Deserts and the Tundra

Teacher's Guide
Middle School

Editors:
Brian A. Jerome, Ph.D.
Stephanie Zak Jerome

Assistant Editors:
Heidi Berry
Anneliese Brown

Visual Learning Company
Brandon, Vermont
1-800-453-8481
www.visuallearningco.com

Use and Copyright:

The purchase of this video program entitles the user the right to reproduce or duplicate, in whole or in part, this teacher's guide and the blackline master handouts for the purpose of teaching in conjunction with this video, *Deserts and the Tundra.* The right is restricted only for use with this video program. Any reproduction or duplication, in whole or in part, of this guide and student masters for any purpose other than for use with this video program is prohibited.

92201

Table of Contents

Viewing Clearances

The video and accompanying teacher's guide are for instructional use only. In showing these programs, no admission charges are to be incurred. The programs are to be utilized in face-to-face classroom instructional settings, library settings, or similar instructional settings.

Duplication rights are available, but must be negotiated with the *Visual Learning Company.*

Television, cable or satellite rights are also available, but must be negotiated with the *Visual Learning Company.*

Closed circuit rights are available, and are defined as the use of the program beyond a single classroom but within a single campus. Institutions wishing to utilize the program in multiple campuses must purchase the multiple campus version of the program, available at a slightly higher fee.

Discounts may be granted to institutions interested in purchasing programs in large quantities. These discounts may be negotiated with the *Visual Learning Company.*

A Message from our Company ...

Dear Educator:

Thank you for your interest in the educational videos produced by the *Visual Learning Company.* We are a Vermont-based, family owned and operated business specializing in the production of quality educational science videos and materials.

We have a long family tradition of education. Our grandmothers graduated from normal school in the 1920's to become teachers. Brian's mother was an elementary teacher and guidance counselor, and his father was a high school teacher and superintendent. This family tradition inspired Brian to become a science teacher, and to earn a Ph.D. in education, and lead Stephanie to work on science educational programs at NASA.

In developing this video, accompanying teacher's guide, and student activities, our goal is to provide educators with the highest quality materials, thus enabling students to be successful. In this era of more demanding standards and assessment requirements, supplementary materials need to be curricular and standards based - this is what we do!

Our videos and accompanying materials focus on the key concepts and vocabulary required by national and state standards and goals. It is our mission to help students meet these goals and standards, while experiencing the joy and thrill of science.

Sincerely,

Brian and Stephanie Jerome

Standards Correlations

National Science Education Standards

(Content Standards: 5-8, National Academy of Sciences, c. 1996)

Science as Inquiry - Content Standard A:

As a result of activities in grades 5-8, all students should develop:

- Abilities necessary to do scientific inquiry.
- Understandings about scientific inquiry.

Life Science- Content Standard C:

As a result of their activities in grades 5-8, all students should develop an understanding that:

- The number of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.
- Species acquire many of their unique characteristics through biological adaptation, which involves the selection of naturally occurring variations in populations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.

Benchmarks for Science Literacy

(Project 2061 - AAAS, c. 1993)

The Living Environment - Interdependence of Life (5D)

By the end of the 8th grade, students should know that:

- In all environments - freshwater, marine, forest, desert, grassland, mountain, and others - organisms with similar needs may compete with one another for resources, including food, space, water, air, and shelter. In any particular environment, the growth and survival of organisms depends on their physical conditions.

Student Learning Objectives

Upon viewing the video and completing the enclosed student activities, students should be able to do the following:

- Identify the major characteristics of deserts;
- Name and locate some of the major deserts throughout the world, such as the Sahara, Mojave, and Sonoran Deserts;
- Describe the different soil types found in deserts;
- Explain how the structure of cactuses enables them to flourish in the heat;
- List some examples of desert animals and describe the ways in which they have adapted to desert life;
- Understand why the tundra is referred to as the cold desert;
- Describe the phenomenon of permafrost;
- Explain where alpine tundra is located and how it is similar to arctic tundra;
- Describe some of the characteristics of tundra plants; and
- List examples of tundra animals and explain how they are able to survive the tundra's harsh environment.

Assessment

Preliminary Test:

The Preliminary Test, provided in the Student Masters section, is an assessment tool designed to gain an understanding of student preexisting knowledge. It can also be used as a benchmark upon which to assess student progress based on the objectives stated on the previous pages.

