Grade 9

CONCEPTS OF

EARTH SCIENCE D-1

SCIENCE & TECHNOLOGY E-1

Units for D-1 & E-1

Based on the Alaska Science Standards

SD 3.1,2 SD 4.1,2,4 SE 1.1 SE 2.1 SE 3.1




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.

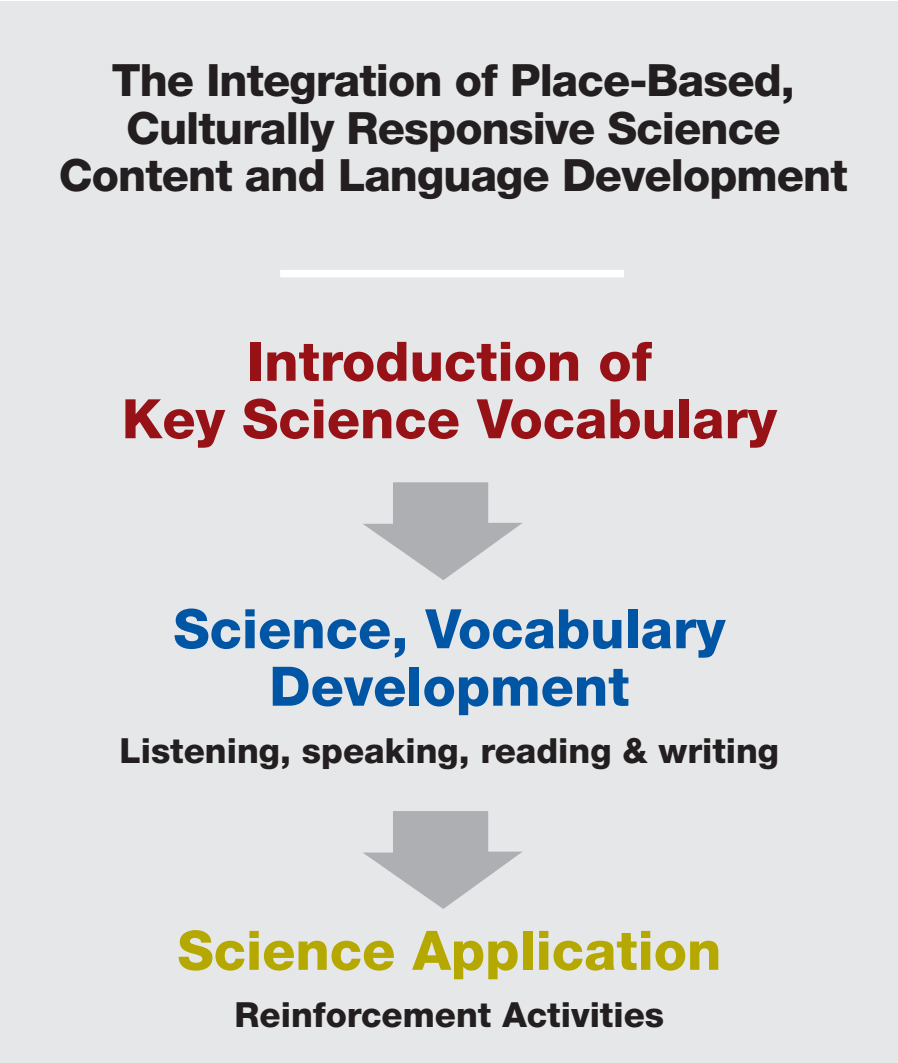
During science lessons, the students are exposed to new information and to key vocabulary that represent that information. While the students may acquire, through various processes, the scientific information, the vocabulary is often left at an exposure level and not internalized by them. Over time, 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 understand 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.

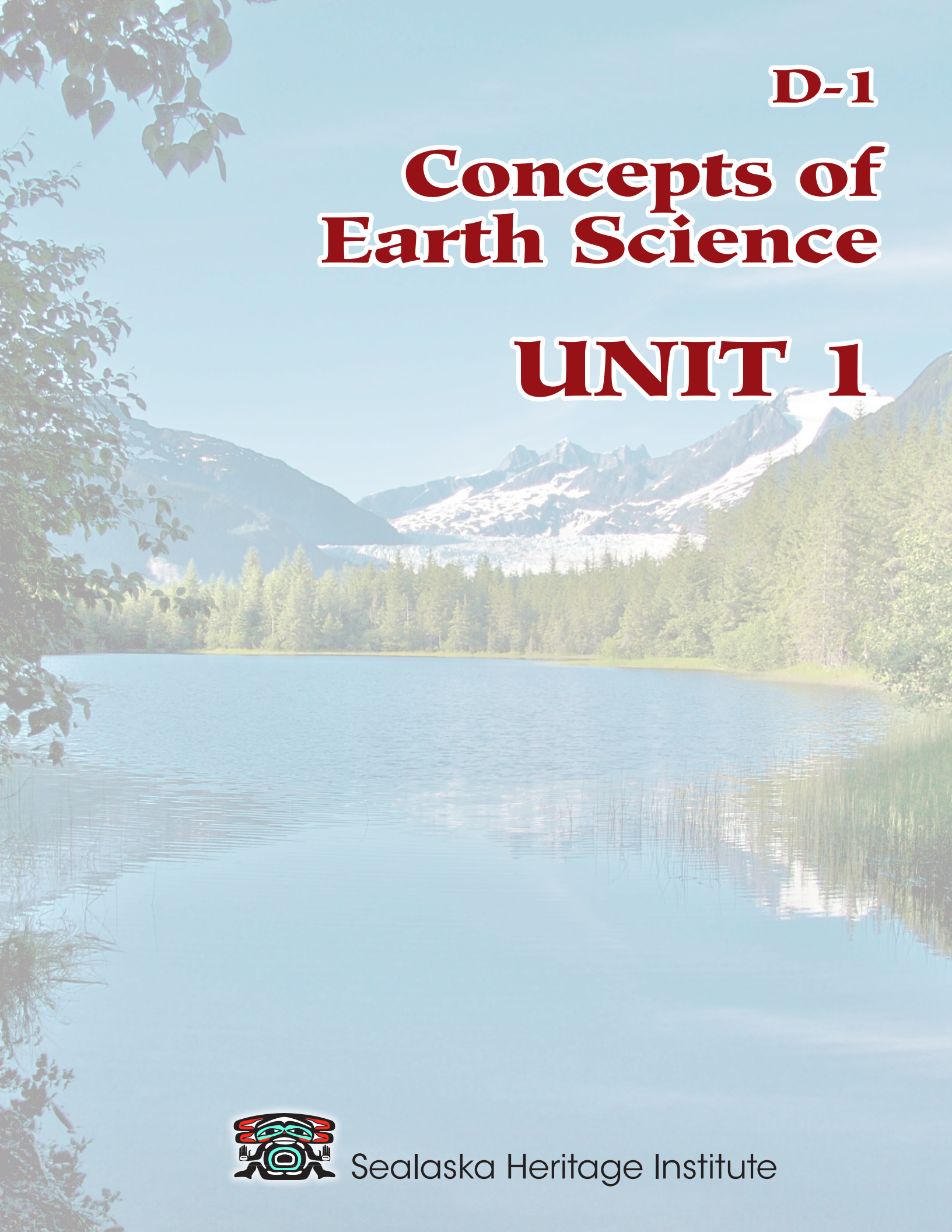
F. Cultural, Social, Personal Perspectives and Sciences
A student should understand the dynamic relationships among scientific, cultural, social, and personal perspectives. A student who meets the content standard should:

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



D-1

Concepts of Earth Science

UNIT 1

Sealaska Heritage Institute

INTRODUCTION OF

Key Vocabulary

Culturally Responsive & Place-based Perspective
Introduction of Science Vocabulary

Solar System

PLACE-BASED PERSPECTIVE

Teach students the following phrase to help remember the planets of our *solar system.*

My	Mercury
Very	Venus
Elderly	Earth
Mother	Mars
Just	Jupiter
Served	Saturn
Us	Uranus
Nachos	Neptune

HERITAGE CULTURAL PERSPECTIVE

The phases of the moon provided a standard form of time measurement to Native peoples. Homes were usually built in areas to receive as much sunshine as possible.

Phenomena

PLACE-BASED PERSPECTIVE

Show the students pictures of a sun-dog and pictures of the "rings" that form around the moon. Discuss these *phenomena* and the unique circumstances in which they are created.

HERITAGE CULTURAL PERSPECTIVE

Sun dogs represented good fortune for the people.

Aurora

PLACE-BASED PERSPECTIVE

Ask the students if they recall any occurrences with radio static or poor cell phone service, even when the weather is good. Discuss how the same conditions that cause the *aurora* can cause interference in communication equipment.

HERITAGE CULTURAL PERSPECTIVE

Red *aurora* indicated that cold weather was coming and that misfortune may also be on the way. The people of Yakutat perform the Aurora Borealis Dance which strongly resembles the northern lights.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Cyclical

PLACE-BASED PERSPECTIVE

Show a digital clock and a clock with "arms." Have the students tell you how the two clocks are the same, besides the fact that they both show time. Lead the students to suggest that they both show cycles of time, on a 24 hour basis. Use this to introduce the concept of *cyclical*. Cite other cycles.

HERITAGE CULTURAL PERSPECTIVE

The migration of the birds to and from Southeast Alaska is *cyclical*. Cycles can be found in all aspects of life.

To Control

PLACE-BASED PERSPECTIVE

Show a dog harness to the students. Have them suggest its use. Lead the students to suggest that the harness is used to *control* a dog. Cite other examples of *control* in nature, such as the moon controlling the tides, seasons controlling migrations, etc.

HERITAGE CULTURAL PERSPECTIVE

The seasons of Southeast Alaska control harvesting from the sea and land.

Position

PLACE-BASED PERSPECTIVE

Show a picture of a GPS device and discuss with students how a GPS works with at least three satellites to triangulate the device's position.

HERITAGE CULTURAL PERSPECTIVE

Stars and the sun are still used for navigation. Landmarks played an important role in indicating *positions.*

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Star

PLACE-BASED PERSPECTIVE

Discuss how a *star* combines hydrogen (H) to create helium (He) through the process of fusion, Helium is a heavier atom. Helium fuses to create even heavier elements. After much of the matter in the sun has been converted to heavier elements, it collapses under its own weight.

HERITAGE CULTURAL PERSPECTIVE

Constellations were very familiar to Native peoples.

To Expand

PLACE-BASED PERSPECTIVE

Make popcorn for the class and discuss with them how the gas inside the kernel heat up and explodes to make popcorn.

HERITAGE CULTURAL PERSPECTIVE

Inflated seal stomachs were used as buoys for fish lines.

Universe

PLACE-BASED PERSPECTIVE

Show a picture of the *universe* and discuss how the *universe* includes everything that we can see and can't see, including space and time.

HERITAGE CULTURAL PERSPECTIVE

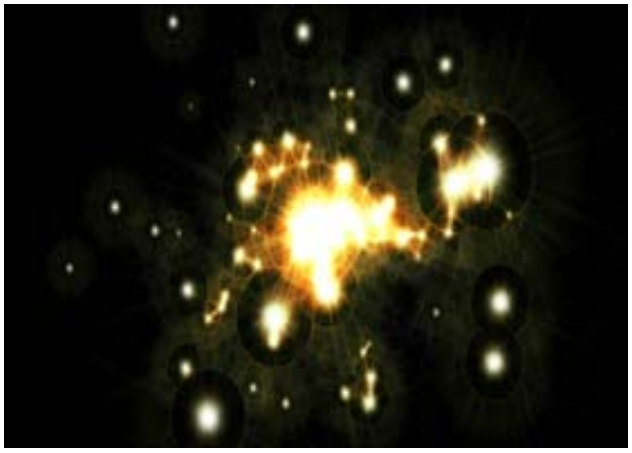
Native peoples were aware of the existence of the universe.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Big Bang

PLACE-BASED PERSPECTIVE

Show a picture of a hand grenade and explain that the *Big Bang* may be represented by the matter originating from a central source and exploding out in all directions.



Tilt

PLACE-BASED PERSPECTIVE

Show a picture of the Leaning Tower of Pisa and describe that *tilt* is any angle between parallel and perpendicular to a flat surface.

HERITAGE CULTURAL PERSPECTIVE

Scraping poles were *tilted* against buildings to facilitate fleshing of the skins.

In windy areas, poles were tilted against the walls of homes to brace them.

Spring Tide

PLACE-BASED PERSPECTIVE

Show a picture of a full moon and a new moon and explain that the gravity of the moon and sun pulls the oceans and they "spring" back causing bigger tidal variation called *spring tides*. It has nothing to do with the seasons.

HERITAGE CULTURAL PERSPECTIVE

Spring tides signal the harvesting of seaweed, herring, herring roe, and shell fish.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Neap Tide

PLACE-BASED PERSPECTIVE

Show a picture of the moon during the quarter phases and explain that the moon and sun's gravitational forces "cancel each other out" when they are at 90 degree angles to each other. In a *neap tide* the oceans are less affected and the tidal range is minimal.

HERITAGE CULTURAL PERSPECTIVE

Neap tides signaled favorable transportation conditions. With less tidal variation people were able to travel among the communities and to their favorite harvesting locations.

Revolve

PLACE-BASED PERSPECTIVE

Using a globe, show the students the central axis. Spin the globe around this axis to introduce how the Earth *revolves*.

HERITAGE CULTURAL PERSPECTIVE

Natives knew that the world turned, as evidenced in cultural songs and traditional oratory.

Orbit

PLACE-BASED PERSPECTIVE

Ask one student to be the "Sun" and another student to be the "Earth". Have the Earth *orbit* the sun. Having the student turning the globe on its central axis reinforces the difference between *orbit* and revolve.

Language Skills

Language & Skills Development

LISTENING

Use the activity pages from the Student Support Materials.

Matching Halves

Cut each of the vocabulary illustrations in half. Mix all of the halves together and distribute them to the students. Say a vocabulary word. The two students who have the halves for the illustration that goes with the vocabulary word you said, should show their halves. You may have the students exchange illustration halves periodically during this activity.

SPEAKING

Vocabulary Chips

Mount the vocabulary illustrations on the chalkboard. Place a number of blue and white poker chips in a container. Each student should reach into the container and remove four (4) chips. The remaining chips should be left in the container. When a student has his/her four chips, he/she should hold three of them in his/her hands and place one poker chip on his/her desk. Reach into the container and remove one of the poker chips. Call the colour of the poker chip you have removed from the container. All students in the class who have that colour of poker chip on their desks, must identify a vocabulary illustration you point to. Then, those students may place those poker chips to the side. When a student has placed a poker chip to the side in this way, he/she should then place another poker chip from his/her hand on his/her desk. Continue in this way until a student or students have no poker chips left on their desks or in their hands. This activity may be repeated a number of times.

READING

Use the activity pages from the Student Support Materials.

Dicey Words

Mount the sight word cards on the chalkboard. Number each sight word, using a number between 1 and 6 (a number may be repeated as often as necessary). Group the students into two teams. Give the first player in each team a die. When you say “Go,” each player should roll the die and then identify any sight word on the chalkboard that has that number. The first player to do this correctly wins the round. Repeat until all players have participated.

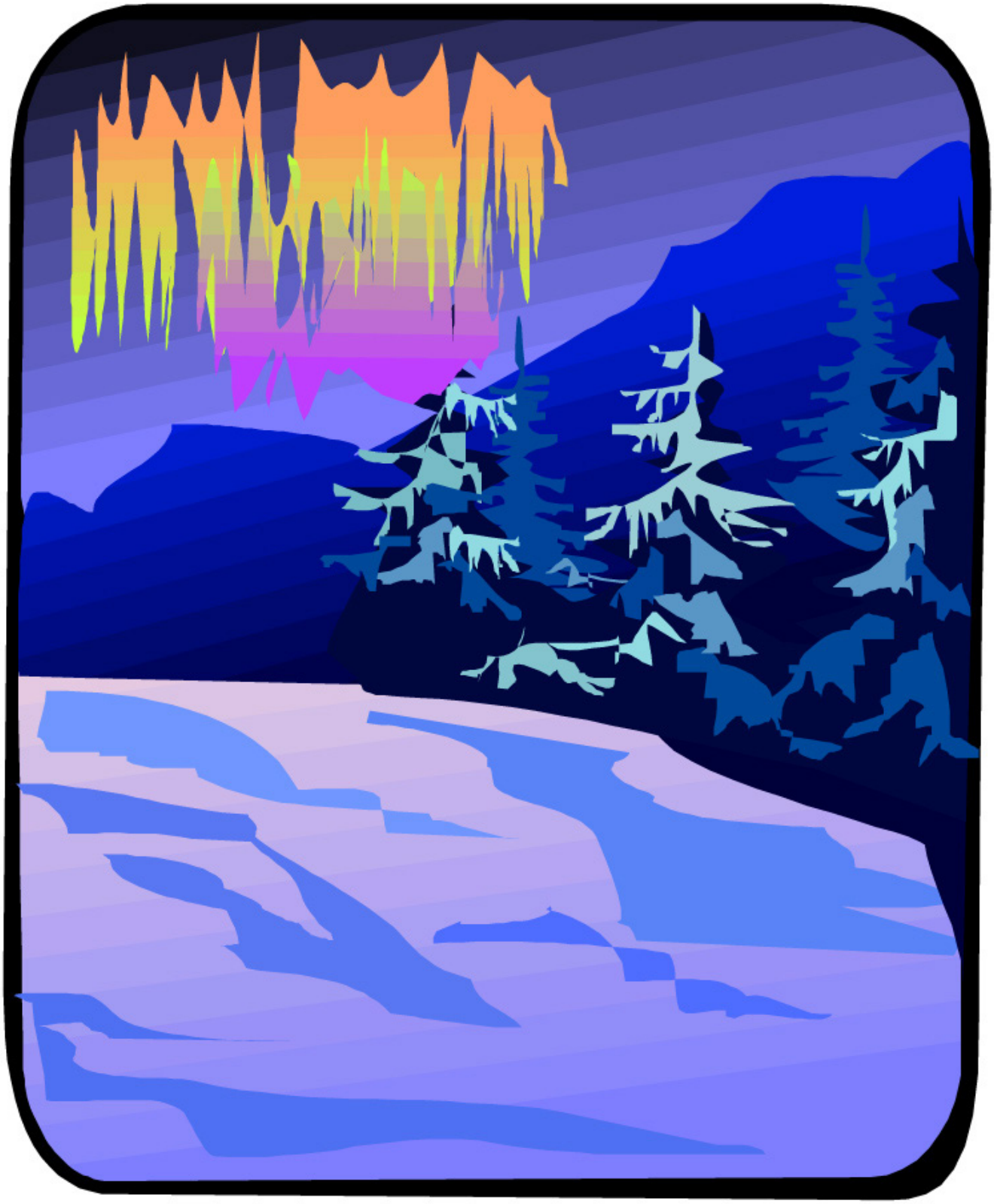
WRITING

Use the activity pages from the Student Support Materials.

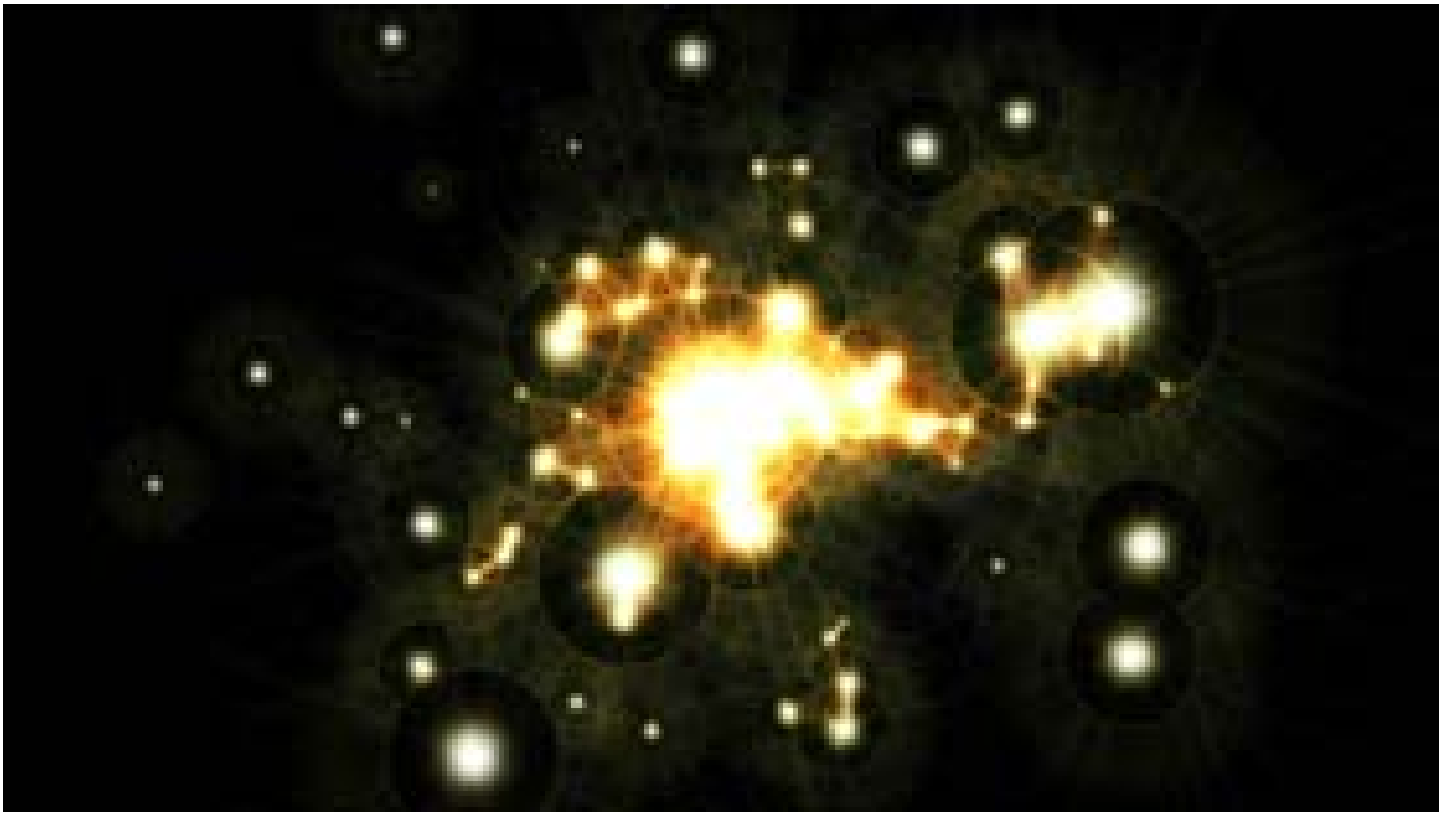
Dash

Group the students into two teams. Make two sets of dashes on the chalkboard - each set should be the same and should represent a sight word. When you say “Go,” the first player in each team must rush to his/her set of dashes on the chalkboard. Each player must then write a sight word that fits the number of dashes. Accept any sight word that fits the dashes. The first player to do this correctly wins the round. Repeat with other sets of dashes until all students from each team have had an opportunity to participate.

