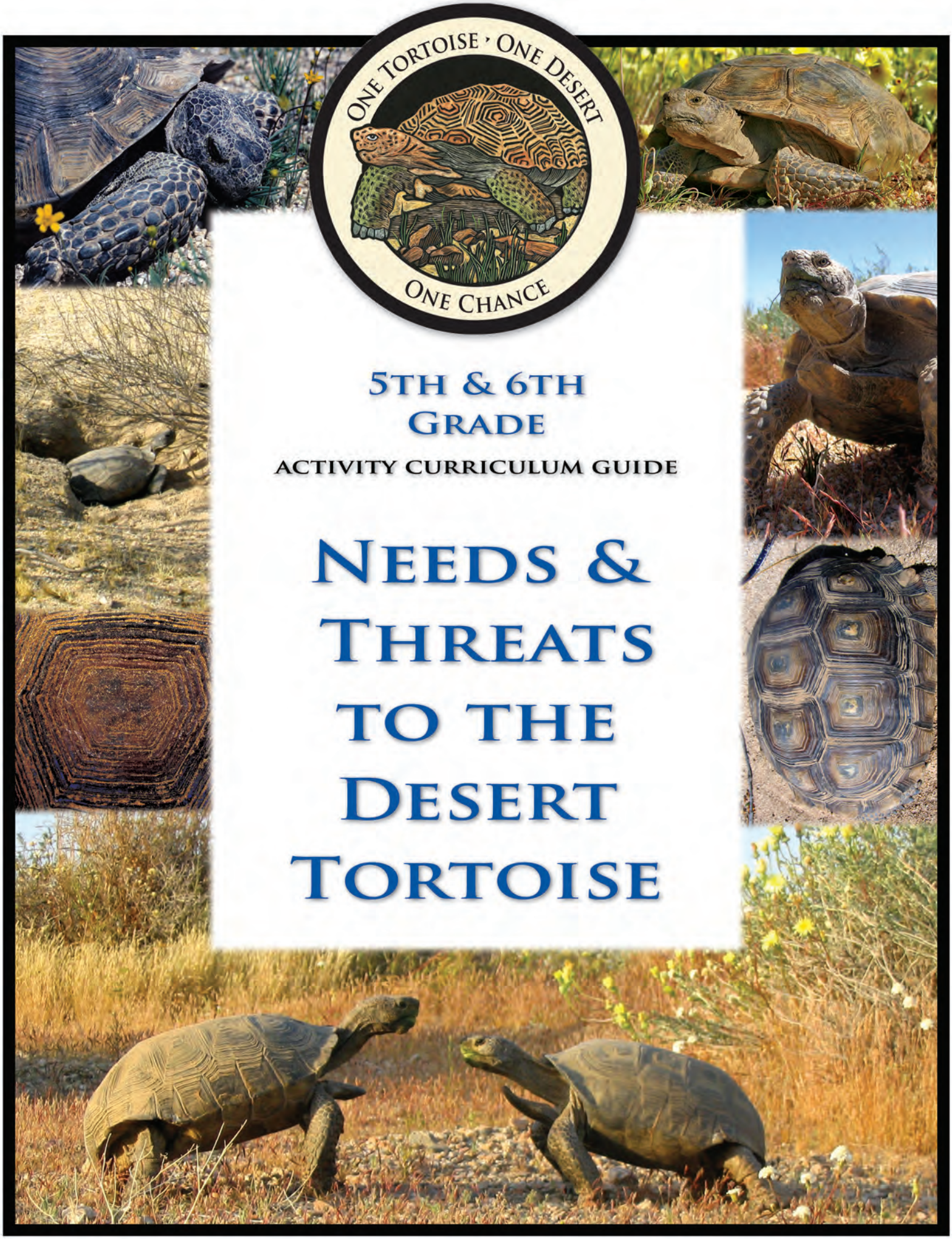


5TH & 6TH GRADE

ACTIVITY CURRICULUM GUIDE

NEEDS & THREATS TO THE DESERT TORTOISE

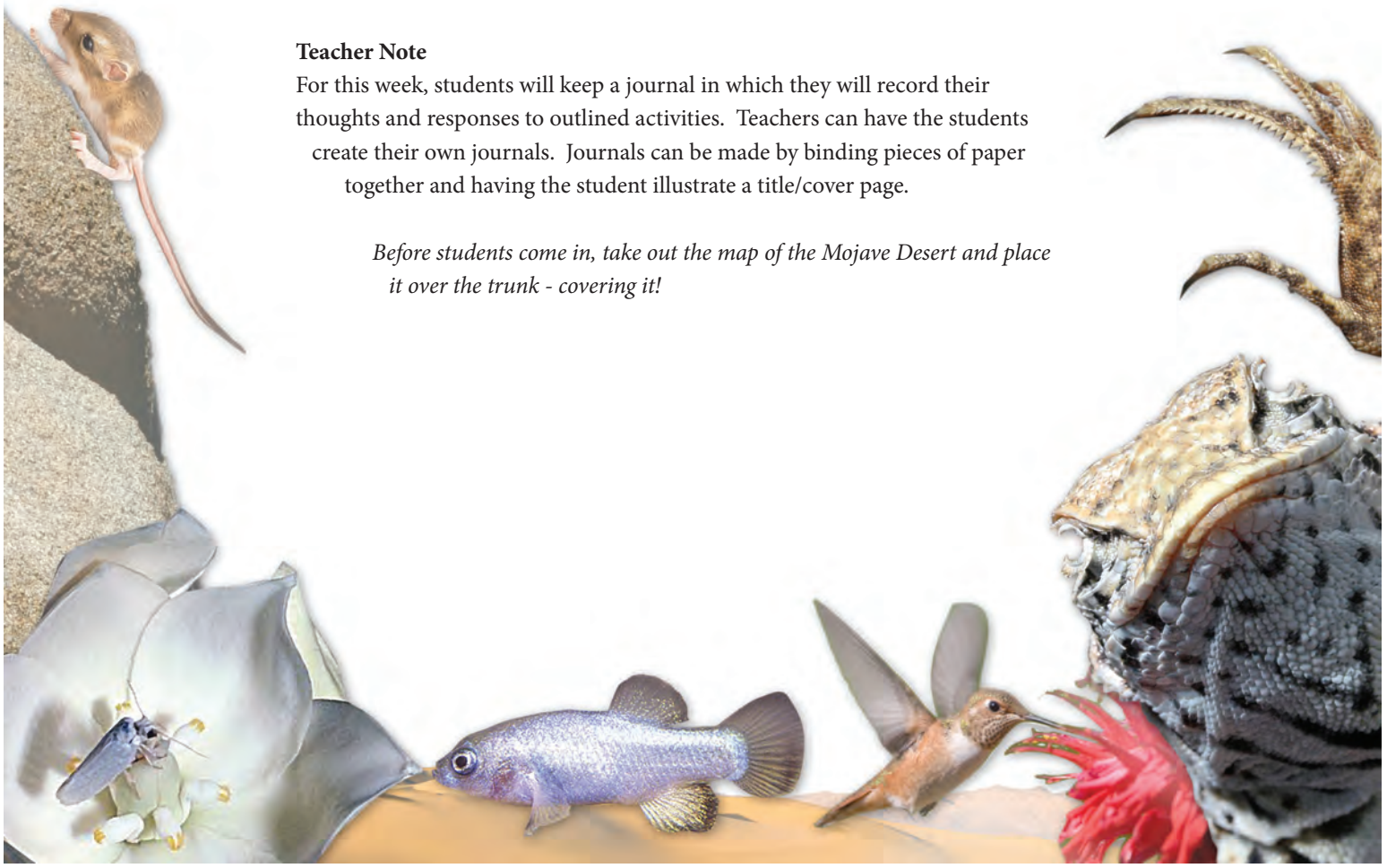
Activity Flow for Tortoise Trunk
5th/6th Grade Trunk

Table of Contents

Teacher Note

For this week, students will keep a journal in which they will record their thoughts and responses to outlined activities. Teachers can have the students create their own journals. Journals can be made by binding pieces of paper together and having the student illustrate a title/cover page.

Before students come in, take out the map of the Mojave Desert and place it over the trunk - covering it!



It's the Desert - Role Playing Desert Ethics

Theme/Concept: Ethics concerning the desert and desert tortoise

Goals: Students will gain an understanding of, and appreciation for appropriate interaction with the desert landscape and organisms in the desert landscape, specifically the desert tortoise.

Objectives:
- Students will be able to explain appropriate human interaction with a desert tortoise in the wild.
- Students will be able to explain how human activity can negatively impact the desert tortoise.