Video Review:

The Video Review, provided in the Student Masters section, can be used as an assessment tool or as a student activity. There are two main parts. The first part contains questions titled "You Decide" that can be answered during the video. The second series of ten questions consists of a video quiz to be answered at the conclusion of the video.

Post-Test:

The Post-Test, provided in the Student Masters section, can be utilized as an assessment tool following student completion of the video and student activities. The results of the Post-Test can be compared against the results of the Preliminary Test to assess student progress.

Introducing the Video

Before showing the video, ask the class to list some of the ways in which they use water. Write this list on the board. Next, ask the class to imagine what it would be like to live in a world with very little water. Have them discuss ways in which they would need to alter their lives in order to survive on a limited water supply. How would they obtain and store water, and what things would they have to live without? Explain that many plants and animals make similar changes, called adaptations, to survive in the dry climates of the desert and tundra biomes. Tell the students to watch the video closely to learn more about these biomes and the plants and animals that live within them.

Video Viewing Suggestions

The Student Master "Video Review" is provided for distribution to students. You may choose to have your students complete this Master while viewing the program or to do so upon its conclusion.

The program is approximately 20-minutes in length and includes a ten-question video quiz. Answers are not provided to the Video Quiz on the video, but are included in this teacher's guide. You may choose to grade student quizzes as an assessment tool or to review the answers in class.

The video is content-rich with numerous vocabulary words. For this reason you may want to periodically stop the video to review and discuss new terminology and concepts.

Student Assessments And Activities

Assessment Masters:

- Preliminary Test
- Video Review
- Post-Test

Student Activity Masters:

- Deserts of the World
- Animal Adaptations
- Vocabulary of *Deserts and the Tundra*

Video Script: *Deserts and the Tundra*

1. This place is called Death Valley. It's named for the obstacles it posed to those traveling by foot, and by horse and wagon enroute to…
2. …California, in search of gold and riches over 150 years ago.
3. What makes this place so inhospitable?
4. Is it the irrepressible heat and blazing sun,…
5. …the lack of readily available water,…
6. …the blasting winds that commonly tear across the valley floor?
7. Or is it the lack of vegetation that makes this place so harsh?
8. Despite all these factors, this place is surprisingly full of life – both plant…
9. . . . and animal life.
10. During the next few minutes, we're going to explore deserts, like the one here in Death Valley,…
11 ….as well as another type of biome – the tundra.
12. **Graphic Transition – Geography of Deserts**
13. Deserts are found throughout the world in very arid regions.
14. Most desert regions are located between 20 and 30 degrees north latitude and between 20 and 30 degrees south latitude.
15. The world's largest desert, the Sahara, is nearly the size of the United States.
16. While less than 5% of North America is desert, about 14% of the world's landmass is desert.
17. There are several major deserts in North America, including the Chihuahuan Desert in northern Mexico and Texas…
18. . . . the Mojave desert in California and Nevada . . .
19. . . . and the Sonoran Desert that spans across Arizona and into Mexico.
20. During the next few minutes we are going to explore the characteristics of a few of these deserts…
21. …and take a closer look at desert climate and the plants and animals of these desert biomes.
22. **Graphic Transition – Desert Climate**
23. As you may recall, climate is the overall weather of an area.
24. Climate is critical in determining the nature of deserts.
25. **You Decide!** How much water do deserts receive in a year?
26. Generally speaking, deserts receive less than 25 centimeters of water per year.
27. Many deserts receive much less than this.

Script (cont.)