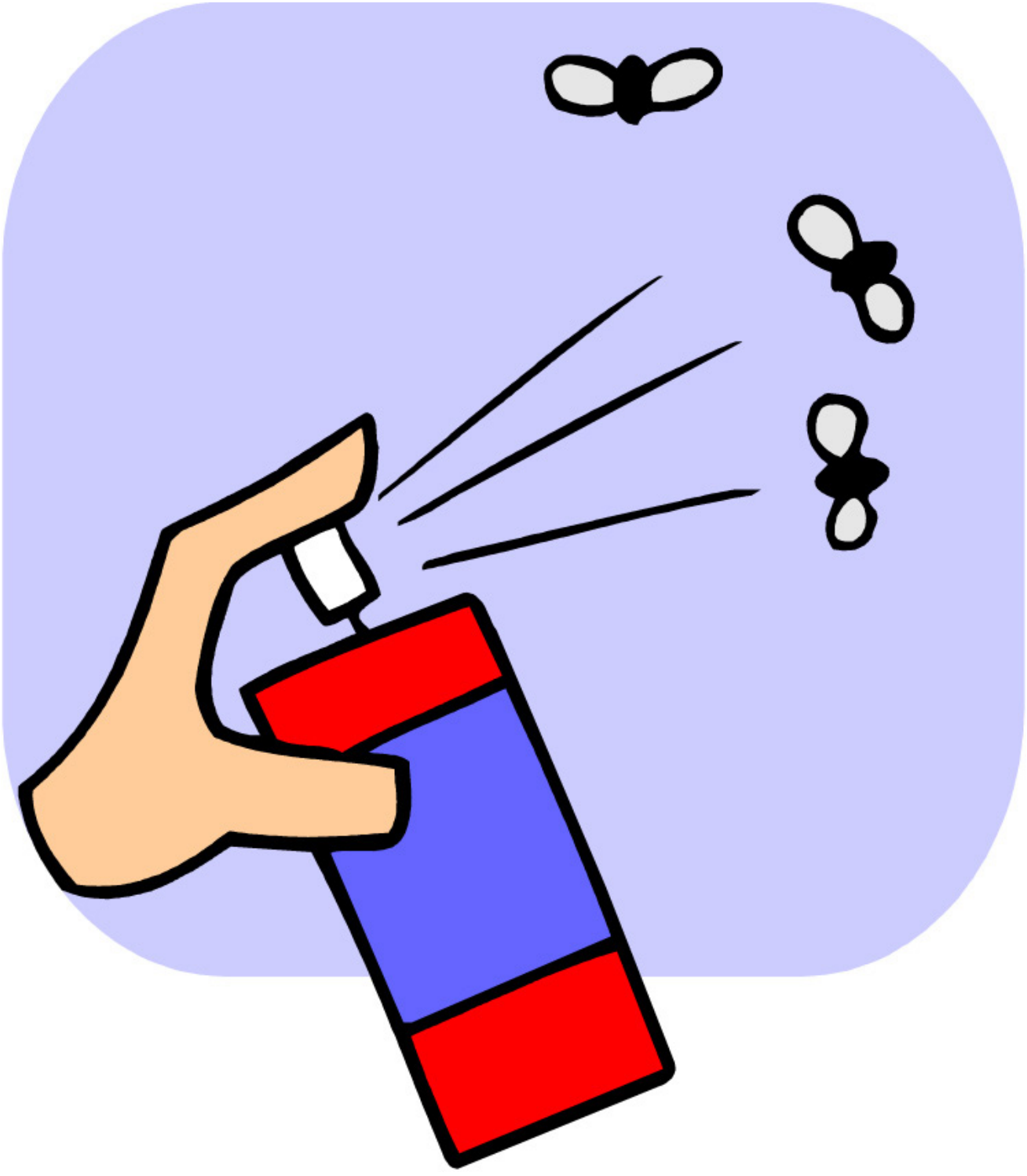
Vocabulary Images

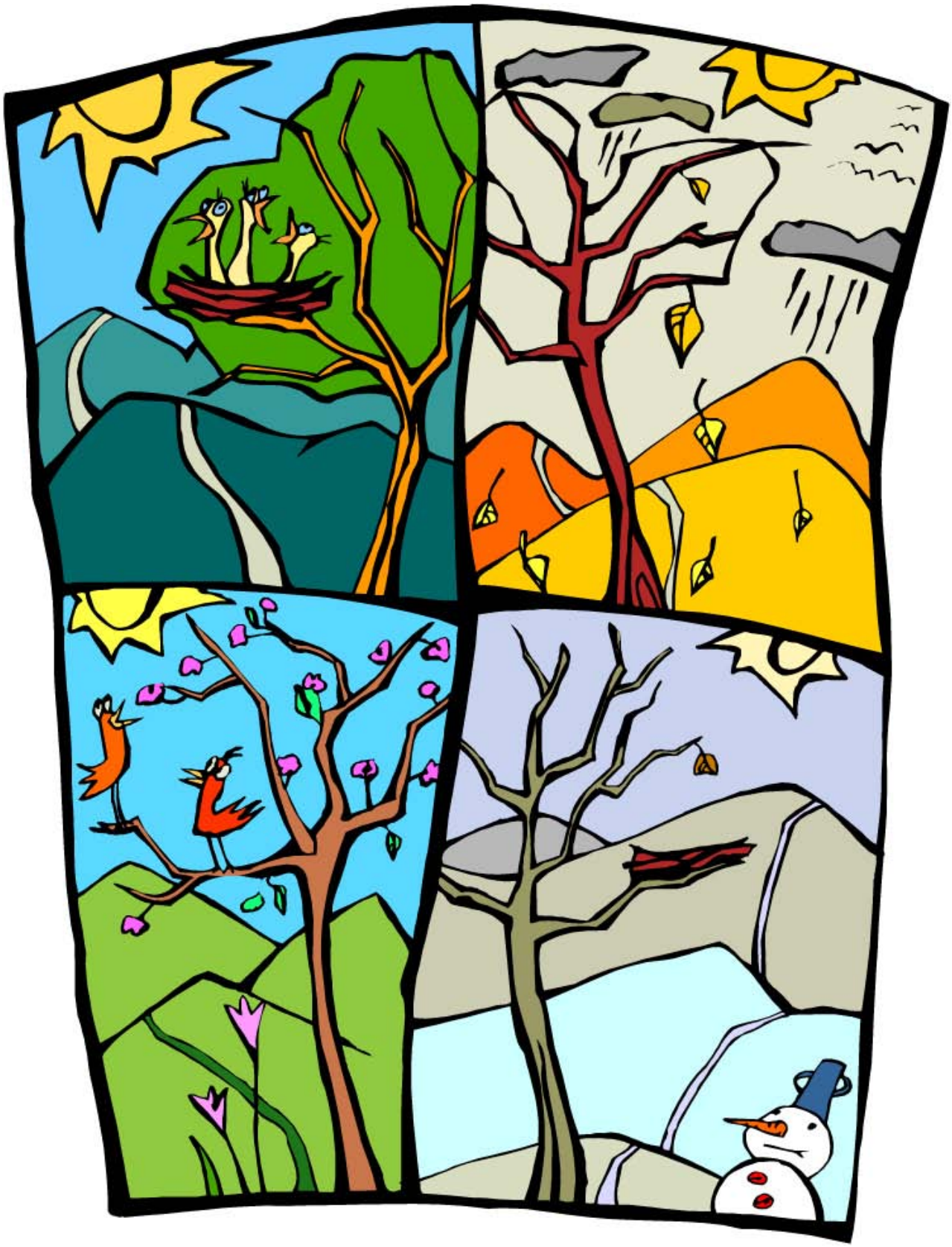


big bang

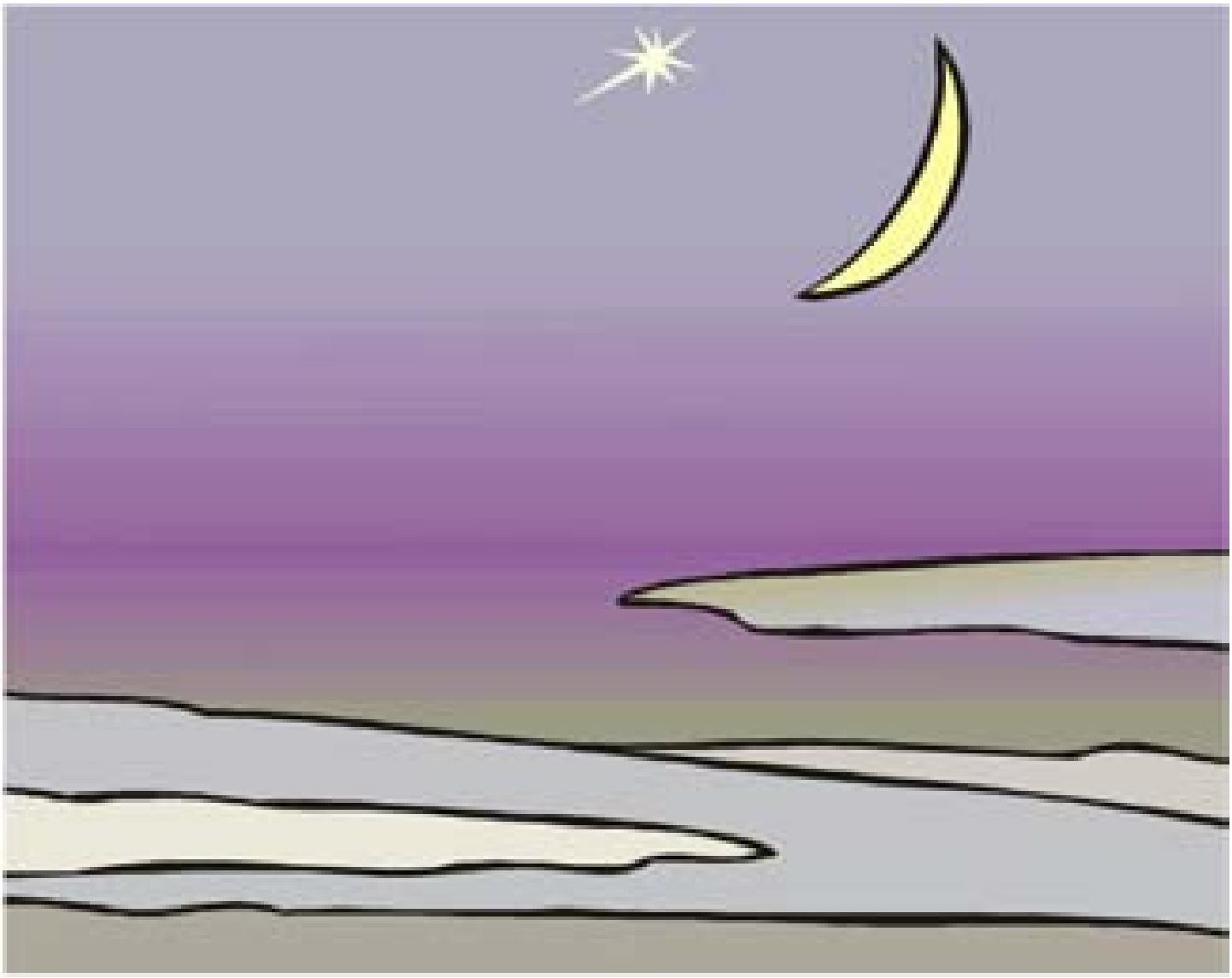


control



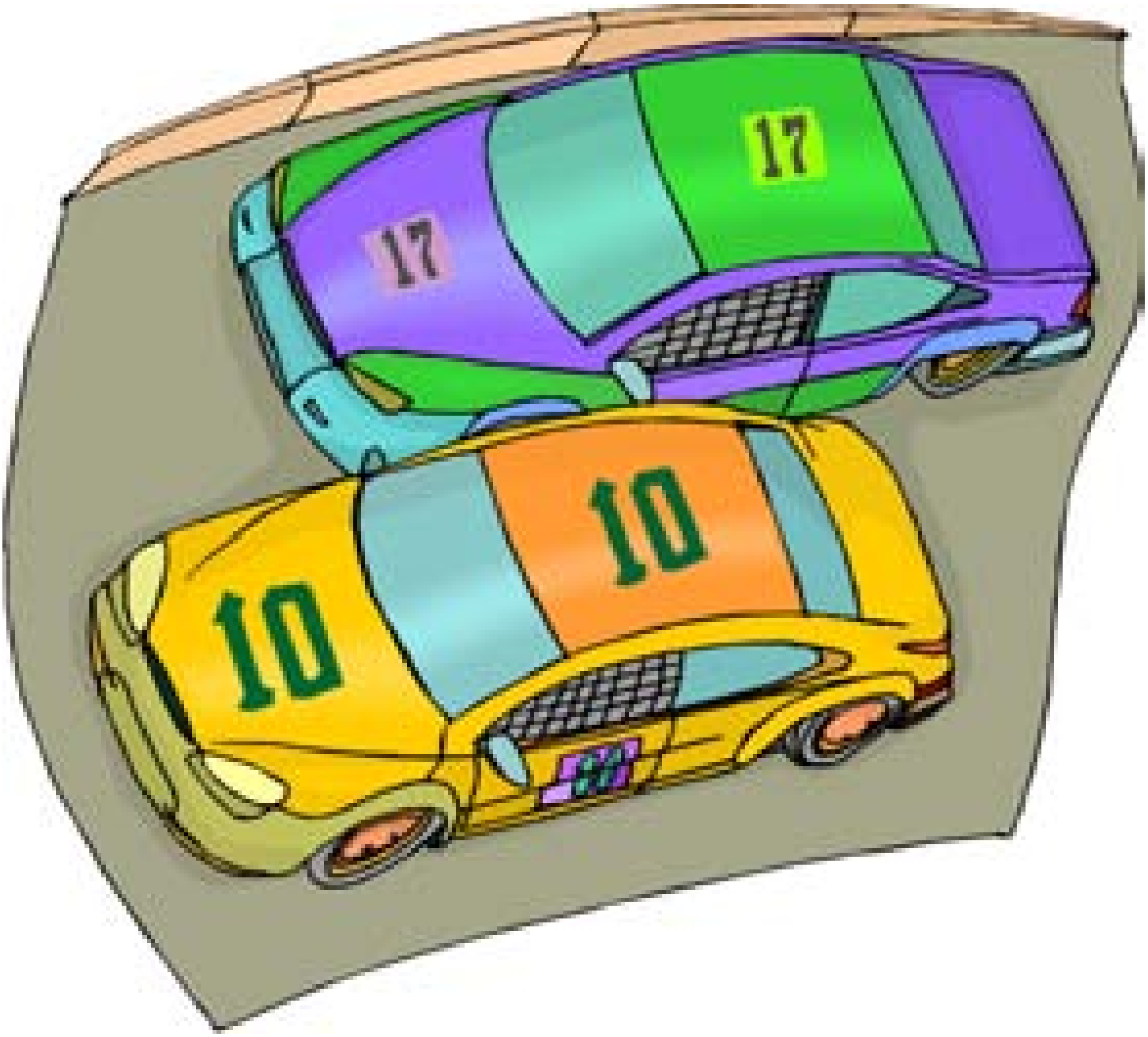


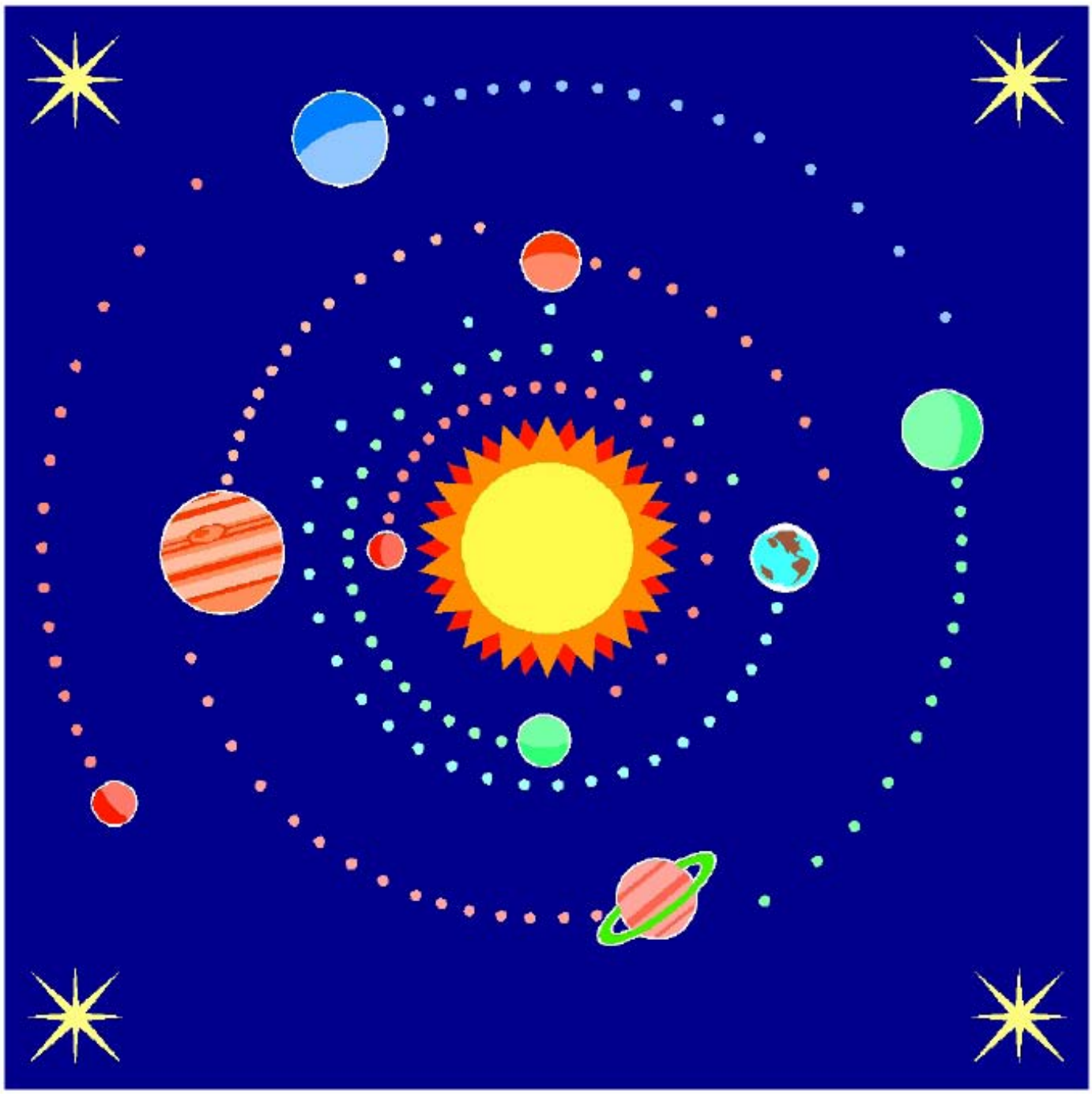
neap tide

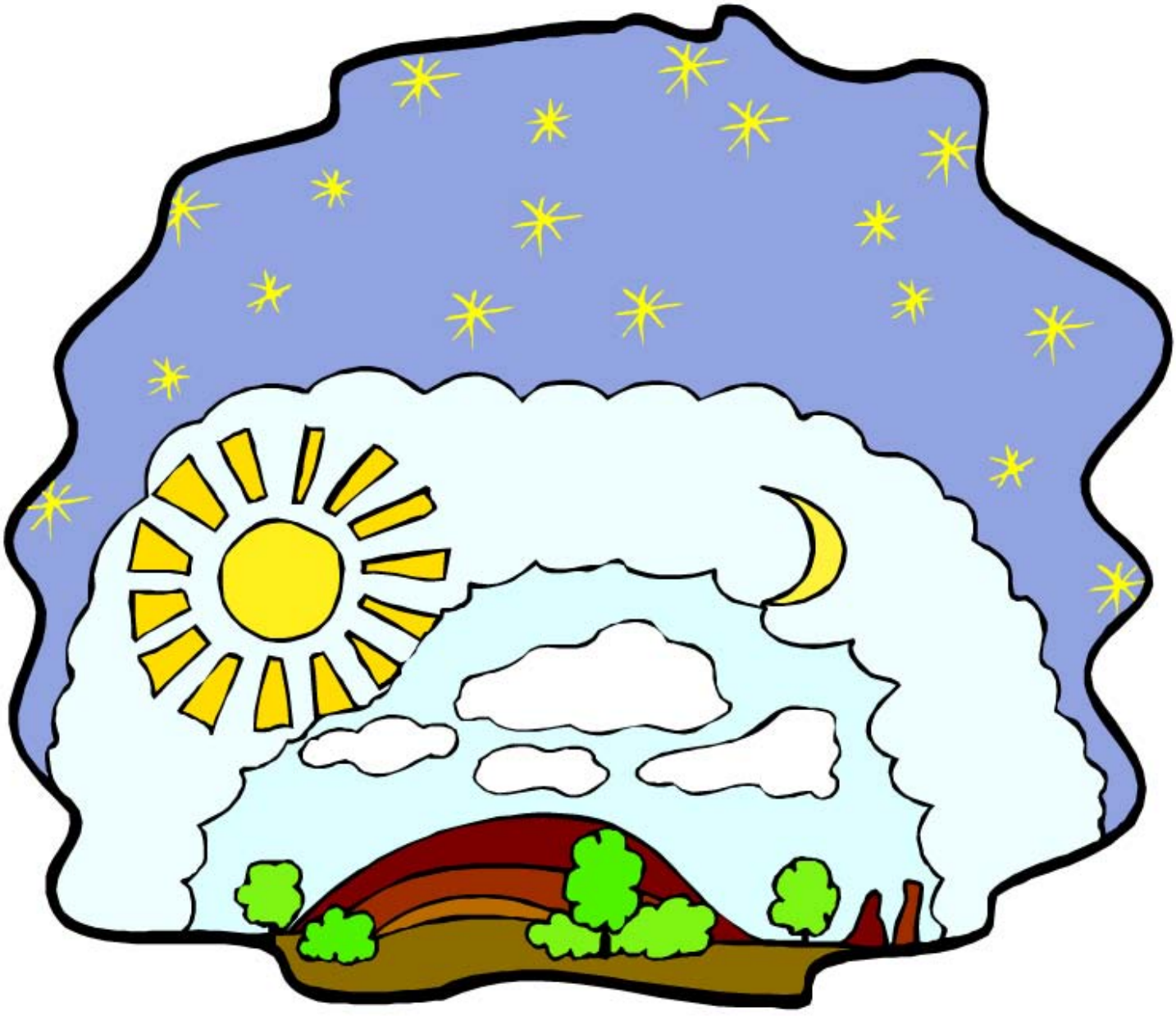



USA

position



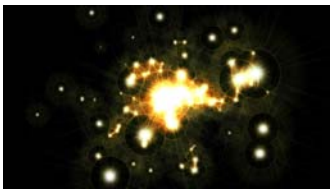


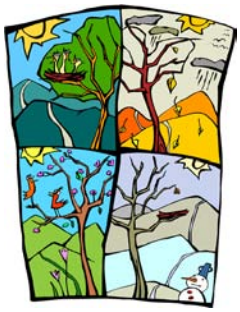


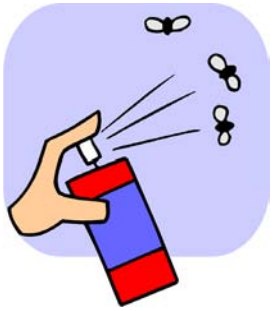
STUDENT SUPPORT MATERIALS

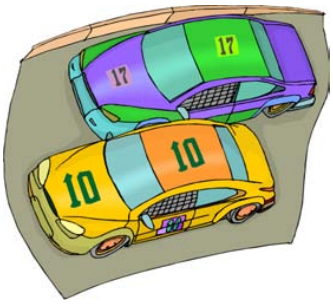
Listening

Say these words to the students - they write the numbers of the words under the pictures.
(1)solar system (2)expand (3) orbit (4) neap tide (5) position (6) control (7) revolve (8) big bang (9)star (10)cyclical (11)aurora (12)phenomena (13)tilt (14)universe (15)spring tide









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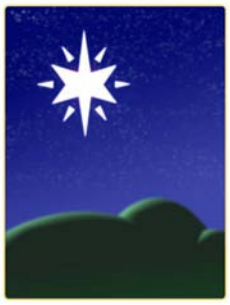

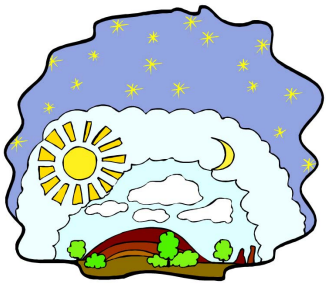

True Or False?

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

1. Our solar system is a collection of billions of stars that are spinning in a pinwheel-like formation through space.
2. Science is concerned not only with natural phenomena, but also with unnatural phenomena.
3. The best time to see the Aurora is at noon on a clear summer day.
4. Many of nature's processes are cyclical, including the water cycle, seasons, and tides.
5. If you cannot control your emotions you may find yourself doing and saying things that you might later regret
6. Young children often hold the same political opinions and take the same political positions as their parents
7. Stars are big balls of burning gas that are fueled by thermonuclear reactions
8. You can expand your list of options by graduating from high school
9. It is thought by some scientists that the universe not only contains regular matter—the stuff we can see, taste, and feel—but also dark matter, a mysterious substance that we have yet to directly observe.
10. The big bang happened about 5 million years ago.
11. Spring tides occur on the quarter moon.
12. Neap tides occur when the sun and moon are aligned.
13. Old-west pistols work on the principle of revolving actions.
14. The orbit of the Earth is such that the Earth is the third planet.
15. A solar system is formed in gaseous nebulaes.

Answers

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

STUDENT SUPPORT MATERIALS

Sight Words

solar system phenomena

aurora

cyclical

control

position

star

expand

universe

big bang

tilt

spring tide

neap tide

revolve

orbit

STUDENT SUPPORT MATERIALS

Reading

Word Find

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

aurora
big bang
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position
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solar system
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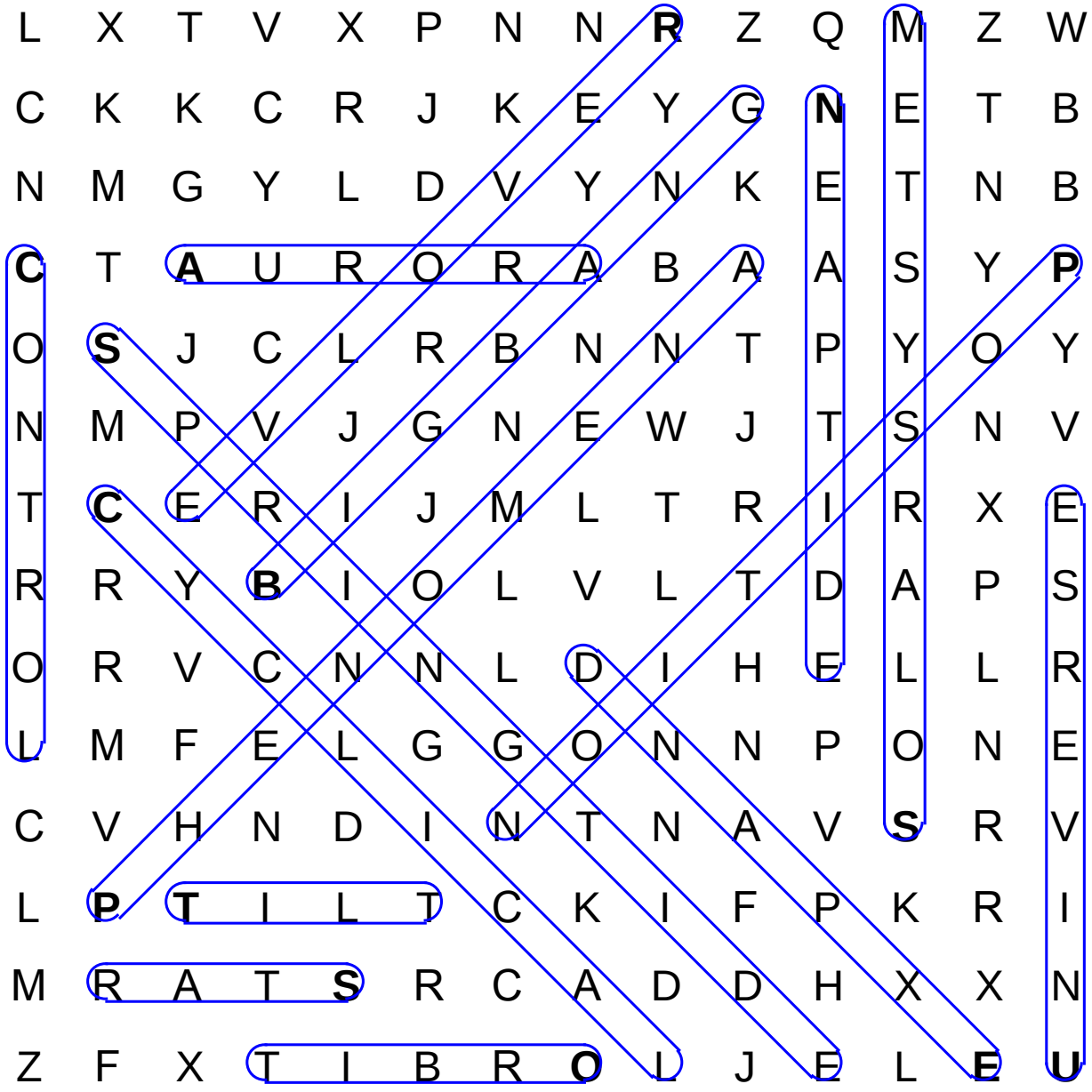
Word Find Solution



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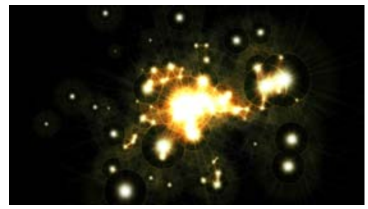

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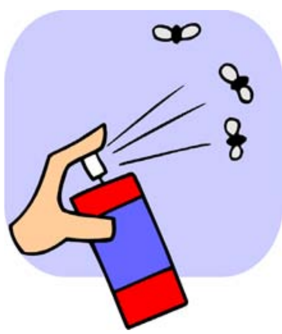

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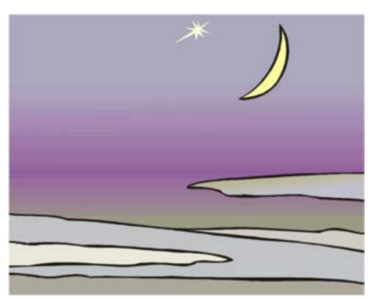

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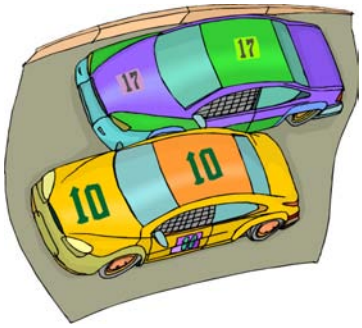

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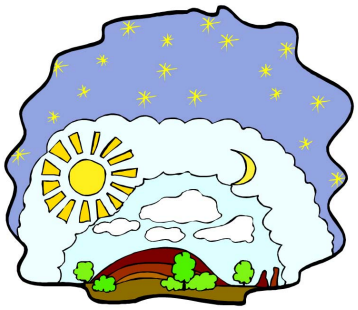

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Sentence Halves

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

1) Pluto is no longer considered
2) Observing natural phenomena is
3) The Aurora Borealis occurs in the northern hemisphere while the
4) A cycle that isn't cyclical
5) Once you are on board an airplane
6) Stars are used to navigate, but only
7) It is fun to watch gulls jockey for position
8) It is important to expand
9) The title "Mr. Universe" is a body-building title
10) Scientists say that everything (including space and time) began
11) Spring tides often
12) Neap tides are not the
13) The Earth is said to orbit
14) A tachometer in a car
15) Mars is part of

A) One's skill set whenever possible.
B) A cornerstone of science.
C) Is not really a cycle.
D) refloat and bring debris into the channels from beaches.
E) the sun.
F) our solar system to be home.
G) A planet in our solar system.
H) measures the number of revolutions that the engine makes.
I) When the fishing boats come in to the docks.
J) That is massively exaggerated.
K) Aurora Austoralis occurs in the southern hemisphere,
L) You are no longer in control of where you are going or with whom you are traveling.
M) On clear nights.
N) best to go clamming on as much of the intertidal area is not exposed.
O) with the big bang

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

Word & Definition Match

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

the sum of everything that exists in the cosmos	*the existential reality of "something"*	*The evolution of the universe since that beginning point*	*tides that occur during the first and third quarter*	*to exercise restraint or direction*
the sun and all the objects in orbit around it	*to move in a circular or curving course or orbit*	*to get bigger*	*a place or location*	*to slope or incline*
recurring at regular intervals	*tides occuring at maximum range.*	*Also known as the australis or borealis*	*the path traveled by a body that is attracted by another body in space*	*massive, luminous ball of plasma*

1. solar system	2. phenomena	3. aurora	4. cyclical	5. to control
6. position	7. star	8. to expand	9. universe	10. big bang
11. tilt	12. spring tide	13. neap tide	14. revolve	15. orbit

Which Belongs?

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

1. In our solar system, planets revolve around/orbit the sun.
2. Natural phenomena/phenomenons are all around us—we just need to keep an eye out for them.
3. Why is the most common color in the aurora/star green?
4. Processes that are cyclical/controlled are bound to repeat themselves.
5. In anger management training one learns to control/position one's anger.
6. Positioning/expanding is important in sports—if you are in the right spot at the right time, good things happen.
7. Stars appear small in the sky because they are, in fact, so small/far away,
8. The universe continues to expand/contract.
9. There are billions and billions of stars in the universe/solar system.
10. The beginning of the universe is marked by the big bang/small bang.
11. The highest tides of the year are always spring/neap tides.
12. The lowest tides of the year are always spring/neap tides.
13. Billy became trapped in the orbiting/revolving door when it stopped moving.
14. The orbit/revolve of Pluto is not circular.
15. Copernicus was not able to publish his findings that indicated the Sun was the center of the solar system/orbit.

Answers
1. orbit, 2. phenomena, 3. aurora, 4. cyclical, 5.control, 6.positioning,
7. far away 8. expand, 9. universe, 10. big-bang, 11. spring, 13. neap,
14. revolve, 15. solar 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.

1. A _____ is at the center of our solar system.

- (a) Star
- (b) Planet
- (c) Moon

2. How do you say the plural form of "phenomenon"?

- (a) Phenomenons
- (b) Phenomena
- (c) Phenomeni

3. Plasma is one of the most brilliant states of matter, as illustrated by the dancing lights of the _____ .

- (a) Aurora
- (b) Semi-Trucks
- (c) Movie Screen

4. Many of nature's processes are cyclical in nature, excluding

- (a) The carbon, water, and nitrogen cycle
- (b) Seasons, tides, and flooding
- (c) Evolution

5. It is difficult to maintain control of a fast moving car when the roads are

- (a) Plowed and clear
- (b) Dry and warm
- (c) Icy with a thin layer of water on top

6. A hockey goalie is wise to maintain her _____ in front of the goal.

- (a) Position
- (b) Composure
- (c) Both of the above

7. The sun is really just a _____.

- (a) Planet
- (b) Moon
- (c) Star

8. Blowing air into a balloon causes it to _____.

- (a) Expand
- (b) Contract
- (c) Maintain its size

9. Which is the proper order, from smallest to greatest?

- (a) Universe, galaxy, solar system
- (b) Solar system, universe, galaxy
- (c) Solar system, galaxy, universe

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.

10. It all began with the _____, but what was there before that?

(a) Big Bang
(b) Terraforming
(c) Space-time continuum

11. Which of the following is not true regarding neap tides:

(a) They are the lowest tides of the month
(b) They are the highest tides of the month
(c) They occur when the moon is not full or new.

12. Which of the following is not true regarding Spring tides:

(a) They are the lowest tides of the month
(b) They are the highest tides of the month
(c) They occur when the moon is full or new

13. Gravity does not depend on the Earth:

(a) Having mass
(b) Revolving
(c) Being comprised of matter.

14. The orbit of a satellite

(a) Is such that it is in constant free fall;
(b) Is only maintained by constant rocket propulsion;
(c) Is only maintained if it is above the atmosphere.

15. Our solar system:

(a) Is at the center of the galaxy;
(b) Consists of a star called Sol, 8 planets, and numerous other orbiting masses;
(c) Is the only complete solar system in the universe.

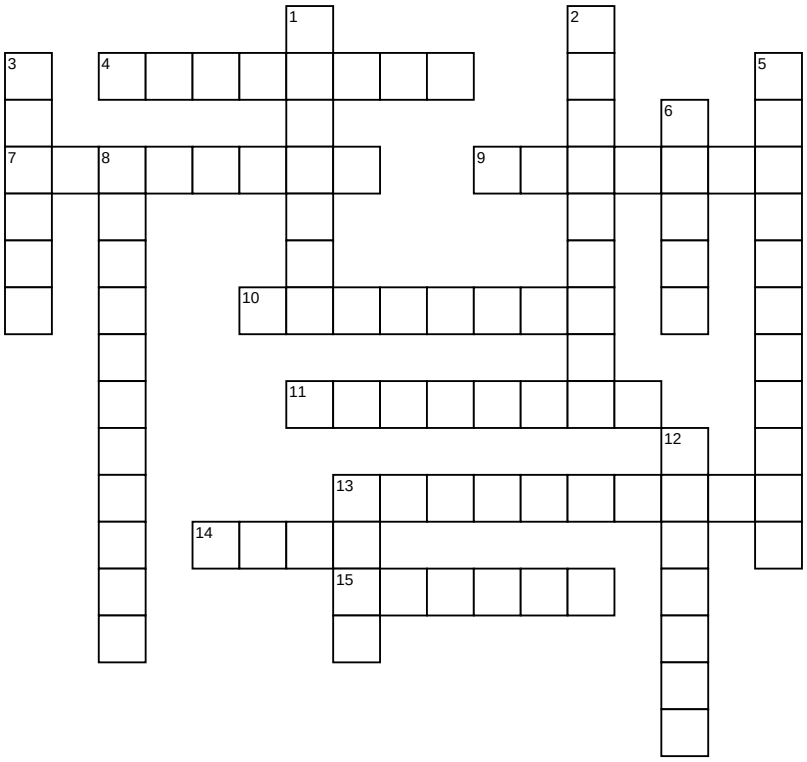
Answers
1. a, 2. b, 3. a, 4. c, 5. c, 6. c, 7. c, 8. a, 9. c, 10. a, 11. b, 12. a, 13. a, 14. b, 15. b

STUDENT SUPPORT MATERIALS

Writing

9th D-1 Concept of Earth Science

Unit 1



ACROSS

4 the sum of everything that exists in the cosmos, including time and space.
7 a place or location.
9 to exercise restraint or direction over, common, to hold in check, curb.
10 the tide that occurs when the difference between high and low tide is the least.
11 recurring at regular intervals.
13 the tide that occurs when the moon is new or full, the tides which have the maximum range.
14 to slop or incline.
15 an atmospheric phenomenon created by charged particles from the sun striking the upper atmosphere, creating colored lights in the sky.

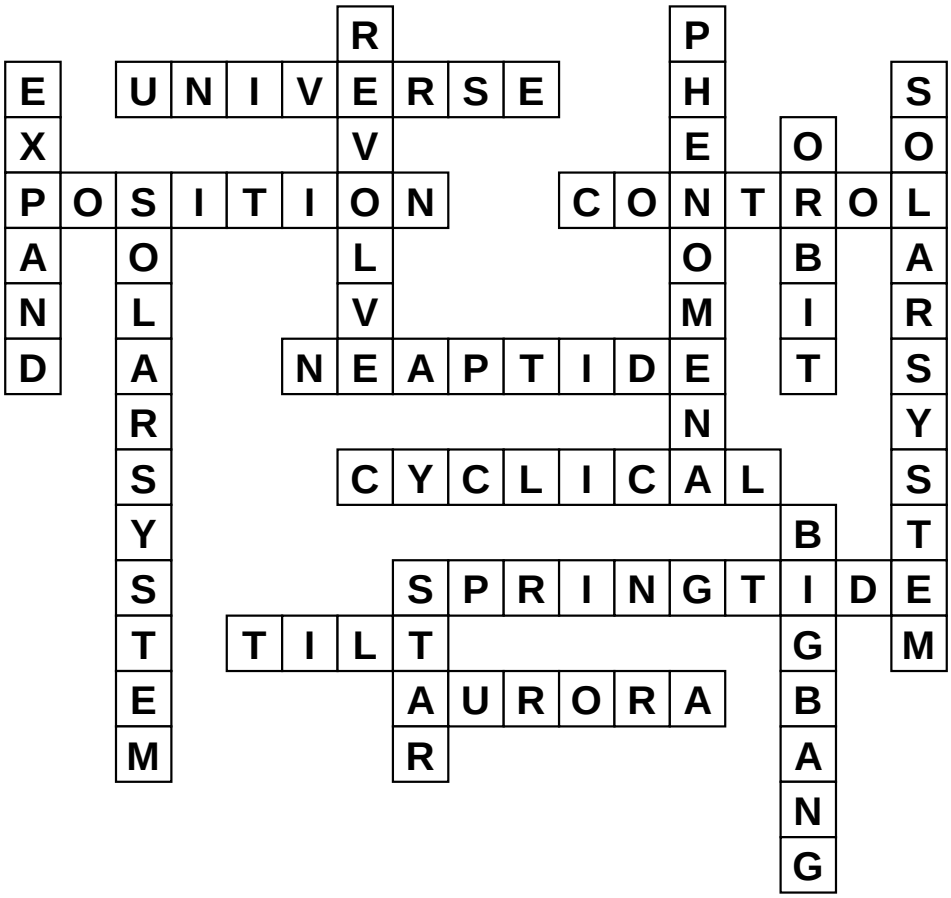
DOWN

1 to move in a circular or curving course or orbit.
2 the existential reality of "something", plural of phenomenon.
3 to get bigger.
5 the sun and all the objects in orbit around it.
6 the path traveled by a body that is attracted to another body in space.
8 the sun and all the objects in orbit around it.
12 the cosmic event that marks the beginning of time and the rapid expansion of space for the visible universe.
13 massive, luminous ball of plasma.