Fifth Grade Standards

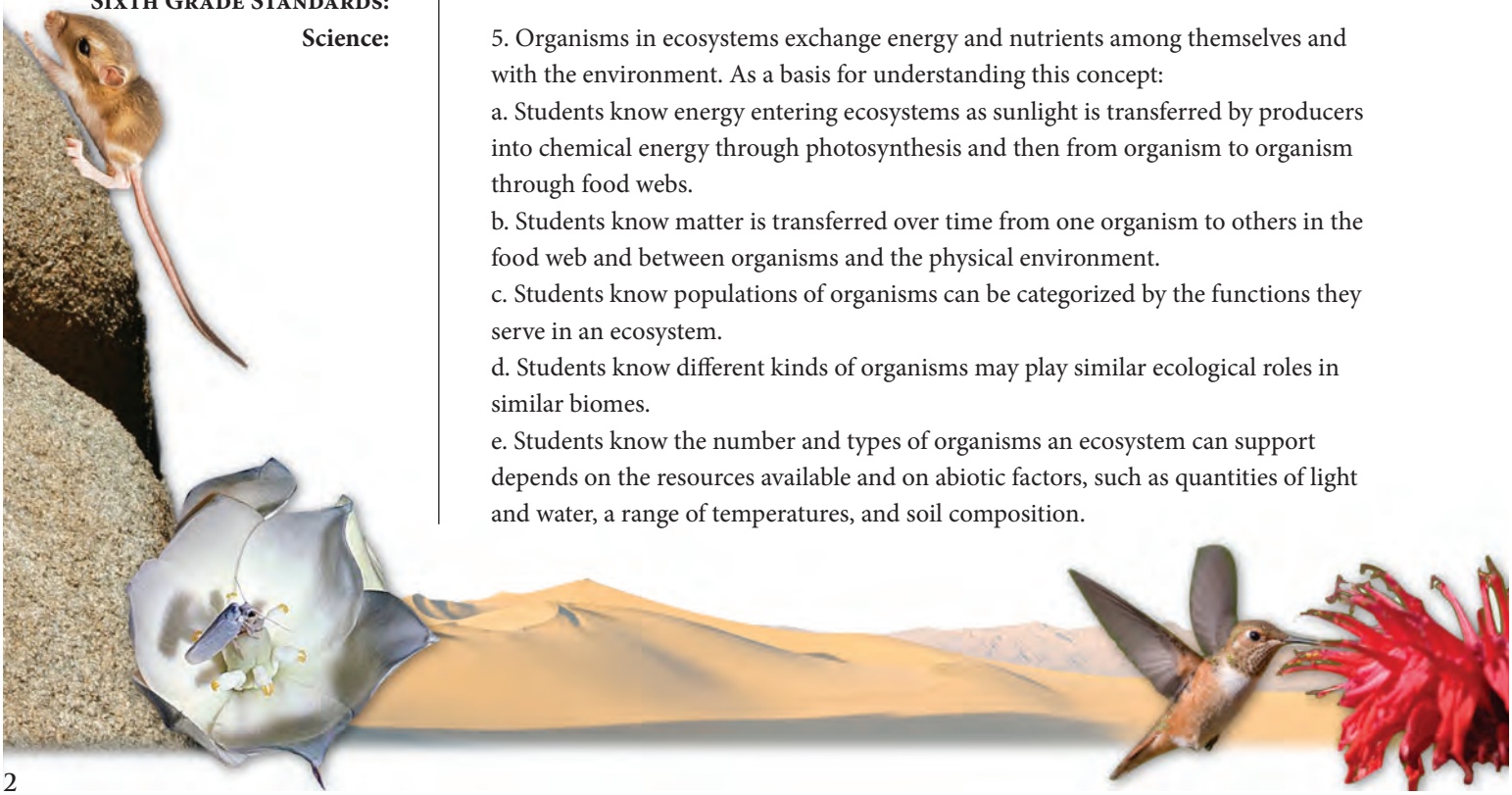
Science:

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:
a. Students know many multi-cellular organisms have specialized structures to support the transport of materials.
b. Students know how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO2) and oxygen (O2) are exchanged in the lungs and tissues.
c. Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.
d. Students know the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder.
e. Students know how sugar, water, and minerals are transported in a vascular plant.
f. Students know plants use carbon dioxide (CO2) and energy from sunlight to build molecules of sugar and release oxygen.
g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO2) and water (respiration).

Sixth Grade Standards:

Science:

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:
a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.
b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.
d. Students know different kinds of organisms may play similar ecological roles in similar biomes.
e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.



Teacher Resources:

- *http://www.deserttortoise.org/answeringquestions/chapter3-1.html*
- *http://www.nps.gov/moja/planning/tort.htm*
- *http://www.rinconinstitute.org/deserttortoise.pdf*
- *http://www.desertusa.com/june96/tortoiserescue.html*
- *http://www.blm.gov/ca/palmsprings/DesertTortoiseC.html*
- *http://www.blm.gov/ca/ridgecrest/tortoise.html*
- *http://www.tortoisegroup.org/law.html*

Teacher Materials Needed:

8 chairs

Materials in kit:

Leash	Binoculars	Lunch containers
Stuffed Dog	Map	
Tortoise Puppet	Ranger Uniform	
Play Camera	Backpack	
Plastic Bags	Water Bottles	
Mock Trail Sign	First Aid Kit	

Activity:

Students will act out a short skit depicting how our actions affect the environment.