28. In this part of the Sonoran desert, rain usually falls in the summer and winter months.
29. But surprisingly, at times rainfall can be so heavy that water rushes through gullies, such as this one, . . .
30. …and can create dangerous flash floods.
31. Temperature also plays a big role in determining the nature of deserts.
32. For example, the temperatures in Death Valley can be the most severe in North America, exceeding 130 degrees Fahrenheit, or 54 degrees Celsius.
33. However, in winter months at higher elevations, temperatures fall below the freezing point.
34. Deserts also tend to have large fluctuations in temperature between day and night,…
35. …with the difference between high and low temperatures exceeding 77 degrees Fahrenheit, or 25 degrees Celsius.
36. **Graphic Transition – Desert Soils**
37. Although you may commonly think of deserts as being sandy, . . .
38. …most are not. In fact, the soil in some deserts, …
39. …when given sufficient water, can grow fruits and vegetables, . . .
40. …as well as a wide variety of colorful flowers.
41. In some cases, a tough layer of pebbles and hardened soil forms desert pavement, making the growth of new seeds difficult.
42. In many locations, such as in Death Valley, salts and other compounds make soil inhospitable to all but a few plants.
43. In other desert areas, a thin mixture of algae and lichens called cryptogam holds the soil in place.
44. **Graphic Transition – Desert Plants**
45. **You Decide!**
46. What makes this cactus different from this tree?
47. If you said that the cactus does not have leaves, then you are right.
48. While not all desert plants lack leaves, many do.
49. This lack of leaves is one adaptation common to many desert plants. An adaptation is a trait that increases an organism's chance of survival.
50. The lack of leaves helps prevent water loss in this arid environment.
51. Cactuses also have spines, which protect their moisture-rich tissue from being eaten by most animals.
52. Because this saguaro cactus does not have leaves, it carries out photosynthesis through its trunk and arms.

Script (cont.)

53. Although this palo verde tree grows leaves during moist times of the year, it drops its leaves in dry weather and carries out photosynthesis through its green bark.
54. Water is the main factor that limits plant growth in the desert.
55. The ability to store water and to use it when needed, is another adaptation common to many desert plants.
56. For example, saguaro cactuses can store as much as 200 gallons, or over 750 liters, of water in their trunk and arms, which expand and shrink according to the cactus's current water needs.
57. Desert plants also have many different adaptations that enable them to reproduce in this arid environment.
58. For example, flowers such as these Mexican poppies, bloom very quickly in response to the availability of moisture.
59. And this fruitchain cholla cactus reproduces by breaking off pieces of branches that take root to develop into a new plant.
60. Many desert plants produce large numbers of seeds with the possibility of a single one germinating and developing into an adult.
61. A saguaro cactus, for instance, may produce tens of thousands of small seeds each year!
62. **Graphic Transition- Desert Birds and Mammals**
63. The hummingbird is one of the Sonoran desert's most beautiful and smallest birds.
64. With a heart rate of 1200 beats per minute, this bird plays an important role in pollinating plants.
65. Another bird that lives in the Sonoran desert is the Harrison Hawk.
66. As the Harrison Hawk soars above the desert, it uses its keen eyesight and well-developed sense of smell to locate food.
67. Roadrunners, like this one,…
68. …have the ability to run at speeds of up to 15 miles per hour, or 24 kilometers per hour.
69. In addition to a wide variety of birds, many kinds of mammals live in the desert, such as the coyote.
70. Coyotes are highly adaptable animals. They have the ability to eat almost anything, from dead animals to saguaro cactuses.
71. The elusive mountain lion is the largest predator in North American deserts.
72. The bobcat, seen here . . .
73. . . . feeds on smaller animals that live in the desert, such as snakes and rodents.
74. **You Decide!**

Script (cont.)

75. What desert animal has the ability to eat prickly cactuses?
76. Javelinas live off of the vegetation in the desert,…
77. …and even have the ability to eat prickly cactuses.
78. **Graphic Transition – Desert Reptiles and Invertebrates**
79. There are also many smaller animals that live in the desert.
80. This lizard, called a fringe-toed lizard, is ideally suited to living in desert sand dunes.
81. These lizards often dive into the sand to escape predators.
82. The Sonoran desert also has the world's most diverse population of rattlesnakes.
83. Some species of large rattlesnakes can reach lengths of nearly 6 feet or 2 meters.
84. Rattlesnakes feed primarily on rodents. The snakes use poisonous venom to subdue their prey.
85. The Sonoran desert is also inhabited by many smaller, yet very important invertebrate animals, including….
86. …several different species of ants, such as the very interesting leaf cutter ants.
87. **You Decide!**
88. What are these ants doing with this leaf?
89. Colonies of leaf cutter ants gather leaves, which they drag into underground burrows where fungus grows on the leaves, serving as food for the colony.
90. Therefore it can be said that leaf cutter ants are fungus farmers.
91. Bees are among the many different kinds of insects in the desert. There are dozens of different kinds of bees,…
92. …which play an important role in pollinating plants.
93. **Graphic Transition – The Tundra**
94. Far north of the desert biome lies the arctic tundra biome.
95. Even though the desert and the tundra are very far from each other, they are similar in that they both receive little precipitation.
96. As with deserts, the arctic tundra receives less than 25 centimeters of precipitation per year. For this reason, the tundra is often referred to as a cold desert.
97. Generally speaking, the tundra has a cold, dry climate.
98. Much of the moisture remains frozen within the soil throughout the year.
99. Even in the summer, only a thin layer of the upper soil thaws while the lower layer remains permanently frozen. This phenomenon is referred to as permafrost.