9th D-1 Concept of Earth Science

Unit 1

Solution:



Write The Words!

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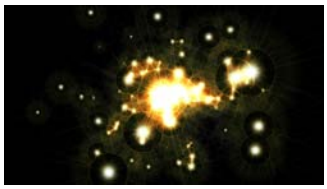

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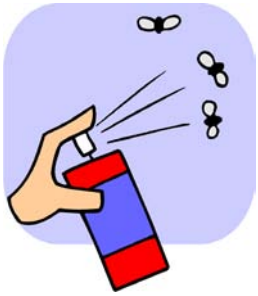

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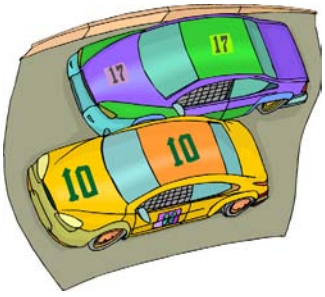


_____

_____

Write the Words!

_____

_____

_____

_____

_____

Complete The Sentence

Have the students write the key words in the blanks.

1. There is some debate regarding the number of planets in our _____ _____ .
2. Astronomers are interested in observing the _____ in space through telescopes.
3. When one sees colorful lights dancing in the sky at night, one is witnessing the _____.
4. If a process repeats itself one could call it _____.
5. When you ride a horse near the edge of a cliff, you must keep the horse under _____ or it might step where you don't want it to step.
6. If you _____ yourself in the lunch line near someone you like, you may get a chance to talk to him/her.
7. On a clear night one is able to see many _____ in the sky.
8. When buried in an avalanche, it is important to (at the last minute before the snow stops moving) _____ your chest as big as you can. This will enable you to have a bit more room to breathe after the snow cements.
9. The _____ includes everything everywhere.
10. Scientists think that the universe began in a massive explosion called the _____ _____ .
11. The tides associated with the sun and moon at right angles to each other are called _____.
12. The tides associated with the sun and moon being aligned to each other are called _____.
13. The Earth wobbles as it ___, a fact called precession.
14. The ___ of a comet is in the form of an ellipse.
15. The earth _____ on its axis.

Answers
1. solar system, 2. phenomena, 3. aurora, 4. cyclical, 5. control, 6. position, 7. stars
8. expand, 9. universe, 10. big bang, 11. neap tides, 12. spring tides, 13. revolves
14. orbit, 15. tilts

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.

solar system

phenomena

aurora

cyclical

to control

position

star

to expand

universe

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.

big bang

tilt

spring tide

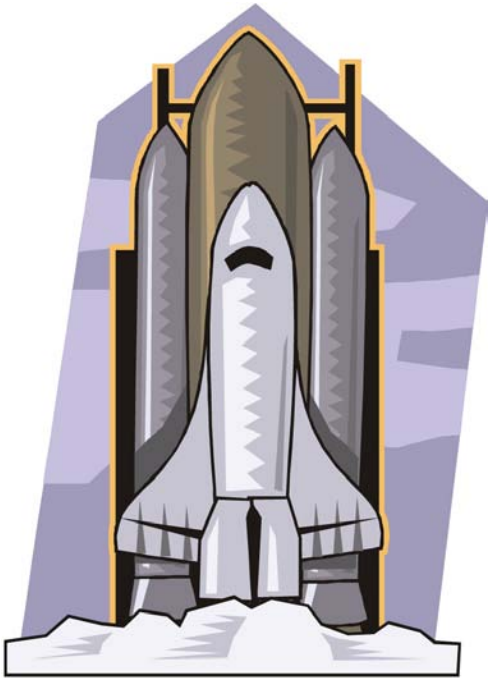
neap tide

revolve

orbit

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 oceans are a unique environment and how their properties support an amazing variety of life.

From the work of S. Marino

The Moving Tides

☐ **Activities**

- Have students watch the video, "Blue Planet: Tidal Seas" and take notes using the video guide.
- Students should discuss the answers they got from the video.
- Pass out the reading "Sending Out an S.O.S." by Chana Freiman from Science World. They should answer the questions on the next page and turn it in when complete.

☐ Materials

- Video: "Blue Planet: Tidal Seas"
- Video guide
- Reading "Sending Out an S.O.S." by Chana Freiman from Science World
- Reading questions

Sending Out an S.O.S.

Reading Guide

Name: _____

1. What kind of trash is picked up most frequently from America's beaches?

2. Where does most trash come from?

3. Why are plastics so bad for organisms in the ocean?

4. How do beachfront homes affect the coastline and animals that live there?

5. What are two big oil spills that are referred to in the reading?

6. What is non-point source pollution?

7. Think about the Enviroscape model that we looked at previously. How does what you learned then relate to non-point source pollution?

8. How big are some of the trawling nets used in Iceland?

9. How does all the man-made noise affect marine mammals?

10. What could happen if the coral reefs are destroyed?

11. How have radioactive wastes entered into the environment?

12. What are the two sources of pollution that are the worst in Alaska?

13. What can be done locally to clean up and prevent pollution in our area?

14. Why is it so hard to regulate ocean pollution?

Blue Planet: Tidal Seas

Video Guide

Name _____

1. How does the moon affect the tides?

2. What happens to the water in the Amazon river?

3. What are the two large predators of herring in the Bay of Fundy?

4. What is myofauna?

5. What is a predator of SE Alaska's clams?

6. Draw at least 2 of the beaks seen on shore birds.

7. How do these beaks give the shore birds an advantage in finding food?

8. What is the relationship between the sand lancet and dogfish?

9. How do the Spring Tides impact organisms on Vancouver Island?

10. How strong are the currents near Vancouver Island?

Part 2

11. Where do the demoiselle fish go when the tides change?

12. Are the tides large or small in equatorial areas like the Caribbean?

13. How do bottle nose dolphins get their meal of razor fish?

14. Explain the relationship between snails and hermit crabs.

15. How do sting rays and sharks locate their meal in the sand?

16. What does the tarpon do when oxygen levels get low?

17. After a hurricane, what is able to survive on the salty mud flats?

18. How are the tides important to crabs on Christmas Island?

19. List 4 challenges for organisms on the intertidal zone?

20. How do the tides affect people in Juneau?

Purpose: Students will practice good stewardship of the land that we study by participating in a beach clean up.

From the work of S. Marino

Beach Clean Up

☐ **Activities**

- Facilitate a discussion with the class on the evidence of pollution they have seen in the local area. Students should also consider how these pollutants can affect other areas (think of the watershed model).
- Ask students what should be done to create a more pristine area that would be beneficial for all living things in this land.
- Inform students that they will be conducting a beach (or stream) clean up. Provide each student with gloves and a bag and go to the area chosen for the clean up.

☐ Materials

- Glove and bags for clean-up. Consider talking to the Watershed council, DOT, or EPA if you need supplies or trash pickup.

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

From the work of S. Marino

We Are All Made From Stars

☐ **Activities**

- Read the story of "Raven and the Box of Daylight," from the book Images of a People by Pelton and DiGennaro.
- Tell students that today they will be thinking about the origins of the universe. Most people have different views on how the universe came to be. The video, "Space Age: The Unexplained Universe" will show evidence for the theory many scientists believe in.
- While watching the video students should answer the questions on the video guide.

☐ Materials

- "Raven and the Box of Daylight," from the book Images of a People by Pelton and DiGennaro
- Space Age: The Unexplained Universe
- Video Guide

Purpose: Students will learn how to identify some main constellations in the sky and discover the multicultural stories behind them.

From the work of S. Marino

Looking to the Stars

☐ **Activities**

- (In Juneau) The first day should be devoted to using the planetarium to look at and identify common constellations that can be seen in this area. Training on how to use the planetarium is available from Michael Orelove and Community Schools.
- For a portion of the time on each of the following days practice identifying the constellations.
- Have students help you create a scoring guide
- Each student will choose a constellation to research and create a poster to inform the rest of the class as well as visitors to the planetarium.

☐ Materials

- Use of the Marie Drake Planetarium (contact community schools or Michael Orelove)
- Library time
- Computers with internet access
- Poster board
- Scissors
- Glue
- Markers

Aurora Topic Sheet

Have the students answer each question. Review their responses.

	Topic	Name
1	Why do Auroras appear?	
2	How do the different colors occur?	
3	What makes them occur?	
4	How do you predict when and where they can be seen?	
5	How is the sun involved?	
6	What is the cultural significance?	
7	What is the Aurora like in the southern hemisphere?	
8	How do you photograph the Aurora?	
9	What do Auroras look like from space?	
10	What is the current aurora research?	

Unit Assessment

Unit 1 Quiz

Grade 9 D1, Unit 1, Concepts of Earth Science Quiz

Name: _____
Date: _____

Multiple Choice: Read each of the following statements carefully and read each of the choices given. Choose the best answer and circle your answer.

1) The sun and all the objects in orbit around it is called _____.

a) the universe

b) the solar system

c) the Milky Way

d) outer space

2) An aurora borealis is an example of a/an _____.

a) lunar display

b) meteor shower

c) heavenly explosion

d) atmospheric phenomenon

3) A massive, luminous ball of plasma is a _____.

a) star

b) planet

c) moon

d) meteor

4) In the world of science, the BIG BANG refers to _____.

a) the loudest noise made to mankind

b) the cosmic event that marked the beginning of time

c) the day the world will come to an end

d) none of the above

5) A scientific phenomena refers an observable fact or event; the existential reality of something.

a) True

b) False

6) Spring Tides occur in the spring.

a) True

b) False

7) Neap Tides occur when the difference between high and low tide is the least.

a) True

b) False

Fill in the Blank: In the items below, fill in each statement with the best word. Choose the words from the ones provided in the Word Bank.

Word Bank		
aurora borealis	control	expand
position	the big bang	universe

8) A ball player charges down the court and is ready to lay up a ball for 2 points. Suddenly he is confronted with an opposing player planted in front of him. He must exercise restraint and demonstrate _____.

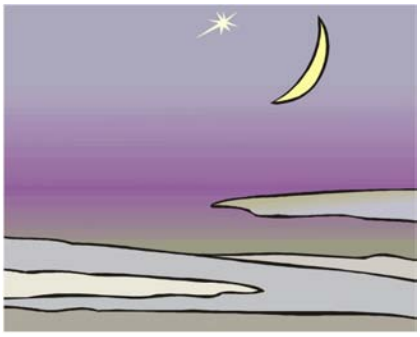
9) Ball players also have to be able to know their plays and be able to find their place, location or proper _____ on the court.

10) Another word for "to get bigger" is to _____.

11) When we want to talk about the solar system, the Milky Way, the solar system and constellations beyond, and talk about everything that exists in the cosmos, including time and space, we want to talk about the _____.

Illustrations: Use illustrations of key vocabulary to answer the following questions.

13) Look below at the two illustrations of tides. One is of a Spring Tide, the others is an illustration of a Neap Tide. Label the illustrations correctly.



14) Define TILT either with words or an illustration.

Grade 9 D1, Unit 1, Concepts of Earth Science Quiz

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Date: _____

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3) A massive, luminous ball of plasma is a _____.

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4) In the world of science, the BIG BANG refers to _____.

a) the loudest noise made to mankind

b) the cosmic event that marked the beginning of time

c) the day the world will come to an end

d) none of the above

True/False: Read each statement below carefully and circle whether the statement is true or false.

5) A scientific phenomena refers an observable fact or event; the existential reality of something.

a) True

b) False

6) Spring Tides occur in the spring.

a) True

b) False

7) Neap Tides occur when the difference between high and low tide is the least.

a) True

b) False

Fill in the Blank: In the items below, fill in each statement with the best word. Choose the words from the ones provided in the Word Bank.

Word Bank		
aurora borealis	control	expand
position	the big bang	universe

8) A ball player charges down the court and is ready to lay up a ball for 2 points. Suddenly he is confronted with an opposing player planted in front of him. He must exercise restraint and demonstrate **control**.

9) Ball players also have to be able to know their plays and be able to find their place, location or proper **position** on the court.

10) Another word for "to get bigger" is to **expand**.

11) When we want to talk about the solar system, the Milky Way, the solar system and constellations beyond, and talk about everything that exists in the cosmos, including time and space, we want to talk about the **universe**.

12) Charged particles from the sun striking the upper atmosphere create colored lights in the sky called the **aurora borealis** in the northern hemisphere.

Illustrations: Use illustrations of key vocabulary to answer the following questions.

13) Look below at the two illustrations of tides. One is of a **Spring Tide,** the others is an illustration of a **Neap Tide**. Label the illustrations correctly.

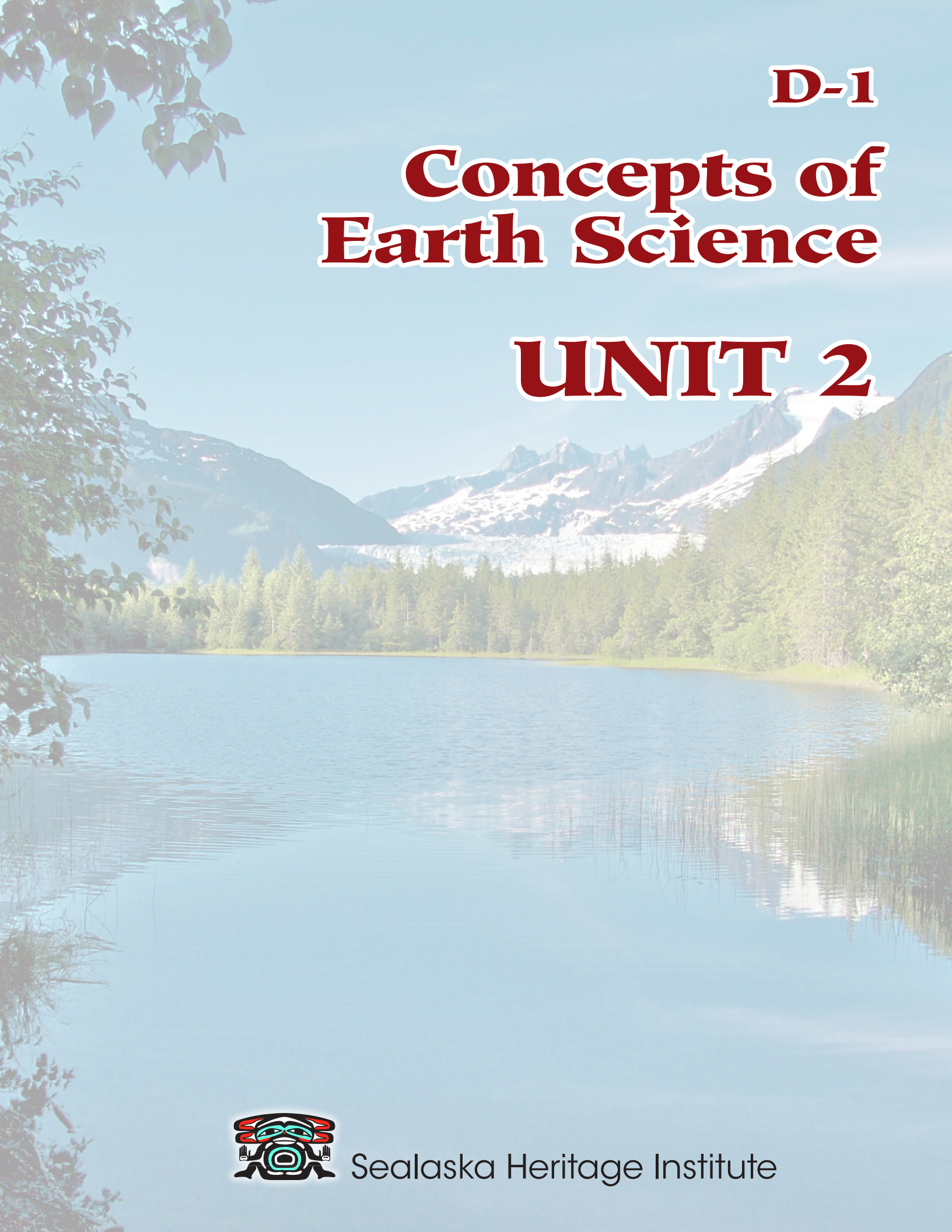
Spring Tide Neap Tide

14) Define TILT either with words or an illustration.

student has illustration or writes "To Slope" or "Incline"

14) Define TILT either with words or an illustration.

student has illustration or writes "To Slope" or "Incline"



D-1

Concepts of Earth Science

UNIT 2

Sealaska Heritage Institute

INTRODUCTION OF

Key Vocabulary

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Model

PLACE-BASED PERSPECTIVE

Select a variety of *models* to share with the students. Show and discuss the *models*. Have the students discuss the importance of models in terms of architecture, medical endeavors, etc.

HERITAGE CULTURAL PERSPECTIVE

Native peoples would create *models* of Chilkat blankets so that they could be woven symmetrically.

To Demonstrate

PLACE-BASED PERSPECTIVE

Show the students a kitchen tool or other tool that is not overly familiar. *Demonstrate* the use of the tool; have selected students use the tool after the *demonstration*.

HERITAGE CULTURAL PERSPECTIVE

Most learning took place through demonstrations. This would have included, physical activities, language, beliefs, and customs.

Rock Cycle

PLACE-BASED PERSPECTIVE

Show a sample of dry mud or plaster. Have the students tell what caused the mud or plaster to harden. Use this to introduce the *rock cycle*.

Show a picture of the rock cycle. Discuss with students that there are no new rocks today; there are just old rocks that have been changed into different forms; sedimentary, igneous, and metamorphic.

HERITAGE CULTURAL PERSPECTIVE

Native peoples have always known that weather impacts the land. They observed the grinding of rocks by the glaciers and the erosion of earth and rocks.

Culturally Responsive & Place-based Perspective
Introduction of Science Vocabulary

To Apply (Knowledge)

PLACE-BASED PERSPECTIVE

Show the students something that is hand made. Direct their attention to the details in the item. Lead the students to understand that the artist *applied* his or her skills to create the item. Have the students cite other examples of *applying* knowledge.

HERITAGE CULTURAL PERSPECTIVE

Traditionally, Native peoples *applied* their knowledge in many different ways. This included hunting, fishing, building, carving, cooking, and harvesting.

Water Cycle

PLACE-BASED PERSPECTIVE

Boil water in an electric kettle, in front of the students. As the water boils, hold a solid item in the steam/condensation coming from the kettle. Have the students note the water on the solid item. Use this to illustrate a *cycle* - liquid to steam to condensation to liquid. Show a picture that represents the *water cycle* and discuss it with the students.

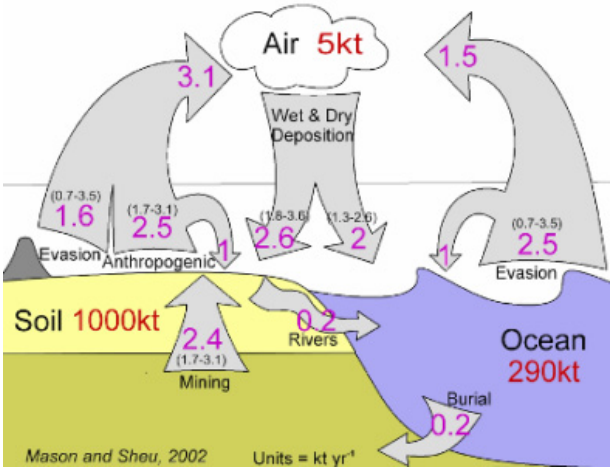
HERITAGE CULTURAL PERSPECTIVE

Native peoples recognized the importance of water and its characteristics. For example, they applied their knowledge of evaporation in their drying techniques.

Geochemical Cycles

PLACE-BASED PERSPECTIVE

Place a tray of soil on a table in front of the students. Crumble a dead plant over the soil. Have the students suggest the effects of the rotting plants on the soil - they act as fertilizers for the growth of more plants. Use this *cycle* as an example of the *geochemical cycle* on earth - show the picture from the Student Support Materials to reinforce the *geochemical cycles*.



Culturally Responsive & Place-based Perspective
Introduction of Science Vocabulary

Origins

PLACE-BASED PERSPECTIVE

Show a sample of salt. Lead the students to realize that salt has played an important role in history - in Roman times, people were often paid with salt, thus the *origin* of the word *salary*. Cite other *origins* such as sauerkraut (China), bagpipes (Persia), etc.

HERITAGE CULTURAL PERSPECTIVE

Natives of Southeast Alaska knew that the *origin* of tanned moosehides was from the interior. They also knew that the Chilkat blanket robes *originated* with the Tsimshian people.

In traditional stories they would know that waterforms *originate* from Raven.

Ongoing

PLACE-BASED PERSPECTIVE

Have the students recall the battery advertisement that has a rabbit beating a drum constantly. The students should suggest the purpose of the advertisement - the *ongoing* nature of the rabbit shows the strength and endurance of the batteries. Cite other *ongoing* activities from around the world.

HERITAGE CULTURAL PERSPECTIVE

All aspects of life in Southeast Alaska were and are *ongoing*. This includes, wildlife, harvesting and processing of traditional foods, clan structure, and cultural events.

To Shape

PLACE-BASED PERSPECTIVE

Show actual samples or pictures of two food items that have different *shapes* - e.g., breads, cakes, cookies, etc. Have the students suggest how the *shapes* were created. Cite other examples of things that can be *shaped*.

HERITAGE CULTURAL PERSPECTIVE

Many Native art forms involved *shapes.* For example, Chilkat robes, spruce baskets, totem poles, and clan houses. Carvings were often *shaped* to represent traditional beliefs. Life views were *shaped* through traditional stories.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Composition

PLACE-BASED PERSPECTIVE

Show the students a familiar chocolate bar - have them tell the *composition* of the bar. Repeat with other well-known food items such as cereals, cookies, and so on.

HERITAGE CULTURAL PERSPECTIVE

Traditionally there were a variety of *compositions*. For example, cranberries were mixed with salmon eggs, and game meats were preserved in seal and hooligan oils.

The Chilkat blankets are a good example of *composition*, in terms of their materials and colors.

Physical History

PLACE-BASED PERSPECTIVE

Make an overhead of a resume - show the overhead to the students and draw their attention to the information conveyed. Use this as an example of a person's history and relate it to *physical history*. Show a picture of an archaeologist and have the students relate his/her work to *physical history*.

HERITAGE CULTURAL PERSPECTIVE

Traditional introductions include a physical history of a person's ancestry, including names, clans, moieties, and ancestral homeland.

Dynamic/Erosion

PLACE-BASED PERSPECTIVE

Place a tray of soil on a table in front of the students. Make a *mountain* out of the soil. Then, use a container of water to demonstrate *erosion*. Use this as an example of a *dynamic geological* event. Cite other *dynamic* geological events such as the melting of glaciers, the hot house effect, and so on.

HERITAGE CULTURAL PERSPECTIVE

In Southeast Alaska, many rivers and fish streams have been altered *dynamically* by logging, mining, and road construction. Mountains have been cleared through clear-cut logging.

Culturally Responsive & Place-based Perspective
Introduction of Science Vocabulary

Interaction

PLACE-BASED PERSPECTIVE

Show the students a can opener, a hammer, and a staple remover (or other such tools). Have the students tell the uses of the items - lead this into the *interaction* that the tools have with other items, e.g. the can opener with cans, the hammer with nails, and the staple remover with staples. Lead this into *interaction* in nature; cite examples.

HERITAGE CULTURAL PERSPECTIVE

Native artisans use a variety of *interactions* in their work. For example, adzes, knives, skin scrapers, sharpening stones, and weaving looms.

Deposition

PLACE-BASED PERSPECTIVE

Hold a clear colored container of water in front of the students. Drop some soil (e.g., from the tray of soil used earlier) on top of the water. Have the students notice the sediments or *deposition* of soil as it sinks to the bottom. Show a picture of a river delta, e.g. the Kuskokwim River delta, as an example of *deposition*.

HERITAGE CULTURAL PERSPECTIVE

Deposition of sand and silt is a common occurance in Southeast Alaska, particularly at the mouths of rivers and streams.

Forces

PLACE-BASED PERSPECTIVE

Locate an item that is very *used* - e.g., an old coin or bill, an old shoe, an old plate, etc. Direct the students' attention to the condition of the items and have them suggest what caused the changes in appearance. Use this to introduce *forces*, particularly in nature (wind, rain, sun, etc.). Have the students determine how *forces* affect things in nature.

HERITAGE CULTURAL PERSPECTIVE

The effects of the *forces* of nature are evident everywhere in Southeast Alaska. For example, the people of Hoonah at one time had to relocate from the Glacier Bay area due to the advancing glacier.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Theory

PLACE-BASED PERSPECTIVE

Locate an item that has been altered in some way, e.g. from water, sunlight, stains, etc. Present the item to the students, calling upon them to *theorize* what caused the alteration in the item. Use this to introduce *theory*, particularly as it relates to nature.

HERITAGE CULTURAL PERSPECTIVE

Traditionally, Native peoples developed a variety of theories related to their environment. This would have included their interaction with nature and practices such as steaming wood to make canoes, bent wood boxes and drums.

Plate Tectonics

PLACE-BASED PERSPECTIVE

Collect a number of unbreakable dinner plates. Place them on the table, side-by-side, on top of one another, leaning on one another, etc. Use the plates to represent *plate tectonics* - move the plates, causing some to fall and others to slip.

HERITAGE CULTURAL PERSPECTIVE

Native peoples of Southeast Alaska were very familiar with the earth's movements. This was evidenced by the story of the tidal wave in Lituya Bay.

Language Skills

Language & Skills Development

LISTENING

Use the activity pages from the Student Support Materials.

Funnel Vision

Before the activity begins, collect a large funnel. Have a student stand at the front of the classroom, with his/her back to the other students. Give the student the funnel. Give the vocabulary illustrations to the other students in the class. The students should hold their illustrations up, facing the front of the classroom. Say a vocabulary word. When you say "Go," the student with the funnel should place the funnel over his/her eyes and turn to face the other students. The student must then look through the funnel to find the illustration for the vocabulary word you said. This activity may be conducted with two players (each player having a funnel). The winner of each round is the student who locates the correct illustration first. Have the students in the class exchange illustrations for each new round of the activity. Repeat with other pairs of players until all students have participated.

SPEAKING

Make A Change

Say a sentence that contains one or more of the vocabulary words. Call upon a student to repeat the sentence, making ONE change in it. The student may add a word to the sentence, delete a word, change the tense, etc. Then, call upon another student to make another change in the sentence. Continue in this way until as many changes as possible have been made in the sentence. Begin each round with a new sentence.

READING

Use the activity pages from the Student Support Materials.

Mended Words

Mount the sight word cards on the chalkboard. Cut the matching vocabulary illustrations for the sight words in half (or, prepare photocopies of the vocabulary illustrations). Mix all of the halves together and distribute them to the students. Point to one of the sight words on the chalkboard. The two students who have the illustration halves for that sight word must stand and name the sight word. Repeat until all sight words have been identified in this way. This activity may be repeated more than once by collecting, mixing and redistributing the illustration halves to the students.

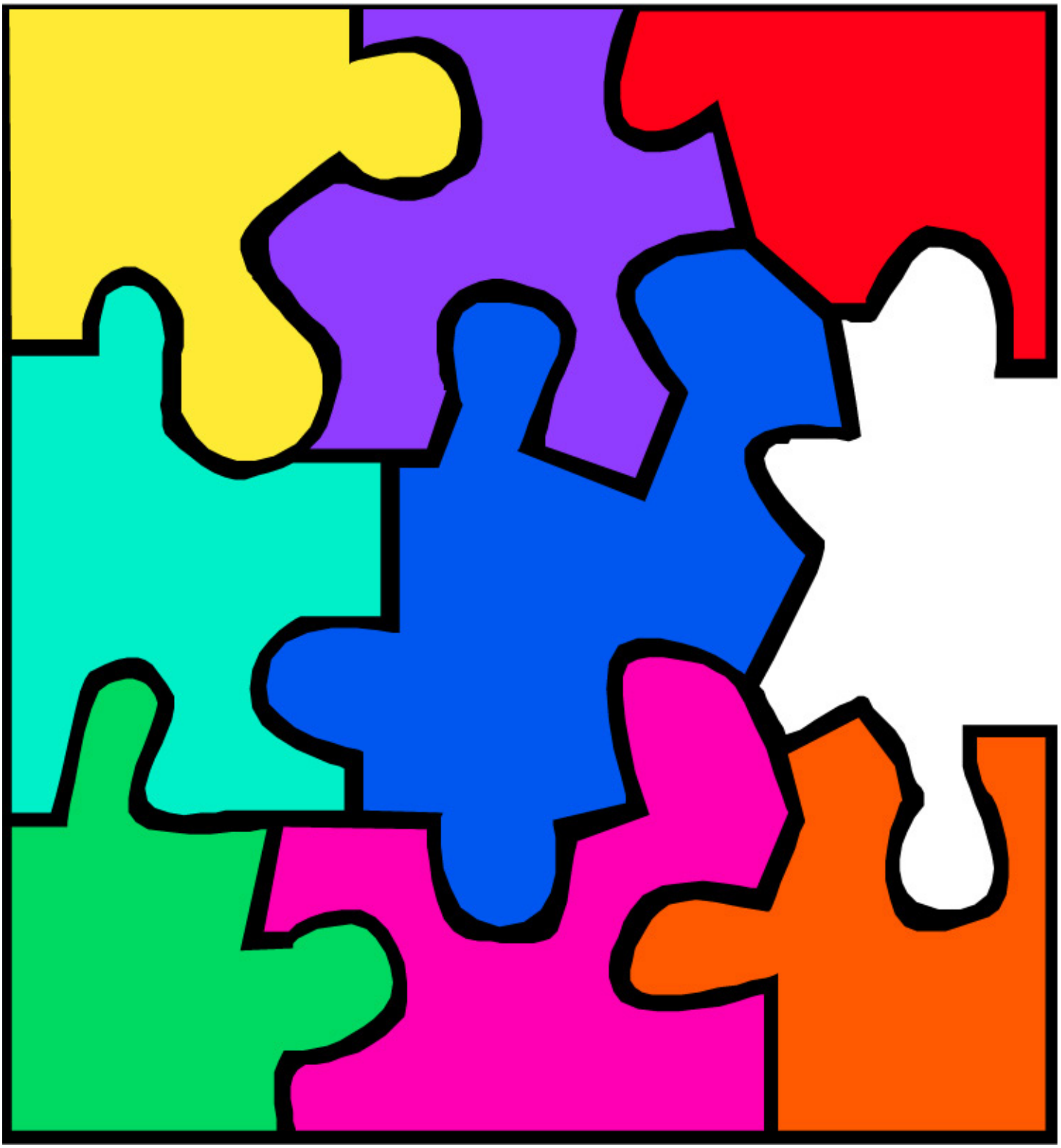
WRITING

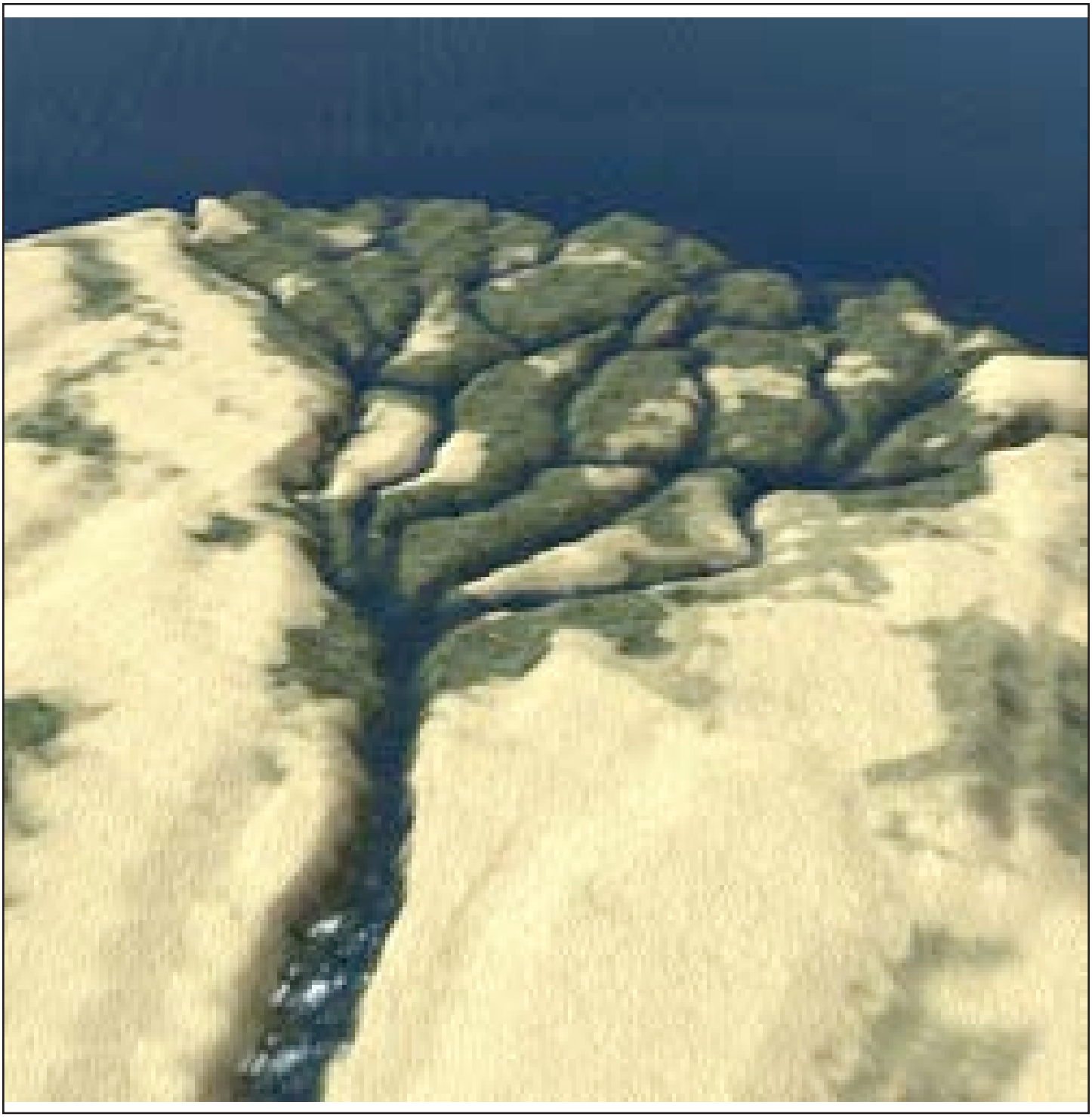
Use the activity pages from the Student Support Materials.

