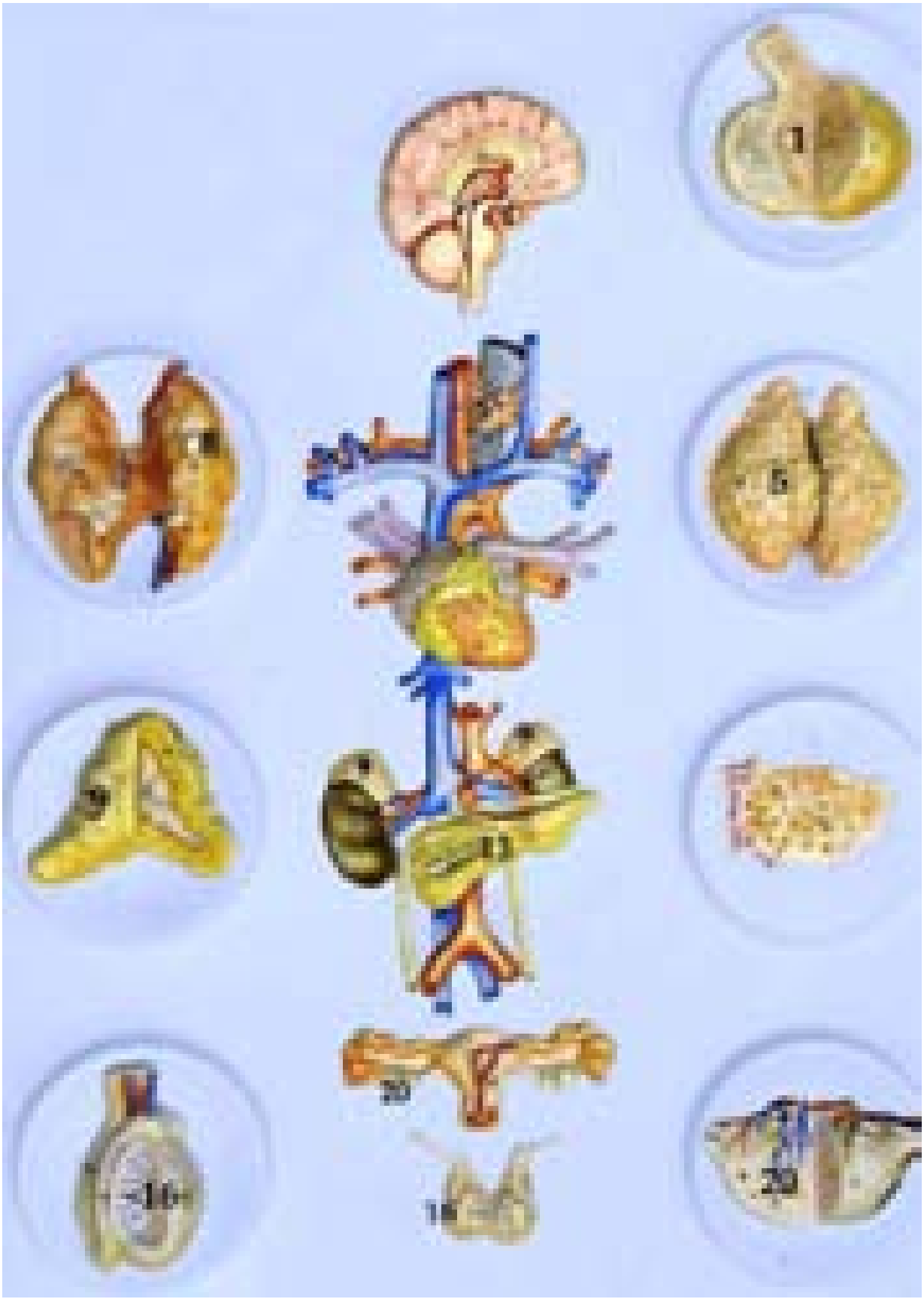
linked







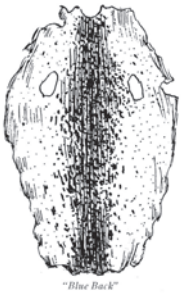
transformation

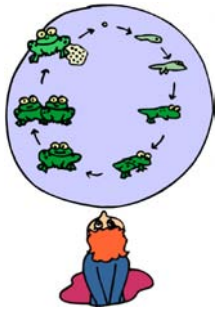


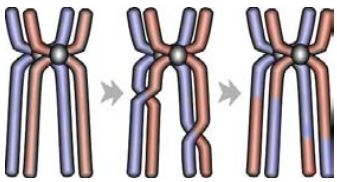
STUDENT SUPPORT MATERIALS

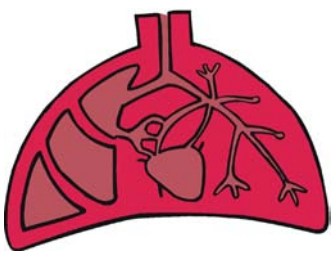
Listening

Say these words to the students - they write the numbers of the words under the pictures.
(1)transformation (2) nervous system (3) diverse (4) life cycle (5) immune (6) organ system
(7) linked (8) development (9) musculoskeletal (10) endocrine (11) integument (12) transfer









True or False?

Read the following sentences to the students. The students should write "true" or "false" for each of the sentences.

1. Some diseases can affect most or all of the organs in one particular organ system, while leaving the other systems alone.
2. If you suddenly start having difficulty with your fine motor skills (like tying your shoe laces or playing the piano like you used to), you may have a problem with your nervous system.
3. A person's immune system is responsible for secondary sexual characteristics like facial hair in boys and widening hips in girls.
4. Activities like lifting weights and doing sports can have an effect on one's endocrine system.
5. A sprinter's ability to run fast depends heavily on how good of a musculoskeletal system he or she has.
6. When butchering a deer, one is mostly concerned with the deer's integumentary system.
7. Some tapeworms require two different hosts to complete their life cycle.
8. Having some diversity in the courses you take and the activities you do can help you get into a good college.
9. The development of a star athlete often starts when that person is very young.
10. Social class and political affiliation are often linked, but not always.
11. If I want to transfer data from one computer to another, all I need to do is set the computers near each other for a couple hours and they'll do it on their own.
12. "Transformers" have this name because they undergo a transformation from one form (normally a car or vehicle of some sort) to another (normally humanoid/robot-like).

Answers
1. T, 2. T, 3. F, 4. T, 5. T, 6. F, 7. T, 8. T, 9. T, 10. T, 11. F, 12. T

STUDENT SUPPORT MATERIALS

Sight Words

development

diverse

endocrine

immune

integument

organic linked musculoskeletal

nervous system

transfer

organ system transformation

STUDENT SUPPORT MATERIALS

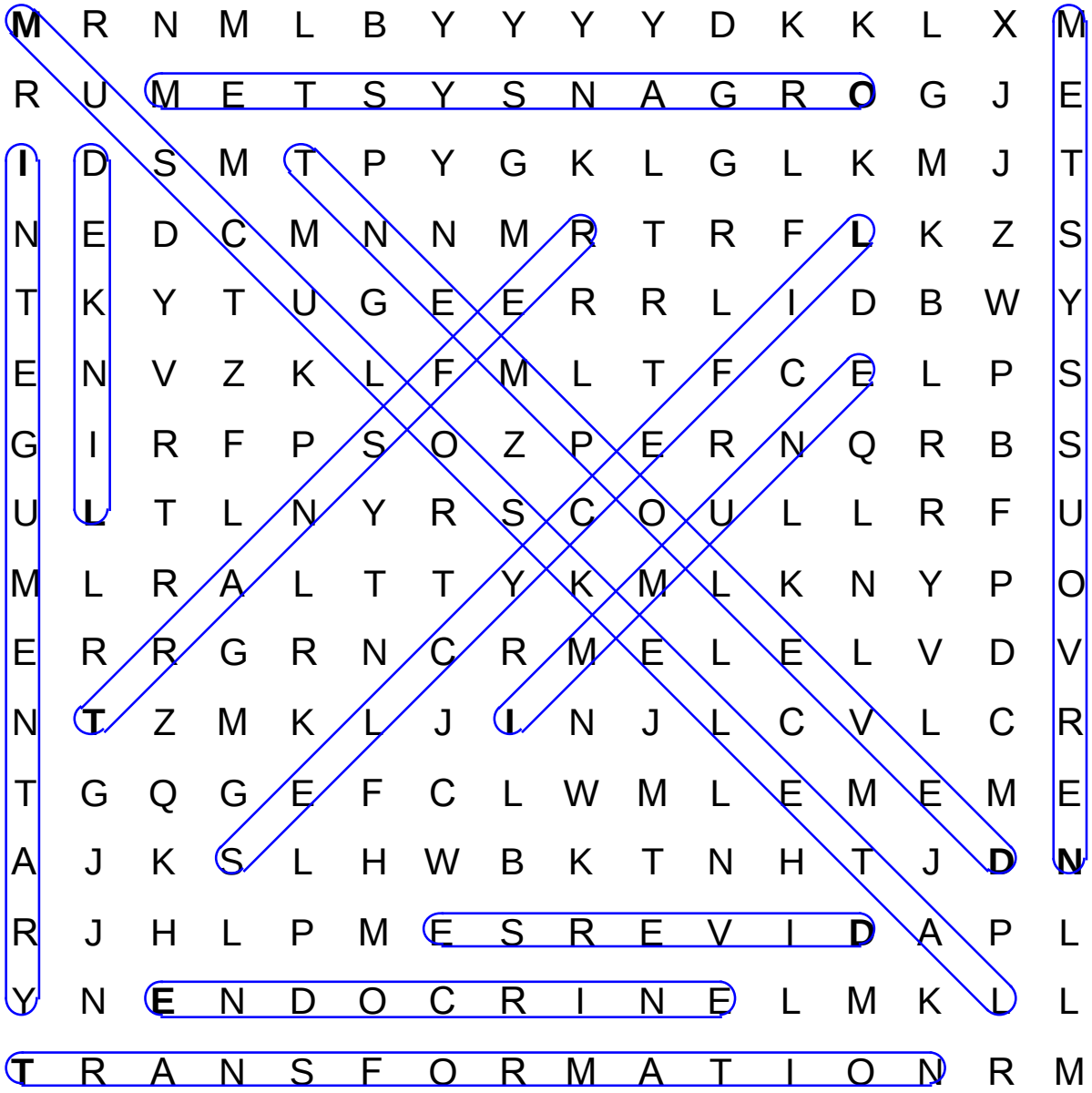
Reading

Word Find

M R N M L B Y Y Y Y D K K L X M
R U M E T S Y S N A G R O G J E
I D S M T P Y G K L G L K M J T
N E D C M N N M R T R F L K Z S
T K Y T U G E E R R L I D B W Y
E N V Z K L F M L T F C E L P S
G I R F P S O Z P E R N Q R B S
U L T L N Y R S C O U L L R F U
M L R A L T T Y K M L K N Y P O
E R R G R N C R M E L E L V D V
N T Z M K L J I N J L C V L C R
T G Q G E F C L W M L E M E M E
A J K S L H W B K T N H T J D N
R J H L P M E S R E V I D A P L
Y N E N D O C R I N E L M K L L
T R A N S F O R M A T I O N R M

Development
Diverse
Endocrine
Immune
Integumentary
Life Cycles
Linked
Musculoskeletal
Nervous System
Organ System
Transfer
Transformation

Word Find Solution



Find The Word

development
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endocrine
immune
integument
life cycle
linked
musculoskeletal
nervous system
organ system
transfer
transformation

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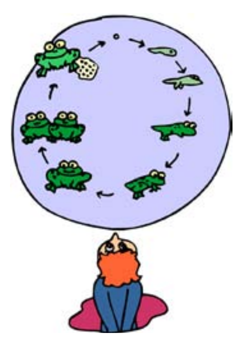

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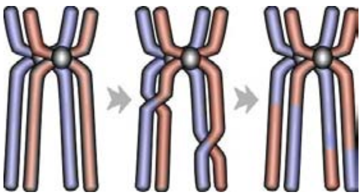
transformation

Find The Word



development
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integument
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musculoskeletal
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organ system
transfer
transformation

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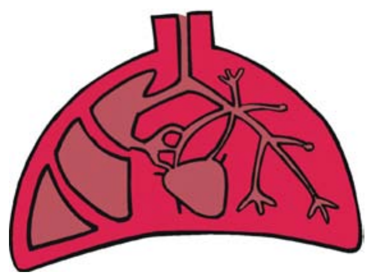

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transformation

Match The Halves

Have the students write the numbers/letters for sentence halves that match.

1. *It was once thought that the nervous system*
2. *Sometimes during organ transplants one has to use drugs to suppress*
3. *The endocrine system is responsible*
4. *Lifting weights not only strengthens muscle but also*
5. *The integumentary system needs to be supple yet strong*
6. *The life cycle of humans*
7. *Without diversity our lives would*
8. *Teachers attend conferences, take classes, and observe each other teach*
9. *Are level of education achieved and amount of income*
10. *Will you be able to transfer*
11. *After graduation you will undergo such an enormous transformation that*
12. *We depend on the smooth operation*

A. *Of all of our organ systems.*

B. *Includes a long infant and adolescent stage during which much learning takes place.*

C. *For our body's "flight or fight" response.*

D. *Even your closest friends will not recognize you.*

E. *What you learn today to your life outside this classroom?*

F. *Bone, which are the two main parts of the musculoskeletal system.*

G. *to allow for shock absorption and to keep our muscles and bones in place.*

H. *Was unable to repair itself if damaged—we now know this to be untrue.*

I. *One's immune system*

J. *Be very monotonous.*

K. *in their pursuit of professional development.*

L. *Linked?*

Answers

1/H 2/I 3/C 4/F 5/G 6/B 7/J 8/K 9/L 10/E 11/D 12/A

Word & Definition Match

Have the students write the word numbers on their matching definitions.

a difference or variety	*also known as the locomotor system*	*where an organism passes from fertilized zygote into maturity*	*the state of being transformed*
A natural outer covering or coat	*take from one place to another*	*A group of related organs*	*protected by inoculation*
produces internal secretions	*genes located on the same chromosome*	*The process of developing*	*tissue in most animals that controls body functions*

1.development 2. diverse 3. endocrine 4. immune 5. integument

6. life cycle 7. linked 8. musculoskeletal 9. nervous system 10. organ system

11. transfer 12. transformation

Which Belongs?