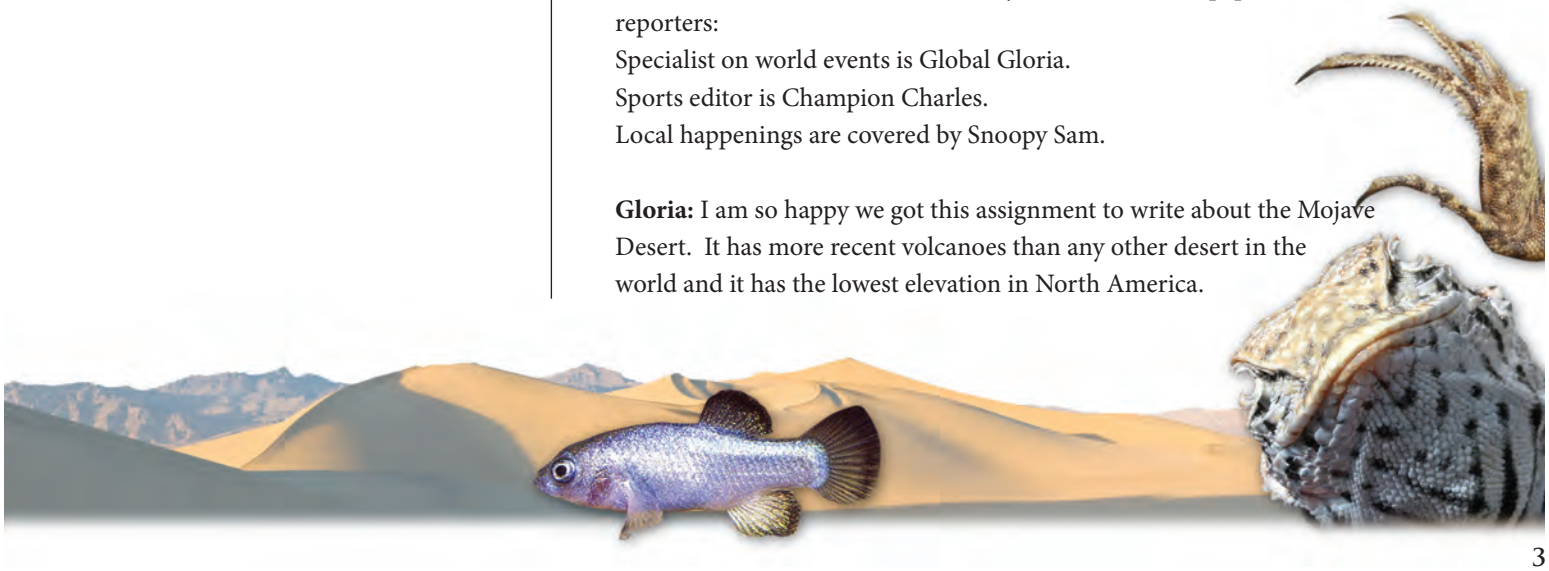
News writer: Nick/Nancy
Global: Gary/ Gloria
Champion: Charles/Chelsea
Snoopy: Sam/Sandra
Student 1
Student 2christ
Student 3
Ranger (can have 2)

Names can be changed for male or female.

Gloria, Nick, Sam, and Charles, are sitting in four chairs as if they are in a car. They silently act as if they are looking out the windows, pointing things out to each other, writing notes on to tablets, and occasionally taking pictures. One serves as a driver, represented by slowly turning the steering wheel. As they are introduced, they pause from their observing and say a quick hello to the audience. Sam's Dog is in the back of the car.

Nick: Good evening. My name is News Writer Nick and this is my team of action reporters. We are on a mission to investigate what is happening in the desert. Allow me to introduce my star team of newspaper reporters:
Specialist on world events is Global Gloria.
Sports editor is Champion Charles.
Local happenings are covered by Snoopy Sam.

Gloria: I am so happy we got this assignment to write about the Mojave Desert. It has more recent volcanoes than any other desert in the world and it has the lowest elevation in North America.



Activity: *(continued)*

Charles: The first flight faster than the speed of sound occurred on October 14, 1947 in the Mojave Desert. The aircraft was the Bell X-1 and the pilot was Captain Charles Yeager. Also, in 1960, a racecar called the Pontiac Assault broke a world speed record at March Air Force Base. It went 149 miles per hour within one mile from a standing start. At March Air Force Base, the elevation is relatively low at 1,535 feet above see level. The elevation allowed an air pressure close to sea level and giving an advantage to the carburetor.

Sam: There is a legend of a lost treasure in the mountains. In searching for the treasure, many people were discouraged by the harsh desert conditions, and turned back. Little is known about the existence of the treasure, however it is believed to still be there.

Nick: It would be a Top Story if we were to find the treasure. What do you think the chances are of the treasure still being up there? Gloria, is that place on our map?

Gloria: (Opens map and looks over it) According to the map the area is located just up here to the west. In ten miles we will intersect with a dirt road going in that direction and then a trail, or we can cut across the desert as a short cut. If we drive across the desert we can be there much faster.

Charles: Absolutely Not! Driving across the desert should never be done.

Gloria: Why not? It saves so much time!

Charles: Driving on the desert causes erosion, damages plants that grow there, crushes animal burrows, and often even crushes the animals themselves. Tracks left behind are an eyesore and invite other drivers to follow the path created. Before long the desert would be nothing but one giant road.

Sam: Which would destroy habitats for the animals whose home this really is. Remember, we are just visitors here!

Student 1, 2 and 3 are in a car in front of the news team. They get out of their car.