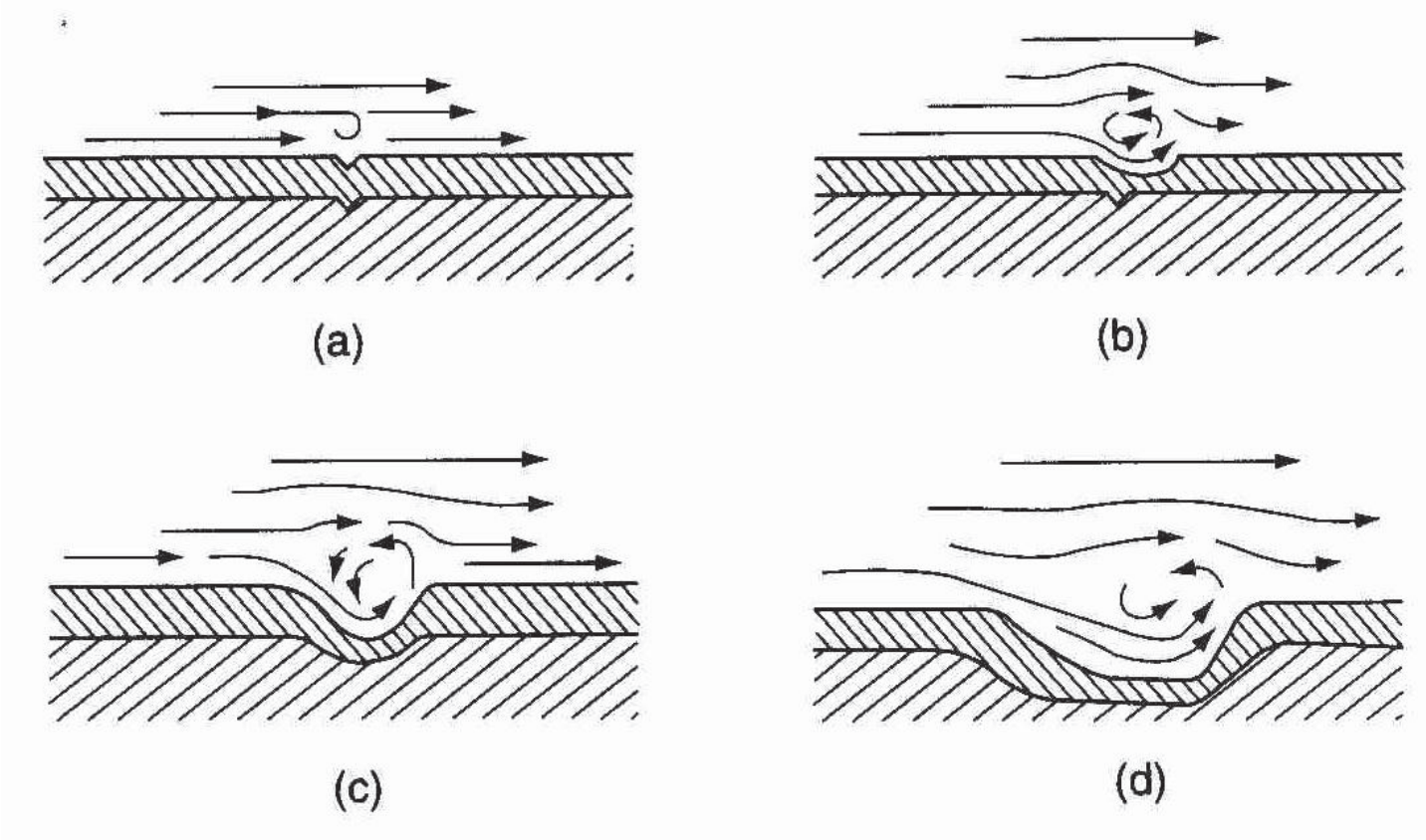
Meshy Words

Write a "meshword" on the chalkboard. To create a meshword, use two word halves (from different words) together. For example, *erosion* and *deposition* to make *erosition*. Provide each student with writing paper and a pen. The students should look at the meshword you have written and attempt to identify the words from which the halves were chosen. Each student should then write those two sight words on his/her sheet of paper. Repeat this process with other meshwords.

Vocabulary Images



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(b)
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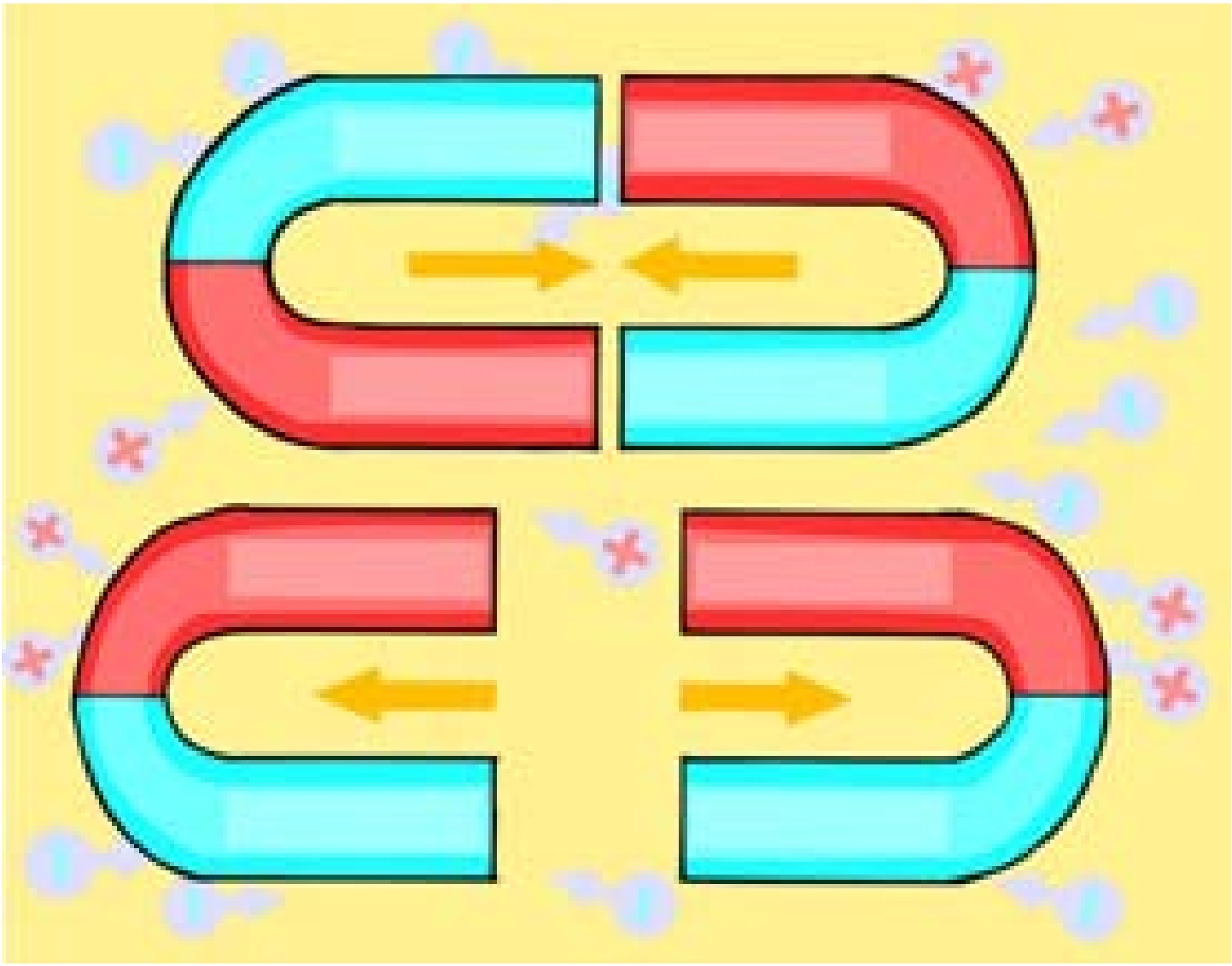
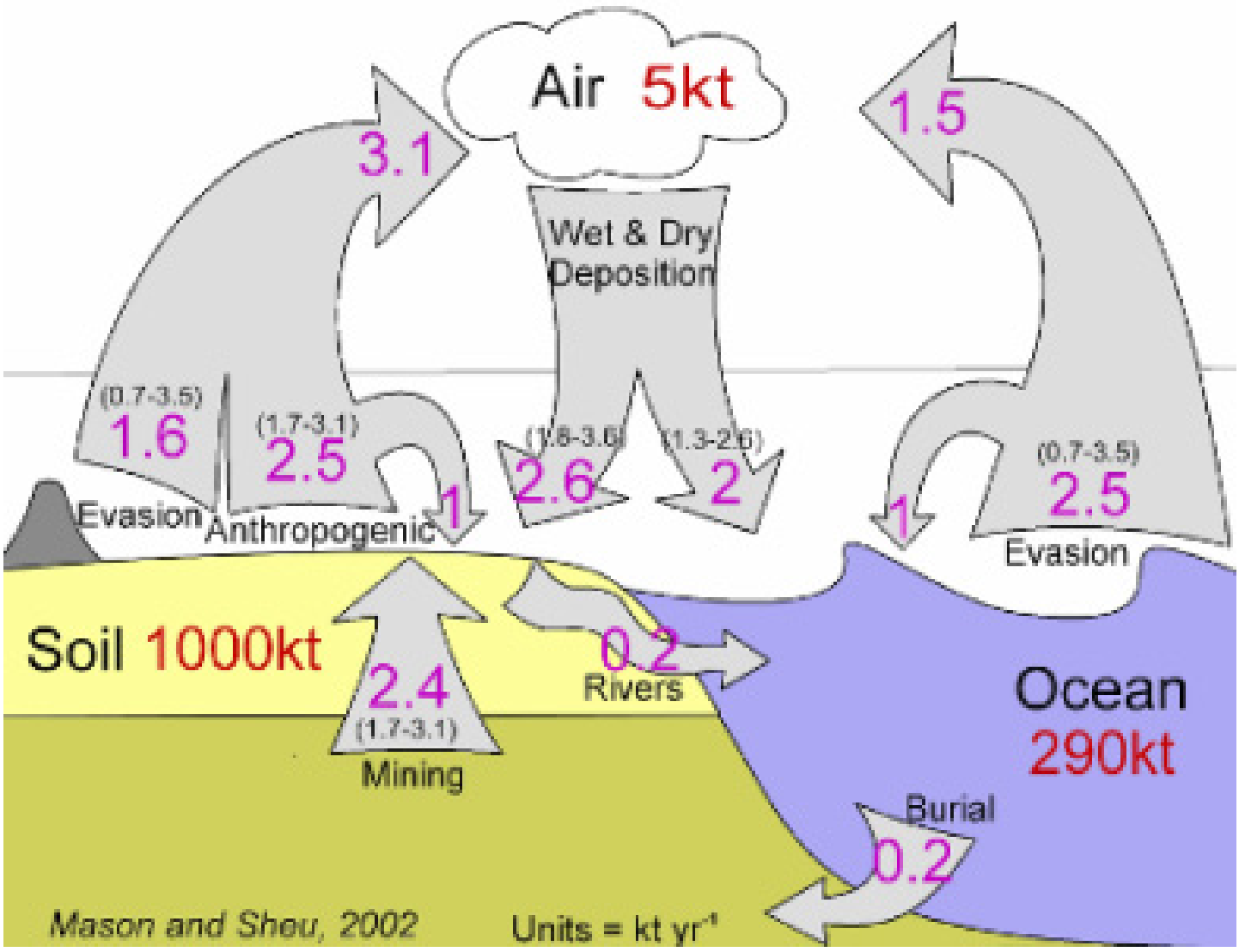
(d)




Air 5kt
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1.5
Wet & Dry
Deposition
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1.6
(1.7-3.1)
2.5
(1.8-3.6)
2.6
(1.3-2.6)
2
Evasion
Anthropogenic
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1
(0.7-3.5)
2.5
Evasion
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(1.7-3.1)
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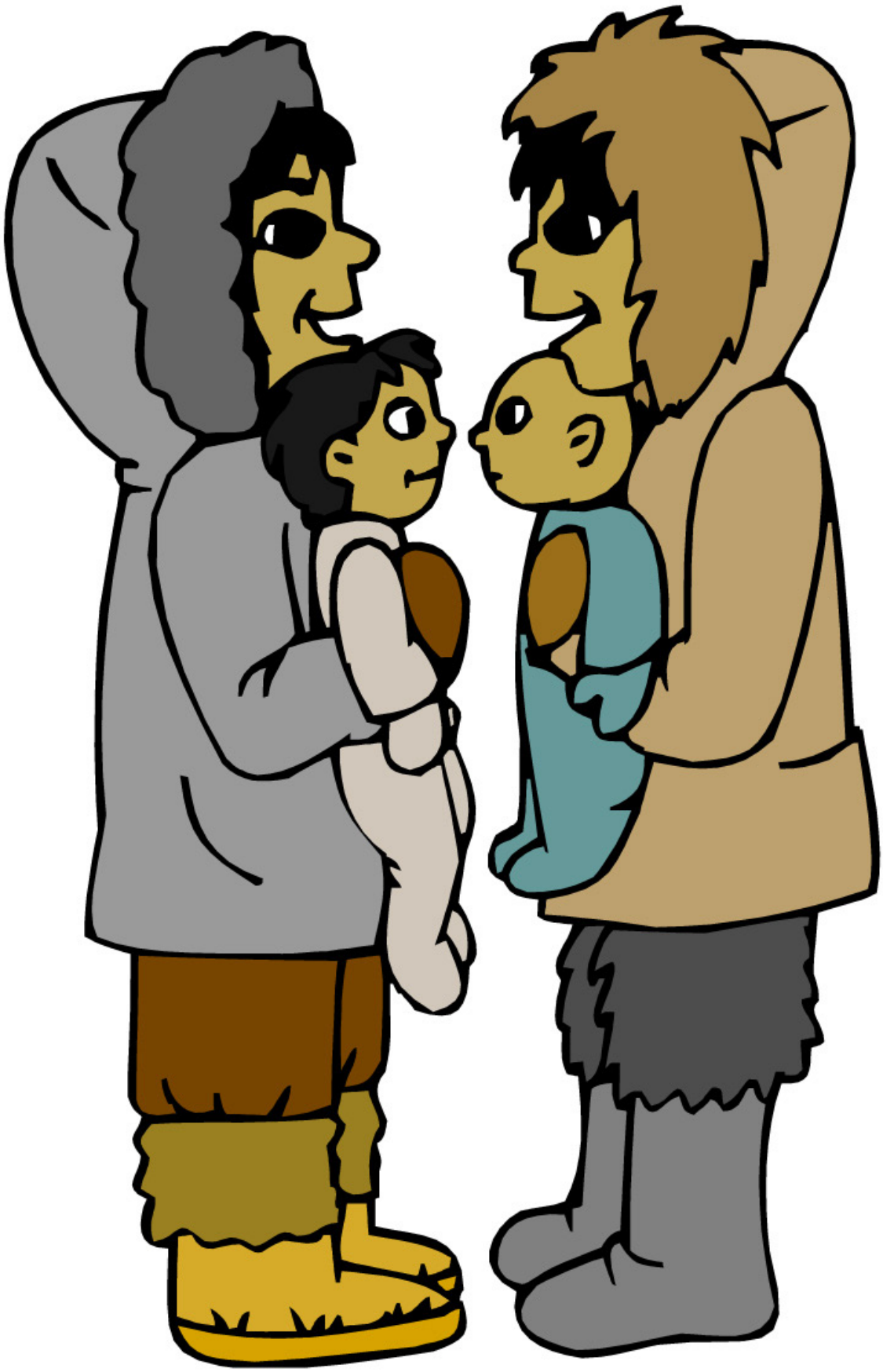
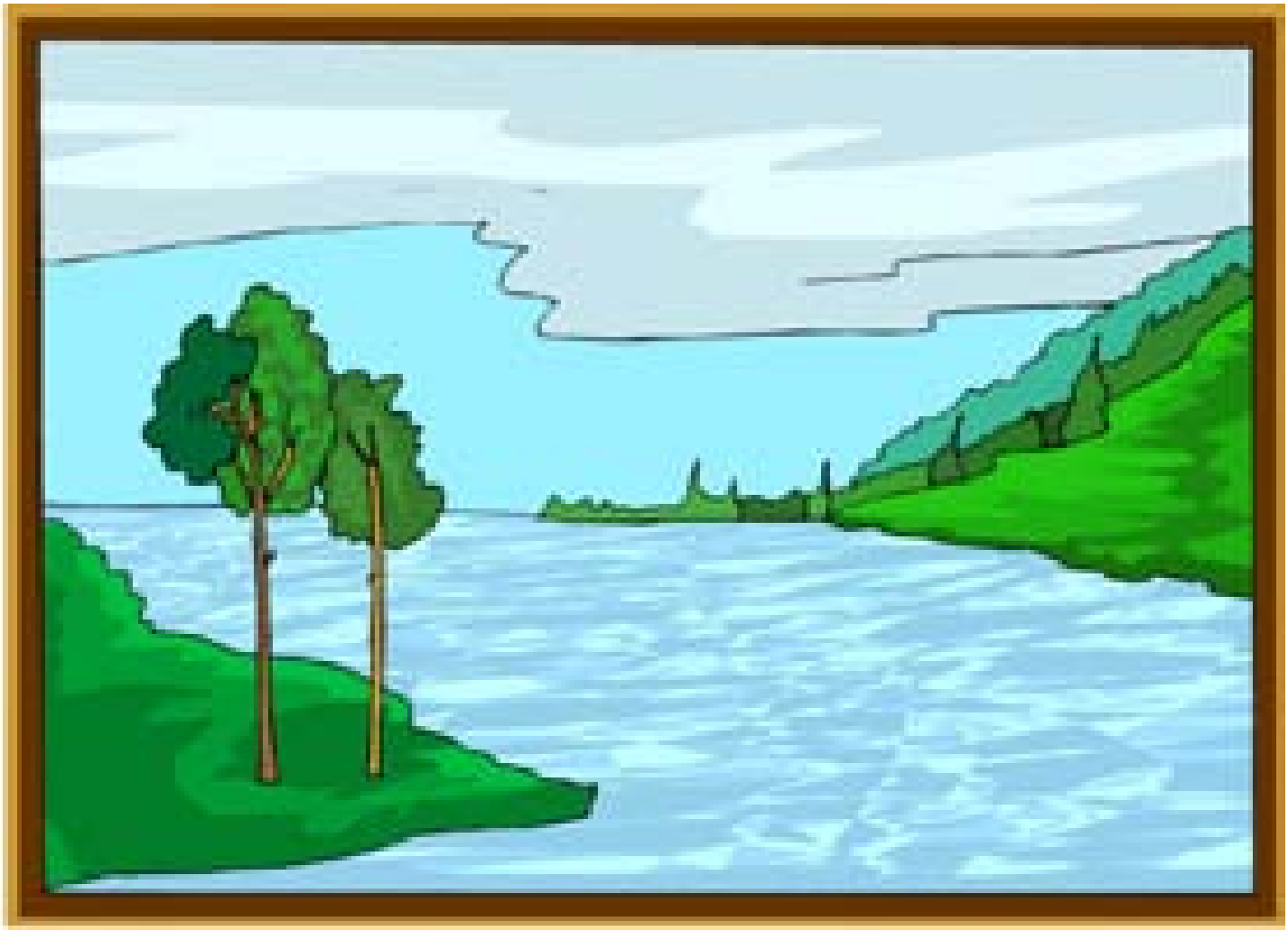
Mason and Shou, 2002
Units = kt yr⁻¹





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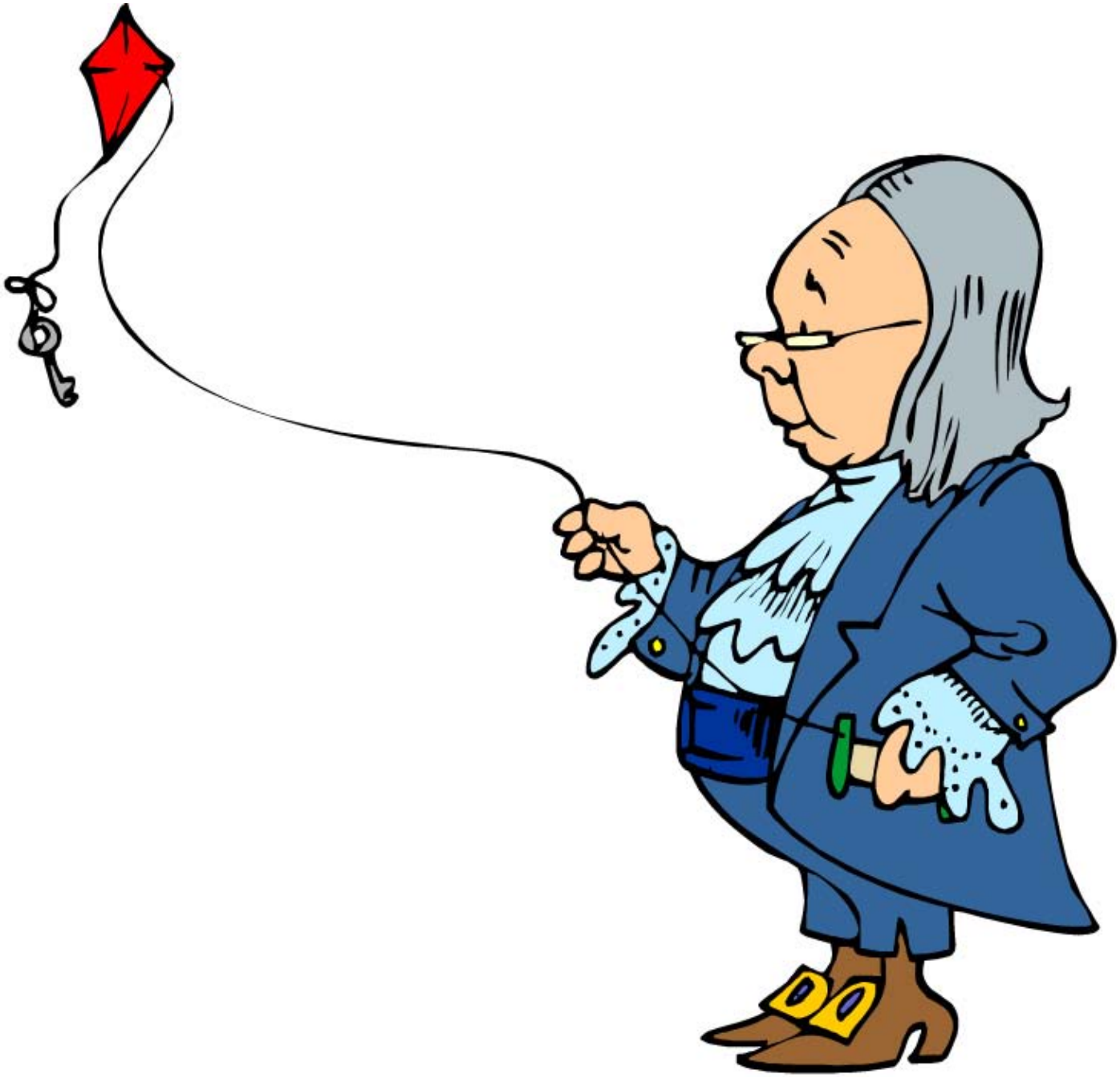
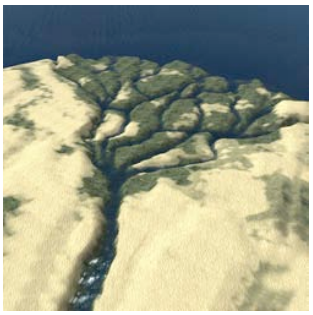
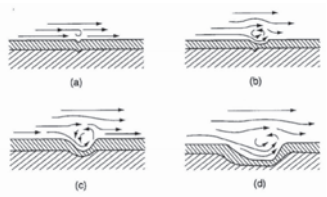


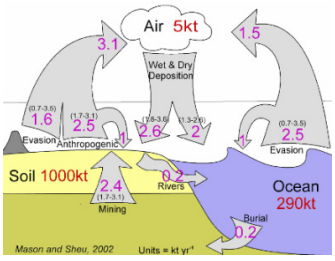
STUDENT SUPPORT MATERIALS

Listening

Say these words to the students - they write the numbers of the words under the pictures.
(1)geochemical cycles (2)water cycle (3) physical history (4)model (5)ongoing (6)interaction
(7)erosion (8) rock cycle (9)composition (10)demonstrate (11)forces (12)origin (13)plate tectonics







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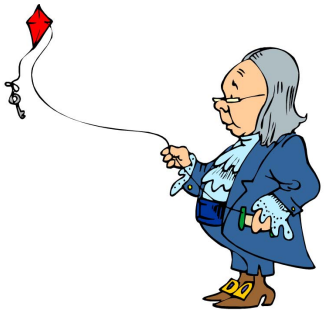

True Or False?

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

1. The Composition of the Earth's crust varies from place to place.
2. When scientists refer to the physical history of the Earth, this includes the forming of the Moon and Jupiter.
3. The surface of the Earth is dynamic, which means it changes very little over time.
4. The interaction of plate tectonics, erosion, and deposition is complicated and dynamic.
5. Erosion is the process of wearing away.
6. Deposition is the carrying of a load by a glacier, a river, or the sea.
7. In science we use the terms law, theory, fact, and hypothesis to mean about the same thing.
8. Plate tectonics unifies into one theory the concepts of continental drift and sea-floor spreading.
9. There are many forces that shape the Earth, including gravity.
10. The model of an atom is many times smaller than the actual thing.
11. It is important to demonstrate clearly how to drive a car before allowing a teen-ager to give it a try.
12. The rock cycle accounts for what happens to rocks after they are formed, but it ignores how rocks are formed in the first place.
13. Getting students to apply their knowledge to new situations should be the goal of every teacher.
14. Gravity is a crucial connecting force in the water cycle—without it rain would not fall nor would warm air rise.
15. The water cycle is the only geochemical cycle of importance to humans.
16. Sometimes knowing the origins of a culture can help us understand that culture more fully.
17. Science is a process that is continually ongoing—it does not ever settle 100% on anything.
18. Our socioeconomic situation does not shape our political views.

Answers
1. T, 2. F, 3. F, 4. T, 5. T, 6. F, 7. F, 8. T, 9. T. 10. F
11. T, 12. F, 13. T, 14. T, 15. F, 16. T, 17. T, 18. F

STUDENT SUPPORT MATERIALS

Sight Words

composition

demonstrate

deposition

dynamic erosion forces

geochemical cycles

interaction

model

ongoing

origin

physical history

theory

rock cycle

to apply

plate tectonics

shape

water cycle

STUDENT SUPPORT MATERIALS

Reading

Word Find

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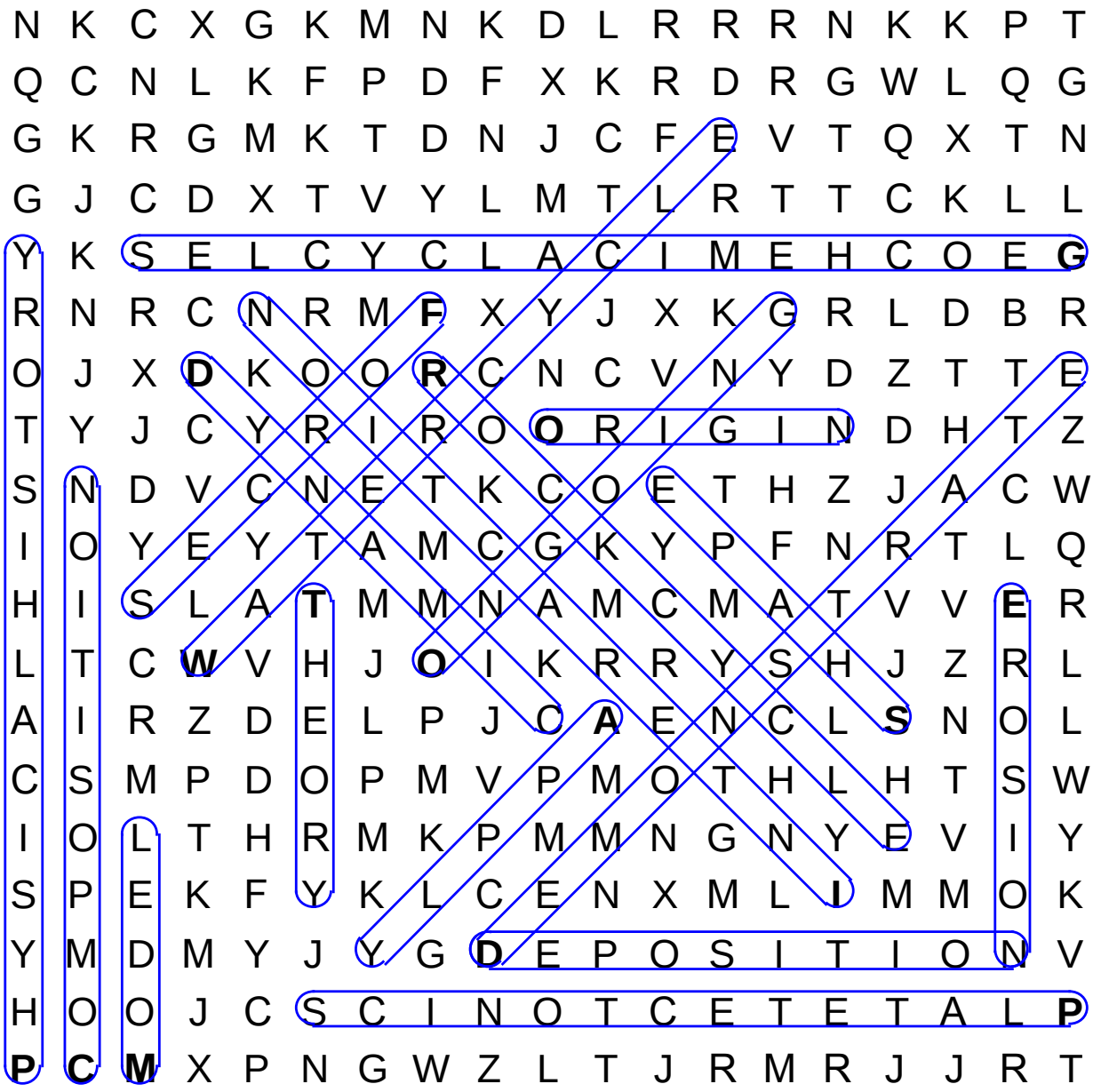
Word Find Solution



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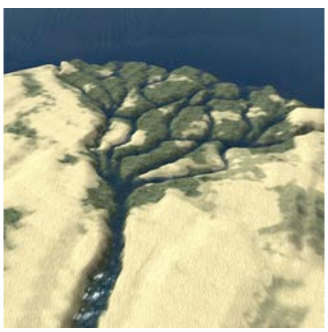

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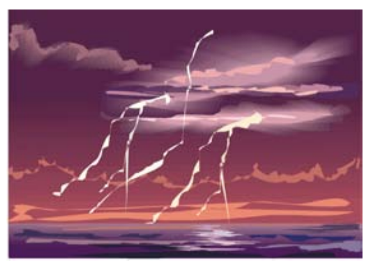

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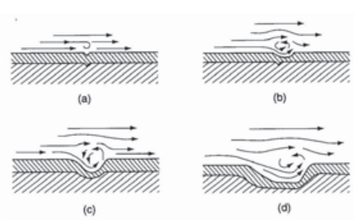

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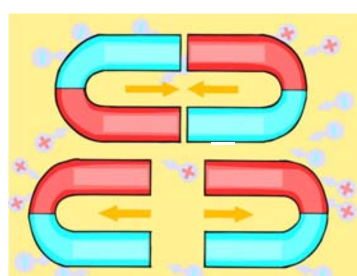

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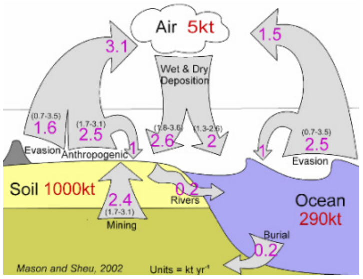

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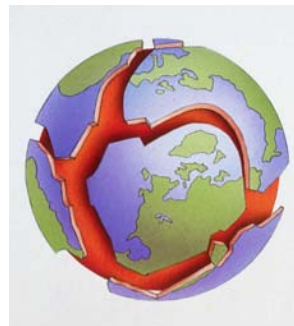
shape
water cycle



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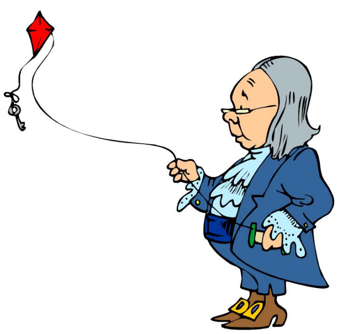

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Sentence Halves

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

1. Using a model, whether life-size or scaled, can help us
2. If you can demonstrate your proficiency in your course work
3. The rock cycle explains
4. Applying your knowledge from outside the classroom is helpful
5. The evaporation and condensation of water in a cyclical manner is
6. Geochemical cycles are cycles of chemicals
7. The origin story that interests most humans is the
8. If you learn in an ongoing fashion, you will
9. Scientific discoveries, theories, and insights should shape
10. The composition of a rock determines
11. The physical history of an area
12. The Earth's crust is always shifting and changing—in short, it is
13. A positive interaction between employee and boss
14. Erosion is the
15. Deposition is the
16. A theory is not merely a hypothesis or a hunch,
17. Even with our advanced technology, it is impossible
18. There are many forces that shape

A. Opposite of deposition.
B. You can pass the class.
C. but a comprehensive explanation.
D. Can give insight into the cultural history of an area.
E. To stop plate tectonics.
F. Story about human evolution.
G. Always look at life with fresh perspective.
H. Where rocks come from and what is going to eventually happen to rocks as they age.
I. The Earth's surface.
J. Dynamic.
K. In adding insight and perspective to the topics covered.
L. That occur on the earth.
M. The way you see the world.
N. Its economic value.
O. Called the water cycle.
P. Better understand the real thing.
Q. Is always preferable to an argument.
R. Opposite of erosion.