Have the students circle/identify the word that is correct for each sentence.

1. Organ systems/Diversity vary from phylum to phylum, but they are very similar overall.
2. Insects have a decentralized nervous/musculoskeletal system, while mammals' is centralized with a brain and spinal cord.
3. Once you have Chicken Pox you are immune/linked to it.
4. The brain is also part of the endocrine/immune system since it can respond to and cause the releasing of hormones.
5. Doing Judo falls repeatedly changes your bone density and your muscle tone; one could say that your entire endocrine/musculoskeletal system adapts to the practice.
6. The connective tissue (that is, tendons, ligaments, and fascia) makes up your endocrine/integumentary system.
7. During both the aquatic (larval) stage and the reproductive (flighted) stage of a dragonfly's life cycle/transformation the dragonfly feeds on mosquitoes.
8. While sitting on a city bus in Reno, Nevada, one can see the diversity/transformation of our society.
9. Schooling is part of how we support the endocrine system/development of our children in our society.
10. How hard someone works and how much money they make is not necessarily linked/transferred, although it often is.
11. The skills one learns in a martial arts class can transfer/link to certain sports, like fencing, boxing, wrestling or even football and basketball.
12. When one goes to college or trade school, one can undergo a complete transformation/development in one's personality and life outlook--so much so that it is hard to recognize that person when you see them years later.

Answers

1. organ systems, 2. nervous, 3. immune, 4. endocrine, 5. musculoskeletal,

6. integumentary, 7. life cycle, 8. diversity, 9. development, 10. linked, 11. transfer

12. transformation

What's The Answer?

Have the students read the questions and then select the correct answer for them.

1. **Which organ system is responsible for processing the food we eat?**
   - (a) Digestive system
   - (b) Nervous system
   - (c) Reproductive system

2. **I am feeling very _____--I'm jumpy, edgy, and just having difficulty focusing on the task at hand.**
   - (a) Nervous
   - (b) Immune
   - (c) Linked

3. **My immune system consists, in part, of my**
   - (a) White blood cells and antibodies.
   - (b) Heart, arteries, and veins.
   - (c) small intestine, large intestine, and colon.

4. **If someone's hormones are not balanced in the correct way, we say that person has a problem with which body system?**
   - (a) Lymphatic system
   - (b) Musculoskeletal system
   - (c) Endocrine system

5. **A person's _____ system is really just a system of levers, pulleys, and** other simple machines.
   - (a) Digestive
   - (b) Musculoskeletal
   - (c) Transfer

6. **Ligaments, cartilage, tendons, and fascia make up the _____ system.**
   - (a) Integumentary
   - (b) Immune
   - (c) Nervous

7. **Some animals have a short _____, like a mosquito or dragonfly, while others have a longer one, like an elephant or a blue whale.**
   - (a) Life cycle
   - (b) Temper
   - (c) Immune system

What's The Answer?

Have the students read the questions and then select the correct answer for them. They should fill in the appropriate circles beside the answers of their choice.

8. The loss of animals like the polar bear and panda will be dramatic examples of how this planet is losing its _____ of life.

(a) Diversity
(b) Cause
(c) Circle

9. Of the following options, which would help most in Jimmy's development as a Judo practitioner?

(a) Jimmy will always select a Judo character when playing his favorite video game, Judo World Tournament.
(b) Jimmy will attend Judo practice every day and give his best effort while at practice.
(c) Jimmy will tell his friends about his intentions to be an expert at Judo, but will never attend practice because his favorite show, Kung Fu, is on at that time.

10. How likely do you think it is that TV viewing is linked to slower language development in toddlers?

(a) Very likely
(b) Maybe likely
(c) Not very likely

11. Do the skills that one practices on video/computer games transfer to relevant or important real-world situations?

(a) Yes, always
(b) No, never
(c) In some instances, but not others

12. When a caterpillar emerges from its cocoon, it has undergone a complete transformation called

(a) mutation
(b) metamorphosis
(c) shape shifting

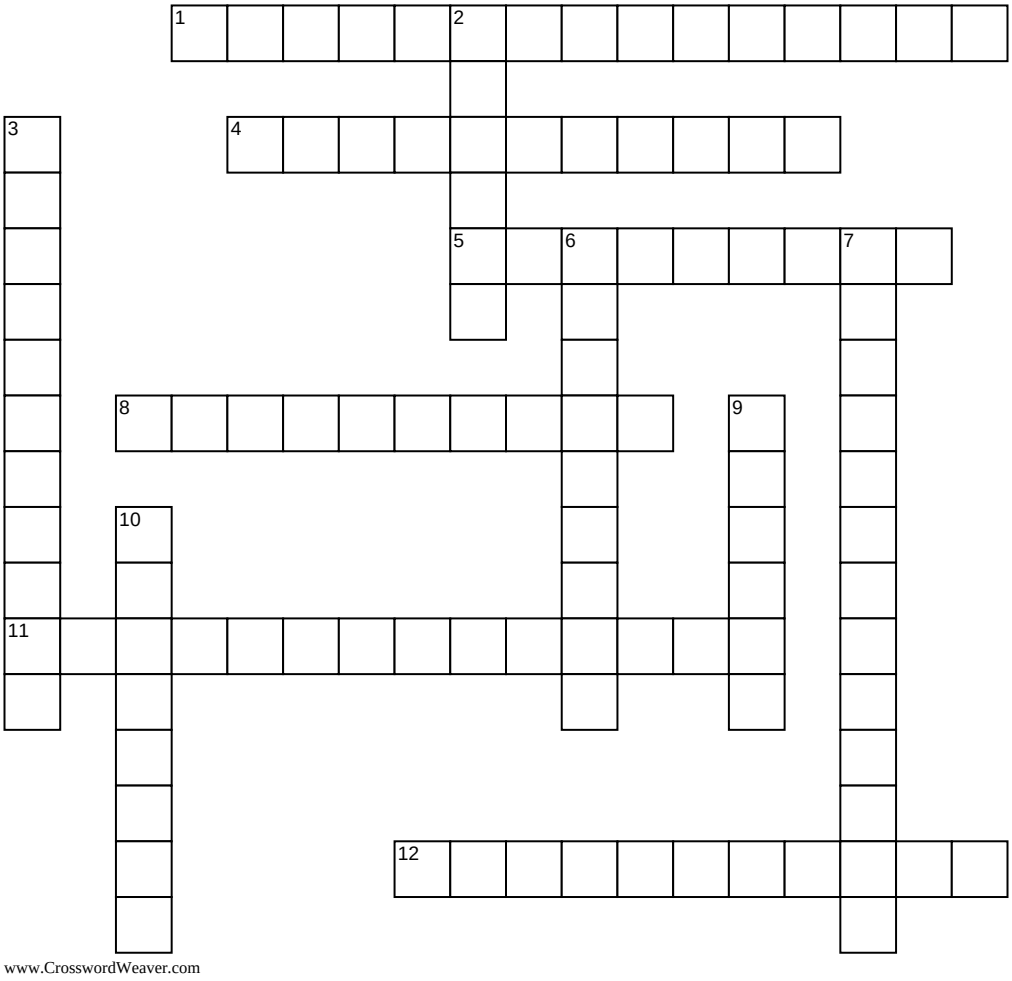
Answers
1. a, 2. a, 3. a, 4. c, 5. b, 6. 7. a, 8. a, 9. b, 10. b, 11. c 12. b

STUDENT SUPPORT MATERIALS

Writing

C-1: Concepts of Life Science

Unit 3



ACROSS

1 an organ system that gives animals the ability to physically move using the muscles and skeletal system.
4 a group of related organs.
5 producing internal secretions that are transported around the body by the bloodstream.
8 the course of stages through which an organism passes from fertilized zygote until maturity.
11 the act of transforming.
12 the process of developing.

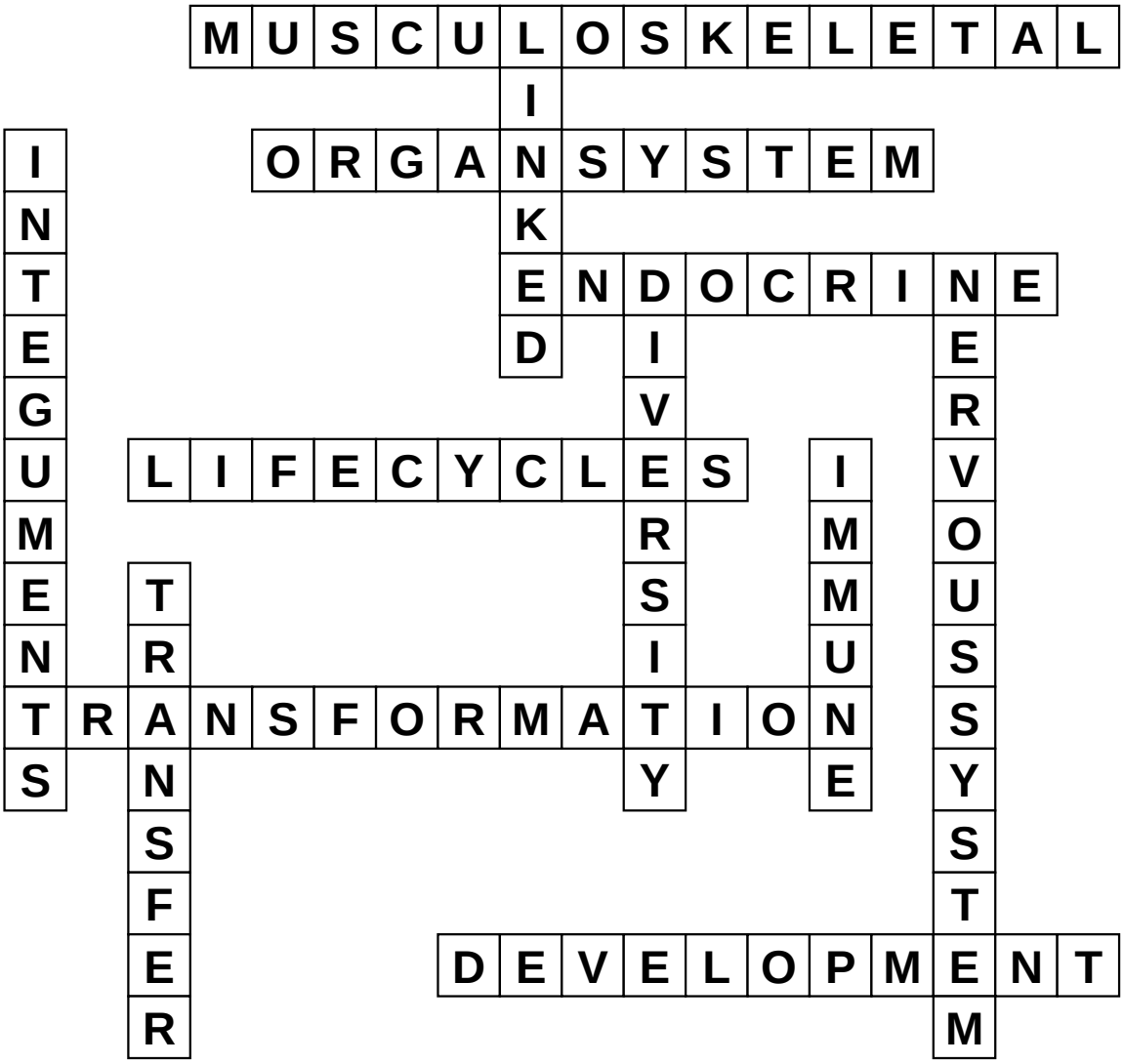
DOWN

2 refers to genes that are on the same chromosome and generally inherited together.
3 a natural outer covering or coat, such as the skin of an animal the membrane enclosing an organ or in botany, the envelope of an ovule.
6 the quality of being diverse or different.
7 it controls the body functions.
9 protected by inoculation.
10 You take it from one place or one form to another.

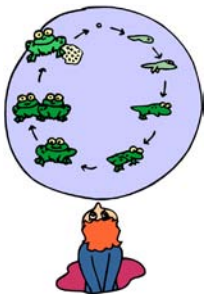
C-1: Concepts of Life Science

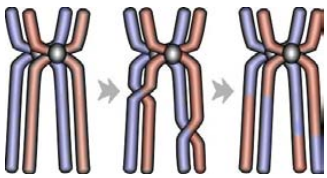
Unit 3

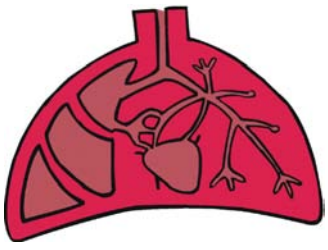
Solution:



Write The Words







Write The Words

Complete The Sentence

Have the students write the key words in the blanks.

1. An _____ is a group of related organs.

2. Humans have a complex _____ system that is comprised of a brain, a spinal cord, and thousands of tiny threadlike cells called nerves.

3. If someone is _____ to a disease, they cannot catch it.

4. The _____ system is responsible for manufacturing, releasing, and regulating the hormones in the body.

5. People who suffer from _____ diseases sometimes have trouble lifting heavy objects or performing tasks that require coordination or strength.

6. Without our _____ system, our bones wouldn't be connected to our muscles, and our skeletal system would not have any integrity.

7. The _____of a salmon includes hatching as an egg in fresh water, reaching maturity in the open ocean, and then returning to the fresh water where it hatched to lay and fertilize eggs.

8. It is important to have _____ in a classroom so that multiple points of view are heard.

9. During a child's _____ in the womb, she becomes accustomed to her mother's voice and movements.

10. Whether you want to believe it or not, your political views are probably _____ to your birth order in your family.

11. We are in hopes that you will be able to _____ the knowledge gained in these exercises to your adventures in science class.