Nick: Why is that car stopping in the road?

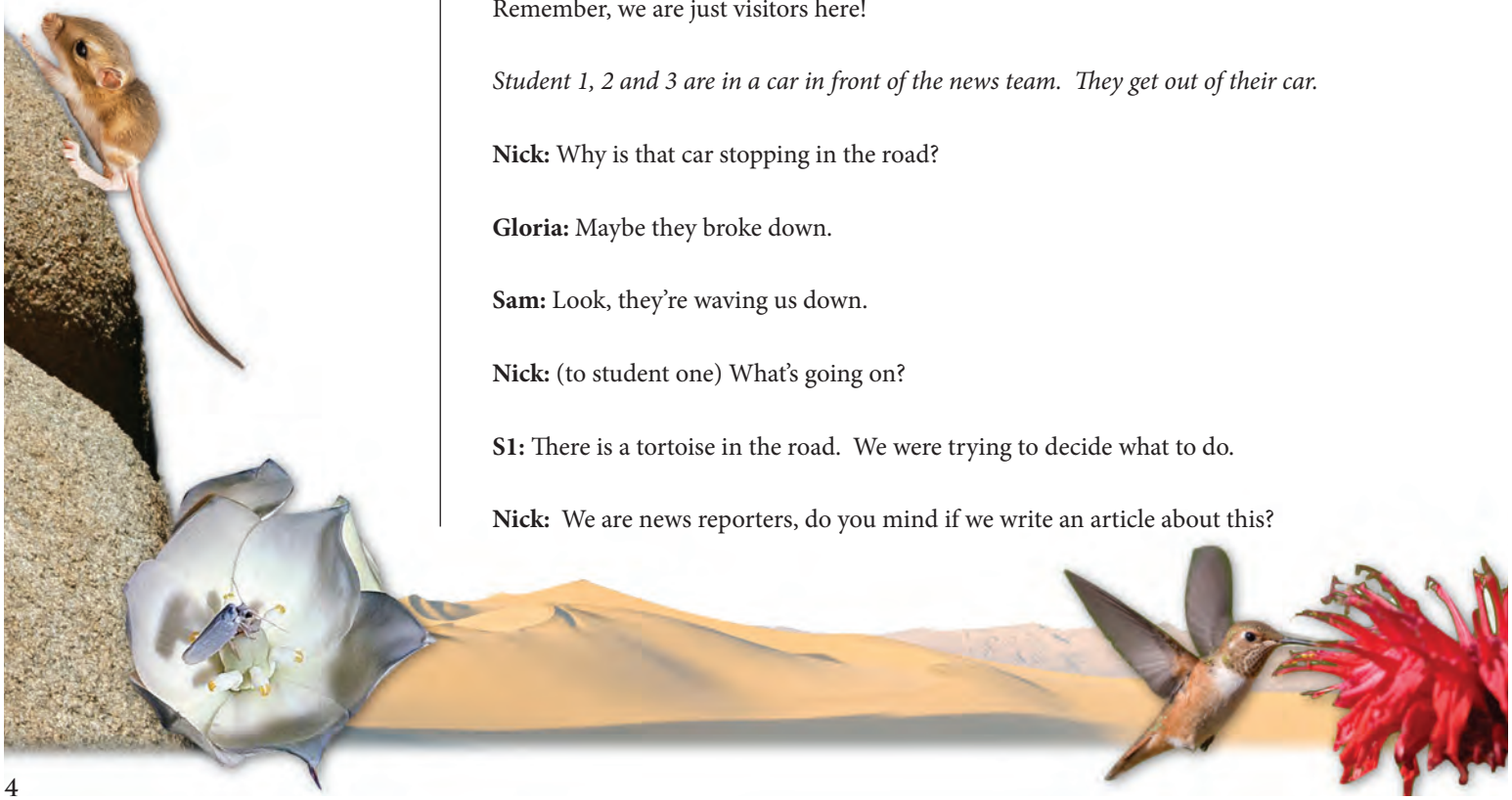
Gloria: Maybe they broke down.

Sam: Look, they're waving us down.

Nick: (to student one) What's going on?

S1: There is a tortoise in the road. We were trying to decide what to do.

Nick: We are news reporters, do you mind if we write an article about this?



Activity: *(continued)*

S1: That would be great. Maybe more people will learn how to treat the desert and how to deal with the wildlife.

Gloria: Why don't you just pick it up and move it?

S2: That could frighten it and it might empty its bladder in defense. Since the desert tortoise stores its water in a special part of its bladder, it could cause it to become dehydrated and die.

S3: Also, humans have germs that don't hurt us, but could make the tortoise ill or cause it to die.

Sam: I heard there was a way to move a tortoise if it is on a busy road or there is an immediate threat. Here, I think I have the information right here on a card I was given.

S1: I've heard about that too. This is a fairly busy road so we should move it. I don't remember how we are supposed to handle the tortoise.