Script (cont.)

100. Because water cannot readily drain through the frozen soil, it remains on the surface, forming ponds and wet bogs.
101. Great seasonal variations in sunlight occur in the tundra. Days are very short in the winter months,...
102. ...but in summer months, days are very long, with light existing well past midnight.
103. Similar to the arctic tundra is the alpine tundra, the region found on mountain tops above tree line.
104. Alpine vegetation is often found on mountains which are located at latitudes well below the arctic tundra biome.
105. Yet they still possess many of the plants and animals found in the arctic tundra.
106. **Graphic transition – Tundra Plants**
107. Cold temperatures, low levels of precipitation, strong winds and few nutrients make life difficult for tundra plants.
108. A short growing season of less than 60 days limits the type and size of plants that live in the tundra.
109. Generally speaking, plants of the arctic and alpine tundra are low lying plants.
110. Although trees do grow, they are often short and twisted, as are these conifers.
111. Lichens commonly grow on rocks.
112. Lichens actually consist of a mixture of algae and fungus,...
113. ...and serve as an important food source for caribou.
114. Mosses are another common low-lying plant of the tundra.
115. Grasses and sedges survive where soil is abundant enough for seeds to take root.
116. In the tundra, when the weather warms, different kinds of wildflowers quickly blossom…
117. …and rapidly produce seeds during the short growing season.
118. **Graphic Transition - Tundra Animals**
118. If you were to visit the arctic tundra in the summer, chances are you would be swarmed by insects, including biting mosquitos and black flies.
119. The large amount of insect life attracts many different species of breeding birds, such as the red knot.
120. Red knots fly over 3,000 miles, or 5,000 kilometers, from southern South America to the Arctic tundra every spring.
121. And snow geese come by the tens of thousands to breed in the spring.
122. The ptarmigan is one of the few year-round residents.
123. Other larger mammals, such as the caribou, tend to migrate in and out of the tundra, spending summers on the tundra…

Script (cont).

124. … and migrating to the more sheltered coniferous forests in winter.
125. The wolf migrates with the caribou, preying on them for food.
126. **Graphic Transition – Summing Up**
127. During the past few minutes we have explored many of the different characteristics of deserts.
128. We have studied where deserts are located throughout the world,…
129. …including the locations of some of the deserts in North America.
130. We took a look at the climate of deserts,…
131. …as well as some of the plants…
132. …and animals that inhabit deserts.
133. We also took a quick look at the tundra biome.
134. We explored why the tundra is often called a cold desert,…
135. …and we talked about some of the plants…
136. …and animals that survive in the tundra biome.
137. So the next time you see a photo of the desert…
138. …or the tundra, think about some of the things you learned during the past few minutes.
139. You just might look at these biomes a little differently.
140. **Video Quiz**
141. Fill in the correct word when you hear this tone. Good luck and let's get started.

1. Deserts generally receive less than ____ centimeters of precipitation.
2. Most deserts are found between 20 and ____ degrees latitude.
3. An _____ is a trait that increases an organism's chance of survival.
4. Cactuses conduct photosynthesis in their _____.
5. The _____ of reptiles help prevent water loss.
6. Only about _____ percent of the world's landmass is desert.
7. _____ is the limiting factor affecting plant growth in the desert.
8. The tundra is sometimes called a _____ desert.
9. Many animals _____ to and from the tundra.
10. Tundra plants grow _____ to the ground.

Answers to Student Assessments

Preliminary Test

1. water
2. Sahara
3. 25
4. spines
5. permafrost
6. cactuses
7. Sonoran
8. south
9. low
10. lichens
11. true
12. false
13. false
14. true
15. true
16. false
17. false
18. true
19. false
20. false

Video Review

You Decide:

A. Deserts receive less than 25 centimeters of water per year.
B. The cactus has spines instead of leaves.
C. Javelinas have the ability to eat prickly cactuses.
D. The ants are dragging the leaf into underground burrows in order to grow fungus, which feeds the colony of ants.