12. Sometimes when people have traumatic head injuries, their personality can undergo significant _____.

Answers

1. organ system, 2. nervous, 3. immune, 4. endocrine, 5. musculoskeletal,
6. intugementary 7. life cycle 8. diversity, 9. development, 10. linked, 11. transfer,
12. transformation

Creative Writing Activity Page

Have the students write sentences of their own, using the key words from this unit. When the students' sentences are finished, have them take turns reading their sentences orally. The students should say "Blank" for the key words; the other students must name the "missing" words. You may wish to have the students write the "definitions" for the key words.

development

diverse

endocrine

immune

integument

life cycle

linked

musculoskeletal

nervous system

Creative Writing Activity Page

Have the students write sentences of their own, using the key words from this unit. When the students' sentences are finished, have them take turns reading their sentences orally. The students should say "Blank," for the key words; the other students must name the "missing" words. You may wish to have the students write the "definitions" for the key words.

organ system

transfer

transformation

Creative Writing Activity Page

Have the students write sentences of their own, based on the picture below. When finished, have each student read his/her sentences to the others.

STUDENT SUPPORT MATERIALS

Reinforcement Activities

Purposes: Students will learn how the sun moves to bring us seasons.

Students will discover that plants contain many pigments to capture sunlight for photosynthesis.

From the work of S. Marino

The Sun and Plants

☐ **Activities**

• Talk to students about the movement of the sun. How does it create seasons? Why is it such an important aspect for many cultures? Students will research the importance of the sun to one particular culture and give a 2 minute presentation on their findings. A good website to start with would be: http://solar-center.stanford.edu/AO/
• At the end of the presentations ask students what was similar between some of the cultural beliefs and practices regarding the sun.

• Leaves are like solar panels. Review the parts of leaves students discovered in the previous lab.
• Show students the Light Spectrum. Discuss how light is made of many wavelengths.
• Discuss the importance of chlorophyll in the process of photosynthesis. Talk about xanthophyll and caratenoids which help to capture more light.

☐ Materials
- Computers with web access
- Light Spectrum
- Optional: prism
- Mixed Greens salad

Optional: Other local plants (Seaweed is good)

Colors to Catch the Sun

Materials:

- 1 pencil
- Plastic wrap
- Beakers
- Filter paper
- Isopropyl Alcohol
- 3 different leaves (the greater the color difference the better)
- A coin (like a penny or quarter)

Methods

- Cut the filter paper into 3, one-inch wide strips.
- Draw a line with the pencil 2 centimeters from the bottom.
- From the line you drew cut the sides to create a point as seen in the diagram.
- Place one of the leaves on one of the strips. Roll the coin over the leaf pressing the juices into the filter paper on the pencil line you drew.
- Repeat the same process for the other two leaves and filter paper strips.
- Pour 1 centimeter of Isopropyl Alcohol into the beaker.
- Tape the 3-pieces of filter paper to the pencil so the pointed ends hang down evenly.
- Place the filter papers into the beaker so they just touch the Isopropyl Alcohol. The pencil should balance the papers on the beaker.
- Cover the top with the plastic wrap.
- Allow for the Isopropyl Alcohol to pull the pigments up the filter paper. Once the Isopropyl Alcohol comes within a centimeter from the top of the paper.
- Place the filter paper on the table or paper towel and allow them to dry.
- Tape the papers into your lab book. Draw a line to each of the different pigments that you see on each paper.
- Label the pigments as chlorophyll a, chlorophyll b, xyanthophyll, or caratenoids.

Unit Assessment

Unit 3 Quiz

C1, Unit 3, Concepts of Life Science Quiz

Name: _____

Date: _____

Matching: Match the key vocabulary word on the left with the correct definition on the right. Place the letter from the definition in front of the word it matches.

1) _____ endocrine gland

2) _____ musculoskeletal

3) _____ integuments

4) _____ nervous system

5) _____ organic

6) _____ organ system

7) _____ level

a. a natural outer covering or coat, such as the skin of an animal or the membrane enclosing an organ

b. a group of related organs

c. an extent, measure, or degree of intensity or achievement

d. any of various glands producing hormonal secretions that pass directly into the bloodstream.

e. The system of cells, tissues, and organs that regulates the body's responses to internal and external stimuli.

f. things pertaining to, derived from, or produced by living things

g. concerning, involving, or made up of both the muscles and the bones

Fill in the Blank: Use a correct key vocabulary word to complete the statements below.

8) When you receive a shot or inoculation at the doctor's office or clinic for influenza or pneumonia, this will help make you _____ to the disease.

When animals, like brown bears, have different varieties among their species, it indicates that they have _____ qualities or the quality of being different.

If your parents have black hair and brown eyes and you do too, you probably have genes that are on the same chromosome and are l_____ or inherited together.

Multiple Choice: Circle the best choice for answering the question below.

13) The change, as of an equation or quantity, into another form without altering the value is called....

a) transfer

b) translate

c) transformation

14) To move or shift something from one place to another is to _____ it.

a) transform

b) transfer

c) translate

15) Which of the following is NOT an example of an endocrine gland?

a) thyroid

b) pituitary

c) adrenal

Illustrations: Draw a picture that best illustrates the meaning of the following key vocabulary.

16) Write a definition for the key vocabulary word TRANSFER , OR draw a picture that illustrates the meaning of the word.

17) Write a definition for the key vocabulary word TRANSFORMATION, OR draw a picture that illustrates the meaning of the word.

C1, Unit 3, Concepts of Life Science Quiz

Name: _____
Date: _____

Matching: Match the key vocabulary word on the left with the correct definition on the right. Place the letter from the definition in front of the word it matches.

1) **d** endocrine gland
2) **g** musculoskeletal
3) **a** integuments
4) **e** nervous system
5) **f** organic
6) **b** organ system
7) **c** level

a. a natural outer covering or coat, such as the skin of an animal or the membrane enclosing an organ
b. a group of related organs
c. an extent, measure, or degree of intensity or achievement
d. any of various glands producing hormonal secretions that pass directly into the bloodstream.
e. The system of cells, tissues, and organs that regulates the body's responses to internal and external stimuli.
f. things pertaining to, derived from, or produced by living things
g. concerning, involving, or made up of both the muscles and the bones

Fill in the Blank: Use a correct key vocabulary word to complete the statements below.

8) When you receive a shot or inoculation at the doctor's office or clinic for influenza or pneumonia, this will help make you **immune** to the disease.

9) When an organism passes through various stages of growth, from a fertilized zygote to maturity, this is called a L**ife** C**ycle**.

10) Another term used to express growth, is d**evelopment**.

11) When animals, like brown bears, have different varieties among their species, it indicates that they have **diverse** qualities or the quality of being different.

12) If your parents have black hair and brown eyes and you do too, you probably have genes that are on the same chromosome and are l**inked** or inherited together.

Multiple Choice: Circle the best choice for answering the question below.

13) The change, as of an equation or quantity, into another form without altering the value is called....

a) transfer

b) translate

c) transformation

14) To move or shift something from one place to another is to _____ it.

a) transform

b) transfer

c) translate

15) Which of the following is NOT an example of an endocrine gland?

a) thyroid

b) pituitary

c) adrenal

d) tonsils

Illustrations: Draw a picture that best illustrates the meaning of the following key vocabulary.

16) Write a definition for the key vocabulary word TRANSFER , OR draw a picture that illustrates the meaning of the word.

Transfer-when something is taken or moved from one place or one form to another.

17) Write a definition for the key vocabulary word TRANSFORMATION, OR draw a picture that illustrates the meaning of the word.

Transformation-the act of transforming or the state of being transformed.

UNIT 4

Sealaska Heritage Institute

INTRODUCTION OF

Key Vocabulary

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Carbon

PLACE-BASED PERSPECTIVE

Show students pictures of coal, diamonds, humans, and a model of a buckyball (fullerene). Ask the students what these objects have in common. Use this discussion to introduce *carbon*.

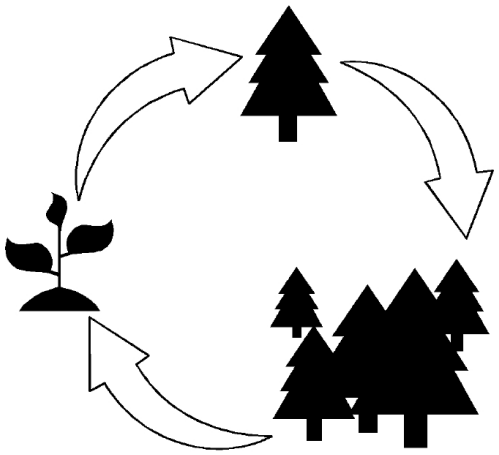
HERITAGE CULTURAL PERSPECTIVE

Carbon, obtained from old campfires was wiped on a person's face during times of mourning. The opposite moiety would apply the carbon to the faces of the mourners. This practice is used today as well. *Carbon*, from the old campfires, was also used as a base for creating black paint, which was used for art purposes.

Nitrogen

PLACE-BASED PERSPECTIVE

Show a picture of the symbol (N) for *nitrogen*. Have all the students take a deep breath and hold it. Ask them what they just breathed in. Explain to them that the air we breathe is composed of about 78% *nitrogen*. Let them exhale if they haven't yet.



Cycle

PLACE-BASED PERSPECTIVE

Show a picture and discuss the life *cycle* of a butterfly and draw it on the board for students to visualize that a *cycle* is a circle.

HERITAGE CULTURAL PERSPECTIVE

There are many *cycles* evident in Southeast Alaska. This is also reflected in the harvesting of resources. In spring, herring roe, black seaweed, hooligan, and spring king salmon are harvested. In the summer, berries, other plants, and the pink and red salmon are harvested. In the fall, game animals are harvested. In the late fall to early winter, potlatches are held. These activities are *cyclical*.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Ecosystem

PLACE-BASED PERSPECTIVE

Compare pictures of Southeast Alaska and a desert. Discuss the different *ecosystems* with students.

HERITAGE CULTURAL PERSPECTIVE

The *ecosystem* of Southeast Alaska is a northern rainforest. Native peoples were careful to live in harmony with the environment. Natural resources were not depleted.

Input

PLACE-BASED PERSPECTIVE

Show the students a cell phone. Tell them that you want to put a person's number in the phone for automatic dialing. Have the students describe how this can be done. Use this to introduce *input*. Cite other examples of *input*.

HERITAGE CULTURAL PERSPECTIVE

At a potlatch, a *Naakáani* acted as a messenger between the host of the party and his guests. Today, he/she provides valuable information such as the names of the attending clans, the leaders' names and the houses they come from. He/She also provides *input* to the guests about the planned potlatch activities arranged by the host.

Energy

PLACE-BASED PERSPECTIVE

Bring in a can of Red Bull and discuss how it gives the students *energy*.

HERITAGE CULTURAL PERSPECTIVE

Salmon egg cheese is one source of *energy* for people in Southeast Alaska. To make salmon egg cheese, salmon eggs are dried in a smoke house. When dried, they are mashed and eaten as a source of *energy*. Being light-weight, and durable, egg cheese is easily transportable.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Carrying Capacity

PLACE-BASED PERSPECTIVE

Show an empty egg carton (for 1 dozen eggs). Tell the students that you want to put 15 eggs in the carton - lead them to understand that that is impossible. Use this analogy to introduce *carrying capacity* to the students.

Discuss how halibut IFQs are based on the carrying capacity of the environment, for a particular area.

HERITAGE CULTURAL PERSPECTIVE

Native peoples are stewards of the environment. In this capacity, they keep watch on the plants, animals, waterforms and landforms in their ecosystem. Prior to commercial harvesting, Southeast Alaska supported abundant wildlife, in all categories. Today, quotas have to be set to ensure an adequate supply of fish and wildlife for future generations.

Limiting Factors

PLACE-BASED PERSPECTIVE

Show students a picture of a cactus and sequoia tree. Have the students contrast the two environments for the cactus and sequoia tree - use this to introduce *limiting factors* in terms of the environment.

HERITAGE CULTURAL PERSPECTIVE

Southeast Alaska is rich in wildlife and vegetation due to a moderate and rainforest type climate. Certain non-indigenous plants do not thrive in Southeast Alaska due to the wet climate. In the northern part of Southeast Alaska, yellow cedar is scarce due to climate.

Biodiversity

PLACE-BASED PERSPECTIVE

Show the students the pictures of Southeast Alaska and a desert, used for “ecosystem.” Have them name flora and fauna in the two. Draw the students’ attention to the fact that the list for Southeast Alaska is infinitely longer than that for the desert - use this to introduce *biodiversity* to the students.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Productivity

PLACE-BASED PERSPECTIVE

Show the class a picture of a farmer - have them determine ways in which the farmer can increase his *productivity*, e.g. by using fertilizer, using machines, etc.

HERITAGE CULTURAL PERSPECTIVE

Traditionally, Native peoples of Southeast Alaska would grind together unused fish parts and seaweed to create a natural fertilizer for their gardens.

Population

PLACE-BASED PERSPECTIVE

Write the words local, state, and national on the board. Have students describe the people in each of these groups. Discuss how each group is a *population* or group of organisms of the same species that live together.

HERITAGE CULTURAL PERSPECTIVE

Native *populations* have historically been susceptible to outside diseases which affected the populations. As the population within a clan house grew and became too large for that house, another clan house was built.

The Southeast has a wide variety of other natural *populations*.

Environment(s)

PLACE-BASED PERSPECTIVE

Once again, show the pictures of Southeast Alaska and a desert. Have the students imagine how living in the two *environments* would be different.

Cite other environments to add to the discussion.

HERITAGE CULTURAL PERSPECTIVE

Southeast Alaska contains three major *environments*: coastal, forest, and mountainous.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Organic

PLACE-BASED PERSPECTIVE

Bring in some fruits and vegetables with an *organic* label (or show pictures of fruits and vegetables) and discuss what *organic* means.

HERITAGE CULTURAL PERSPECTIVE

All edible plants in Southeast Alaska are *organic*.

Enzyme

PLACE-BASED PERSPECTIVE

Show a picture of computer - have the students suggest how the computer's speed can be increased - they should suggest increasing the computer's memory; an *enzyme* is similar in the human body in that it allows processes to happen faster.

HERITAGE CULTURAL PERSPECTIVE

The tallow lining of the moutain goat's stomach is eaten with salmon to aid with digestion. Both brains and urine were used to prepare animal's skins for tanning. They acted as *enzymes* on the skins.

Seal oil is eaten with berries and other foods to aid with digestion.