S2: You approach the tortoise from the end with the head. Carry the tortoise upright with 2 hands, across the road in the direction it was traveling. Try to keep its head pointed in the direction it was traveling, and keep it very low to the ground. Do not take it more than 150 feet into the desert.

S3: Let's go move it to safety before any other cars come along.

S1, 2, and 3 move the tortoise, wave good-bye to the news team, and leave in their car. News team drives on for a while.

Sam: I think the dog has to go to the bathroom!

Charles: There is a pull off up here, we will stop there.

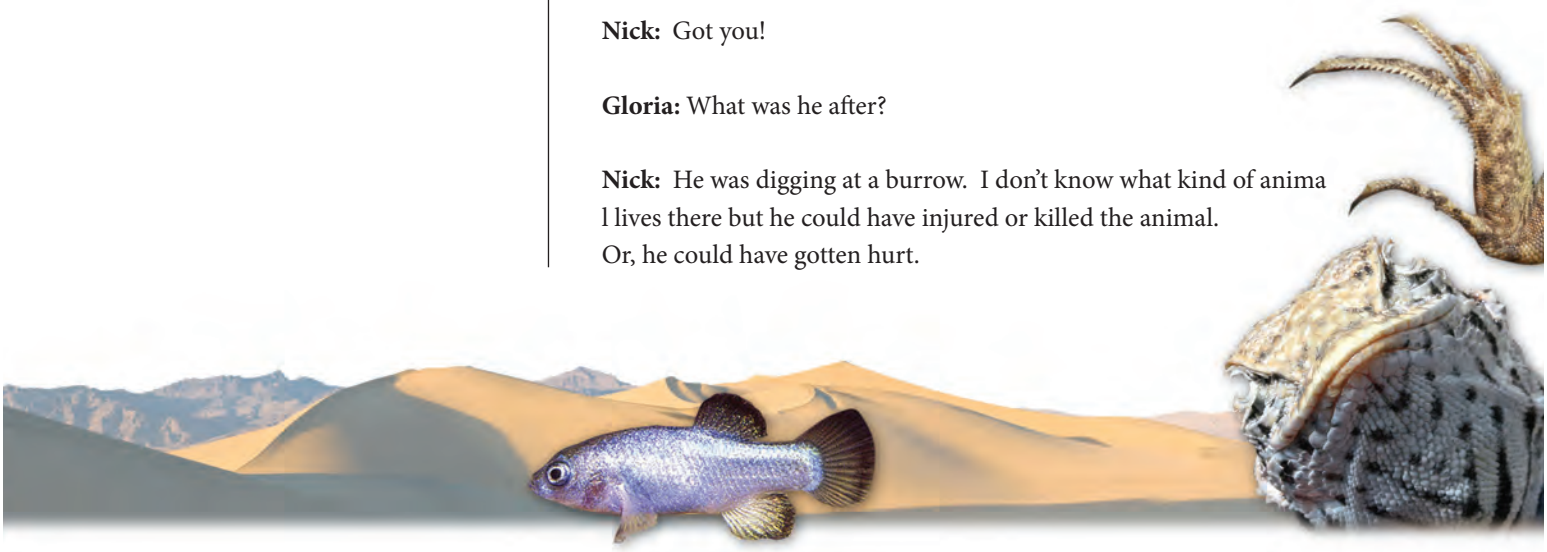
Nick: I will take him.

Nick goes to get dog out of the car and the dog runs off (string used to pull him away/ out of sight). Dog starts "digging" at a burrow. Nick goes after him.

Nick: Got you!

Gloria: What was he after?

Nick: He was digging at a burrow. I don't know what kind of anima
l lives there but he could have injured or killed the animal.
Or, he could have gotten hurt.



Activity: *(continued)*

Charles: At least you got to him before anything happened. He could have hurt another animal, or he could have gotten hurt by the plants or animals here. That is why it is best to keep pets on a leash, even if they are well behaved.

Nick: Does anyone have a plastic bag? I need to clean up after him.

Gloria: Eeww! You're going to pick that up?

Nick: Well we can't just leave it here. The scent an animal leaves behind is stronger than human scent. So, animals that live here might be stressed by the scent.

Charles: Also, dogs have different germs than wild animals. Those germs can make a wild animal sick or cause it to die, especially since they can't go to the veterinarian when they get sick.

Sam: I have plastic bags that you can use. How about double bagging it?

Nick: Okay.

Clean up after dog, get back in the car and start driving.

Sam: It looks like the road we want to take is coming up. There is a ranger station at the intersection.

Charles: Let's stop at the ranger station before we go on. It would be nice to take a quick break. And maybe we can interview the ranger while we are here.

They all agree to stop.

Nick: Excuse me sir (to ranger). We are a news team investigating the desert, would you mind if we interviewed you?

Ranger: That would be just fine.