Answers
1/P 2/B 3/H 4/K 5/O 6/L 7/F 8/G 9/M 10/N 11/D 12/J 13/Q 14/A 15/R 16/C 17/E 18/I

Word & Definition Match

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

a number of cycles that occur

continuous

makeup, constitution

a proposed explanation of a natural phenomenon

a group of changes between types of rocks

continuously changing

to change

the chronological record of significant events

the act of depositing material

anything that acts on a body to change its rate of acceleration

a representation of something, not the real thing

to display a method

acting upon one another

the process in nature that recycles fresh water

to put to use

explains how the crust of the earth is made up of giant plates that move around

the process of wearing away

the point at which something is derived or comes into existence

1. composition
2. demonstrate
3. deposition
4. dynamic
5. erosion
6. forces
7. geochemical cycles
8. interaction
9. model
10. ongoing
11. origin
12. physical history
13. rock cycle
14. plate tectonics
15. theory
16. to apply
17. to shape
18. water cycle

Which Belongs?

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

1. A model of the solar system would be smaller than/larger than the actual thing.
2. If you successfully demonstrate/punctuate your abilites on the driving test you can get a license.
3. The movement of the tectonic plates helps make the rock cycle/water cycle occur.
4. If you apply/disregard your knowledge about recycling, you may find yourself doing it more often.
5. According to the water cycle/wind cycle, the water that you see in a river today may be in the ocean tomorrow and/or in a cloud the next day.
6. The water, carbon, and nitrogen cycles are all examples of geochemical/solar cycles.
7. The rumor had its origin/original in an off-hand remark, but that didn't keep it from spreading far and wide.
8. One's education is ongoing/truncated only if one continues to question, think critically, and read extensively.
9. When you leave your family for college, trade school, or work you will start to shape/share your future.
10. The composition/forces of rock determines its economic value.
11. The theory/physical history of the Earth's crust affects its composition.
12. If the Earth's crust were not composition/dynamic we would not have earthquakes or continental drift.
13. The interaction/deposition of the Earth's plates is sometimes violent and surprising.
14. Erosion/deposition is the process by which mountains are worn down.
15. Deposition/plate tectonics is the opposite of erosion.
16. The theory/hypothesis of plate tectonics is well supported by mountains of evidence.
17. The only way to stop plate tectonics/physical history is to cool the Earth's core, which would cause a whole series of other problems.
18. Forces/Theories act upon objects all the time, one of which is gravity.

Answers

1. smaller than, 2. demonstrate, 3. rock cycle, 4. apply, 5. water cycle, 6. geochemical
7. origin, 8. ongoing, 9. shape, 10. composition, 11. physical history, 12. dynamic
13. interaction, 14. erosion, 15. deposition, 16. theory, 17. plate tectonics, 18. forces

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. A _____ of the solar system would be smaller than the actual thing.

(a) Model
(b) Imaginary representation
(c) Big Bang

2. One cannot learn a math technique solely by _____—most of the time you have to practice it yourself.

(a) Watching Demonstrations
(b) Working problems
(c) Practicing it

3. Why is the rock cycle considered a "cycle"?

(a) Because it tells us where rocks come from
(b) Because the cycle has a definite beginning and end
(c) Because it explains the cyclical nature of rock formation and destruction.

4. It is important to apply the paint in thin coats, as this will prevent

(a) It from running
(b) Full coverage
(c) Complaints from the neighbors

5. What are the two main state changes involved in the water cycle?

(a) Evaporation and condensation
(b) Freezing and thawing
(c) Sublimation and deposition

6. All the following are geochemical cycles except

(a) Nitrogen cycle
(b) Carbon cycle
(c) Life cycle

7. The origin of humans dates back to the time of the

(a) Dinosaurs
(b) Evolution of the great apes
(c) Early evolution of mammals

8. One's learning should be

(a) Ongoing
(b) Stagnant
(c) Irrelevant

9. A scientist should never allow his personal views to _____ the outcome or interpretation of an outcome of an experiment of study.

(a) Shape
(b) Conflict with
(c) Agree With

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.

10. We can discover the composition of the sun (and other stars) through

(a) Direct observation
(b) Indirect observation
(c) Indiscreet observation

11. Which of the following statements best describes the physical history of Earth's surface?

(a) Earth's crust has been static since it first cooled several billion years ago.
(b) Earth's crust changes constantly, although at a slow pace when viewed through the lens of a human lifespan.
(c) Earth's crust changes little over the long term, but during episodes of incredible violence replaces most of the crust through worldwide earthquakes and massive subduction.

12. Dynamic means

(a) Changing
(b) Static
(c) Built up

13. Which of the following interactions would concern you the most?

(a) A boy accidently trips another boy in the hall and then apologizes.
(b) Two girls argue with each other and independently decide never to hang out together again.
(c) One gang of 20 boys agrees to meet another gang of 20 boys in the parking lot at lunch for a fight.

14. Erosion is responsible for

(a) Building up mountains
(b) Breaking down the Earth's crust
(c) Continental drift

15. When does deposition occur?

(a) Deposition occurs when a river, glacier, or sea releases its load of silt/sand/gravel.
(b) Deposition occurs when rivers, glaciers, and/or seas absorb Carbon Dioxide from the atmosphere.
(c) Deposition occurs when a river increases in speed, causing it to erode more of its banks.

16. Which of the following would be an appropriate use of the word "theory"?

(a) I have a theory about why you have ADHD—you watched too much TV as a kid!
(b) Since Evolution and Gravity are just theories, I have no intention of learning about them or paying attention to them.
(c) The theory of plate tectonics is one supported by many independent studies and observations and can predict what will happen in the future.

17. The theory of plate tectonics does not explain

(a) Certain distributions of plants and animals (including some dinosaurs)
(b) Sea floor spreading
(c) How Earth's moon formed.

18. The force of gravity is not

(a) Measurable
(b) Related to the mass of an object or its distance from another object
(c) Convenient, at times.

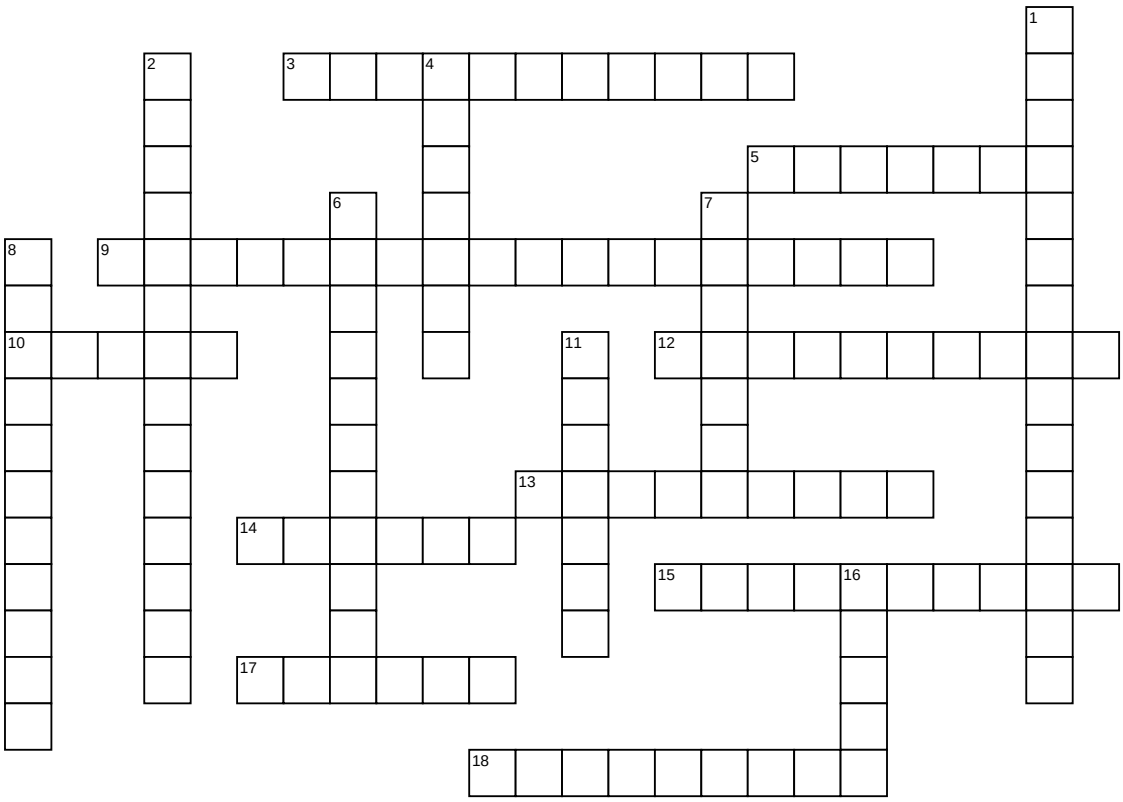
Answers
1. a, 2. a, 3. c, 4. a, 5. a, 6. c, 7. b, 8. a, 9. a 10. b, 11. b, 12. a, 13. c, 14. b, 15. a, 16. c, 17. c, 18. c

STUDENT SUPPORT MATERIALS

Writing

9th D-1 Concepts of Earth Science

Unit 2



ACROSS

3 acting upon one another.
5 the point at which something is derived or comes into existence.
9 a number of cycles that occur on search, including the nitrogen cycle, carbon cycle, water cycle, and phosphorous cycles.
10 a representation of something, not the real thing.
12 the process in nature that recycles fresh water.
13 a group of changes between types of rock.
14 anything that acts on a body to change it's rate of acceleration.
15 the act of depositing material, especially by a natural process.
17 a proposed explanation of a natural phenomenon that takes into account observations, facts, and ideas relevant to the phenomenon.
18 to make use of as relevant, suitable, or pertinent.

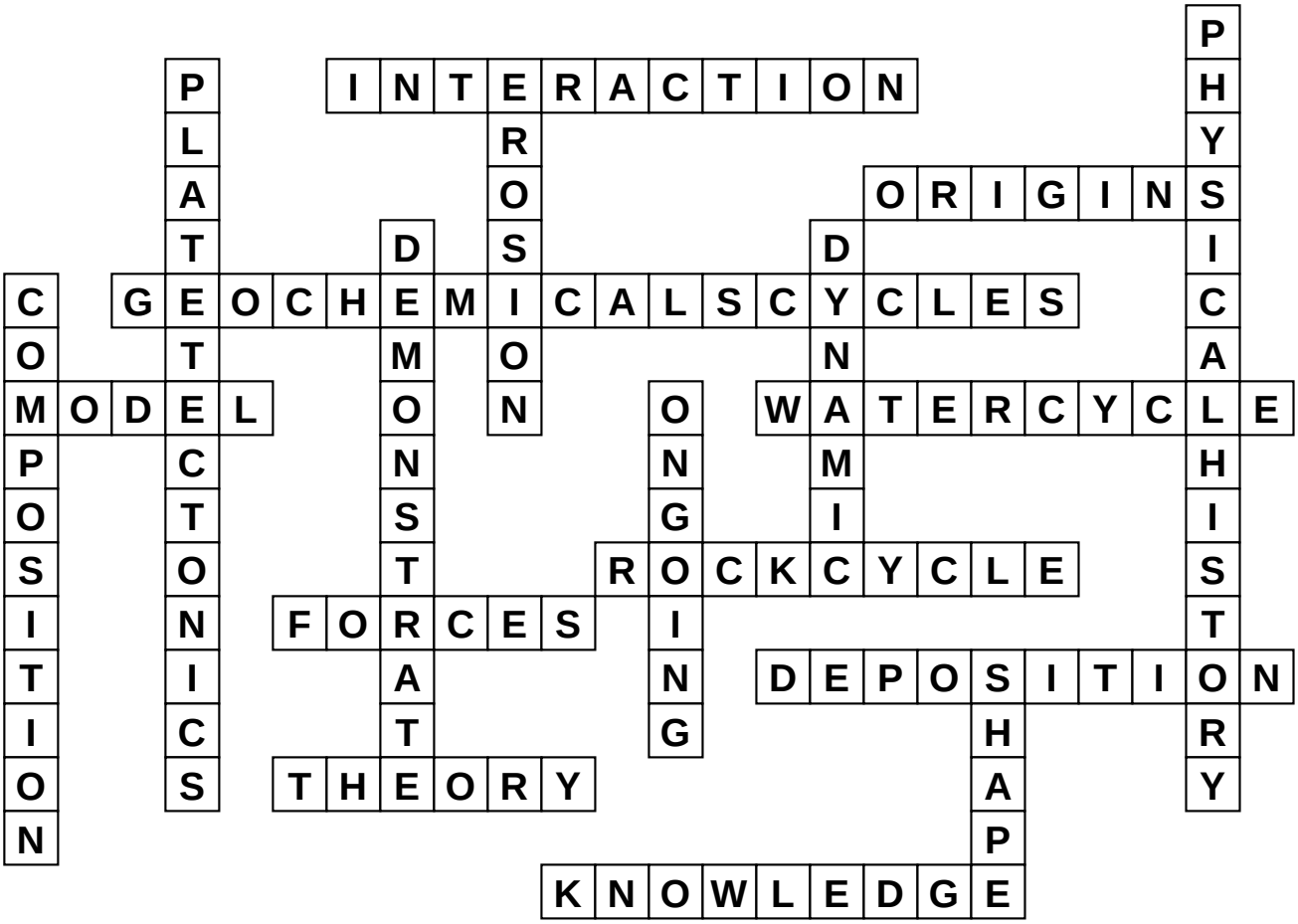
DOWN

1 the chronological record of significant events often including an explanation of their causes.
2 explains how the crust of the earth is made up of giant plates that move around.
4 process of wearing away.
6 to display a method.
7 Continuously changing.
8 makeup, constitution.
11 continuous.
16 to change, morph, of affect.

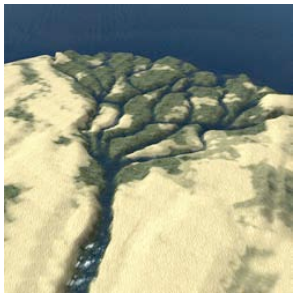
9th D-1 Concepts of Earth Science

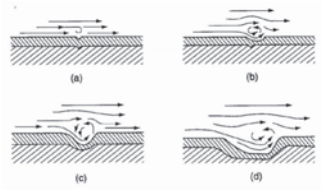
Unit 2

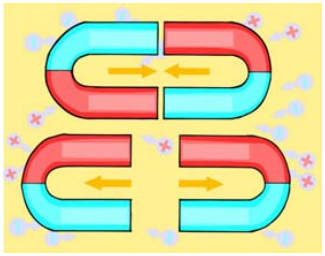
Solution:

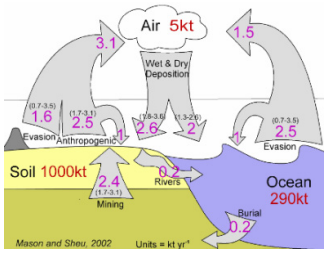


Write The Words!









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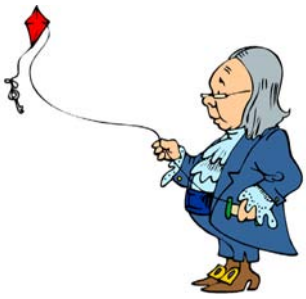


Complete The Sentence

Have the students write the key words in the blanks.

1. One can use a _____ to represent things that are either too big or too small to see well.
2. Aikido students once learned almost exclusively by observing their teacher _____ techniques—no explanation was given.
3. Learning the _____ in the classroom was tiresome, but now that I know where all of the rocks I see came from (and where they are going!) I feel a better connection with the world.
4. It is important to _____ the wax on your car in a circular manner in order to practice your karate technique.
5. The _____ cycle has two main parts: evaporation and condensation.
6. There are many _____ cycles, including, but not limited to, the water cycle, nitrogen cycle, and phosphorous cycle.
7. Humans are forever interested in our _____, the story of how humans came to be.
8. Learning is an _____ endeavor—you should never stop learning, as long as you live.
9. Erosion _____ the mountains daily.
10. Geologists and miners are interested in the _____ of rocks because some of the components can be extracted for a profit.
11. If you know the _____ of an area, you can often apply that knowledge to gain insight into other fields, such as anthropology and paleontology.
12. If something can change, is elastic, or is in motion, it is often referred to as _____ in science.
13. People who are “anti-social” often avoid _____ with people.
14. Mountains, for all the gains they’ve made due to plate tectonics, will fall victim to _____ eventually.
15. The _____ of sand and silt at the mouth of a fast moving stream can eventually change that stream’s course.
16. A good scientific _____ is an explanation (or model) about the natural world that is based on observation, experimentation, and/or reasoning.
17. The theory of _____ explains the movement of the Earth’s crust, as well as many volcanoes, earthquakes, and mountain building.
18. When scientists talk about “pushing” or “pulling” something, they are often referring to _____ .

Answers

1. model, 2. demonstrate, 3. rock cycle, 4. apply, 5. water, 6. geochemical, 7. origins, 8. ongoing, 9. shapes, 10. composition, 11. physical history, 12. dynamic, 13. interaction 14. erosion, 15. deposition, 16. theory, 17. plate tectonics, 18. forces

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.

composition

demonstrate

deposition

dynamic

erosion

forces

geochemical cycles

interaction

model

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.

ongoing

origin

physical history

rock cycle

plate tectonics

theory

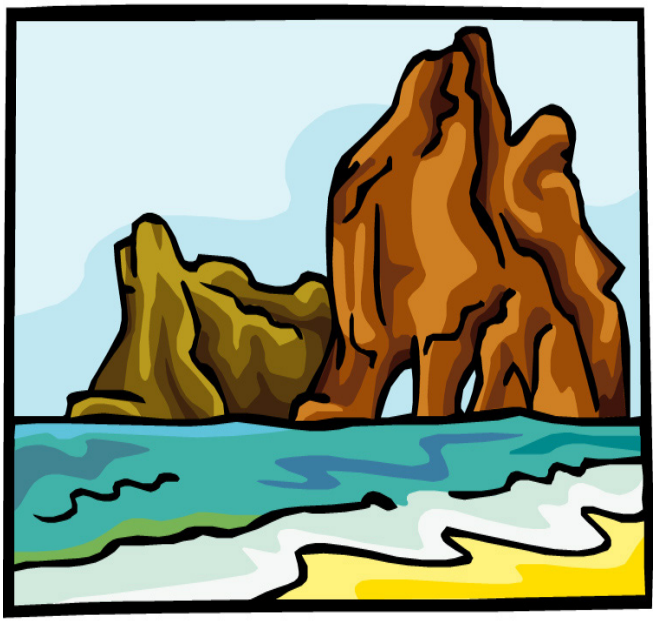
to apply

to shape

water cycle

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: Student will learn how water flows through a landscape. They will also understand how pollution and runoff can be prevented.

From the work of S. Marino

The Flow of Water

☐ **Activities**

- Have students discuss the term "watershed" and come up with a working definition
- Have students help you set up a landscape on a tray of soil. Put possible pollutants in the appropriate places.
- Using the spray bottle create some rain and see what happens as water runs off the landscape.
- Ask the students to think about how the run-off could have been prevented. Try putting some of their ideas into action on the model and see if they work well. Students should take notes on the new scenarios.
- Have students discuss the term, "run-off" and come up with a working definition.
- Students should respond to the following: "In general, how does water flow through the environment?" and "Why is it so important that pollution does not get into our water system?"
-

☐ Materials

- Tray of soil
- Spray bottle

Purposes: Students will test a local body of water to determine its properties and quality.

From the work of S. Marino

Stream Testing

☐ **Activities**

- Choose a nearby body of fresh water to be tested.
- Divide students into small groups and give each group a testing kit.
- Students should do each test and write the results in their notebooks over the next two days.
- **It is important that they do the coliform test on the first day because it takes 48 hours to incubate.
- Students should write down observations on the area-
    - What kind of water body is it?
    - What kinds of plants and animals are here?
    - What is the surrounding land like?
    - What are the human influences?
- Have students respond to the following prompts: “What do the physical and chemical tests reveal to you about this body of water” and “How could pollution be prevented in this body of water?”

☐ Materials

- Water Quality Monitoring kits, Carolina item number 65-2567

Purposes: Students will do basic chemical and physical test on a local marine area.

From the work of S. Marino

The Salt Water Environment

☐ **Activities**

- Choose a local marine area to study. Students should be divided into small groups and given a water testing kit.
- Students should complete the test they did previously on the fresh water and write their results in their notebooks.
- Students should write down observations on the area-
    - What kind of water body is it?
    - What kinds of plants and animals are here?
    - What is the surrounding land like?
    - What are the human influences?
- Once the tests are completed, the students should respond to the following prompts: "How do the physical and chemical tests compare to the fresh water? Why do you think these differences exist?" and "What evidence of pollution or other human influences are here?"

☐ Materials

- Water Quality Monitoring kits

Purposes: Students will understand how the ocean floor is constantly in motion causing the continents to shift.

From the work of S. Marino

Continental Drift

☐ **Activities**

- Have students read “Continental Drift” by Ocean’s Online, highlighting important information and taking notes in the margins.
- Facilitate a Socratic seminar starting with the question, “How does the movement of the ocean floor in the Atlantic affect life in Alaska?”
- Conclude the lesson by having students respond to the opening question in their notebooks.

☐ Materials

- Reading “Continental Drift” by Ocean’s Online
- A good substitution for low level readers would be “Evidence to Support Continental Drift” by NASA
- Highlighters
- notebooks

Unit Assessment

Unit 2 Quiz and Test for Unit 1 & 2

Grade 9 D1, Unit 2, Concepts of Earth Science Quiz

Name: _____
Date: _____

Fill in the Blank: Fill in the blank for each statement below. Choose the words from the words provided in the Word Bank.

Word Bank		
cycle	demonstrate	models
origin	shape	theory

1) 1. A toy car, a plastic horse, doll house furniture would all be examples of _____ since they are representations of the real thing.

2) There are people who make their living displaying or showing other people methods of how to do things. Some show how to use a vegematic, or how to apply the latest and greatest skin care products, or how to change the oil in a car. In doing this, they _____ or display a product or method.

3) Rocks are able to change from one type to another. For example, igneous rock can change into sedimentary rock or into metamorphic rock. Sedimentary rock and metamorphic rock can changes as well. This process is called the rock _____.

4) When scientists propose an explanation for natural phenomenon, they make observations, they look at the facts, and consider all the ideas relevant to the phenomenon. Based on these considerations, the explanation that scientists propose is called a _____.

Multiple Choice: Read the following items carefully. Choose the correct answer from the choices below each item and circle it.

5) The make-up of something is the same as its _____

a) origins

b) on-going

c) shape

d) composition

6) The point at which something comes into existence, it is said to be its _____.

a) origin

b) on-going

c) shape

d) composition

7) Another word for continuous is _____.

a) origins

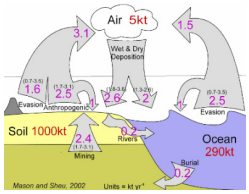
b) on-going

c) dynamic

d) composition

illustrations: The following questions will use illustrations for identifying the correct answer.

8) Below you will find four illustrations. One illustrations represents the concept of **cycles,** another the **rock cycle**, another the **geochemical cycle** and the fourth, **the water cycle.** Label each of the illustrations correctly.



9) In the space below, draw an illustration that best defines PHYSICAL HISTORY.

Grade 9 D1, Unit 2, Concepts of Earth Science Quiz

Name: _____
Date: _____

Fill in the Blank: Fill in the blank for each statement below. Choose the words from the words provided in the Word Bank.

Word Bank		
cycle	demonstrate	models
origin	shape	theory

1) 1. A toy car, a plastic horse, doll house furniture would all be examples of **models** since they are representations of the real thing.

2) There are people who make their living displaying or showing other people methods of how to do things. Some show how to use a vegematic, or how to apply the latest and greatest skin care products, or how to change the oil in a car. In doing this, they **demonstrate** or display a product or method.

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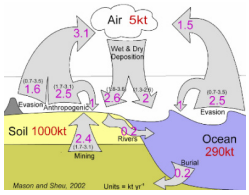

Ilus. water cycle illus. cycle illus. rock cycle i llus. geochem cycl

9) In the space below, draw an illustration that best defines PHYSICAL HISTORY.

D1, Unit 1-2, Earth Science; E1, Science & Technology Test

Name: _____

Date: _____

There are two parts to each question below.

1. Complete the spelling of the words below in the left hand column .
2. Match the completed word with the correct illustration in the right column by placing the corresponding letter in front of completed word.

1) _____ C _ _P _ _i T I _ N
2) _____ I_ T_ R _ C _ _O _ S
3) _____ D _ N _ _I _
4) _____ P_ R S _ E _ _I V_ _
5) _____ T _ C _ N _ _O_ G _
6) _____ I _ N _ O _ V _ A T _ O N _

a. acting upon one another
b. choice of a single point of view from which to sense, categorize, measure experience
c. the generation of knowledge and processes to develop a system that solves problems and extends human capabilities
d. the introduction of something new
e. continuously changing
f. make up, constitution

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

plate tectonics, deposition, geochemical, rock, model, water, life

7) A representation of something, not the real thing, is a _____.

8) Nitrogen cycles, carbon cycles, water cycles, and phosphorous cycles are all known as _____ cycles.

9) The _____ cycle is an ongoing process of the movement of water between the atmosphere and lithosphere.

10) The theory of _____ is an explanation of how the crust of the Earth is made up of giant plates that are still in motion. It provides evidence that the continents have moved and are still moving.

11) With _____ wind, water and even gravity move materials from one area and deposit them in another.

12) When there is a group of changes between types of rocks, this is known as the _____ cycle.

Match the verb on the left with it's meaning on the right. Put the letter of correct meaning in front of the verb

13) _____ to shape
14) _____ to demonstrate
15) _____ to expand
16) _____ to tilt
17) _____ to revolve
18) _____ to orbit
19) _____ to control
20) _____ to solve

a. to exercise restraint
b. to display a method
c. to get bigger
d. to find an answer or solution to a problem or question
e. to move in a circular or curving course or orbit
f. to change or morph
g. to slope or incline
h. the path traveled by a body that is attracted to another body in space

21) A scientific phenomena refers to observable facts that are may be rare and significant.

a) True

b) False

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

a) A spring tide occurs when the moon is new or full and tides are at their maximum range.

b) A neap tide occurs when the difference between high and low tide is the greatest.

23) A massive, luminous ball of plasma is a...

a) moon

b) star

c) meteor

d) planet

24) An aurora borealis is an example of a/an....

a) atmospheric explosion

b) meteor shower

c) heavenly explosion

d) solar display

25) Write a definition OR illustrate the term the BIG BANG.

26) Another work for continuous is on-going.

a) True

b) False

27) Which of the following statements is most likely to be correct?

a) A breakthrough occurs when someone trespasses.

b) An innovation occurs when something new is introduced.

28) The point at which something comes into existence is said to be its composition.

a) True

b) False

29) The solar system includes the planets, moons, and Milky Way.

a) True

b) False

In the left column are verb definition. In the right column are illustrations of the verbs. Match the definition with the illustration by placing the correct letter in front of the definition.

30)	_____ to answer or reply	a.	illus to test
31)	_____ to collect information about a subject	b.	illus to research
32)	_____ to create a likeness or model	c.	illus to simulate
33)	_____ to assess or to try	d.	illus. to respond
34)	_____ to find an answer or solution	e.	illus to solve
35)	_____ to examine critically	f.	illus to analyze

D1, Unit 1-2, Earth Science; E1, Science & Technology Test

Name: _____

Date: _____

There are two parts to each question below.

1. Complete the spelling of the words below in the left hand column .
2. Match the completed word with the correct illustration in the right column by placing the corresponding letter in front of completed word.

1) __f__ C _ _P _ _i T I _ N
2) __a__ I_ T_ R _ C _ _O _ S
3) __e__ D _ N _ _I _
4) __b__ P_ R S _ E _ _I V _ _
5) __c__ T _ C _ N _ _O_ G _
6) __d__ I _ N _ O _ V _ A T _ O N _

a. acting upon one another
b. choice of a single point of view from which to sense, categorize, measure experience
c. the generation of knowledge and processes to develop a system that solves problems and extends human capabilities
d. the introduction of something new
e. continuously changing
f. make up, constitution

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

plate tectonics, deposition, geochemical, rock, model, water, life

7) A representation of something, not the real thing, is a **model** .

8) Nitrogen cycles, carbon cycles, water cycles, and phosphorous cycles are all known as **geochemical** cycles.

9) The **water** cycle is an ongoing process of the movement of water between the atmosphere and lithosphere.

10) The theory of **plate tectonics** is an explanation of how the crust of the Earth is made up of giant plates that are still in motion. It provides evidence that the continents have moved and are still moving.

11) With **deposition** wind, water and even gravity move materials from one area and deposit them in another.

12) When there is a group of changes between types of rocks, this is known as the **rock** cycle.