Solar

PLACE-BASED PERSPECTIVE

Show a picture of a *solar* calculator. Discuss with the students the uses and benefits of solar energy.

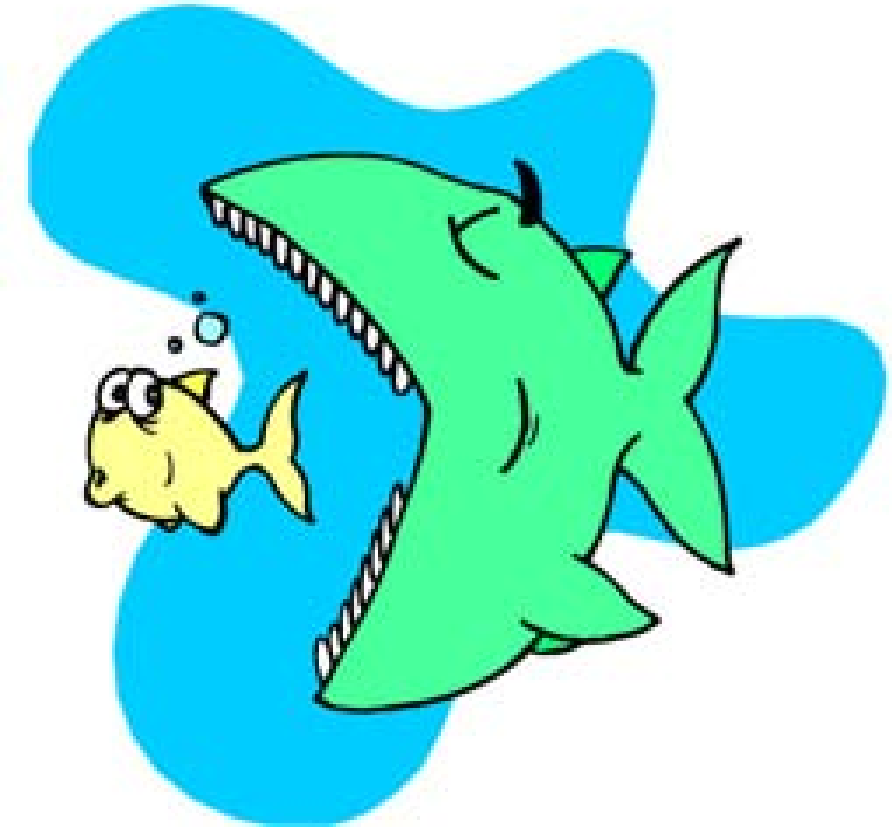
HERITAGE CULTURAL PERSPECTIVE

The sun is represented in Native literature and art forms. One story that highlights the characteristics of the sun is *The Sun Children*.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Level

PLACE-BASED PERSPECTIVE	HERITAGE CULTURAL PERSPECTIVE
Show the students a picture of a “fancy” car, a “regular” car and a bicycle. Have them suggest an order for them, e.g. from most expensive to cheapest, most powerful to least powerful, etc. Use this as an analogy for trophic *levels* of animals - cite examples for the students.	King salmon is the most popular salmon due to its *level* of flavor and richness.



Language Skills

Language & Skills Development

LISTENING

Use the activity pages from the Student Support Materials.

Flashlight Find

Mount the vocabulary illustrations on the walls, chalkboard, windows, etc. Have a student stand in the center of the classroom with a flashlight. Say one of the vocabulary words and the student must find the illustration for the vocabulary word you said using the light of the flashlight. This activity may also be conducted in team form. In this case, have two flashlights available. Have a player from each team stand in the center of the classroom. When you say the vocabulary word, each player must attempt to find the correct illustration with the light of his/her flashlight. The first player to correctly identify the illustration for the vocabulary word you said wins the round. Repeat until all players have played.

SPEAKING

Illustration Bingo

Before the activity begins, prepare a page that contains a small version of each vocabulary illustration. Provide each student with a copy of the small illustrations. Each student should cut out the illustrations from his/her copy. When the students' illustrations are cut out, each student should place them on his/her desk, face down. Then, have each student turn one illustration face up. Say a vocabulary word. Any student or students who have the illustration for that word face up must say a complete sentence, using that vocabulary word. Those illustrations should then be put to the side and other illustrations turned over. Continue in this way until a student or students have no illustrations left on their desks.

READING

Use the activity pages from the Student Support Materials.

Find the Parts

Before the activity begins, prepare a page that contains the sight words. Provide each student with a copy of the page. Each student should then cut out the letter/syllables of the sight words. When a student has cut out all of the letter/syllables, he/she should lay them on his/her desk, in a scattered form. Say one of the sight words. The students should then find the necessary letters/syllables to create the sight word you said. Continue until all of the sight words have been developed in this way. Later, the students can glue their encoded sight words on blank sheets of paper.

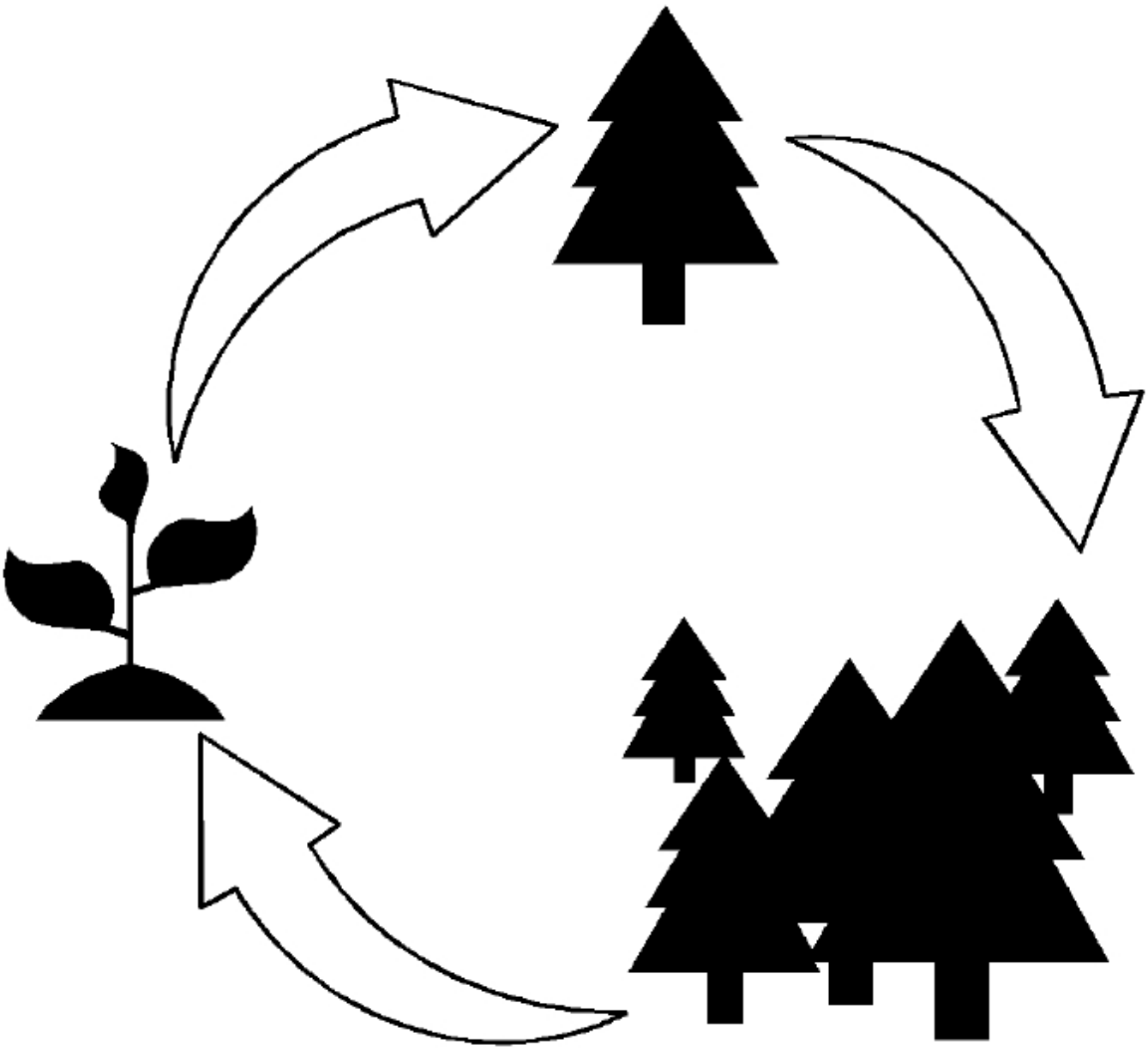
WRITING

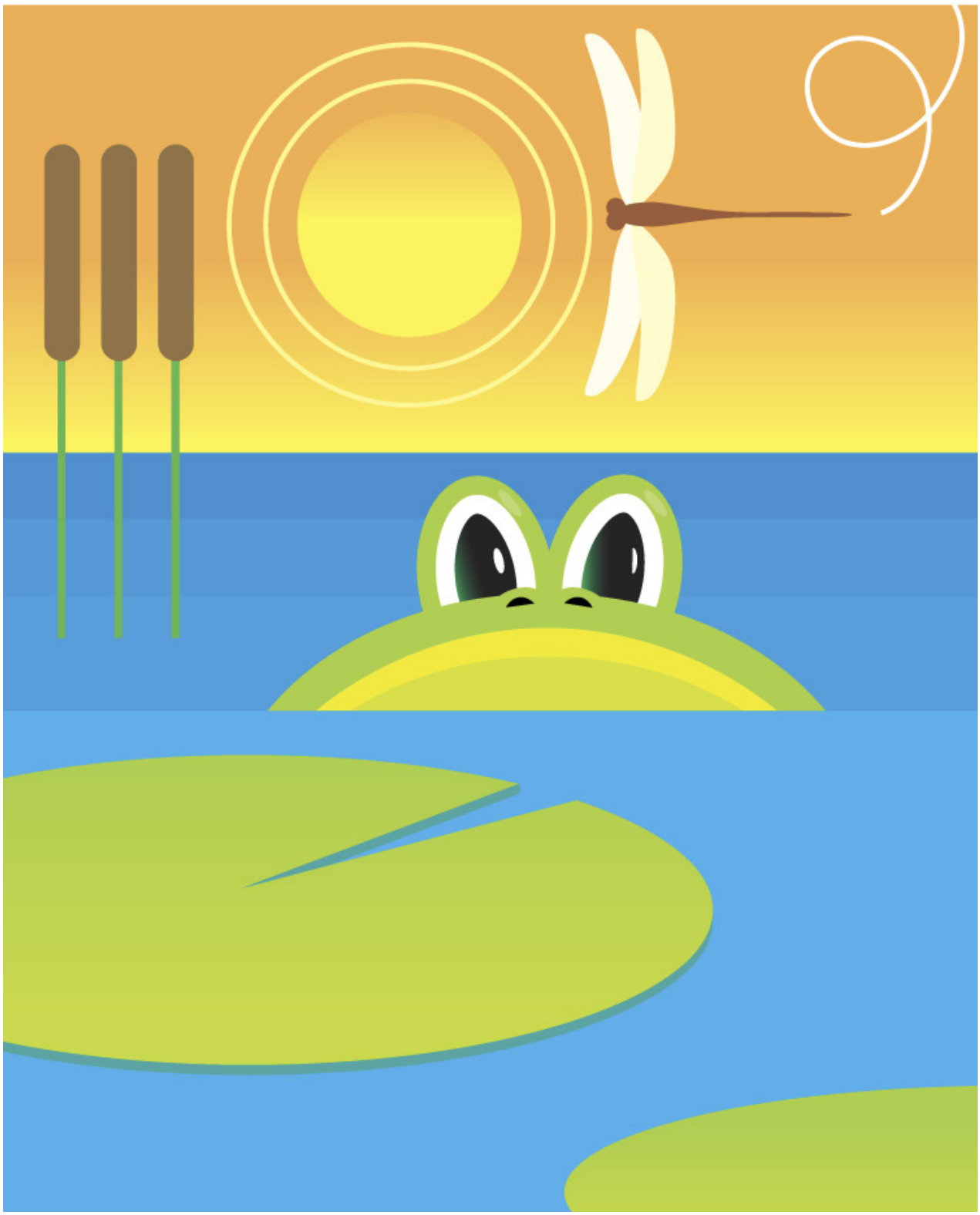
Use the activity pages from the Student Support Materials.