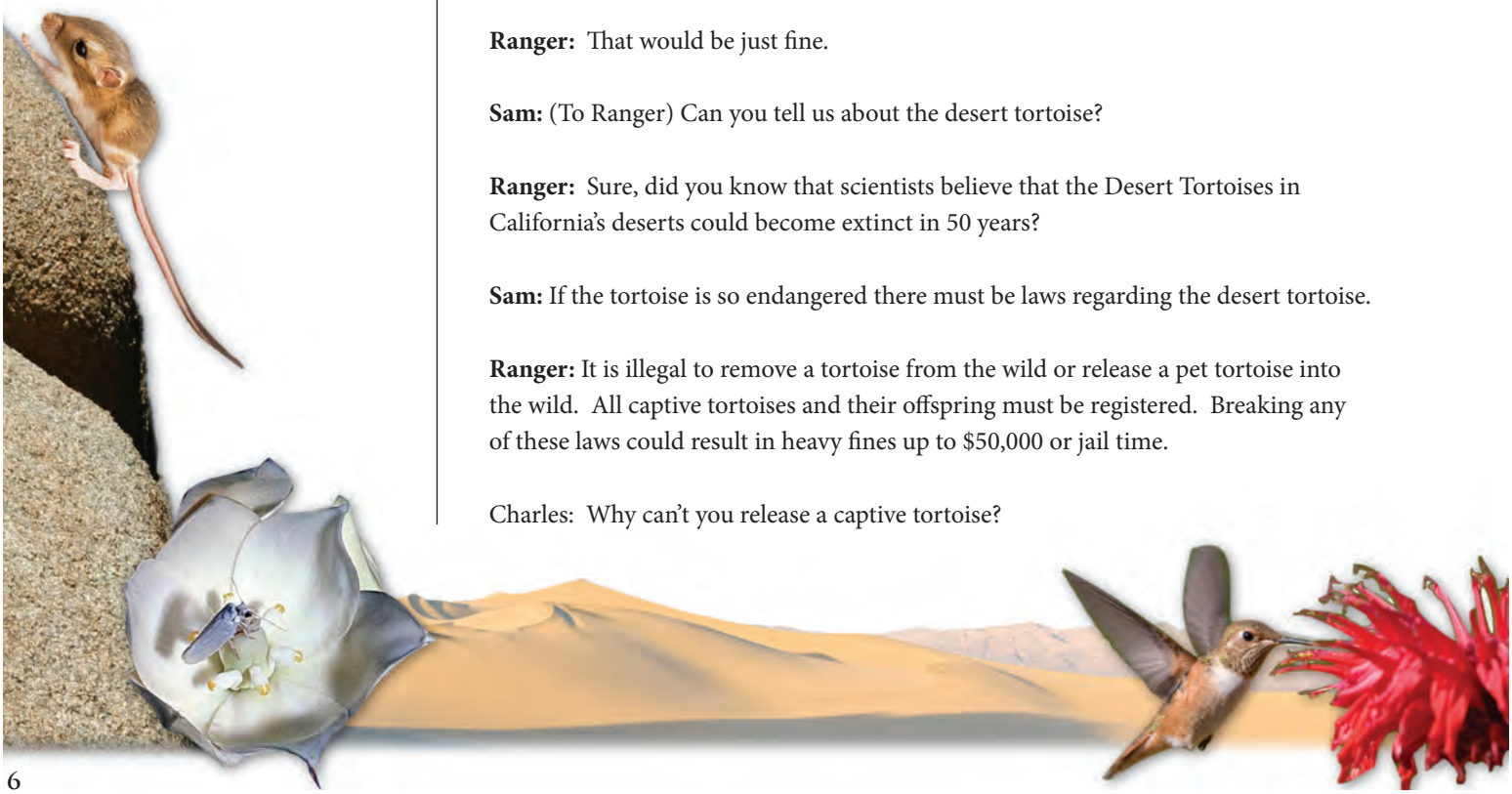
Sam: (To Ranger) Can you tell us about the desert tortoise?

Ranger: Sure, did you know that scientists believe that the Desert Tortoises in California's deserts could become extinct in 50 years?

Sam: If the tortoise is so endangered there must be laws regarding the desert tortoise.

Ranger: It is illegal to remove a tortoise from the wild or release a pet tortoise into the wild. All captive tortoises and their offspring must be registered. Breaking any of these laws could result in heavy fines up to $50,000 or jail time.

Charles: Why can't you release a captive tortoise?



Activity: *(continued)*

Ranger: They can carry diseases that are fatal to tortoises and infect the wild population. The diseases don't affect humans though, and since most owners of pet tortoises take their tortoise to the veterinarian when it gets ill, they aren't seriously affected. Also, the captive tortoise displaces the native population, and the captive tortoise does not know how to survive.

Nick: How do you register a tortoise?

Ranger: You can get them registered through the Department of Fish and Wildlife, a wildlife veterinarian, or a rescue and adoption agency. Here is some information about registering, caring for, and adopting captive tortoises (hands information to group). There is general information in there as well. And remember, it is important to always carry water with you in the desert.