Video Quiz:

1. 25
2. 30
3. adaptation
4. trunks
5. scales
6. 14%
7. water
8. cold
9. migrate
10. low

Post Test

1. false
2. false
3. true
4. false
5. false
6. false
7. true
8. true
9. false
10. true
11. spines
12. cactuses
13. lichens
14. Sonoran
15. low
16. south
17. water
18. permafrost
19. Sahara
20. 25

Answers to Student Activities

Deserts of the World

Check individual student maps.

Animal Adaptations

Part I:

1. D
2. F
3. C
4. F
5. F
6. An adaptation is a trait that increases an organism's chance of survival.
7. Desert animals tend to have light skin or fur, which does not absorb as much heat as do dark colors.
8. Camels' fatty humps serve as an energy source when food is scarce.
9. Tundra winters are cold and windy. The days are very short.
10. The musk oxen move south to areas with low snow coverage for the winter. This enables them to eat sedges and shrubs.

Part II:

Paragraphs will vary.

Vocabulary

1. lichen, g
2. coyote, i
3. arctic tundra, e
4. Sahara desert, a
5. alpine tundra, j
6. Sonoran desert, d
7. desert pavement, b
8. roadrunner, h
9. permafrost, f
10. adaptation, c

Assessment and Student Activity Masters

Name_____

Preliminary Test

Directions: Fill in the blank with the correct word. A list of possible answers is provided at the bottom of the page.

1. The lack of readily available _____ makes deserts difficult places for human survival.

2. The _____ is the largest desert in the world.

3. Deserts generally receive less than ____ centimeters of rain per year.

4. Cactuses have _____ instead of leaves, which prevent water loss.

5. _____ refers to the phenomenon in which only the thin layer of upper soil thaws, while the layers beneath remain permanently frozen.

6. Javelinas have the ability to eat _____.

7. The _____ desert has the world's largest variety of rattlesnakes.

8. Many tundra animals migrate _____ for the winter.

9. Tundra plants tend to grow _____ to the ground.

10. An important source of food for caribou, _____ consist of a mixture of algae and fungus.

cactuses	water
lichens	25
spines	Sonoran
50	north
permafrost	Sahara
south	low

Name_____

Preliminary Test

Directions: Decide whether the answer is True (T) or False (F).

11. Some fruits and vegetables can grow in the desert. T F

12. The tundra is too cold for vegetation to grow. T F

13. One characteristic of desert plants is that they all lack leaves. T F

14. Desert biomes have low levels of yearly precipitation. T F

15. At certain times during the year, beautiful flowers bloom in the desert. T F

16. Desert biomes refer to all areas of constant, sweltering heat. T F

17. Sunlight is the main factor that limits plant growth in the desert. T F

18. Few animals live in the tundra year round. T F

19. Most desert regions are located between 40 and 50 degrees north latitude and between 40 and 50 degrees south latitude. T F

20. A tundra is a warm desert in northern areas. T F

Name_____

Video Review

Directions: During the course of the program, answer the "You Decide" questions as they are presented in the video. Answer the Video Quiz questions at the end of the video.

You Decide:

A. How much water do deserts receive in a year? Answer _____

B. What makes this cactus different from this tree? Answer _____

C. What desert animal has the ability to eat prickly cactuses? Answer _____

D. What are these ants doing with this leaf? Answer _____

Video Quiz:

1. Deserts generally receive less than _____ centimeters of precipitation.
2. Most deserts are found between 20 and _____ degrees latitude.
3. An _____ is a trait that increases an organism's chance of survival.
4. Cactuses conduct photosynthesis in their _____.
5. The _____ of reptiles help prevent water loss.
6. Only about _____ percent of the world's landmass is desert.
7. _____ is the limiting factor affecting plant growth in the desert.
8. The tundra is sometimes called a _____ desert.
9. Many animals _____ to and from the tundra.
10. Tundra plants grow _____ to the ground.

Name_____

Post Test

Directions: Decide whether the answer is True (T) or False (F).