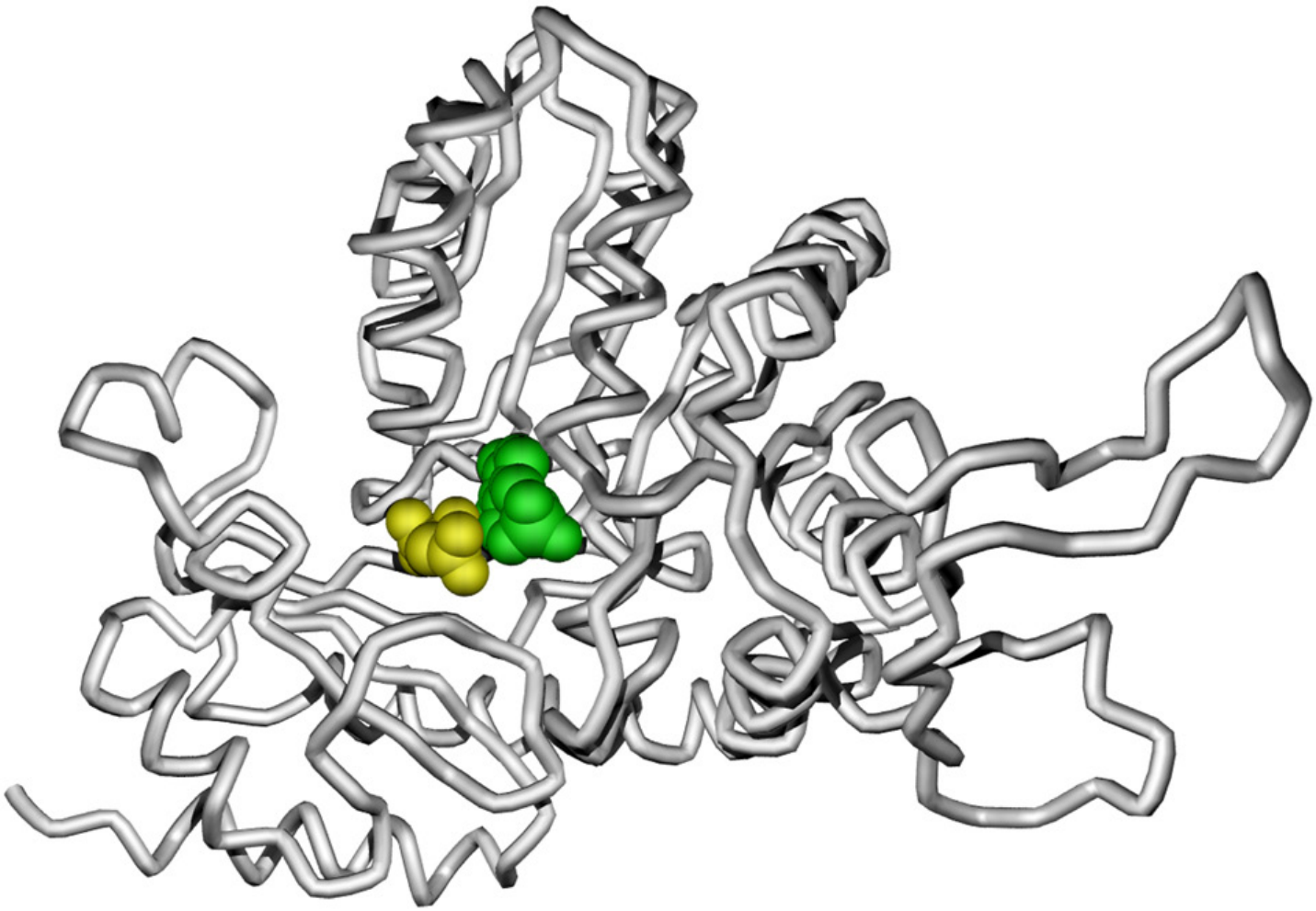
Numbered Illustrations

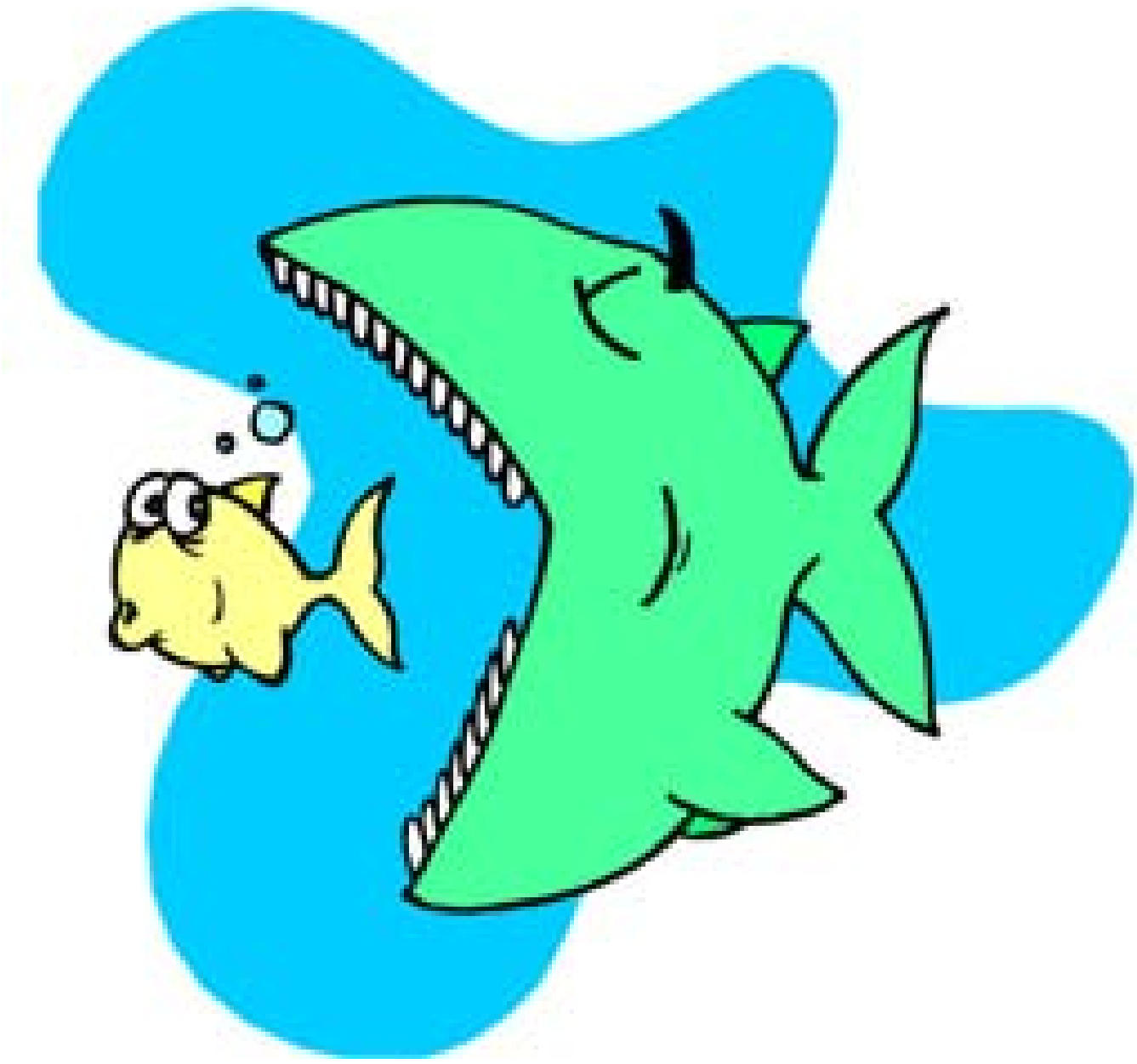
Mount the vocabulary illustrations on the chalkboard and number each illustration. Provide each student with writing paper and a pen. Call the number of an illustration. Each student should write the vocabulary word for the illustration represented by that number. Repeat until all vocabulary words for the illustrations have been written. Review the students' responses.

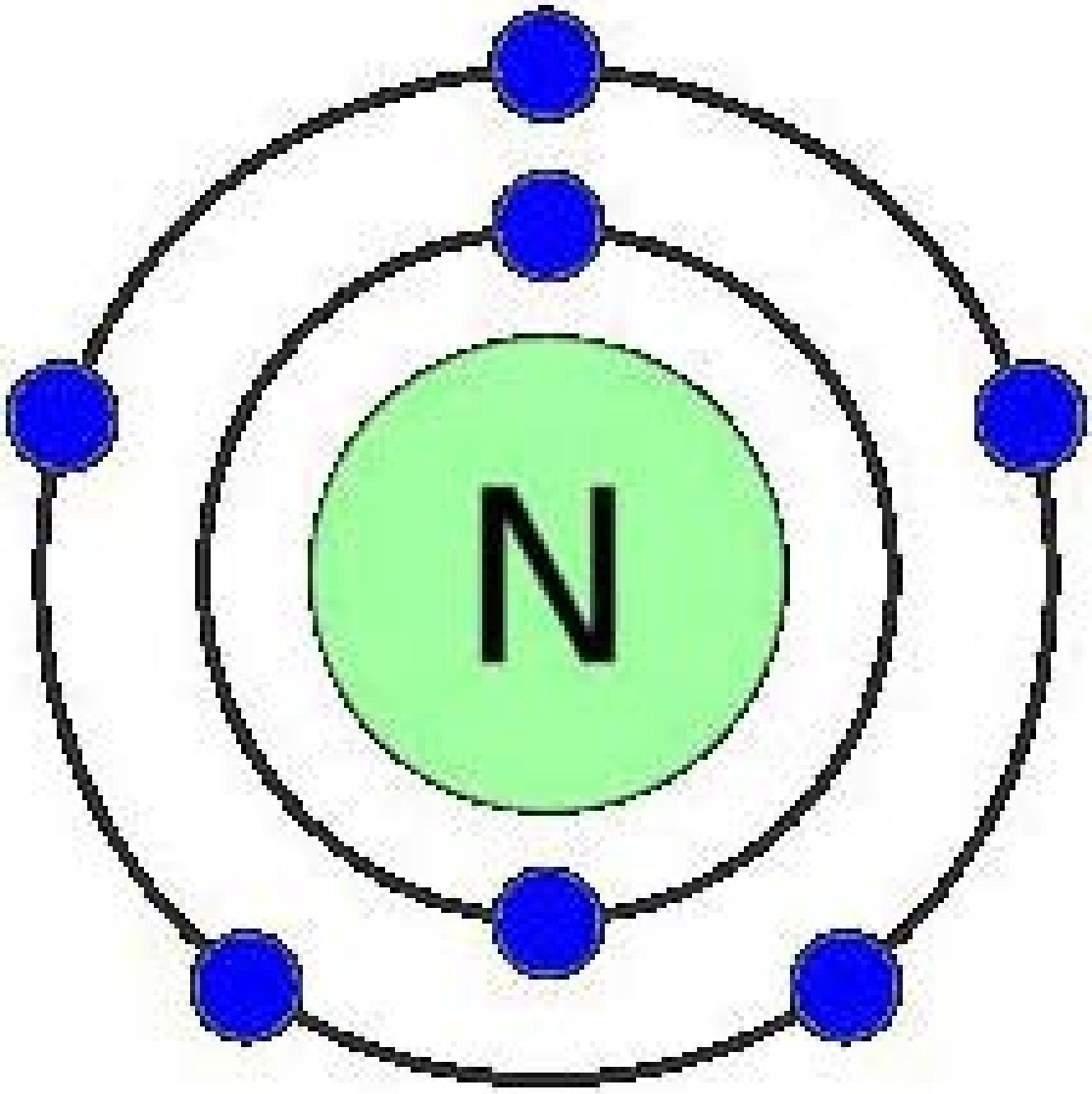
Vocabulary Images







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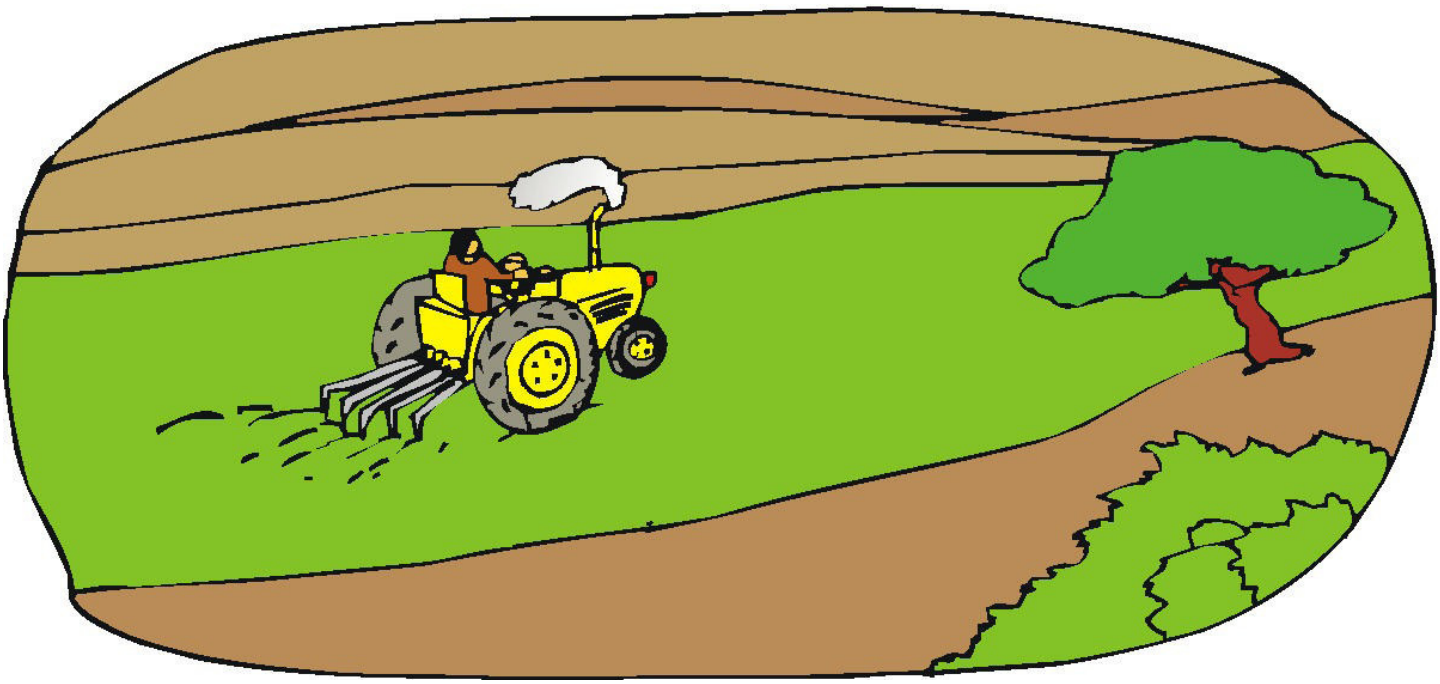
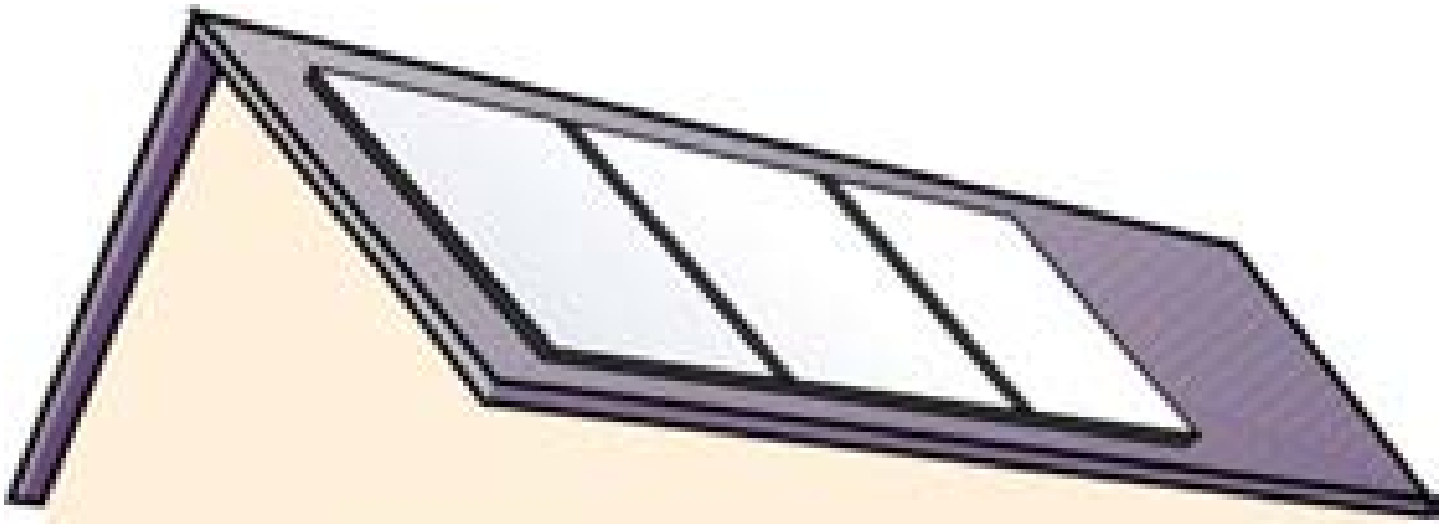
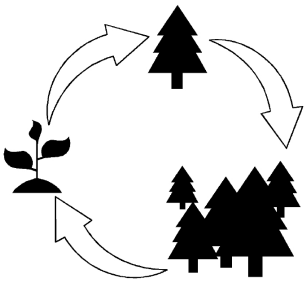