Match the verb on the left with it's meaning on the right. Put the letter of correct meaning in front of the verb

13) **f** to shape
14) **b** to demonstrate
15) **c** to expand
16) **g** to tilt
17) **e** to revolve
18) **h** to orbit
19) **a** to control
20) **d** to solve

a. to exercise restraint
b. to display a method
c. to get bigger
d. to find an answer or solution to a problem or question
e. to move in a circular or curving course or orbit
f. to change or morph
g. to slope or incline
h. the path traveled by a body that is attracted to another body in space

21) A scientific phenomena refers to observable facts that are may be rare and significant.

a) True

b) False

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

a) A spring tide occurs when the moon is new or full and tides are at their maximun

b) A neap tide occurs when the difference between high and low tide is the greatest.

23) A massive, luminous ball of plasma is a...

a) moon

b) star

c) meteor

d) planet

24) An aurora borealis is an example of a/an....

a) atmospheric explosion

b) meteor shower

c) heavenly explosion

d) solar display

25) Write a definition OR illustrate the term the BIG BANG.

illustration OR cosmic event that marks the beginning of time and the expansion of the universe

26) Another work for continuous is on-going.

a) True

b) False

27) Which of the following statements is most likely to be correct?

a) A breakthrough occurs when someone trespasses.

b) An innovation occurs when something new is introduced.

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30)	**d**	to answer or reply	a. illus to test
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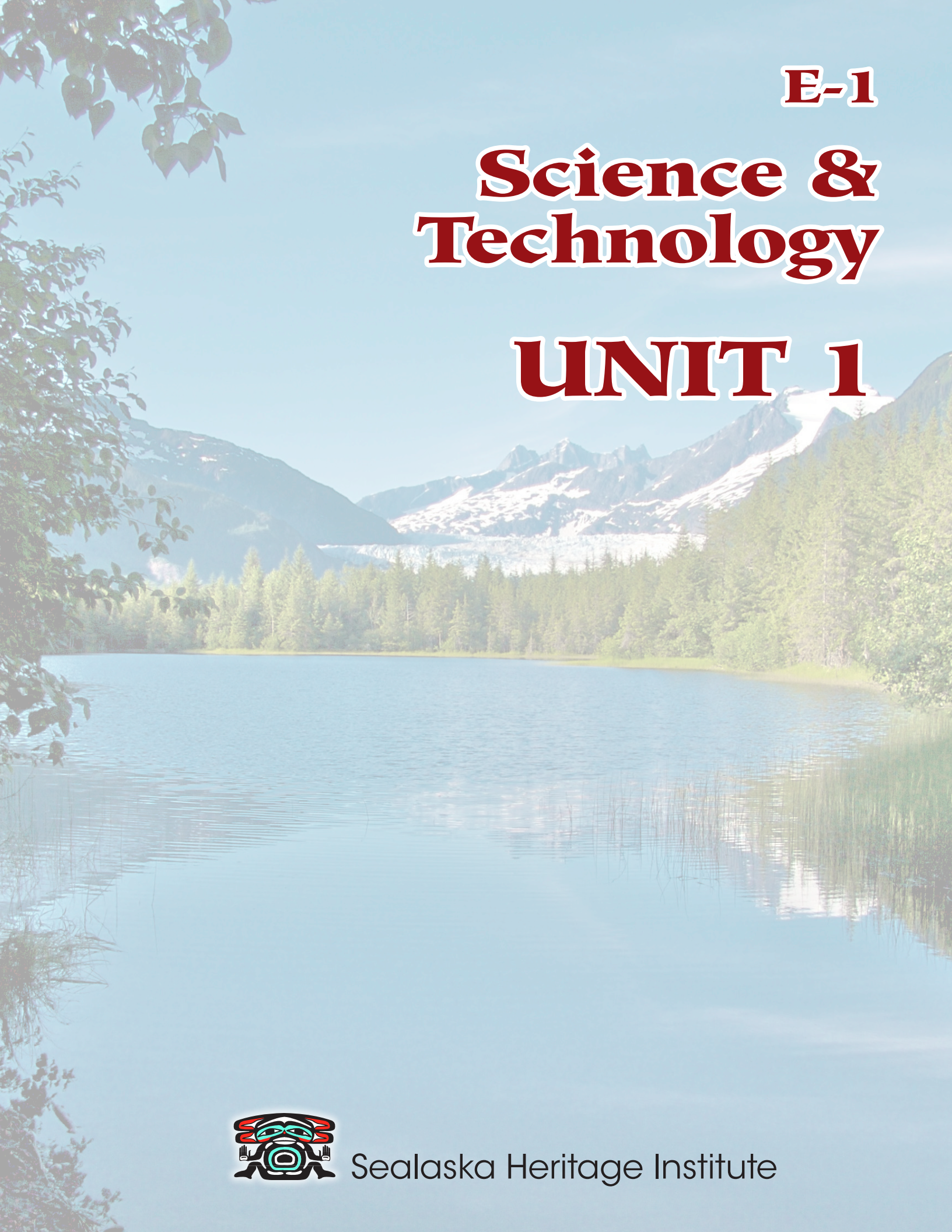
33)	**a**	to assess or to try	d. illus. to respond
34)	**e**	to find an answer or solution	e. illus to solve
35)	**f**	to examine critically	f. illus to analyze



E-1

Science & Technology

UNIT 1

Sealaska Heritage Institute

INTRODUCTION OF

Key Vocabulary

Culturally Responsive & Place-based Perspective
Introduction of Science Vocabulary

Value

PLACE-BASED PERSPECTIVE

Show the students a button or other such common item; tell them that it is very important to someone - have them suggest *why*. Lead the students to understand that it has great *value* since it belonged (e.g.) to the person's grandfather (make up another reason if you like). Introduce the monetary aspect of *value* using pictures of items of contrasting *value*.

HERITAGE CULTURAL PERSPECTIVE

Native peoples recognized *value* in many contexts. This included items that were obtained through trading, respect for the environment and *valuing* the contributions of others. Songs and stories are highly *valued* as are tradtional names.

Technology

PLACE-BASED PERSPECTIVE

Show the students pictures of a pencil and a computer. Have the students tell how the two are the same. Lead them to understand that both represent developments in *technology*. Have the students cite other examples of *technological* developments.

HERITAGE CULTURAL PERSPECTIVE

Native peoples used *technology* in a variety of ways. This included the development of halibut hooks, bent wood boxes, log canoes, snowshoes, and fish wheels, to name a few. Snares and gaff hooks are two other forms of *technology.*

Issues

PLACE-BASED PERSPECTIVE

Draw a "pad"on the board and tell the students it is a petition (pretend to add names to it). Have the students suggest why petitions are written - use this to introduce *issues* to the students. Have them cite other local, national, and international issues that are current.

HERITAGE CULTURAL PERSPECTIVE

Traditionally, *issues* were talked-out in clan houses. Issues would arise from disrespectful behavior towards others or the environment. Every traditional story contains *issues*.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

To Respond

PLACE-BASED PERSPECTIVE

Show a map of Europe to the students. Direct their attention to Poland. Show how on September 1, 1939, German troops crossed the Polish border using *blitzkrieg* tactics. Have the students suggest what happened to world history as a result - England and the Commonwealth *responded by* declaring war on Germany.

HERITAGE CULTURAL PERSPECTIVE

Southeast Alaska has a history of *responses* in a variety of contexts. This includes *responses* from Native groups such as ANB, ANS, AFN, and Sealaska Heritage Institute.

To Research

PLACE-BASED PERSPECTIVE

Tell the students that a person was proven innocent of a crime for which he had been charged. Have them suggest what might have proven the individual innocent. Lead the students to suggest DNA - have them tell what led to the use of DNA - introduce *research*. Cite other results of research, e.g., Penicillin, plastic, etc.

HERITAGE CULTURAL PERSPECTIVE

In many traditional Native stories, Raven conducted *research* into many topics and issues. For example, one Raven story called The Tides Woman *researches* edible seafoods in the various tidal zones.

Rock Model

PLACE-BASED PERSPECTIVE

Show a picture of a chef - have the students determine how the chef learned his or her culinary skills. Lead them to understand that most likely they learned by observing a master chef who *modeled* the cooking techniques. Have the students suggest other things we learn from *modeling*.

HERITAGE CULTURAL PERSPECTIVE

In traditional Native life, boys were trained and disciplined by their maternal uncles and girls by their maternal aunts. The aunts and uncles *modeled* expected behavior in social interactions and life skills.

Culturally Responsive & Place-based Perspective
Introduction of Science Vocabulary

To Simulate

PLACE-BASED PERSPECTIVE

Show the students an item made of *simulated* leather. Discuss the meaning of *simulated* - have the students suggest other *simulated* examples, e.g. flight training, play station races, etc.

HERITAGE CULTURAL PERSPECTIVE

Some traditional dances *simulate* real life experiences. For example, the killing of the ptarmigan, the killer whale, the bear, the wolf, fishing, and courtship. In these dances, stories are told by simulating the actions of various animals.

To Test

PLACE-BASED PERSPECTIVE

Show the students a meat thermometer. Have them suggest the use of the thermometer - they should say that it is used to *test* the temperature of meats. Cite examples of other things that *test* - e.g., a dipstick in a car, test driving a car, etc.

HERITAGE CULTURAL PERSPECTIVE

Traditionally, critical thinking skills were developed through stories, which contained riddles. Young people were *tested* on the meanings of the riddles.

Solution

PLACE-BASED PERSPECTIVE

Display a map that shows the Panama Canal. Have the students suggest *why* the canal was built. They should suggest that the canal provides an efficient route from the Atlantic to the Pacific, and return, without having to transverse the tip of South America. Have the students suggest other *solutions*.

HERITAGE CULTURAL PERSPECTIVE

Since there is so much rain and snow in Southeast Alaska, traditional dwellings had to have pitched roofs. This was evidenced in the structure of the clan houses. In this way, Native peoples developed a *solution* to life in their environment.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

To Solve

PLACE-BASED PERSPECTIVE

Place a tray of soil in front of the students. Use a container of water to show the problem of *erosion* - have the students suggest how erosion could be prevented. Use their solutions to introduce the problem as *solved*.

HERITAGE CULTURAL PERSPECTIVE

Drying fish and meats was a way to *solve* the problem of food preservation for winter. Other problems were *solved* in areas such as transportation, clothing, and tools.

Perspectives

PLACE-BASED PERSPECTIVE

Show the students a picture of people voting. Have them suggest how most voters determine their choice in the voting process. Use this to introduce the concept of people having different *perspectives* of those running for office. Cite other examples of different *perspectives.*

HERITAGE CULTURAL PERSPECTIVE

Traditionally, Native people's *perspective* of the environment was holistic in nature as opposed to other cultures who viewed the environment for its commercial value.

Multiple

PLACE-BASED PERSPECTIVE

Show a can of WD-40. Have the students suggest the many uses of the product. Since it is made from fish oil, it can be used effectively as a lubricant, a cleaner, a scent on fish bait, and so on. Use this to introduce the concept of *multiple* as in the *multiple* uses of WD-40.

HERITAGE CULTURAL PERSPECTIVE

The peoples of Southeast Alaska have *multiple* uses for the animals they hunt, especially seals and mountain goats. For example people use the seal skins for clothing, seal oil as a condiment and preservative and, the meat and intestines for food.

Culturally Responsive & Place-based Perspective
Introduction of Science Vocabulary

To Analyze

PLACE-BASED PERSPECTIVE

Have the students imagine how to determine what fish in a given area have been eating. Lead them to suggest that the stomach contents of caught fish be *analyzed* to determine their diet. Cite other examples of things that can be *analyzed.*

HERITAGE CULTURAL PERSPECTIVE

The remains of *Shuka Kaa*, the 10,300-year-old Native man whose remains were found on Prince of Wales Island, were *analyzed* in detail.

Merits

PLACE-BASED PERSPECTIVE

Draw an outline of a *studded tire* on the board. Have the students cite the *merits* of studded tires. Also, have the students cite the problems that studded tires can cause.

HERITAGE CULTURAL PERSPECTIVE

The *merits* of dried foods are, 1. light weight for travelling, 2. easy to store, 3. can be reconstituted, and 4. intense flavor.

To Evaluate

PLACE-BASED PERSPECTIVE

Show a picture of a used car. Have the students suggest what they would do prior to buying the used car. Lead them to suggest that they would *evaluate* the condition of the car.

Discuss how Consumer Reports evaluates products so that buyers can make informed decisions prior to purchasing products.

HERITAGE CULTURAL PERSPECTIVE

Traditionally Native people *evaluated* their environment for settling purposes.

Art forms are *evaluated* based on their quality and balance.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Effects

PLACE-BASED PERSPECTIVE

Place a tray of soil in front of the students. Create a *mountain* with the soil. Direct the students' attention to the sides of the mountain. Tell them that there was clear cutting on the sides of the mountain. Have them suggest the *effects* of clear cutting - particularly erosion of the soil on the sides of the mountain.

HERITAGE CULTURAL PERSPECTIVE

Over-harvesting of the natural resources in Southeast Alaska has had a profound *effect* on all peoples living in the area. For example, salmon, crab and halibut numbers are depleted. Construction has had a significant *effect* on a variety of resources. While clear-cutting is viewed negatively, one positive *effect* is the abundance of berries in those areas.

Recent

PLACE-BASED PERSPECTIVE

Show three or four pictures of cars from different eras - e.g., a model T Ford, a 1940s car, a 1960s car and a car from 2008. Have the students suggest a sequence for the cars, from the oldest to the most *recent*. Cite examples of *recent* events, news, etc.

HERITAGE CULTURAL PERSPECTIVE

Recent innovations in food preparation and preservation include the pressure cooker, vacuum sealer, dehydrators, freezers, and canning.

Discovery

PLACE-BASED PERSPECTIVE

Show a map of the United States. Draw the students' attention to the Black Hills of South Dakota. Tell them that these are the sacred hills of the Sioux tribe. Tell them that in the 1800s gold was *discovered* in the Black Hills. Have the students imagine the impact of this *discovery* - gold seekers flooded the Indian lands, forming the illegal town of Deadwood. Eventually the federal governement bought the Black Hills from the Sioux.

HERITAGE CULTURAL PERSPECTIVE

The *discovery* of gold caused a gold rush in Alaska and Yukon. This resulted in the establishment of modern-day towns such as Juneau and Skagway.

Culturally Responsive & Place-based Perspective Introduction of Science Vocabulary

Invention

PLACE-BASED PERSPECTIVE

On the board write: "Necessity is the mother of invention." Discuss this with the students. Look around the room to determine *inventions* that were born from necessity (e.g., the lights, plastics, erasers, etc.). Cite other *inventions* that have affected the way we live.

HERITAGE CULTURAL PERSPECTIVE

There were many traditional *inventions* related to everyday life and art. These included bent-wood boxes, halibut hooks, Chilkat weavings, and copper shields.

Breakthrough

PLACE-BASED PERSPECTIVE

Write DNA on the board. Have the students suggest how DNA has affected mankind. Use DNA as an example of a *breakthrough* in science. Cite other *breakthroughs*, particularly in the area of medicine (e.g., penicillin, laser therapy, etc.).

HERITAGE CULTURAL PERSPECTIVE

There were many *breakthroughs* in the harvesting and preparation of foods. For example, canning fish, seine nets, fish finders, refrigeration on fishing boats, and slush icing of fish were considered breakthroughs.

Innovations

PLACE-BASED PERSPECTIVE

Show the students a cell phone, a container from a Wii game, and a plastic item. Have the students imagine what is the *same* for all of the items. Lead them to understand that all of the items are the results of experimenting and they are or were at one time, innovations. Cite other recent *innovations*.

HERITAGE CULTURAL PERSPECTIVE

To the Native peoples of Southeast Alaska, there have been many *innovations* in all aspects of life. This included transportation, clothing, food processing, technology, communications, and recreation.

Culturally Responsive & Place-based Perspective
Introduction of Science Vocabulary

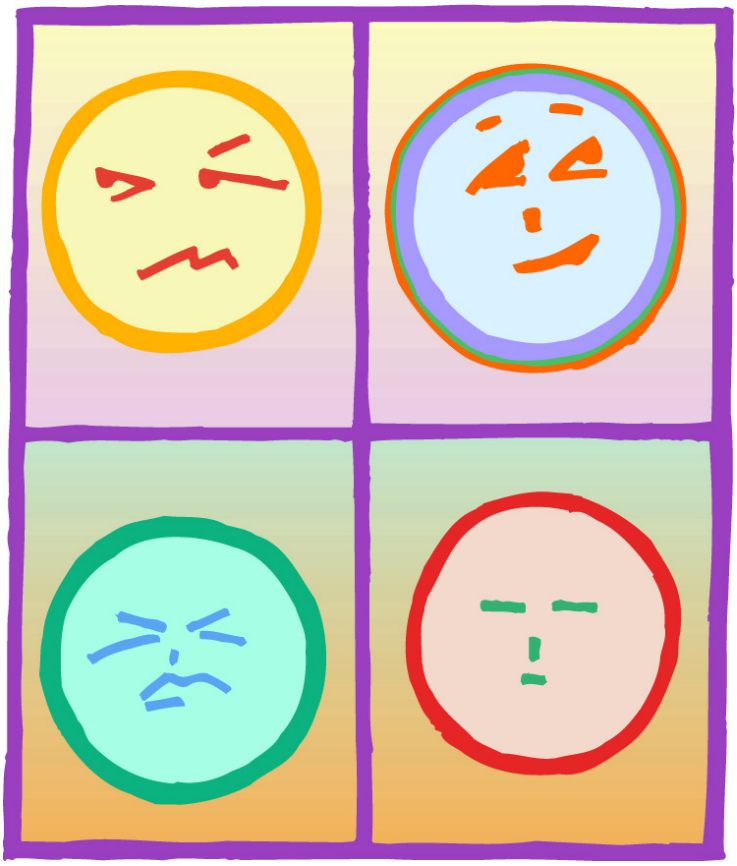
To Affect

PLACE-BASED PERSPECTIVE

Show a container of sun tan lotion. Have the students suggest the use and purpose of the lotion. Lead the students to understand that the sun tan lotion is designed to prevent sun burn, an *effect* from being in the sun for too long.

HERITAGE CULTURAL PERSPECTIVE

Modernization has *affected* the environment and peoples of Southeast Alaska. This is evident in the areas of mining, fishing, transportation, education, housing and so on.



Language Skills

Language & Skills Development

LISTENING

Use the activity pages from the Student Support Materials.

Roll 'Em Again Sam

Provide each student with two flashcards. Each student should then write a number between 1 and 6 on each of his/her cards - one number per card. When the students' number cards are ready, toss two dice. Call the two numbers showing on the dice. Any student or students who have those two numbers on their number cards must then find a vocabulary illustration you name (you may wish to have the vocabulary illustrations mounted on the chalkboard and numbered, for easy identification). The students may change number cards after each round of the activity.

SPEAKING

Flip of the Coin

Provide each student with a penny. Keep one penny for yourself. Mount the vocabulary illustrations on the chalkboard. Have the students (gently) toss their pennies into the air. Each student should look to see which side of his/her penny is face-up. Toss your penny into the air in the same way. Call the side of your penny that is face-up. The students who have the same side of coin face-up must then identify (orally) a vocabulary illustration you point to. For example, if the "heads" side of your coin is face-up, the students who have "heads" showing on their coins must then orally identify the vocabulary illustration you point to. Repeat this process a number of times.

READING

Use the activity pages from the Student Support Materials.

Half Time Concentration

Before the activity begins, cut each of the sight words in half. Mix all of the word halves together and spread them on the floor or on a table, face down. Group the students around the word halves. Call upon a student to select one of the word halves. The student should show that word half to the other students. Then, the student should take another word half. The student should show *that* word half to the other students. If the two word halves go together to create a sight word, the student should keep the two halves. However, if the two halves do not go together, he/she should place them in their original locations on the floor. Continue in this way until all of the sight word cards have been encoded correctly. The winner or winners of this activity are those students who collect the greatest number of sight words.

WRITING

Use the activity pages from the Student Support Materials.

Funny Grams

Mount a set of sight word cards on the chalkboard. Provide the students with writing paper and pencils/pens. Each student should select one of the sight words to write a "funny gram." To do this, the student uses the letters of the sight word as the initial letters of words in a sentence. For example, for the word "recent," a student might write:

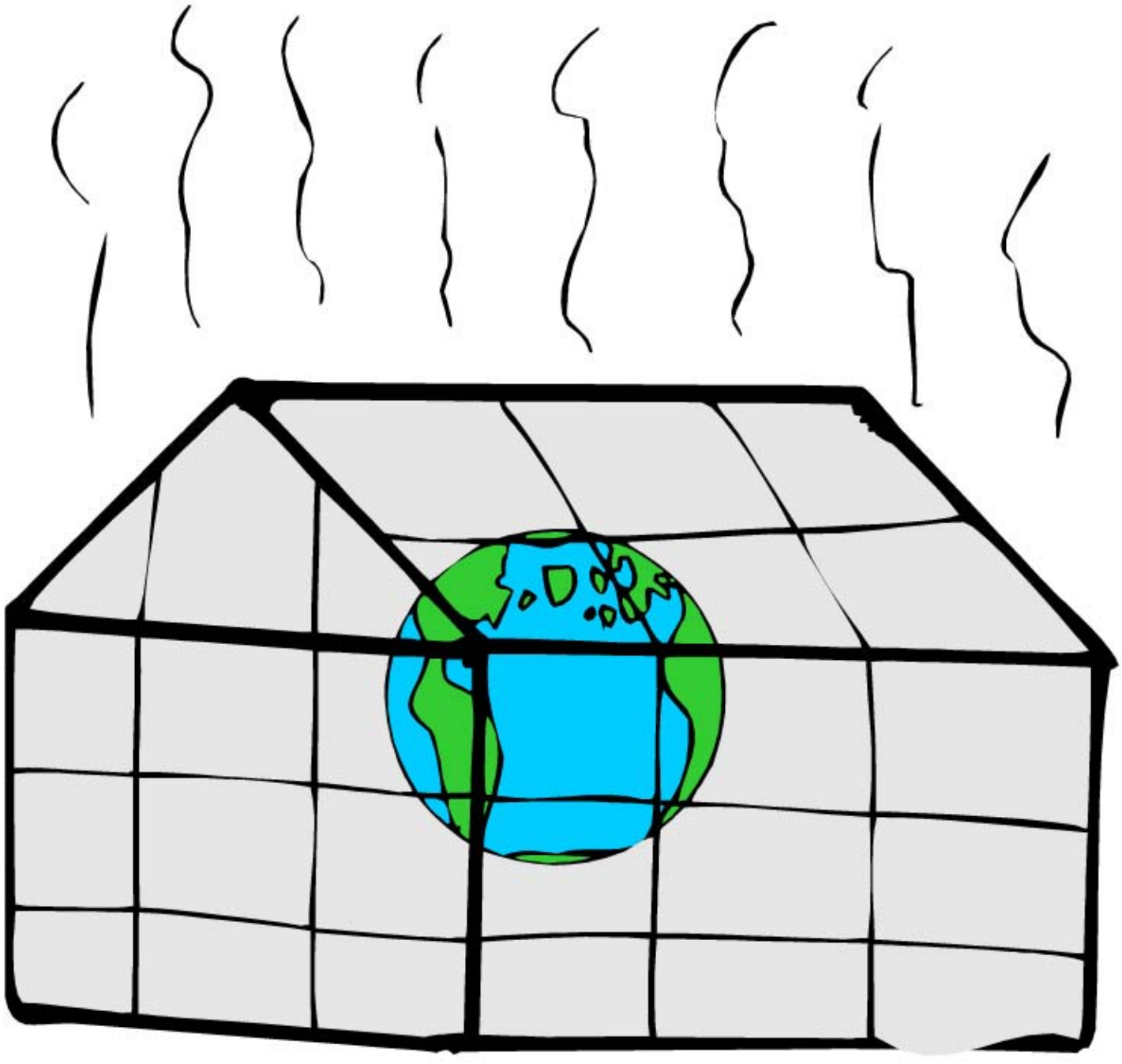
Royal **e**ngineers **c**riticize **e**very **n**ew **t**enant.

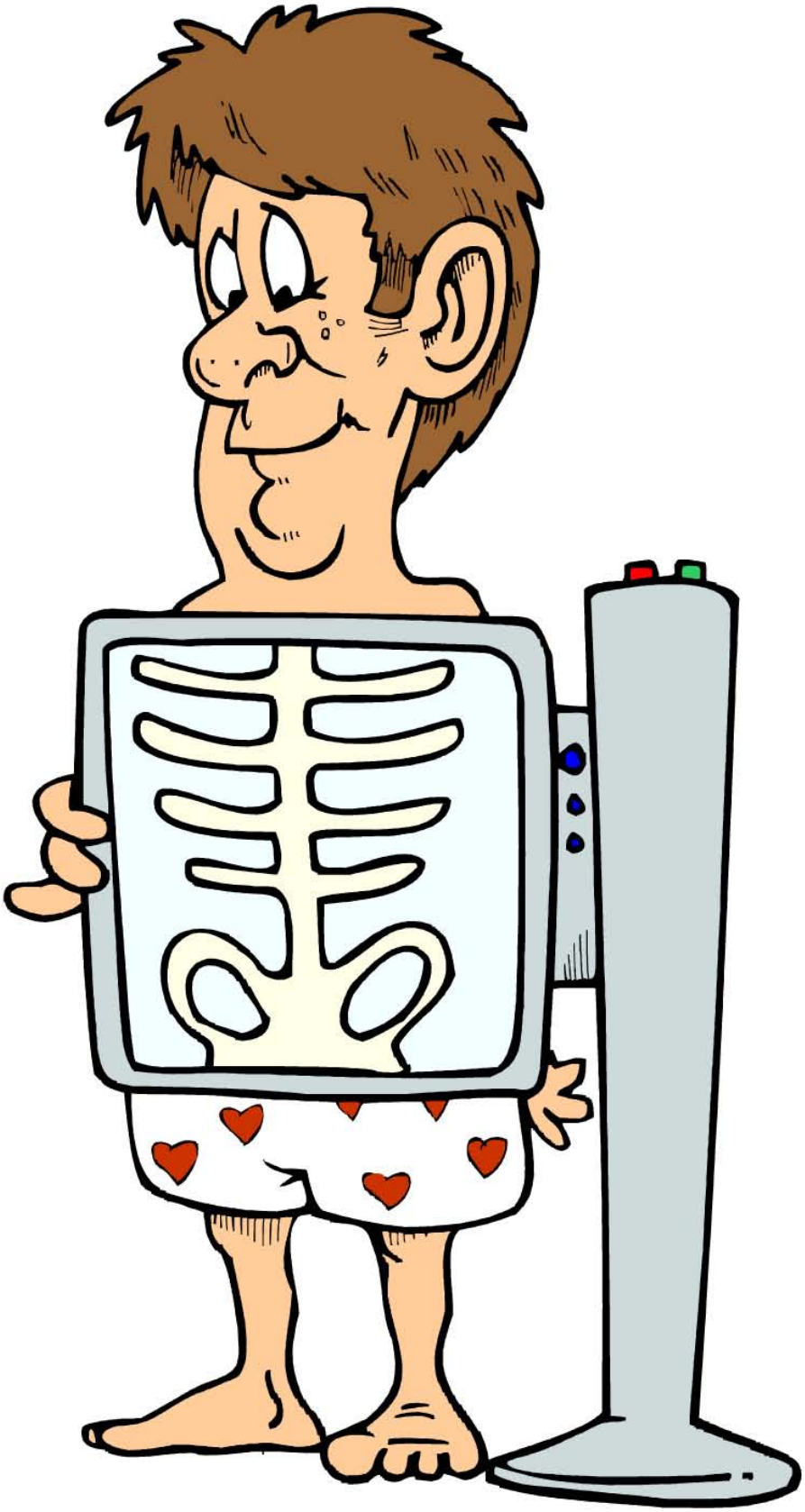
When the students have completed their "funny grams," have a student read his/her sentence to the others. The other students should name the sight word used by the student to write the sentence. You may wish to have the students write a "funny gram" for each sight word.