1. One characteristic of desert plants is that they all lack leaves. T F
2. Sunlight is the major factor that limits plant growth in the desert. T F
3. Some fruits and vegetables can grow in the desert. T F
4. Most desert regions are located between 40 and 50 degrees north latitude and between 40 and 50 degrees south latitude. T F
5. The tundra is too cold for vegetation to grow. T F
6. A tundra is a warm desert in northern areas. T F
7. Few animals live in the tundra year round. T F
8. Desert biomes have low levels of yearly precipitation. T F
9. Desert biomes refer to all areas of constant, sweltering heat. T F
10. At certain times during the year, beautiful flowers bloom in the desert T F

Name_____

Post Test

Directions: Fill in the blank with the correct word. Choose from the list of possible answers at the bottom of the page.

11. Cactuses have _____ instead of leaves, which prevent water loss.

12. Javelinas have the ability to eat _____.

13. An important source of food for caribou, _____ consist of a mixture of algae and fungus.

14. The _____ desert has the world's largest variety of rattlesnakes

15. Tundra plants tend to grow _____ to the ground.

16. Many tundra animals migrate_____ for the winter.

17. The lack of readily available _____ makes deserts difficult places for human survival.

18. _____ refers to the phenomenon in which only the thin upper layer of soil thaws, while the layers beneath remain permanently frozen.

19. The _____ is the largest desert in the world.

20. Deserts generally receive less than ____ centimeters of rain per year.

cactuses	water
lichens	25
spines	Sonoran
50	north
permafrost	Sahara
south	low

Name_____

Deserts of the World

Objective: In this lab students will learn about the location of deserts around the world.

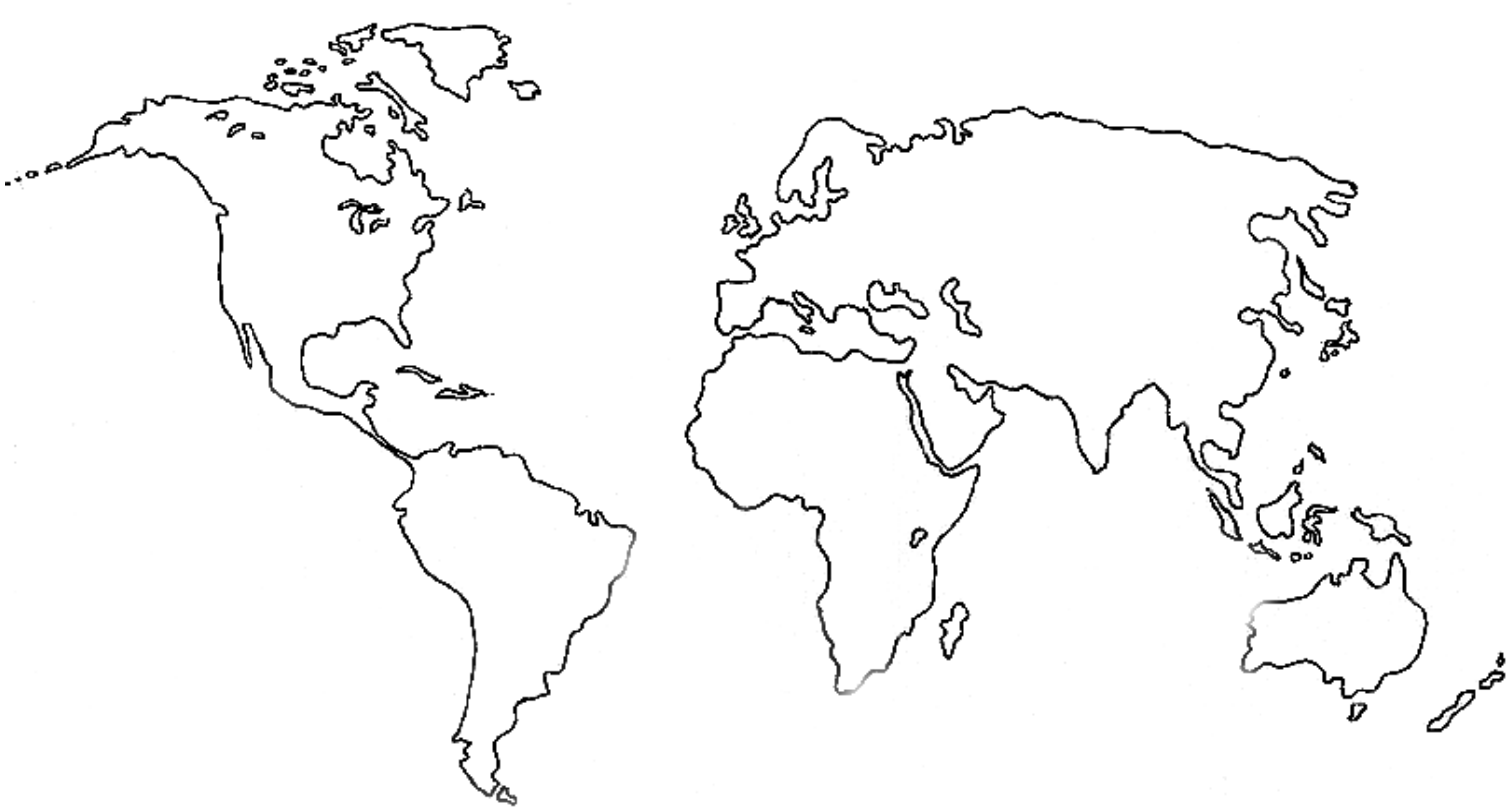
Background: Areas that receive less than 25 centimeters of rain per year are classified as deserts. These arid biomes are located throughout the world. In fact, approximately 14% of the world's landmass is covered by desert. Deserts are found on every continent, except Europe. Large deserts are located in North America, South America, Asia, Australia, and Africa. The Sahara Desert, the world's largest desert, covers nearly half of the continent, spanning across many different countries. This differs greatly from North America, where less than 5% of the continent is covered by desert.