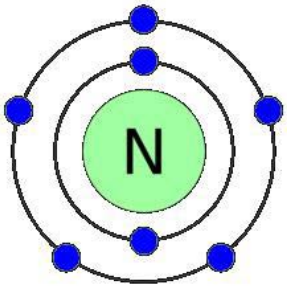


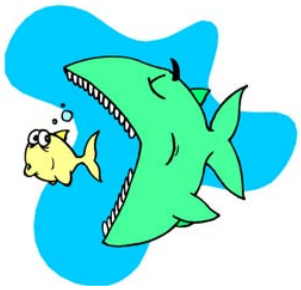
STUDENT SUPPORT MATERIALS

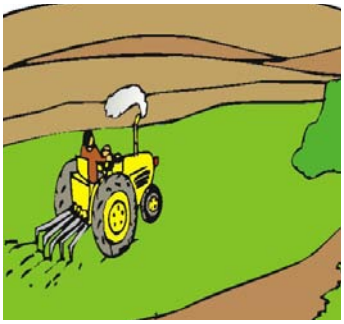
Listening

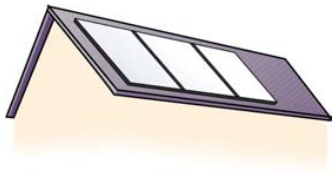
Say these words to the students - they write the numbers of the words under the pictures.
(1)carrying capacity (2)productivity (3)input (4)organic (5)biodiversity (6)environment (7)energy (8)level (9)cycle (10)nitrogen (11)solar (12)carbon (13)population (14)enzyme (15)ecosystem (16)limiting factors











STUDENT SUPPORT MATERIALS

Sight Words

biodiversity

carbon

cycle

carrying capacity

ecosystem

energy

enzyme

input

level

limiting

factors

nitrogen

organic

solar

productivity

population

environment

STUDENT SUPPORT MATERIALS

Reading

Word Find

L P R O D U C T I V I T Y F H H
I X K D R P F Y E X H Q V D N X
M K M T F K Z T N I T R O G E N
I E T D X Z L I V T W Z T P K W
T C V W M Q E S I C D W P N B J
I O K K P Q V R R M E M Y Z N E
N S L G L L E E O N K Q K R N P
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F S Y L Q L W I M T L L B P I E
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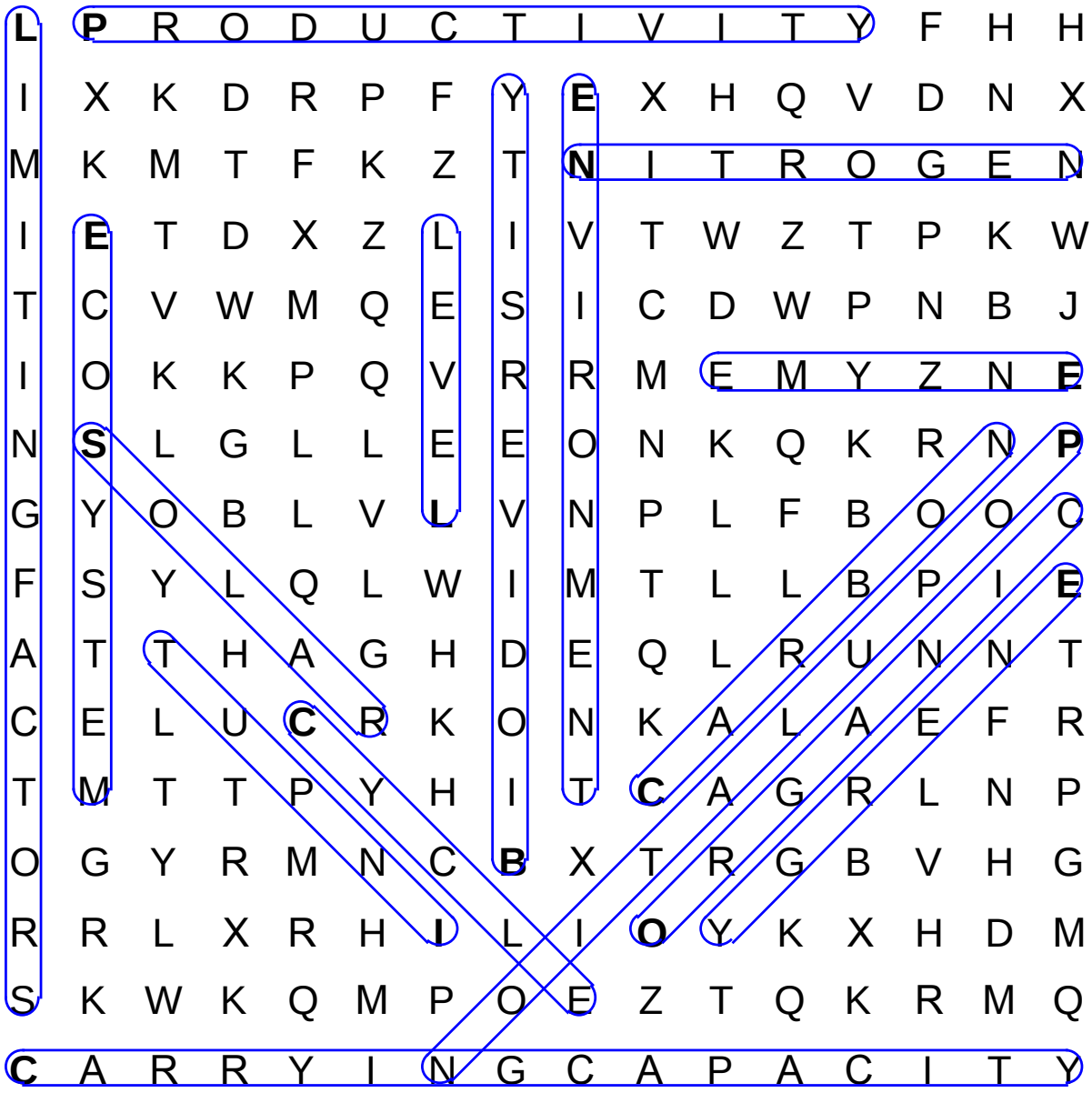
C A R R Y I N G C A P A C I T Y

Biodiversity
Carbon
Carrying capacity
Cycle
Ecosystem
Energy
Environment
Enzyme
Input
Level
Limiting factors
Nitrogen
Organic
Population
Productivity
Solar

Word Find Solution



Find The Word

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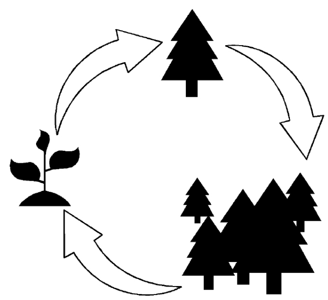

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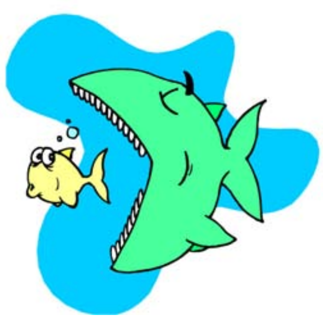

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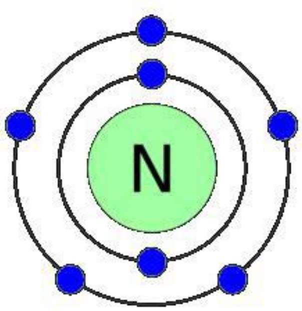

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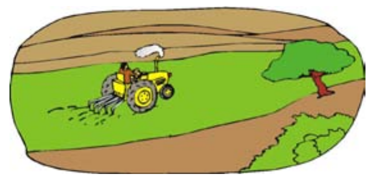

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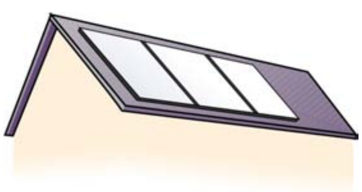

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Match The Halves

Have the students write the numbers/letters for sentence halves that match.

1)	Organic molecules contain	A)	Remains constant over time.
2)	Plants cannot fix nitrogen from the air,	B)	But bacteria that live symbiotically with some plants' roots can.
3)	Repeatedly quitting and restarting smoking can be a	C)	than bull kelp.
4)	Humans have become a major influence	D)	On all of the world's ecosystems.
5)	Input is	E)	enzymes of the cell.
6)	The energy of a closed system	F)	Can change over time or from season to season, depending on conditions.
7)	The carrying capacity of an ecosystem	G)	An aquatic environment.
8)	A limiting factor	H)	to explore for "alternative" energy sources.
9)	Pharmaceutical companies rely	I)	What goes into a system.
10)	My productivity depends on	K)	that the world's food supply may soon have difficulty keeping pace.
11)	The population of the world is growing so fast	L)	Vicious cycle.
12)	Some animals, like whales, have adapted exclusively to	M)	Restricts the productivity of an ecosystem.
13)	People often confuse the meaning of organic	N)	On the biodiversity of our planet to find new compounds to test.
14)	Solar power is an important source of energy	O)	Carbon.
15)	DNA is what codes for all of the	P)	The time of day and what is on my mind.
16)	A whale is at a higher trophic level	Q)	such that essential minerals are not included in the definition of organic food.

Answers
1/O 2/B 3/L 4/D 5/I 6/A 7/F 8/M 9/N 10/P 11/K 12/G 13/Q 14/H 15/E 16/C

Word & Definition Match

Have the students write the word numbers on their matching definitions.

An extent, measure, or degree of intensity, etc.	*a term that applies to anything concerning the sun*	*the capacity to do work can take several forms*	*a factor that controls a process*
An interval of space or time in which one set of events or phenomena is completed	*a group of organisms of the same species that live together*	*A common element with the atomic number 6*	*the very beginning of a process or chain of events*
the variability among living organisms	*complex proteins found in living cells that speed up reactions*	*A common nonmetallic element*	*maximum size of a population that an ecosystem can support*
Things pertaining to, derived from, or produced by living things	*a network of the interactions between organisms and their envronment*	*the state of being productive*	*all the things surrounding something*

1. biodiversity
2. carbon
3. carrying capacity
4. cycle
5. ecosystem
6. energy
7. enzyme
8. input
9. level
10. limiting factors
11. nitrogen
12. organic
13. solar
14. productivity
15. population
16. environment

Which Belongs?

Have the students circle/identify the word that is correct for each sentence.

1. The “Organic” label is/is not referring to the carbon content of the food.
2. Our lungs are mostly filled with nitrogen/oxygen when we take a breath.
3. The water input/cycle goes on and on, it has no beginning and has no end.
4. If one is able to preserve the ecosystem/energy that an animal relies upon, one might be able to spare the animal from extinction.
5. If you input/cycle the data before lunch, you will have time over lunch to examine the data using excel or another graphing program.
6. I don’t have the carrying capacity/energy to continue reading these statements—I think I’ll go take a nap.
7. The deer on Douglas Island exceeded the carrying capacity/biodiversity of the island, and there was a massive die off.
8. The length of the growing season is a major limiting factor/productivity for corn yield in the United States.
9. Keeping a species healthy requires keeping a certain degree of variation in the gene pool; without this input/biodiversity, inbreeding can become a serious problem.
10. It is important to keep pests under control on a farm, or productivity/nitrogen will lower.
11. Certain populations/ecosystems in the school are interested in Dungeons and Dragons, and others are not.
12. If you do not like the learning environment/population of the University that you attend your Freshman year, pick another college for the following fall semester!
13. Animals are all dependent on consuming organic/enzyme sources of energy.
14. All organisms rely on endocrine/enzymes to increase the reactions of processes within cells
15. The ultimate source of energy for living organisms on the planet is organic/solar.
16. The trophic level/development refers to the energy level that an organism occupies.

Answers
1. is not, 2. nitrogen, 3. cycle, 4. ecosystem, 5. input, 6. energy, 7. carrying capacity
8. limiting factor, 9. biodiversity, 10. productivity, 11. populations, 12. environment
13. organic, 14. enzymes, 15. solar, 16. level

(b) Cause

(c) Cir

What's The Answer?

Have the students read the questions and then select the correct answer for them. They should fill in the appropriate circles beside the answers of their choice.