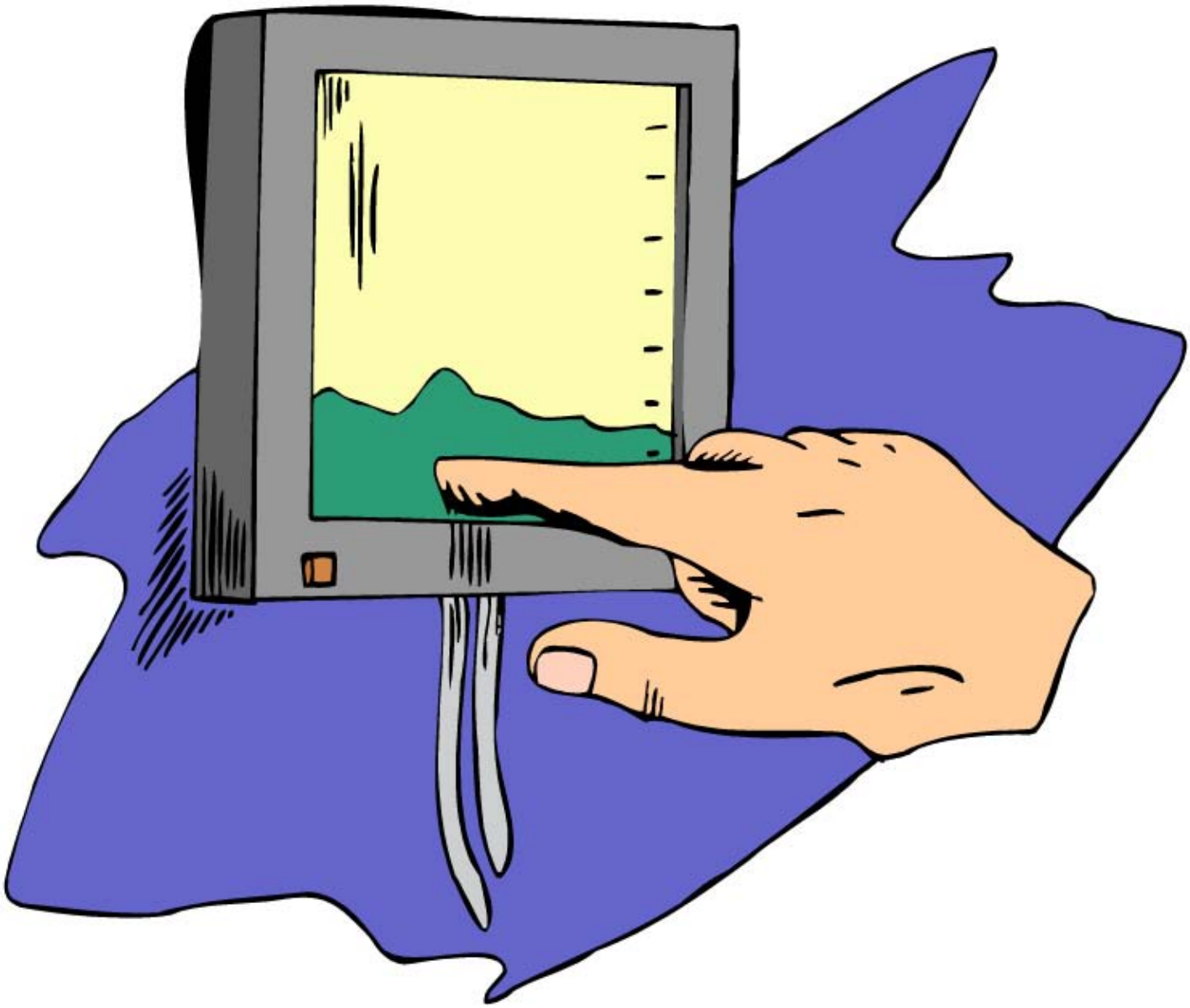
Vocabulary Images

analyze

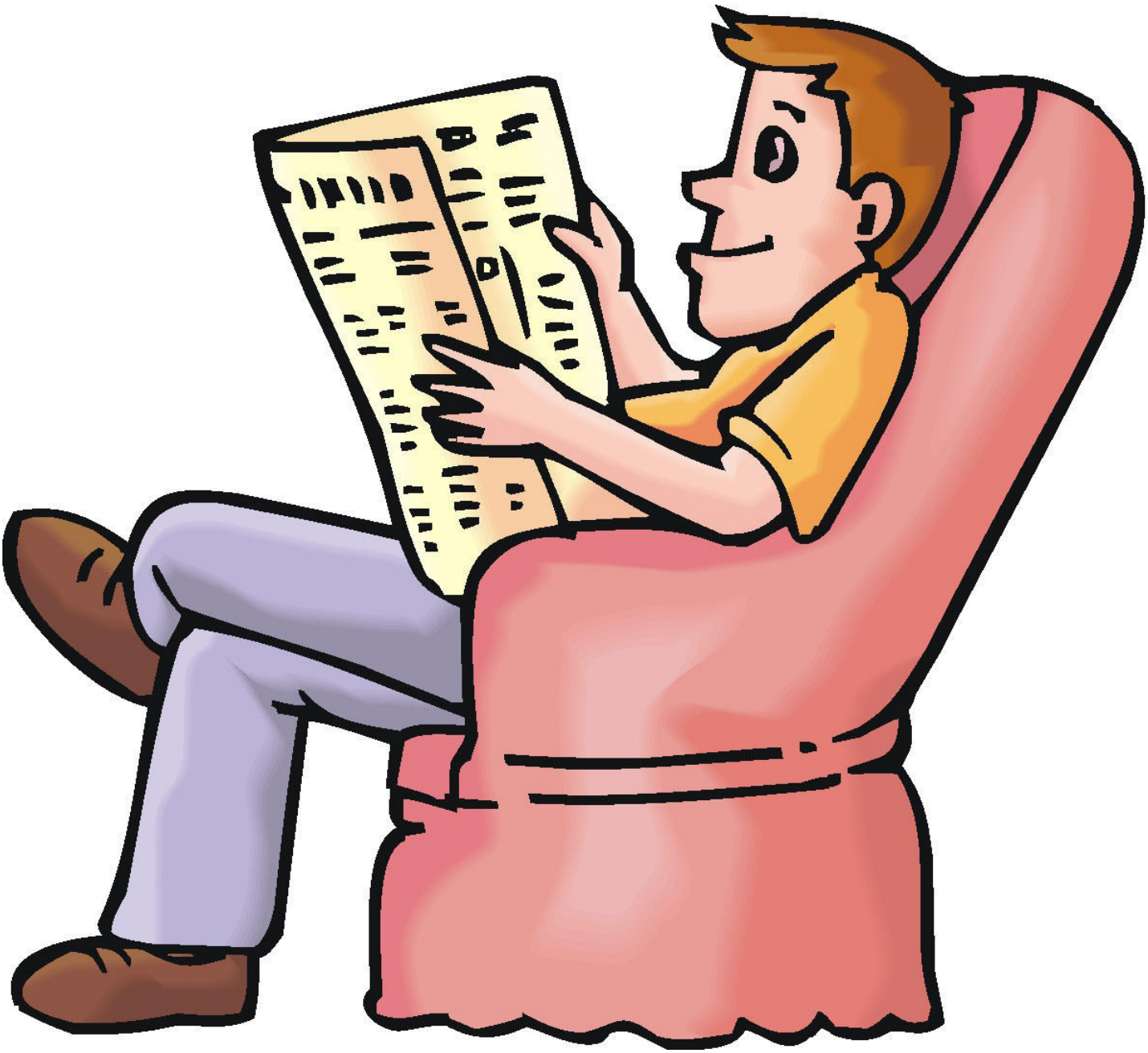

MENU

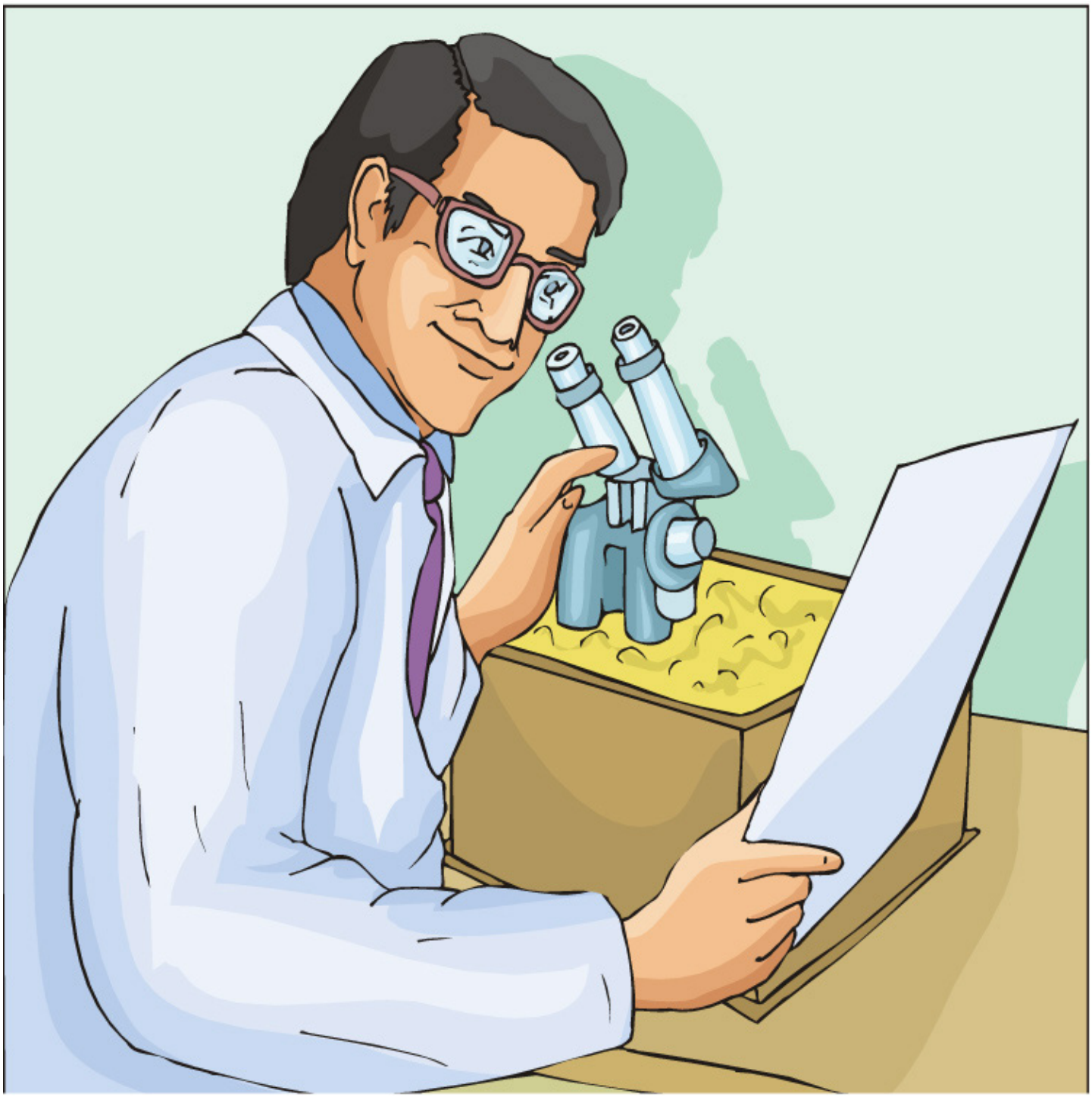


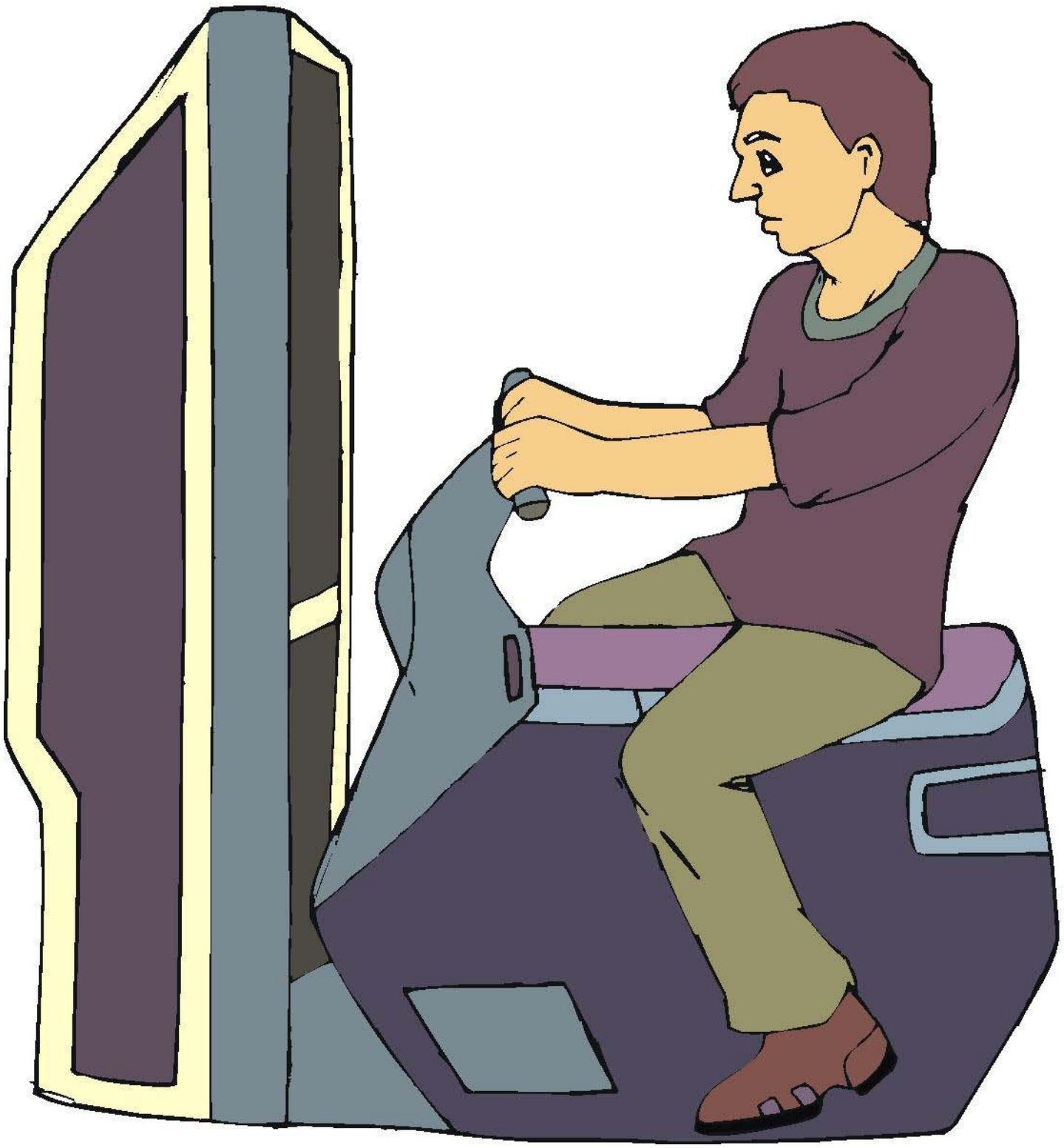


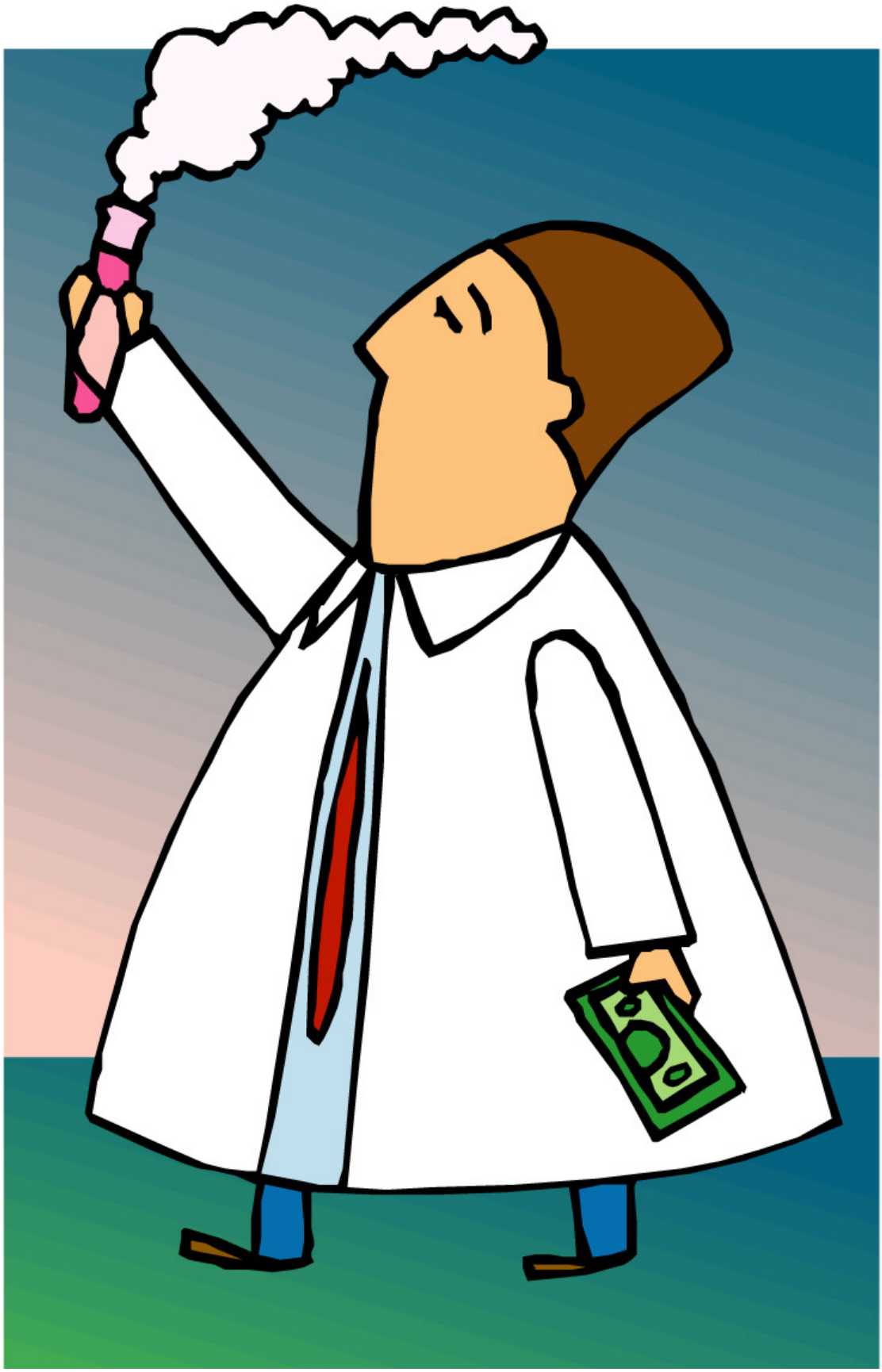


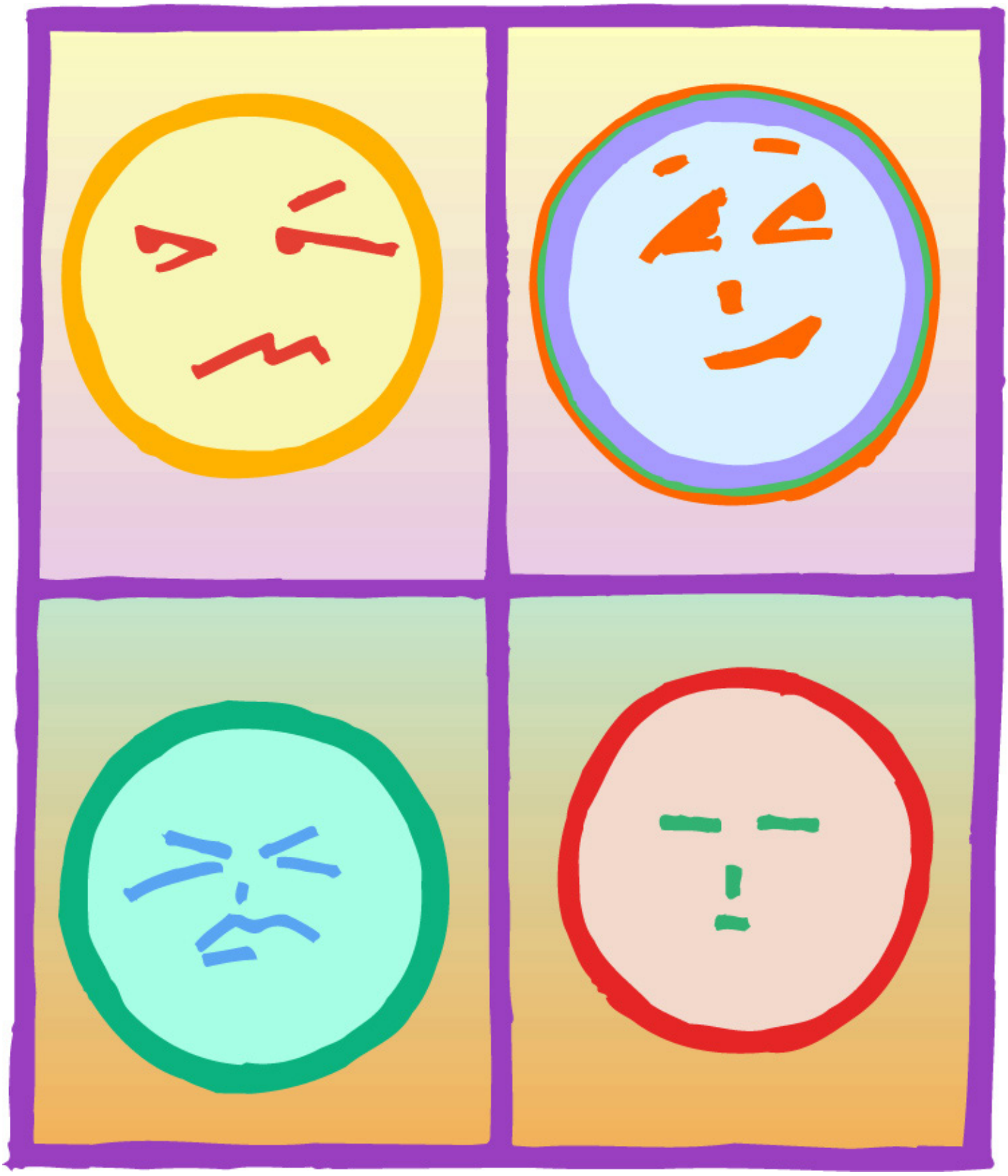

NEWS

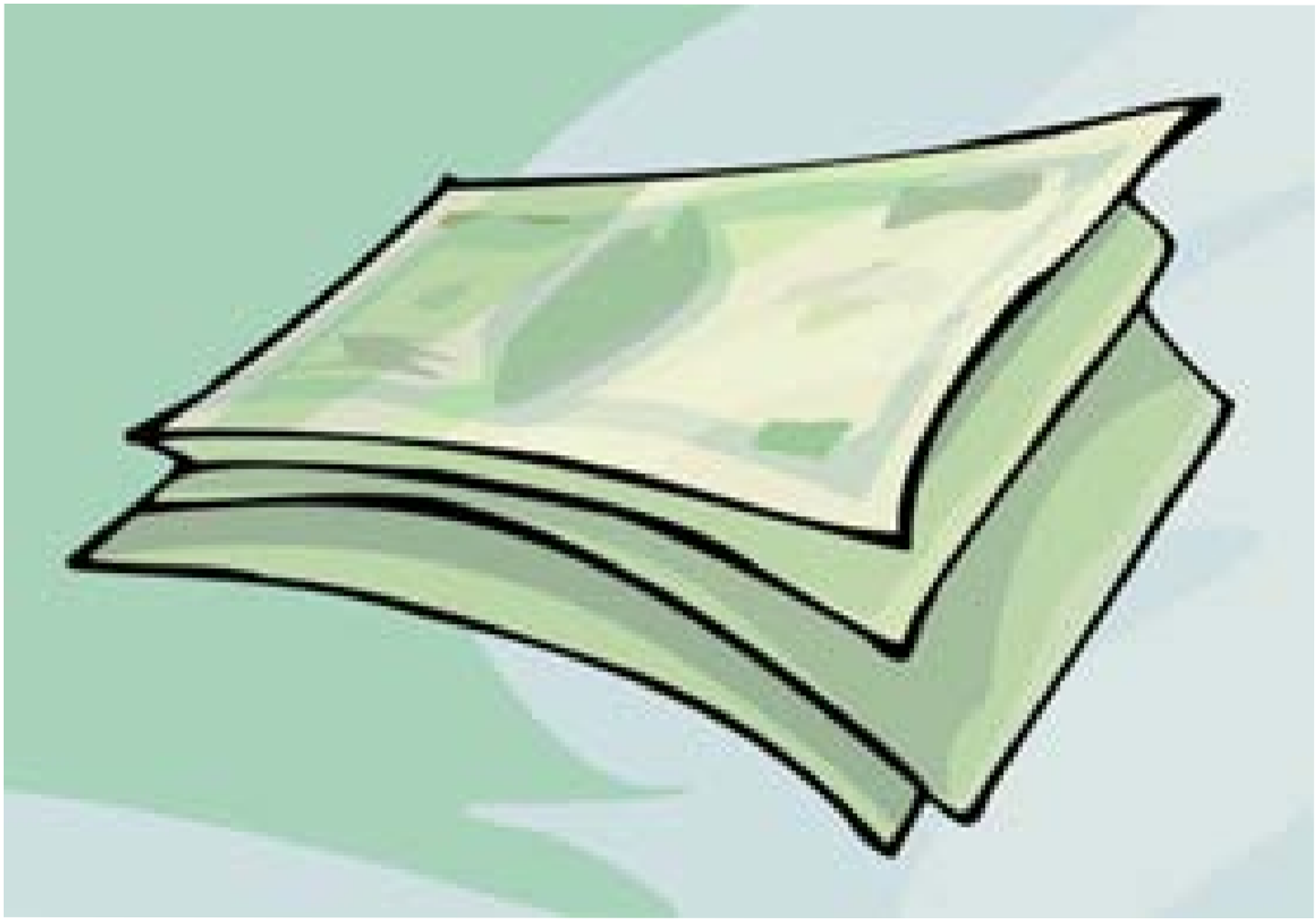








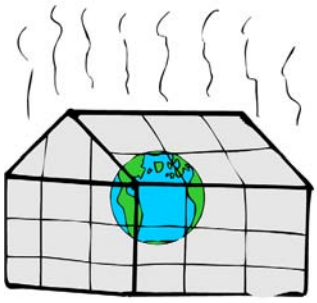


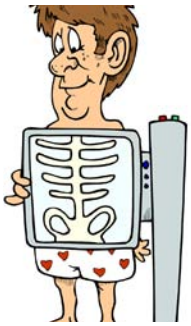


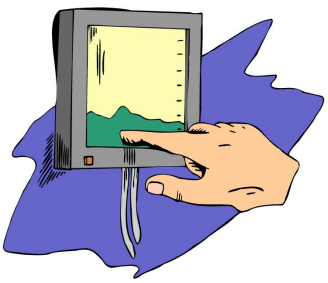
STUDENT SUPPORT MATERIALS

Listening

Say these words to the students - they write the numbers of the words under the pictures.
(1)model (2)issues (3) effects (4)affects (5)analyze (6)solution (7)invention (8)evaluate (9) test (10)perspective (11)solve (12)merit (13)innovation (14)recent (15)discovery (16)value (17)simulate (18)respond (19)breakthrough (20)technology (21)research (22)multiple







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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. If you value your health you will not smoke or eat excessively.
2. Developing new technology is the only important role science plays in our society.
3. As a society we debate a number of important political and social issues, including genetic engineering, poverty, gambling, and abortion.
4. Some people respond to high gasoline prices by restricting their driving.
5. It is not important to research a topic before beginning your own novel investigation—after all, a good scientist would consider reading others' work as cheating.
6. Scientists do not respect experiments that are done to model a situation or process; it's either the real deal or nothing.
7. To simulate the effects of weightlessness, astronauts experience free-fall inside of an air craft that is plunging to earth at the appropriate speed and acceleration.
8. A scientist would consider an hypothesis that you could not test as useless.
9. If you are able to find a solution to a problem, the problem is unsolvable.
10. To solve a problem means to find a solution to that problem.
11. Typically, it is important when solving a community's problems to get multiple perspectives
12. Multiple births are rare in humans, but with modern fertility treatments they are becoming more common.
13. Analysts analyze data.
14. Scientists try to judge another scientist's work by its own merits and not the past accomplishments of the scientist.
15. If a committee evaluates a proposal from an interest group they look at it quickly and with little discussion or depth.
16. The effects of global climate change are growing as years pass.
17. Recent developments in stem cell research make it possible to clone a brain, including your memory.
18. The discovery of microorganisms in the 17th century laid the foundations for the sciences of bacteriology and microbiology.
19. The invention of the telescope made the discovery of microorganisms possible.
20. Science is but a series of breakthroughs with little work done in between.
21. Innovation refers to doing something the same, over and over, and expecting the a different result.
22. How much one reads about a topic directly affects how much one knows about that topic.

Answers

1. T, 2. F, 3. T, 4. T, 5. F, 6. F, 7. T, 8. T, 9. F, 10. T, 11.T, 12. T
13. T, 14. T, 15. F, 16. T, 17, F, 18. T, 19. T, 20. F, 21. F, 22. T

STUDENT SUPPORT MATERIALS

Sight Words

analyze

breakthrough

discovery

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STUDENT SUPPORT MATERIALS

Reading

Word Find

Find the words in the grid. Words can go horizontally, vertically and diagonally in all eight directions.

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

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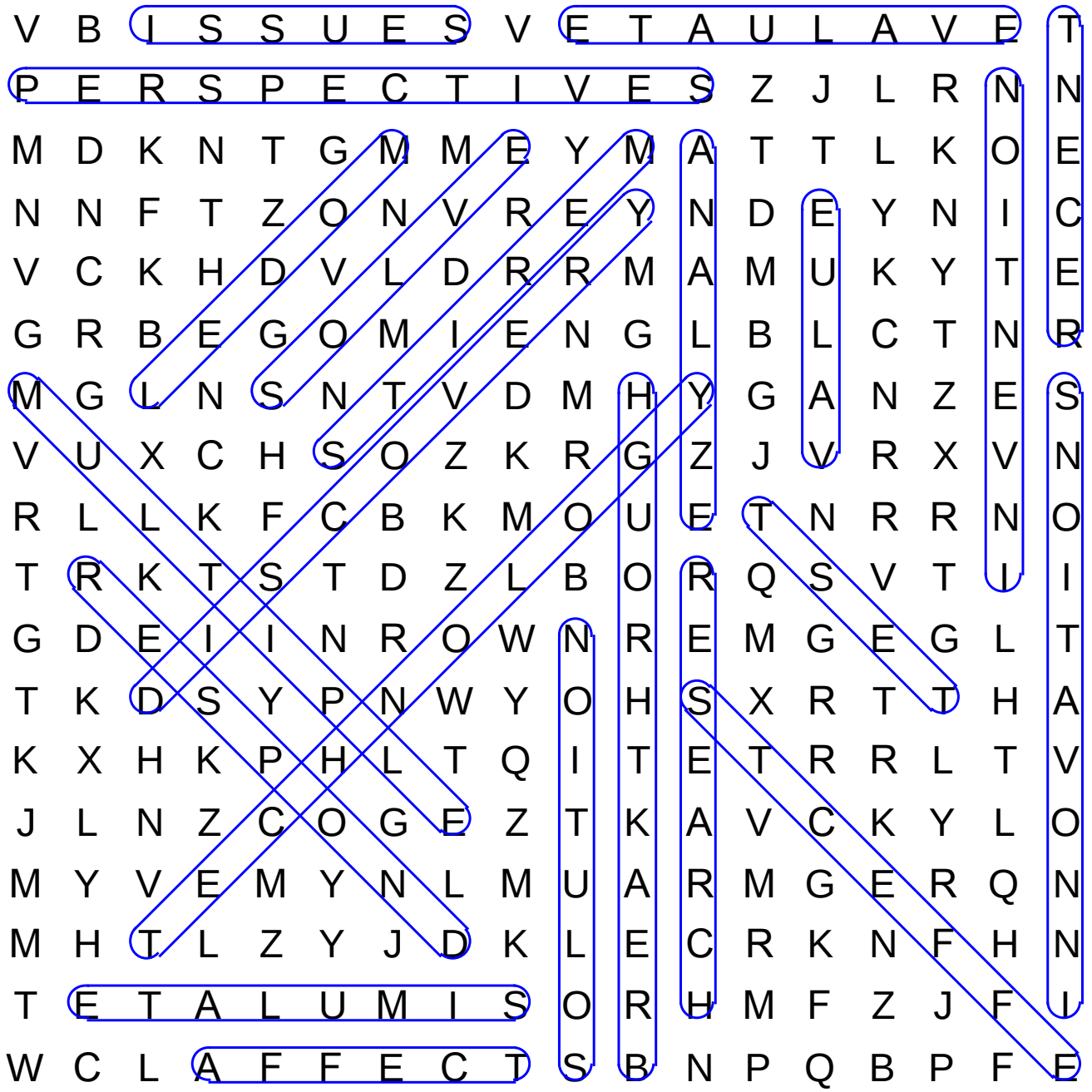
Word Find Solution



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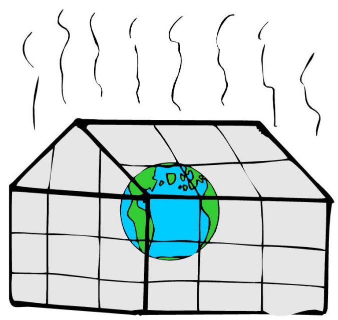

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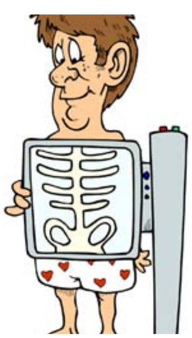

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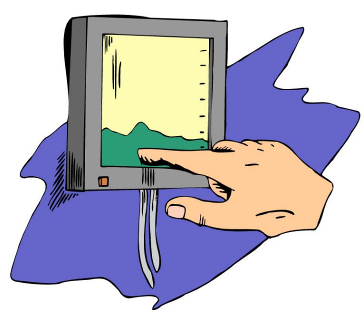

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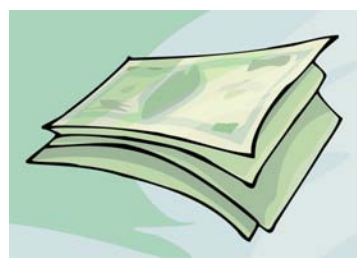

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Sentence Halves

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

1. The value of a home can
2. All of the technology that we enjoy and suffer from today
3. There are many issues over which
4. If you don't respond to me I
5. If you don't know the specifications of a particular car
6. The yoga instructor modeled the pose before
7. During Halloween celebrations one can often hear
8. The gym teacher asked students to perform dribbling and shooting techniques in front of the class
9. The best solution to a problem
10. If you show your work and solve all of the math problems successfully on the test
11. The elderly have different perspectives than
12. There are multiple side effects
13. Raw data is not very useful
14. Scientific studies should be judged by
15. A principal will evaluate a teacher
16. The effects of the poisoning
17. Recent studies show that
18. The discovery of America is often accredited to Christopher Columbus
19. The invention and use of the automobile has
20. Even today, curing the common cold would
21. An innovation is the first attempt
22. The new dance rules at the high school do not seem

A. To affect student behavior.
B. Contributed heavily to global climate change.
C. Requesting that students copy her.
D. Politicians can argue.
E. You will pass the test with an A+.
F. Certain plastic bottles may leach toxins into the water they hold.
G. You can always research online to find that information.
H. Be considered a breakthrough.
I. Until it has been analyzed.
J. Will be forced to scream.
K. increase or decrease over time.
L. Simulated screams and see simulated blood.
M. Was not apparent until years after the incident.
N. In order to test their basketball skills.
O. Is not always the first one happens upon.
P. Is a result of scientific development.
Q. The youth of today.
R. Of alcohol consumption.
S. Their merits alone, not by the popularity or status of the scientist doing the study.
T. By observing lessons throughout the school year.
U. To carry out an invention or new idea into practice.
V Even though the islands he happened upon were already inhabited by people.

Answers
1/K 2/P 3/D 4/J 5/G 6/C 7/L 8/N 9/O 10/E 11/Q 12/R
13/I 14/S 15/T 16/M 17/F 18/V 19/B 20/H 21/U 22/A

Word & Definition Match

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

something found	*the choice of a single point of view*	*the result or outcome of a cause*	*external display of emotion*	*the act of solving a problem*
having more than one element	*the points in a question*	*the introduction of something new*	*to say something in return*	*the state of deserving*
a discovery or invention that is characterized by major progress or overcoming a significant obstacle	*to find an answer or solution to a problem or question*	*innovations in action*	*to create a likeness or model*	*something that has never been made*
the collecting of information about a subject	*the process of collecting information in order to determine how well a design meets set requirements*	*to assess*	*to examine critically*	*happening a short while ago*

1. analyze	2. breakthrough	3. effects	4. discovery	5. evaluate
6. innovation	7. invention	8. issues	9. merit	10. multiple
11. perspective	12. recent	13. research	14. respond	15. simulate
16. solution	17. solve	18. technology	19. test	20. affect

Word & Definition Match

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

the degree of impor-tance given to	*to represent something*

21. model

22. value

Which Belongs?