Directions: Below is a chart that contains some of the major deserts of the world. Also included are the sizes of the deserts and their general locations. On the following page you will find a map of the world and a desert key. Color in the box next to the name of each desert in the key and then shade in the corresponding location on the map. You may need to use the Internet or a text book to determine the location of some of the deserts.

Desert	Size		Continent
	miles^2	kilometers^2	
Sahara	3,500,000	9,065,000	Africa
Sonoran	120,000	312,000	North America
Kalahari	225,000	582,000	Africa
Mojave	25,000	65,000	North America
Great Victoria	150,000	338,5000	Australia
Gobi	500,000	1,295,000	Asia
Chihuahuan	175,000	455,000	North America

Name_____

Deserts of the World (cont).



- ☐ Sahara Desert
- ☐ Sonoran
- ☐ Mojave Desert
- ☐ Gobi Desert
- ☐ Kalahari Desert
- ☐ Chihuahuan Desert
- ☐ Great Victoria

Name_____

Animal Adaptations

Objective: In this activity students will learn about the ways animals adapt to specific climates. Students will use this knowledge to create their own well-adapted animals.

Background: The climates of both the desert and the tundra are extremely harsh. A desert is an area that receives less than 25 centimeters of precipitation per year and is described as arid. The days are often very hot, and evenings can be cold. Often referred to as a "cold desert," the tundra also receives less than 25 cm of precipitation per year. This biome has a cold, dry climate. Because it is located relatively close to the North pole, the arctic tundra receives very little sunlight in the winter and has long days in the summer.

The severe conditions make it difficult for living things – plants, animals, and humans alike – to survive in these areas. However, along with plants and humans, many animals do inhabit these biomes. These animals have adaptations that allow them to survive in the harsh climates. An adaptation is a trait that increases an organism's chance of survival. For example, many desert animals can efficiently obtain and conserve water, which is essential in the dry desert climate. They also have light-colored skin and fur, enabling them to stay cooler than dark-colored animals. Many desert animals have nocturnal life styles, meaning that they sleep during the day and scavenge for food at night when the temperatures are much cooler.

One animal that has become well adapted to the dry desert climate is the camel. Because of their unique physiological makeup, camels can survive for up to ten days without water during the hottest time of the year. While other animals would die of dehydration under these conditions, the metabolism of camels allows them to store water in their bloodstream. Even when water is available, camels often will not drink it unless their bodies are in need. When their bodies do become dehydrated, camels can consume 21-30 gallons of water in just 10 minutes! Camels can also tolerate high temperatures by reducing water loss through perspiration. Because the body temperature of camels is often lower than the air temperature, groups of camels will keep cool by lying so that their bodies are pressing against one another, transferring the cool temperature throughout the group. While many animals would be greatly affected by the desert's limited vegetation, camels are able to obtain energy from the fat stored in their humps. If food is scarce and a camel needs to use energy from the fatty tissue in its hump, the hump will shrink and become flabby. If a camel relies on this fat for a long period of time, the lump will fall over to one side. Fortunately, with food and rest, the hump easily returns to its normal appearance.