1. Carbon is found in all of the following items except

(a) Apples
(b) Paper
(c) Glass

2. Nitrogen is

(a) An element
(b) A compound
(c) An essential amino acid

3. When we say something is cyclical (that is, in a cycle), we mean it happens

(a) With the same steps over and over again
(b) Once and then never happens again
(c) Quickly

4. An ecosystem contains

(a) Only biotic components
(b) Only abiotic components
(c) Both biotic and abiotic components

5. In a vibrant, active democracy, citizens should participate in the political process because their input is

(a) Necessary for politicians to know what citizens want and need.
(b) Of no concern to anyone of importance.
(c) Purple

6. Most of the energy that is used on Earth in biological processes comes (came) from

(a) Sun
(b) Earth's core
(c) Fossil fuels

7. Gustavus is a place that must pay close attention to the _____ of the environment for moose.

(a) Population
(b) Environment
(c) Carrying capacity

8. All of the following are limiting factors for deer in Southeast Alaska except

(a) Amount of snowfall
(b) Amount of rainfall
(c) Amount of plant growth

9. Humans have a great deal of biodiversity, yet, biologically, we have most everything

(a) In common
(b) Different
(c) Developing

10. The productivity of a system can be measured by

(a) The quality or quantity of what it produces
(b) The amount that one has to take care of the system
(c) The amount that the system is able to conserve

11. As a population grows and resources become scarce, only those individuals most fit will survive to pass on their genes. This is called

(a) A series of unfortunate events
(b) Natural selection
(c) Biodiversity

12. The Earth's environment not only includes plants, animals, rivers, and the ocean, but also

(a) Roads, buildings, farms, and cities
(b) Jupiter, Venus, and the other planets
(c) The mantle and core of the Earth.

13. An organic compound is not:

(a) A food source for an organism like an animal or fungus;
(b) A ferromanganous nodule found in the ocean;
(c) A compound containing carbon.

14. Enzymes in the cell do not:

(a) Digest small food particles;
(b) Remove extra water
(c) Build cell membranes.

15. Solar radiation:

(a) Provides the raw energy for nearly all organisms on the planet;
(b) Is a form of electricity;
(c) Travels at the speed of sound.

16. A lion:

(a) Is a primary producer, the lowest trophic level;
(b) Is a primary consumer, the lowest consuming trophic level;
(c) Is a tertiary consumer, at the top of the food web and at a high trophic level.

Answers:

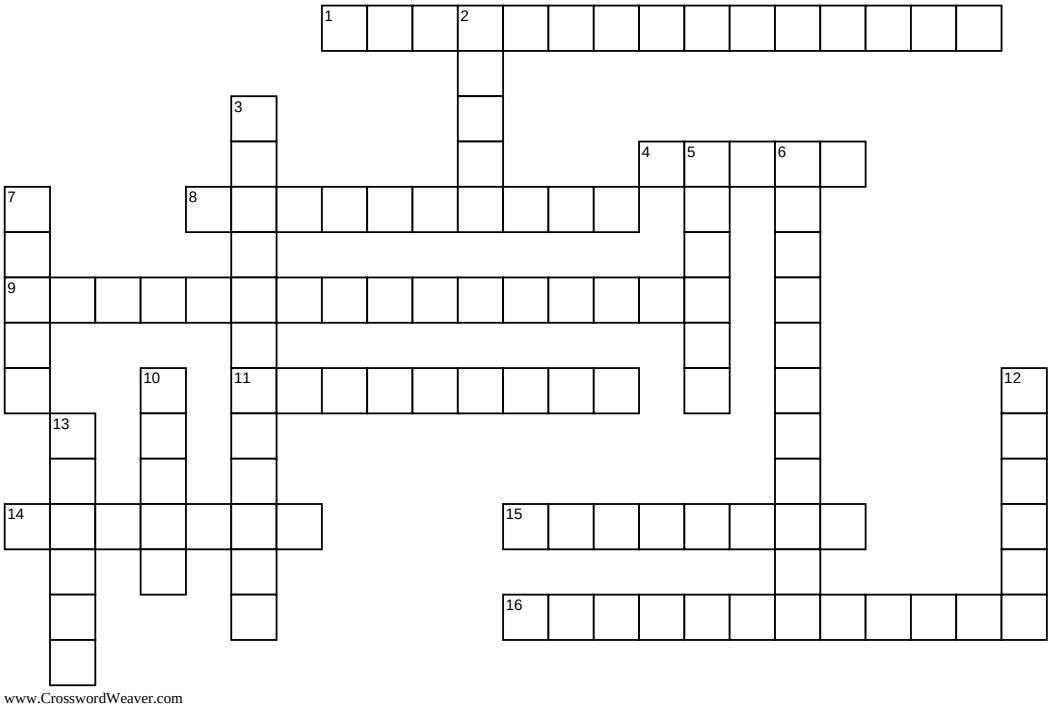
1.c, 2. a, 3. a, 4. c, 5. a, 6. a, 7. c, 8. b, 9. a, 10. a, 11. b. 12. a, 13. b, 14. b, 15. a, 16. c

STUDENT SUPPORT MATERIALS

Writing

9th C-1 Concept of Life Science

Unit 4



ACROSS

1 a factor that controls a process, such as organism growth or species population size or distribution.
4 an extent, measure, or degree of intensity.
8 a group of organisms of the same species that live together.
9 the maximum size of a population that an ecosystem can support.
11 a network of the interactions between organisms and their environment, which has both living and nonliving components.
14 things pertaining to, derived from, or produced by living things.
15 is a common nonmetallic element that is normally a colorless, odorless, and tasteless gas.
16 the state of being productive, fertile, or efficient.

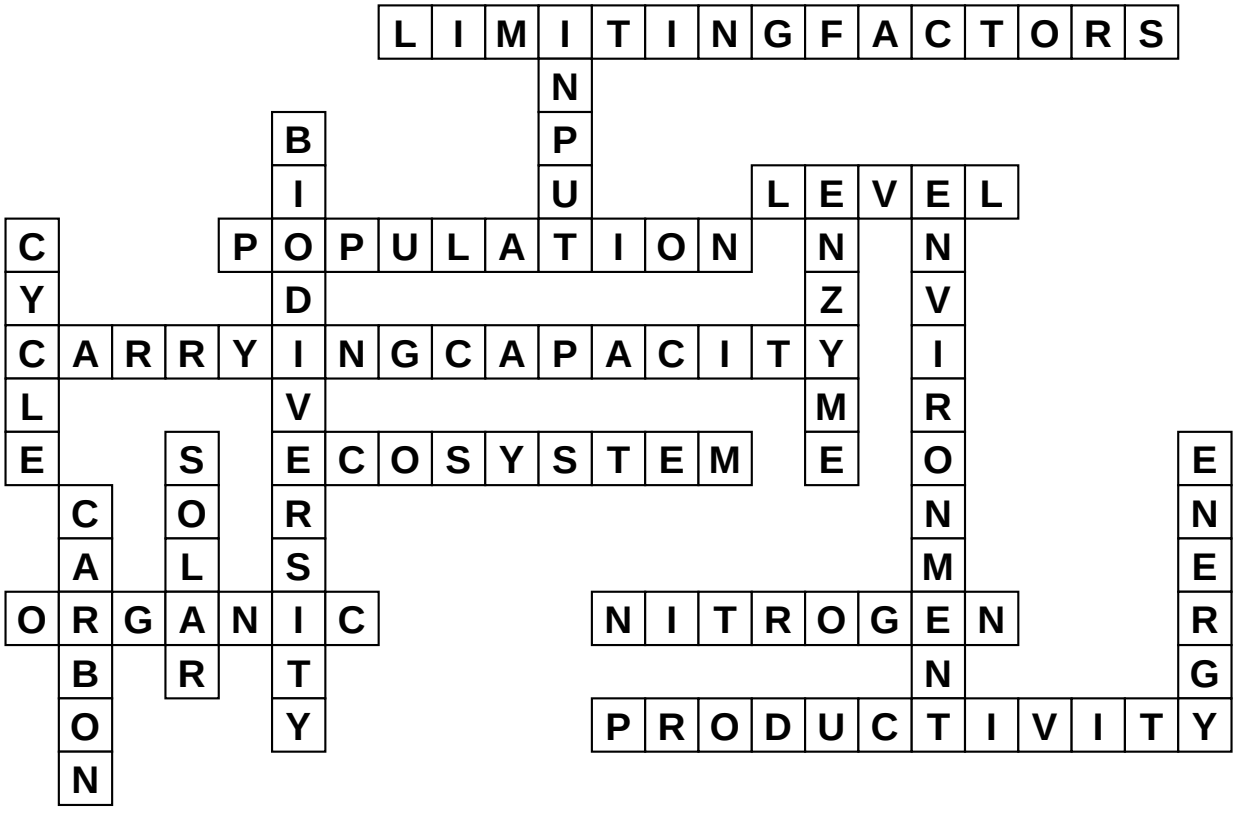
DOWN

2 the very beginning of a process or chain of events, the power or energy that is put into a system.
3 the number of different species of plants and animals in an ecosystem, the variability among living organisms.
5 complex proteins found in living cells
6 all the things surrounding something, the air, water, minerals, organisms, and all other external factors surrounding and affecting a given organism at any time.
7 an interval of space or time in which one set of events or phenomena is completed.
10 this applies to anything concerning the sun.
12 the capacity to do work can take several froms-thermal, electrical, chemical, mechanical, etc.
13 a naturally occurring, common element with an atomic number of six.

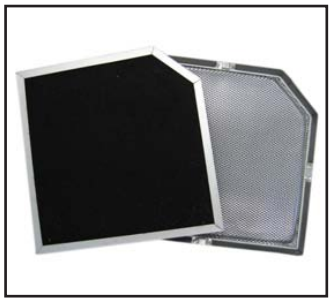
9th C-1 Concept of Life Science

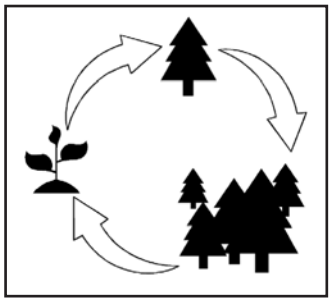
Unit 4

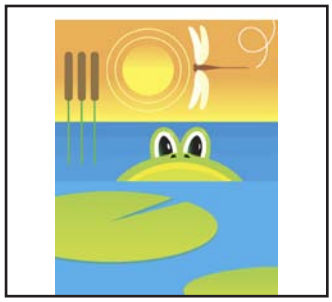
Solution:

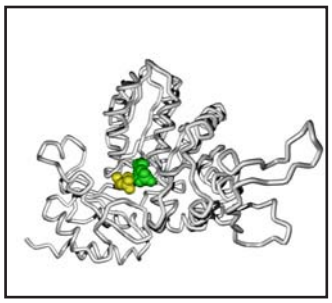


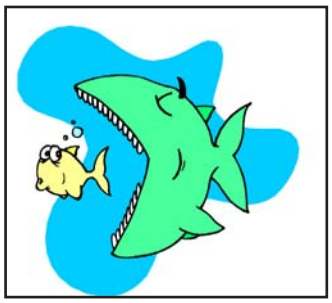
Write The Words



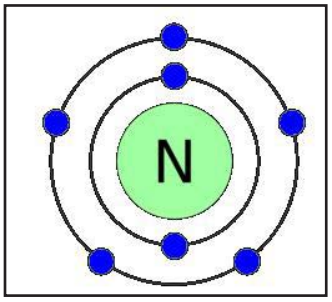


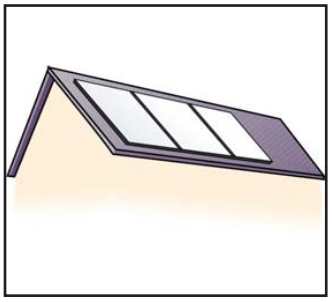






Write The Words





Complete The Sentence

Have the students write the key words in the blanks.

1. _____ is the building block upon which (and with which) all organic molecules are built.
2. _____ makes up a majority of the air we breath, but our bodies do not use it in this gas state.
3. A process that repeats itself is often called a(n) _____.
4. There are abiotic and biotic components to a(n) _____--both are important to supporting the organisms in that system.
5. When a person uses a computer, he/she is responsible for the user _____ .
6. For many years people thought that matter and _____ cannot be created or destroyed, but then Einstein came along with his “e equals m c squared” and changed that outlook.
7. The number of animals that an ecosystem can support is often called the system’s _____ _____ .
8. The size of a lake is a(n) _____ _____ for how many fish it can hold.
9. Much of the world’s _____ is concentrated in a few key areas, one of which is the Amazon rain forest.
10. The _____ of a student is dependent upon how prepared a student is for class, how much he/she is willing to work, how much breakfast that student ate, and how much sleep he/she got the night before.
11. China is the country with the biggest _____.
12. A positive classroom _____ is key to student success
13. An _____ consists of a string of amino acids.
14. By virtue of the fact that it is carbon based, all food is _____
15. Only one side of the planet Mercury receives _____ energy; hence, that side of the planet is much hotter than the other side.
16. A trophic _____ refers to the overall type of energy that an organism consumes.

Answers
1. carbon, 2. nitrogen, 3. cycle, 4. ecosystem, 5. input, 6. energy, 7. carrying capacity 8. limiting factor, 9. biodiversity, 10. productivity, 11. population, 12. environment 13. enzyme, 14. organic, 15. solar, 16. level

Creative Writing Activity Page

Have the students write sentences of their own, using the key words from this unit. When the students' sentences are finished, have them take turns reading their sentences orally. The students should say "Blank" for the key words; the other students must name the "missing" words. You may wish to have the students write the "definitions" for the key words.

biodiversity

carbon

carrying capacity

cycle

ecosystem

energy

enzyme

input

level

Creative Writing Activity Page

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limiting factors

nitrogen

organic

solar

productivity

population

environment

Creative Writing Activity Page

Have the students write sentences of their own, based on the picture below. When finished, have each student read his/her sentences to the others.

STUDENT SUPPORT MATERIALS

Reinforcement Activities

Purposes: Students will be able to define and recognize attributes of an ecosystem.

From the work of S. Marino

Ecosystems: the Interdependence of Living Things.