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

1. The value/technology of supporting the development of science is underestimated by many.
2. Developing technology/a solution is not the only purpose of science, although some see it that way.
3. Many issues/simulations require more than just scientific inquiry to solve effectively.
4. Automakers have begun to respond to/research the growing need for electric cars by starting production of several models.
5. Most students do their research/technology for their classes online.
6. Airplane designers often build miniature airplanes to model/solve the effects of changes to design.
7. The military uses war games to simulate/solve real situations in order to train their soldiers.
8. A negative result on a scientific test/solve of a hypothesis is not necessarily a bad result.
9. The solution/perspective to a problem is not always the first one tried.
10. Sometimes one can find different solutions to a problem that has already been solved/simulated.
11. You can have as many perspectives/simulations on an issue as you have people present.
12. Multiple/simulated births is typically more complicated than having just one.
13. It is important to analyze/affect data appropriately after it is gathered.
14. Your merits/effects will be scrutinized when you apply for a job or to college.
15. If you do not evaluate/breakthrough your options carefully, you may miss a good opportunity.
16. The effects/discovery of vaccination were positive and consistent, although early in their development they were more dangerous than currently.
17. Recent/Analyze advances in stem cell research are promising in the arena of organ transplants.
18. The discovery/breakthrough of land caused celebration aboard the lost ship.
19. We consider something an affect/invention when it is the first occurrance of an idea for something new.
20. Something is a breakthrough/perspective if it is a sudden advance, such as the invention of the stirrup for use on horses.
21. Innovation/discovery is when someone uses a new idea, method, device, or approach to do something that we may have done differently (but less well) before.
22. You coming in late today is going to affect/effect your perfect attendance record.

Answers

1. value, 2. technology, 3. issues, 4. respond, 5. research, 6. model, 7. simulate, 8. test, 9. solution, 10. solved, 11. perspectives, 12. multiple, 13. analyze, 14. merits, 15. evaluate 16. effects, 17. recent, 18. discovery, 19. invention, 20. breakthrough, 21. innovation 22. affect

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. Which of the following will not decrease the value of a motorcycle?

(a) Laying it down at high speed
(b) Allowing a two year old to carve on the gas tank with a galvanized nail.
(c) Selling it.

2. Which of the following are not unwanted by-products of modern technology?

(a) Increased carbon dioxide emissions
(b) Water pollution
(c) Increased communication

3. Which of the following are not current issues discussed by national government candidates in the United States of America?

(a) Health Care, Abortion, Gun Rights
(b) Vacation resorts, Labradoodles, Mac vs. PC
(c) Environment, Education, Economy

4. How should a good teacher respond when asked a question?

(a) They should answer the question or help the student answer his/her question himself.
(b) They should tell the student to quit asking questions.
(c) They should kick the student out of class and write them up for defiance.

5. Why do scientists do research on a subject before asking their own questions or embarking on their own investigations?

(a) So that they are up to speed with what is already known in the field so they can "Stand on the shoulders of giants".
(b) So that they can copy another's work and then claim credit for it.
(c) Because they are lazy and don't have the energy to start from scratch.

6. What is a drawback in using mice to model humans in pain reliever experiments?

(a) Mice will not be affected by the placebo effect.
(b) Mice cannot tell you anything about their pain experience, except through their chemistry and behaviors.
(c) It is easier to get permission to work on mice than on people.

7. What simulates a human in an auto crash test?

(a) The crash dummy
(b) The bumper
(c) The researcher

8. How can you decrease your chances of passing a driving test?

(a) Get plenty of sleep the night before and eat breakfast the morning of the test.
(b) Get good instruction and practice consistently to hone your skills.
(c) Do not practice driving until the morning of the test and then cram all of the knowledge into your brain and sensory-motor system at the last minute.

9. In science, solutions to problems are always

(a) Subject to change if new evidence comes to light.
(b) Made quickly and are not subject to change.
(c) Unpopular and politically incorrect.

10. In mathematics and science, it is important to "show your work" when you solve a problem so that

(a) Others can see how you got your solution.
(b) You can go back and check your own work later.
(c) Both of the above.

11. Scientists with diverse backgrounds can bring diverse perspectives to the laboratory.

(a) Always true
(b) Never true
(c) Sometimes true

12. It is important to approach a problem from multiple angles if

(a) The problem is complex or difficult enough to merit the work.
(b) You don't want to actually solve the problem.
(c) Someone is watching.

13. You can analyze data by using graphs and statistics, but if you start out with bad data you will

(a) Not be able to draw good conclusions
(b) Be able to draw conclusions about other studies that you didn't even do.
(c) Not need to repeat the experiment

14. The merits of a football player's strategy can often be judged by

(a) How it worked during a game
(b) How well he practiced the strategy
(c) How others feel the strategy might work

15. Math teachers evaluate whether their students are learning by

(a) Giving them tests
(b) Assigning homework
(c) Offering study hall

16. The effects of some toxins are immediate, while others can be

(a) Right away
(b) Delayed
(c) Extreme

17. Hostages are often photographed with a recent newspaper so that

(a) Kidnappers can show that the hostage was alive recently
(b) Kidnappers can show that they are providing hostages with current reading material.
(c) Kidnappers can show that hostages are being kept from reading books and are only provided newspapers.

18. The discovery of nuclear fission did the following except

(a) Change modern warfare
(b) Provide a new source of power for powerplants
(c) Enable cars to run more efficiently

19. Typically, people like to patent their inventions so that they can

(a) Earn money and prestige from their efforts
(b) Keep a record of what they've done
(c) Allow others to use their work without giving them anything in return.

20. In modern medicine, the development of a cure for cancer, or even the common cold, would be a

(a) Breakthrough.
(b) Set back
(c) Stumbling block

21. Which of the following innovations do you think had the greatest impact on the 20th century?

(a) Cherry-flavored Coke
(b) Computers
(c) Velcro

22. All of the following affect the rate at which plants grow except

(a) Amount of exposure to sun
(b) Nutrient load of the soil
(c) Length of the farmer's hair

Answers

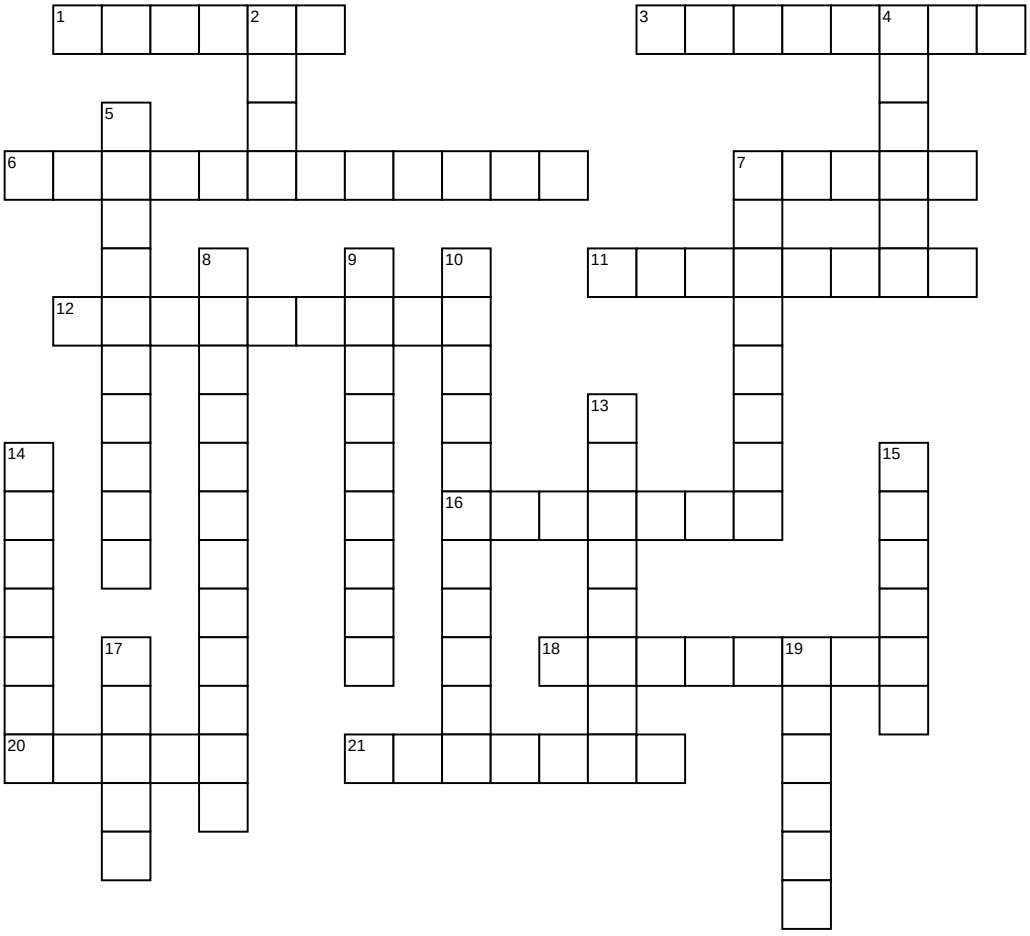
1. c	6. b	11. c	16. b	21. b
2. c	7. a	12. a	17. a	22. c
3. b	8. c	13. a	18. c	
4. a	9. a	14. a	19. a	
5. a	10. c	15. a	20. a	

STUDENT SUPPORT MATERIALS

Writing

9th E-1 Science & Technology

Unit 1



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ACROSS

1 the state of deserving.
3 the collecting of information about a subject, typically done through literature, interviews, or other sources.
6 a discovery or invention that is characterized by major progress or overcoming a significant obstacle.
7 to represent something.
11 the process of collecting information in order to determine how well a design meets set requirement.
12 something that has never been made.
16 to examine critically.
18 to create a likeness or model.
20 to find an answer or solution to a problem or question.
21 to say something in return.

DOWN

2 to assess, to try.
4 happening a short while ago.
5 innovation in actions.
7 having more than one element, part, component, or function.
8 the choice of a single point of view from which to sense, categorize, measure, or codify experience.
9 something found.
10 the introduction of something new.
13 the act of solving a problem.
14 the result or outcome of a cause.
15 topics, the points in question.
17 the degree of importance give to something.
19 external display of emotion or mood.

9th E-1 Science & Technology

Unit 1

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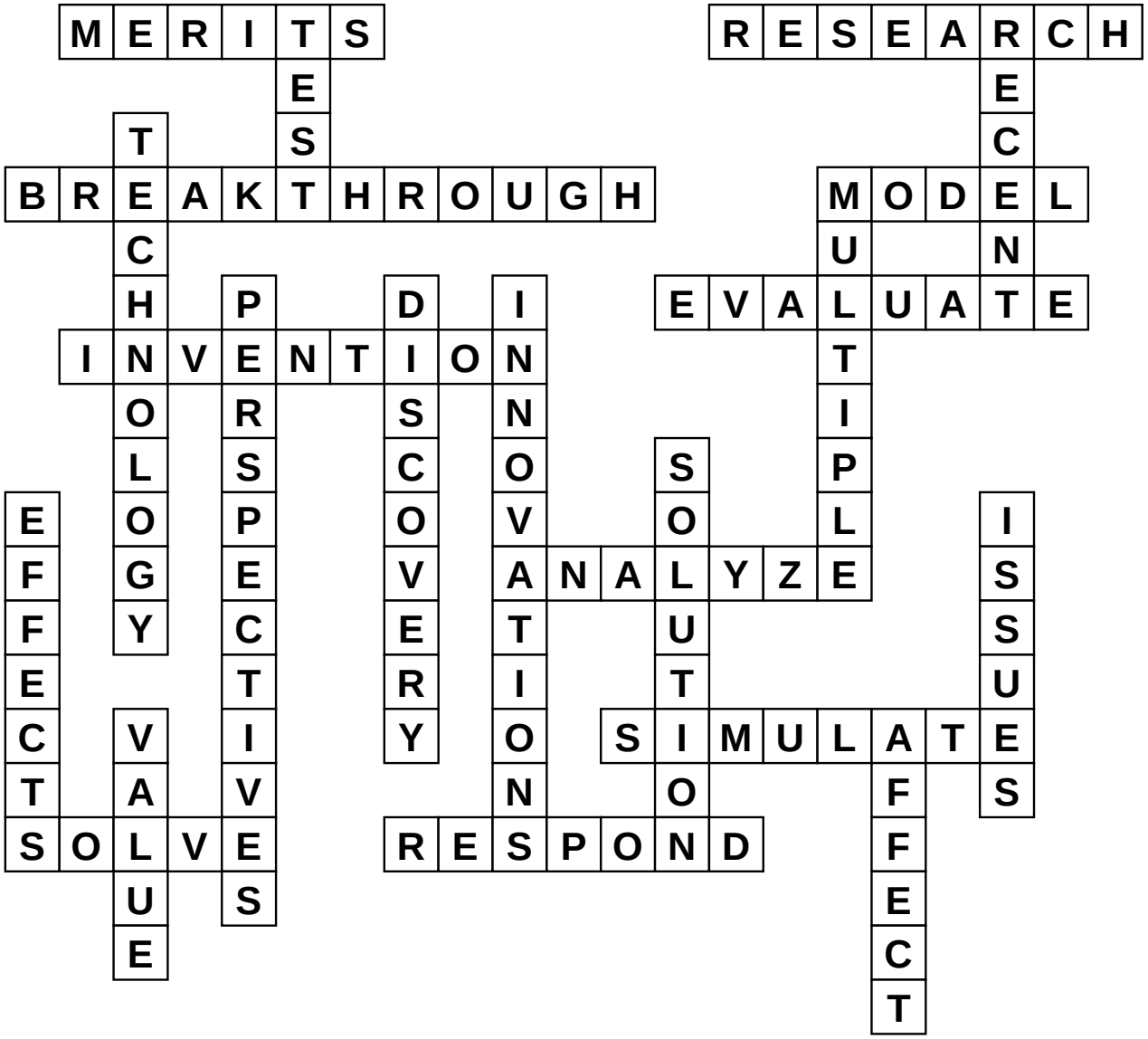
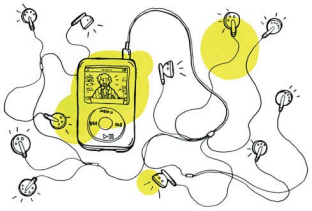
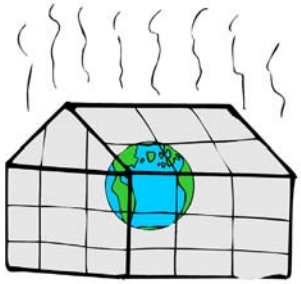
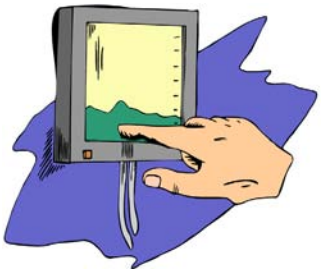


Write The Words!







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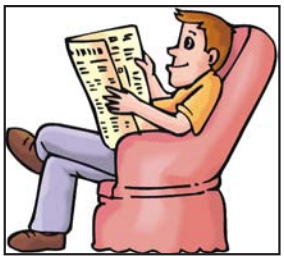

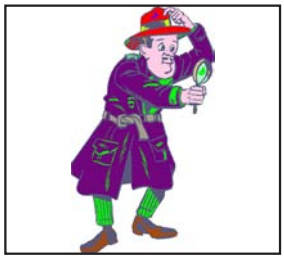

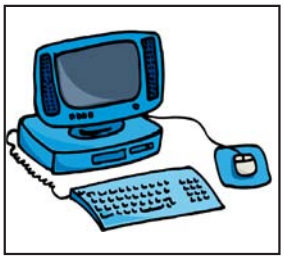

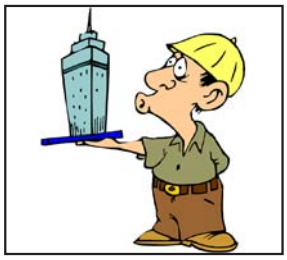

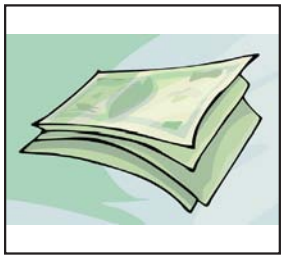

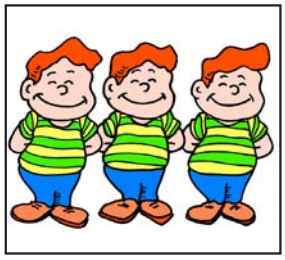

Complete The Sentence

Have the students write the key words in the blanks.

1. The _____ of an item may vary depending on one's situation; for example, one might be willing to pay an awful lot for a small generator if the town's power is cut off for several months.
2. We use _____ every day—we have rubber boots on our feet, light bulbs in our houses, cell phones in our pockets, and computers in our schools.
3. When running for office, candidates often avoid talking about _____ and instead focus on the character or history of their opponent .
4. How would you _____ if someone yelled an insult at you from a passing car?
5. Before buying a snowboard, it is important to _____ all of the possible designs and models available in order to get a board that properly fits you and your riding style.
6. The Army Corps of Engineers has built a miniature (200 acres) of the Mississippi River to _____ the development of the river in order to better understand how the river system operates and changes over time.
7. There are many computer games and programs are available that _____ real life.
8. If you have a good working hypothesis, you must be able to _____ it.
9. Using science we hope to find _____ to many of the problems that plague our planet, including disease and malnutrition.
10. If you _____ a problem, you have worked out a correct solution to that problem.
11. From my _____ that solution seems like a fair one; but then, it does give me everything I asked for and it gives you nothing.
12. If you are able to see things from _____ perspectives, you will have more luck at finding a solution to a problem that satisfies everyone.
13. When you _____ the results of an experiment you look at the results for significant differences, patterns, and trends.
14. One hopes to get into college on one's own _____, but a letter from a relative who is an alumnus to that college doesn't hurt either.
15. Soon you will be _____ your options for life after high school—what will you decide to do?
16. The _____ of the antibiotics were almost immediate—she stopped coughing, her sinuses cleared up, and the massive zit in the middle of her forehead reduced in size.
17. According to a _____ Gallup poll, my favorite candidate is way ahead of yours currently.
18. Sometimes when a scientist makes a new _____ she will not announce it until other scientists have confirmed her findings.
19. The _____ of Velcro was wonderful for toddlers everywhere who wanted to put on their shoes by themselves.
20. Society has been waiting impatiently for a _____ in nuclear "cold" fusion research; if we could build nuclear fusion power plants we could have inexpensive, waste-free energy.
21. If this generation's problems are going to be solved, we are going to have to have many new _____ in the fields of agriculture, waste management, transportation, and education.
22. How does having a television, Ipod, cell phone, and access to the Internet _____ how you think, live, and grow? .

ANSWERS

1. value, 2. technology, 3. issues, 4. respond, 5. research, 6. model, 7. simulate, 8. test, 9. solutions, 10. solve, 11. perspective, 12. multiple, 13. analyze, 14. merits, 15. evaluating, 16. effects, 17. recent, 18. discovery, 19. invention, 20. breakthrough, 21. innovations, 22. affect

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.

analyze

breakthrough

discovery

effects

evaluate

innovation

invention

issues

merit

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.

multiple

perspective

recent

research

respond

simulate

solution

solve

value

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.

technology

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test

---

affect

---

model

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

Activity 1
Take the students to the computer lab and have them list all technology they can in three minutes. Have them create a tag cloud with this information and then review it in the classroom on the projector. Reinforce that inventions such as a pencil are technology, as well as computers and newer technology.

Activity 2
Have students work in pairs. Bring in copies of peer reviewed journal articles for each team. Have the students highlight or underline the citations in the text. They will need to then find the citations in the bibliography. Discuss with them that the citations are research done by the author(s) for their projects.

Activity 3
To simulate what happens to glaciers when the temperature increases, have students place one ice cube in a bowl on the table and place another ice cube in a bowl with a light bulb near the bowl. Have them record the temperature around each bowl, ensuring that the bowl with the light is warmer. Discuss with them how a simulation is a reproduction of something else.

Activity 4
Have students add two unmarked white powders (corn starch and baking soda) to vinegar to test the reactivity of the chemical properties of the substances. Also, place a couple of drops of iodine on the unmarked white powders to test the reactivity of the chemical properties of the substances.

Activity 5
Discuss the chemical reaction of vinegar with sodium carbonate and the chemical reaction of iodine with starch. This should provide enough of a solution to solve which unknown powder is sodium carbonate or starch based.

Mussel Dissection

Materials:

- 1 mussel
- Scalpel
- Probe
- Dissecting mat or paper plate

Methods:

External Anatomy:

- External features:
  - Overall shape, color, and texture of organism
  - Measure length, width, and beard
  - Create a colored drawing labeling measurements and parts

Internal Anatomy:

- Carefully open up the mussel and pull up the mantel (the thin skin like tissue covering the internal organs).
  - Examine the color, shape, and texture of the internal organs. Notice how they are connected.
  - Create a colored drawing and label the parts.

Concluding Questions:

Answer in your lab journal:

1. Explain how the mussel is well suited for its life- where does it live, what does it eat, how does it avoid becoming dinner?
2. What do the anterior and posterior muscles do?
3. Why are the gills textured (how does this help the mussel)?

Crab Dissection

Materials:

- Crab mussel
- Scalpel
- Probe
- Dissecting mat or paper plate

Methods:

External Anatomy:

- External features:
  - Overall shape, color, and texture of organism
  - Measure length, width, and beard
  - Create a colored drawing labeling measurements and parts

Internal Anatomy:

*****Carefully open up the crab and examine the internal organs.

- Examine the color, shape, and texture of the internal organs. Notice how they are connected.
- Create a colored drawing and label the parts.

Concluding Questions:

Answer in your lab journal:

1. How is the crab well suited to its environment?
2. How is an exoskeleton an advantage for this organism?
3. What color is the blood of a crab? Why? (You may need to look this up on-line).
4. How is the crab more advanced than the mussel that you looked at yesterday?

Salmon Dissection

Materials:

- Salmon mussel
- Scalpel
- Probe
- Dissecting mat or paper plate
- Microscope
- Microscope Slides and cover slips
- Medicine Dropper
- Water

Methods:

External Anatomy:

- External features:
  - Overall shape, color, and texture of organism
  - Measure length, width, and beard
  - Create a colored drawing labeling measurements and parts

Internal Anatomy:

- Carefully open up the salmon and examine the internal organs.
  - Examine the color, shape, and texture of the internal organs. Notice how they are connected.
  - Create a colored drawing and label the parts.

Microscopic features:

- Put each tissue sample on a slide. Examine it under the microscope and draw what you see in your lab journal.
  - Scales
  - Muscle Tissue
  - Skin/fins

Concluding Questions:

Answer in your lab journal:

1. How is the crab well suited to its environment?
2. How is an exoskeleton an advantage for this organism?
3. What color is the blood of a crab? Why? (You may need to look this up on-line).
4. How is the crab more advanced than the mussel that you looked at yesterday?

Unit Assessment

Unit Quiz and Test

Name: _____
Date: _____

Multiple Choice: Read the statements carefully and circle the correct answer choosing from the choices provided for each item.

1) _____ is the innovative use of scientific knowledge and processes to solve practical problems and extend human capabilities.

   a) Automation

   b) Technology

   c) Mechanization

2) Which word means "to exert an influence upon" and implies the action of a stimulus that can produce a response or reaction?

   a) affect

   b) effect

Fill in the Blank. Read the paragraph below and fill in the blank spaces, choosing from the words provided below.

3) **affects analyze effects issues merits perspectives recent simulate solution**

When you're examining a scientific question, you want to look at it from multiple _____, many points of view from which to categorize, measure or codify the experience. You will examine various _____ or topics and points in the question that will help you find a _____ or way of solving the problem. In order to _____ or examine your project carefully, you might create a model to _____ one part of your research project. The final _____ or results of your research will depend on the _____ or quality of your work and how much your work is deserving of high marks.

Matching: Match the words in the column on the left with the definitions in the column on the right. Write the letter from the definition in front of the word it matches.

4) _____ discovery

5) _____ invention

6) _____ model

7) _____ value

a. something that was produced for the first time

b. the degree of importance given to something

c. the representation of something

d. something that was found or made knowledge of for the first time

8) When you want to collect information about beetles in Ecuador without having to go there, you might go to science text, use a computer search engine or interview a scientist. All of this would be part of your r_____.

9) Affect means to exert an influence upon; and implies the action of a stimulus that can produce a response or reaction.

a) True

b) False

Illustrations: Use illustrations of key vocabulary words to answer the following questions.

10) Draw an illustration for the term BREAKTHROUGH in the space provided below.

11) Look at the illustrations below and label them correctly with the following terms.
* to test
* to solve
* to respond
* to evaluate

Label_____

Label_____

Label_____

Label_____

Grade 9 E1, Unit 1, Science & Technology Quiz

Name: _____
Date: _____

Multiple Choice: Read the statements carefully and circle the correct answer choosing from the choices provided for each item.

1) _____ is the innovative use of scientific knowledge and processes to solve practical problems and extend human capabilities.

a) Automation

b) Technology

c) Mechanization

2) Which word means "to exert an influence upon" and implies the action of a stimulus that can produce a response or reaction?

a) affect

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Fill in the Blank. Read the paragraph below and fill in the blank spaces, choosing from the words provided below.

3) **affects analyze effects issues merits perspectives recent simulate solution**

When you're examining a scientific question, you want to look at it from multiple **perspectives**, many points of view from which to categorize, measure or codify the experience. You will examine various **issues** or topics and points in the question that will help you find a **solution** or way of solving the problem. In order to **analyze** or examine your project carefully, you might create a model to **simulate** one part of your research project. The final **effects** or results of your research will depend on the **merits** or quality of your work and how much your work is deserving of high marks.

Matching: Match the words in the column on the left with the definitions in the column on the right. Write the letter from the definition in front of the word it matches.

4) **d** discovery

5) **a** invention

6) **c** model

7) **b** value

a. something that was produced for the first time

b. the degree of importance given to something

c. the representation of something

d. something that was found or made knowledge of for the first time

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a) True

b) False

Illustrations: Use illustrations of key vocabulary words to answer the following questions.

10) Draw an illustration for the term BREAKTHROUGH in the space provided below.

Student Insert illustration for Breakthrough

11) Look at the illustrations below and label them correctly with the following terms.
* to test
* to solve
* to respond
* to evaluate

Label_____

Label_____

Label_____

Label_____

Label to respond Label to evaluate Label to solve Label to test

Grade 9 D1, Unit 1-2, Earth Science; E1, Science & Technology Test

Name: _____
Date: _____

Matching: and Completion:

There are two parts to each question below.

• Complete the spelling of the words below in the left hand column .
• Match the completed word with the correct definition in the right column by placing the corresponding letter of the definition in front of completed word that it matches.

1) _____ C _ _ P _ _ i T I _ N
2) _____ I_ T_ R _ C _ _ O _ S
3) _____ D _ N _ _ I _
4) _____ P_ R S _ E _ _ I V _ _
5) _____ T _ C _ N _ _ O_ G _
6) _____ I N _ O V A T _ O N _

a. acting upon one another
b. continuously changing
c. the introduction of something new
d. choice of a single point of view from which to sense, categorize, measure experience
e. make up, constitution
f. the generation of knowledge and processes to develop a system that solves problems and extends human capabilities

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

plate tectonics, deposition, geochemical, rock, model, water, life

7) A representation of something, not the real thing, is a _____.

8) Nitrogen cycles, carbon cycles, water cycles, and phosphorous cycles are all known as _____ cycles.

9) The _____ cycle is an ongoing process of the movement of water between the atmosphere and lithosphere.

10) The theory of _____ is an explanation of how the crust of the Earth is made up of giant plates that are still in motion. It provides evidence that the continents have moved and are still moving.

11) With _____ wind, water and even gravity move materials from one area and deposit them in another.

12) When there is a group of changes between types of rocks, this is known as the _____ cycle.

Matching : Match the verb on the left with its meaning on the right. Put the letter of the correct meaning in front of the verb it matches.

13) _____ to shape

14) _____ to demonstrate

15) _____ to expand

16) _____ to tilt

17) _____ to revolve

18) _____ to orbit

19) _____ to control

20) _____ to solve

a. to exercise restraint

b. to display a method

c. to get bigger

d. to find an answer or solution to a problem or question

e. to move in a circular or curving course or orbit

f. to change or morph

g. to slope or incline

h. the path traveled by a body that is attracted to another body in space

True/False: Read each statement below carefully and decide if it is true or false. Circle the correct answer.

21) A scientific phenomena refers to observable facts that are may be rare and significant.

a) True

b) False

22) Another word for continuous is on-going.

a) True

b) False

23) The solar system includes the planets, moons, and Milky Way.

a) True

b) False

24) The point at which something comes into existence is said to be its composition.

a) True

b) False

Multiple Choice: Read the statements below and choose the correct answer from the choices provided. Circle the correct answer.

25) A massive, luminous ball of plasma is a...

a) moon

b) star

c) meteor

d) planet

26) An aurora borealis is an example of a/an....

a) atmospheric explosion

b) meteor shower

c) heavenly explosion

d) solar display

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

a) A spring tide occurs when the moon is new or full and tides are at their maximum range.

b) A neap tide occurs when the difference between high and low tide is the greatest.

28) Which of the following statements is most likely to be correct?

a) A breakthrough occurs when someone trespasses.

b) An innovation occurs when something new is introduced.

Illustrations: The following items use illustrations for answering questions about key vocabulary words.

29) Write a definition OR illustrate the term the BIG BANG.

In the left column are verb definition. In the right column are illustrations of the verbs. Match the definition with the illustration by placing the correct letter in front of the definition.

30) _____ to answer or reply

31) _____ to collect information about a subject

32) _____ to create a likeness or model

33) _____ to assess or to try

34) _____ to find an answer or solution

35) _____ to examine critically

a. 

b. 

c. 

d. 

e. 

f. 

Grade 9 D1, Unit 1-2, Earth Science; E1, Science & Technology Test

Name: _____

Date: _____

Matching: and Completion:

There are two parts to each question below.

2022Complete the spelling of the words below in the left hand column .

2022Match the completed word with the correct definition in the right column by placing the corresponding letter of the definition in front of completed word that it matches.

1) **e** C OMPOSITION
2) **a** INTER AC TI O N S
3) **b** DYNAM I C
4) **d** PE R S P E C T I V E S
5) **f** T E C H N O L O G Y
6) **c** I N N O V A T I O N S

a. acting upon one another
b. continuously changing
c. the introduction of something new
d. choice of a single point of view from which to sense, categorize, measure experience
e. make up, constitution
f. the generation of knowledge and processes to develop a system that solves problems and extends human capabilities

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

plate tectonics, deposition, geochemical, rock, model, water, life

7) A representation of something, not the real thing, is a **model** .

8) Nitrogen cycles, carbon cycles, water cycles, and phosphorous cycles are all known as **geochemical** cycles.

9) The **water** cycle is an ongoing process of the movement of water between the atmosphere and lithosphere.

10) The theory of **plate tectonics** is an explanation of how the crust of the Earth is made up of giant plates that are still in motion. It provides evidence that the continents have moved and are still moving.

11) With **deposition** wind, water and even gravity move materials from one area and deposit them in another.

12) When there is a group of changes between types of rocks, this is known as the **rock** cycle.

Matching : Match the verb on the left with its meaning on the right. Put the letter of the correct meaning in front of the verb it matches.

13) **f** to shape
14) **b** to demonstrate
15) **c** to expand
16) **g** to tilt
17) **e** to revolve
18) **h** to orbit
19) **a** to control
20) **d** to solve

a. to exercise restraint
b. to display a method
c. to get bigger
d. to find an answer or solution to a problem or question
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Illustrations: The following items use illustrations for answering questions about key vocabulary words.

29) Write a definition OR illustrate the term the BIG BANG.

illustration OR cosmic event that marks the beginning of time and the expansion of the universe

In the left column are verb definition. In the right column are illustrations of the verbs. Match the definition with the illustration by placing the correct letter in front of the definition.

30) **d** to answer or reply

31) **b** to collect information about a subject

32) **c** to create a likeness or model

33) **a** to assess or to try

34) **e** to find an answer or solution

35) **f** to examine critically

a.

b.

c.

d.

e.

f.