Another well-adapted animal is the musk ox, one of the few mammals that live in the tundra year-round. Tundra winters lasts nine months and temperatures often drop to –30 degrees Fahrenheit (-34 degrees Celsius). The constant blowing wind makes the air feel even colder. Musk oxen can withstand this extreme cold because their insulating long, wool-like hair and short bodies enable them to conserve heat. They also conserve energy by remaining relatively inactive during the winter. They spend summer feeding on plants on the banks of rivers. When harsh winter conditions make it difficult to find food, they move to areas with less snow and feed on sedges and shrubs.

Name_____

Animal Adaptations (cont).

Part I: Reading Comprehension

Directions: Answer the following questions based on the information provided on the preceding page.

Multiple choice

1. One common characteristic of both the desert and tundra is:
   - A. extreme heat
   - B. long summer days and short winter days
   - C. extreme temperature fluctuations
   - D. very little precipitation

2. Which of the following are common adaptations of desert animals?
   - A. conserving energy by sleeping long hours at night
   - B. light colored skin and fur
   - C. nocturnal life-styles
   - D. all of the above
   - E. A, C
   - F. B, C

3. How long can camels survive without water?
   - A. 2 days
   - B. 1 week
   - C. 10 days
   - D. two months

4. Why are camels able to survive with very little water?
   - A. They drink water whenever it is available.
   - B. They can consume 21-30 gallons of water in 10 minutes.
   - C. Their metabolism allows them to store water in their blood.
   - D. They sweat frequently.
   - E. All of the above
   - F. B & C
   - G. A, C, D

5. Why are musk oxen able to withstand the extreme cold of the tundra?
   - A. long, wool-like hair
   - B. tall bodies
   - C. little movement during winter months
   - D. traveling further north during the winter to areas of less snow
   - E. all of the above
   - F. A & C
   - G. A, C, D

Name_____

Animal Adaptations (cont).

Short Answer

6. What is an adaptation?

7. How does the color of an animal's skin enable it to survive in a desert climate?

8. What is the function of a camel's hump?

9. Describe winters in the tundra.

10. Describe the migration pattern of musk oxen and explain its purpose.

Part II: Creating Adaptive Animals

Directions:

Using what you have learned about animal adaptations, you are going to create two animals – one that lives in the desert and one that inhabits the tundra. When doing so, keep in mind the climate of each biome and create an animal that will be well-adapted to survive the harsh conditions in which it lives. Build a model of each animal, using the art supplies provided by your teacher (examples: styrofoam, thick wool, colored paper, cellophane, pipe cleaners). Next, write a paragraph about the life of your animals, including how they obtain their food and water, how they adapt to the extreme temperatures of the area, how they prevent water loss, etc. Also describe their movement patterns (for example, does their movement depend on the season, like the musk ox, or the time of day, like many desert animals?). Remember to name each animal.

Name_____

Vocabulary of *Deserts and the Tundra*

_____ 1. heinlc

_____ 2. ycoeto

_____ 3. carict dturna

_____ 4. hasaar derset

_____ 5. elpani rtaudn

_____ 6. nnosaro serdte

_____ 7. tsdree vmpaneet

_____ 8. nauordrern

_____ 9. fasrpetorm

_____ 10. tpadaontai

a. African desert that is about the size of the United States

b. tough layer of pebbles and hardened soil found in some deserts

c. a trait that increases an animal's chance of survival

d. North American desert that spans from Arizona to Mexico

e. biome located at 60 degrees North latitude; dominated by cold temperatures and low-lying vegetation

f. partially thawed soil in which only the top layer thaws, while the bottom layers remain frozen

g. an organism that consists of a mixture of algae and fungus

h. desert bird that can run at speeds up to 15 m.p.h., or 24 k.p.h.

i. desert mammal with the unique ability to eat both dead animals and cactuses

j. region found on mountain tops above the treeline; contains vegetation similar to that of arctic tundra