☐ **Activities**

- Have students draw a detailed picture of their room. On back of the paper have them list important living and nonliving things in their room.
- Allow students time to share their pictures. Have them consider how some of the items are interdependent (i.e. a CD player and CDs).
- Supply students with books and resources to look up the word ecosystem. Have students copy the exact definition from one of those resources.
- Students should share their definitions. Have them look up/discuss terms that are unfamiliar.
- After the definitions have been shared, have students write their own definition of ecosystem.
-

☐ Materials

- Paper and supplies for drawing
- Various books, journals, and magazines that define “ecosystem”
- Ecosystem Vocabulary
- Lab Journals

Purposes: Students will gain field experience by collecting data from a local ecosystem and discovering relationships between organisms and their environment.

From the work of S. Marino

A Local Ecosystem

☐ **Activities**

- Students will gain field experience documenting living and nonliving things within a meter plot. Students should:
  - Measure a meter plot. Sketch the look of the plot including the surrounding area.
  - List biotic things, making observations on appearance and measurement of size.
  - List abiotic things, making observations on appearance and measurements of size.
  - Describe any relationships that can be observed between the organisms and/or the environment.
  - Document any human influences that are noticed.
- The following day students should make another plot following the same guidelines as the day before.
- At the end of the second day students should journal/report on similarities and differences between the 2 plots. They should also make comments on the relationships they noticed.
- Allow students to share their observations with the class.

☐ Materials

- Lab Journal
- Meter Sticks or quadrants
- Rulers
- Colored pencils

Purposes: Students will increase their knowledge of several of our local plants and animals.

From the work of S. Marino

Producers and Consumers

☐ **Activities**

- Have 2 sheets of poster paper. One should be labeled "Producer," the other "Consumer." Have students agree on a definition for these words in terms of Ecology.
- In small groups students should develop a list of the producers and the consumers they found while in the field. Once they have developed a list they should place several of those organisms on the paper under the appropriate category.
- Ask the question, "What other local organisms have relationships with the ones we have already listed?" Add these to the list.
- Tell students they should pick 2 organisms to research from each category. Ideally each student should have different organisms.
- Provide internet access and other resources for research. Have them use the *Organism Research* sheet (on the next page) to help guide them.

☐ Materials

- Lab Journal
- Poster paper
- Marking pens
- Organism Research Sheets

Organism Research

Common Name _____ Scientific Name _____

Physical Characteristics (color, shape, size):

Life Cycle (reproduction, development, life span):

Diet:

Predators:

Natural Range:

Habitat:

Organism Research

Common Name _____ Scientific Name _____

Physical Characteristics (color, shape, size):

Life Cycle (reproduction, development, life span):

Diet:

Predators:

Natural Range:

Habitat:

Purposes: Students will demonstrate an understanding of relationships between organisms in a food web. They will also discover what happened to the local ecosystem during the Exxon Valdez Oil Spill.

From the work of S. Marino

Chains and Webs

☐ **Activities**

- Refresh students on vocabulary: producer, consumer, decomposer, herbivore, carnivore, and omnivore.
- Have students think about what kinds of organisms decompose dead things (bacteria and fungi) and put one of these organisms on a card.
- Display a food chain, such as: Spruce Tree Seed – Squirrel – Eagle – Fungus
- In groups of 2-3 have student assemble the organisms they researched the day before into a food chain of who eats who. They should do this 3-4 times rearranging the organisms and adding unused ones to create different chains.
- Ask student the question: "Are the relationships between who eats who always so simple and follow such a straight path?"
- Using the food chain from the previous example add organisms as appropriate to create a web.
- Students should then combine into groups of 4-5 and create their own web.
- Create a Class Web by trying to connect all the organisms that were researched.

- Have student watch the film, "Legacy of an Oil Spill" and answer questions in the video guide.

☐ Materials

- Students' organism research from the previous day
- String to show connections between organisms
- Video: "Legacy of an Oil Spill"
- Video Guide

Purposes: Students will participate in analyzing a local ecosystem, discovering relationships between organisms and the environment.

From the work of S. Marino

Analyzing a Marine Ecosystem

☐ **Activities**

- Students will work in groups of 3 to map a 5 meter plot from a local ecosystem.
- Have the students document their research and discoveries using a digital camera.
- Each group should document the following:
  - Producers
  - Consumers
  - Abiotic factors
    - substrate
    - pH
    - water and/or soil composition
  - Human influence
  - Relationships between organisms
  - Map the food web
- Using the pictures students took in the field they can create a PowerPoint presentation that documents their research.
- Students should present their PowerPoint presentations to each other.

☐ Materials
- Lab Journals
- Meter sticks
- Rulers
- Water testing kit
- Soil testing kit
- Digital camera
- PowerPoint Criteria

Unit Assessment

Unit 4 Quiz and Test for Units 1-4

C1, Unit 4, Concepts of Life Science Quiz

Name: _____
Date: _____

1) Carbon is found in fossil fuels - coal, oil and natural gas. When fossil fuels are burned the carbon is released into the air and can join with oxygen to make carbon dioxide, a greenhouse gas.

a) coal

b) oil

c) natural gas

d) all of the above

2) Mark the following statement that is correct.

a) Oxygen has an atomic number of 6.

b) Carbon has an atomic number of 6.

c) Nitrogen has an atomic number of 6.

d) none of the above

3) A pond, grassland, tundra, muskeg, and the ocean are all examples of _____ because each contains a network with interactions between organisms and their environment and has living and nonliving components.

a) an ecosystem

b) a community

c) a lifestyle

d) a commune

Matching: Match the words key vocabulary on the left with the definition they match on the right. Place the letter from the definition in front of the word it matches.

4) _____ input

5) _____ carrying capacity

6) _____ limiting factor

7) _____ level

a. an extent, measure, or degree of intensity, achievement

b. of, derived from, relating to, or caused by the sun

c. the very beginning of a process or chain of events, the power or

Matching: Match the words key vocabulary on the left with the definition they match on the right. Place the letter from the definition in front of the word it matches.

4) _____ input

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6) _____ limiting factor

7) _____ level

8) _____ solar

a. an extent, measure, or degree of intensity, achievement

b. of, derived from, relating to, or caused by the sun

c. the very beginning of a process or chain of events, the power or energy that is put into a system

d. the maximum size of a population that an ecosystem can support

e. a factor that controls a process, such as organism growth or species population size or distribution

Word Bank

nitrogen Organic

9) "Bio" means life. "Diverse" means different. When you combine the prefix with the word you create _____ which refers to the number of different species of plants and animals in an ecosystem. Draw a simple illustration below that shows your definition of this word.

10) Which of the following is/are example(s) of a cycle in nature?

a) days and nights

b) phases of the moon

c) seasonal changes

d) All of the above

e) None of the above

11) Population refers to all the organisms that make up a specific group or occur in a specified habitat.

a) True

b) False

12) To be productive is to be infertile.

a) True

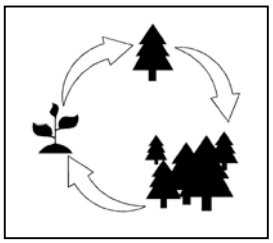
b) False

13) A common nonmetallic element that is normally a colorless, odorless, and tasteless gas is _____.

14) _____ compounds belong to the class of chemical compounds that are formed from carbon, and whose molecules contain carbon.

15) Label each of the following illustrations.

Label_____



Label_____

Label_____

C1, Unit 4, Concepts of Life Science Quiz

Name: _____
Date: _____

Multiple Choice: Read each statement carefully and select the correct answer from the choices provided. Circle the best answer for each item.

1) Carbon is found in fossil fuels - coal, oil and natural gas. When fossil fuels are burned the carbon is released into the air and can join with oxygen to make carbon dioxide, a greenhouse gas.

a) coal

b) oil

c) natural gas

d) all of the above

2) Mark the following statement that is correct.

a) Oxygen has an atomic number of 6.

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4) Which of the following is/are example(s) of a cycle in nature?

a) days and nights

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d) All of the above

e) None of the above

Matching: Match the words key vocabulary on the left with the definition they match on the right. Place the letter from the definition in front of the word it matches.

5) **c** input

6) **d** carrying capacity

7) **e** limiting factor

8) **a** level

9) **b** solar

a. an extent, measure, or degree of intensity, achievement

b. of, derived from, relating to, or caused by the sun

c. the very beginning of a process or chain of events, the power or energy that is put into a system

d. the maximum size of a population that an ecosystem can support

e. a factor that controls a process, such as organism growth or species population size or distribution

True/False; Read the statements below carefully and decide if they are true or false. Mark accordingly.

10) Population refers to all the organisms that make up a specific group or occur in a specified habitat.

a) True

b) False

11) To be productive is to be infertile.

a) True

b) False

Word Bank		
biodiversity	carbon	nitrogen
organic		

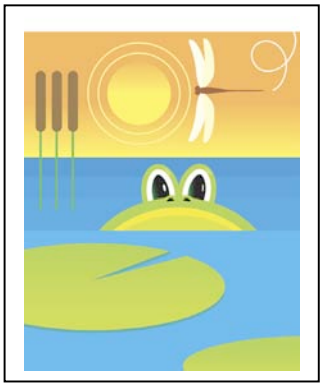
12) A common nonmetallic element that is normally a colorless, odorless, and tasteless gas is **nitrogen** .

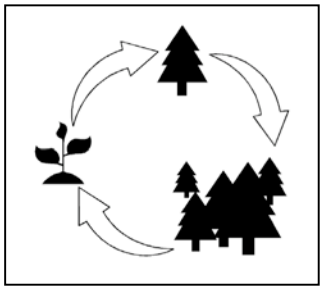
13) "Bio" means life. "Diverse" means different. When you combine the prefix with the word you create **biodiversity** which refers to the number of different species of plants and animals in an ecosystem.

Draw a simple illustration below that shows your definition of this word

14) **organic** compounds belong to the class of chemical compounds that are formed from carbon, and whose molecules contain carbon.

15) Label each of the following illustrations.





Label_Ecosystem_ Label_Cycle_ Label_Environment

C1, Units 1-4, Concepts of Life Science Test

Name: _____
Date: _____

Unscramble the groups of letters to form science words. Write the words in the blank.

1) eomsmcroho (located in the nucleus of a cell that contains genetic information) _____

2) enctariheni (genetic traits that offspring obtain from their parents)_____

3) redetiyh (transmission of the physical and physical qualities of parents to their offspring)_____

4) tnsemugteni(a natural outer covering or coat, such as the skin of an animal)_____

5) babytiliorp(the branch of mathematics dealing with chance)_____]

Match the name of one of the body's systems on the left with the definition on the right, placing the letter of the correct definition in front of the word it defines.

6) _____ circulatory
7) _____ nervous
8) _____ digestive
9) _____ excretory
10) _____ reproductive
11) _____ musculoskeletal
12) _____ respiratory
13) _____ endocrine

a. transports needed substances throughout the body; made up of blood, heart & blood vessels
b. organs & tissues that controls the body's activities; controls body functions
c. breaking down food into substances the body can use
d. removes waste from the body
e. system responsible for reproducing new individuals biologically
f. gives animals the ability to physically move using the muscles and skeletal system
g. gets oxygen to the body; gets rid of carbon dioxide; exchanges gases
h. produces internal secretions that are transported throughout the body by the bloodstream

Fill in each blank with the word that fits best. Choose from the words provided below

DNA traits organisms characteristic evolution Punnett Squares biodiversity natural selection enzymes

14) A table called _____ can be used to predict the traits that off spring will have based on the traits of their parents.

15) On Earth there a millions of different organisms, from the size of whales to size of viruses. This variety of life is known as _____.

16) The theory, based on scientific evidence, that explains how life changes over many generations is _____.

17) Traits are carried in _____.

18) A butterfly, daisies in a garden, a frog, a man, an ant, algae, bacteria are all examples of living things or _____.

19) A special quality or feature that helps to identify a person or thing, is known as a _____.

20) The process _____ refers to what happens when organisms change over time; a process in which some species survive and others become extinct.

21) Complex proteins found in living cells that act as catalysts inside the cell and can break up large food molecules into smaller molecules to be used by the cells are _____.

22) Brown eyes, black hair, black skin are all _____, and are the result of an expressed gene.

23) Which of the following statements is most likely to be true?

a) Nitrogen is an element needed to build the proteins that make up the structure of living things.

b) Carbon is a common element that has an atomic number of 12.

24) Which of the following statements is most likely to be true?

a) Phyla is the bottom of the classification hierarchy or taxonomic level used to classify organisms.

b) Phyla is the third major taxonomic level used to classify organisms.

25) Which of the following statements is most likely to be true?

a) Kingdom is the second broadest classification of organisms after domain.

b) Domain is the second broadest classification of organisms after phyla.

Match the definition on the left with the correct illustration on the right. Put the appropriate letter from the illustration in front of the word.

26) _____ a network of interactions between organisms and their environments

27) _____ the maximum size of a population that an ecosystem can support

28) _____ a fact that controls a process, such as an organisms growth or a species population size

29) _____ the state of being productive, fertile or efficient

30) _____ a group of organisms of the same species that live together

31) _____ all the things surrounding an organism, like the air, water, minerals, and all other external factors

32) _____ genes that are on the same chromosome and generally inherited together

a. 

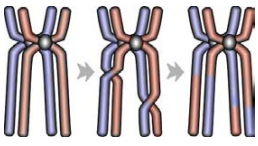
b. 

c. 

d. 

e. 

f. 

g. 

33) Inoculations help keep us immune to particular diseases.

a) True

b) False

34) Solar is a term applying to anything concerning the sun.

a) True

b) False

35) Which of the following definitions means TO TRANSFER.

a) when you take something from one place or form to another

b) the state or act of transforming

36) Inorganic pertains to, is derived from or produced by living things.

a) True

b) False

C1, Units 1-4, Concepts of Life Science Test

Name: _____

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a. transports needed substances throughout the body; made up of blood, heart & blood vessels

b. organs & tissues that controls the body's activities; controls body functions

c. breaking down food into substances the body can use

d. removes waste from the body

11) f musculoskeletal

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13) h endocrine

e. system responsible for reproducing new individuals biologically

f. gives animals the ability to physically move using the muscles and skeletal system

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30) **e** a group of organisms of the same species that live together

31) **f** all the things surrounding an organism, like the air, water, minerals, and all other external factors

32) **g** genes that are on the same chromosome and generally inherited together

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d. 

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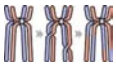
f. 

g. 

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