Charles: We aren't going on a long hike, so we won't need it.

Ranger: Even if you aren't hiking at all, there is no water out here. If your car breaks down it could be a while before anyone comes along. With the heat and the sun out here, it is very easy to dehydrate. You should always take plenty of water with you.

Gloria: Okay, thank you for your time!

Everyone gets back in the car and they continue driving. Gloria reads the information.

Gloria: Did you all know that the shell of a baby tortoise doesn't get hard until it is about five years old?

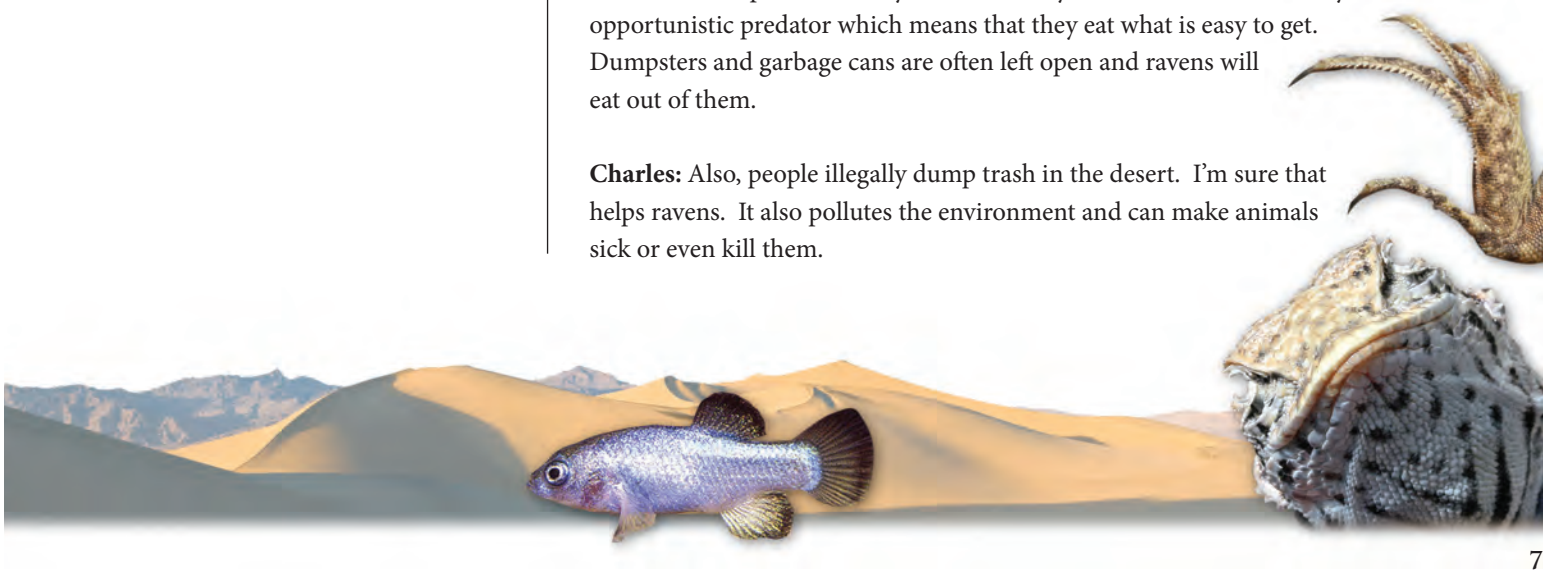
All respond no.

Gloria: That makes it very vulnerable. Some ravens have figured this out and prey on the baby tortoises.

Nick: That's awful.

Sam: Especially since humans are the reason that ravens are doing so well. They are native migrants to the Mojave Desert, but humans have caused their numbers to increase to the point that they have become year-round residents. They are an opportunistic predator which means that they eat what is easy to get. Dumpsters and garbage cans are often left open and ravens will eat out of them.

Charles: Also, people illegally dump trash in the desert. I'm sure that helps ravens. It also pollutes the environment and can make animals sick or even kill them.



Activity: *(continued)*

Nick: The road ends here, but there is a trail. We will take the trail to look for the treasure. Why don't we take some plastic bags with us to collect any garbage we see.

Sam: We need to make sure that we take plenty of water with us.

Gloria: We also need to take food and a first aid kit.

Charles: Good idea!

They hike for a while, then start to look hot and tired.

Charles: I don't think that we are ever going to find the treasure

Sam: We don't even know what it is.

Nick: It's only noon. Why don't we take a break up there in the shade and eat lunch.

Gloria: That sounds like a good idea.

They take a break.

Gloria: Is everyone ready to keep hiking?

All: Yes

Sam gets up and drops a piece of trash, but doesn't realize it.

Nick: Don't forget your trash. We all need to look around and make sure that we picked up all the trash and crumbs from our food.

Sam picks up some trash.

Charles: Looks like we got it all!

They hike for a while.

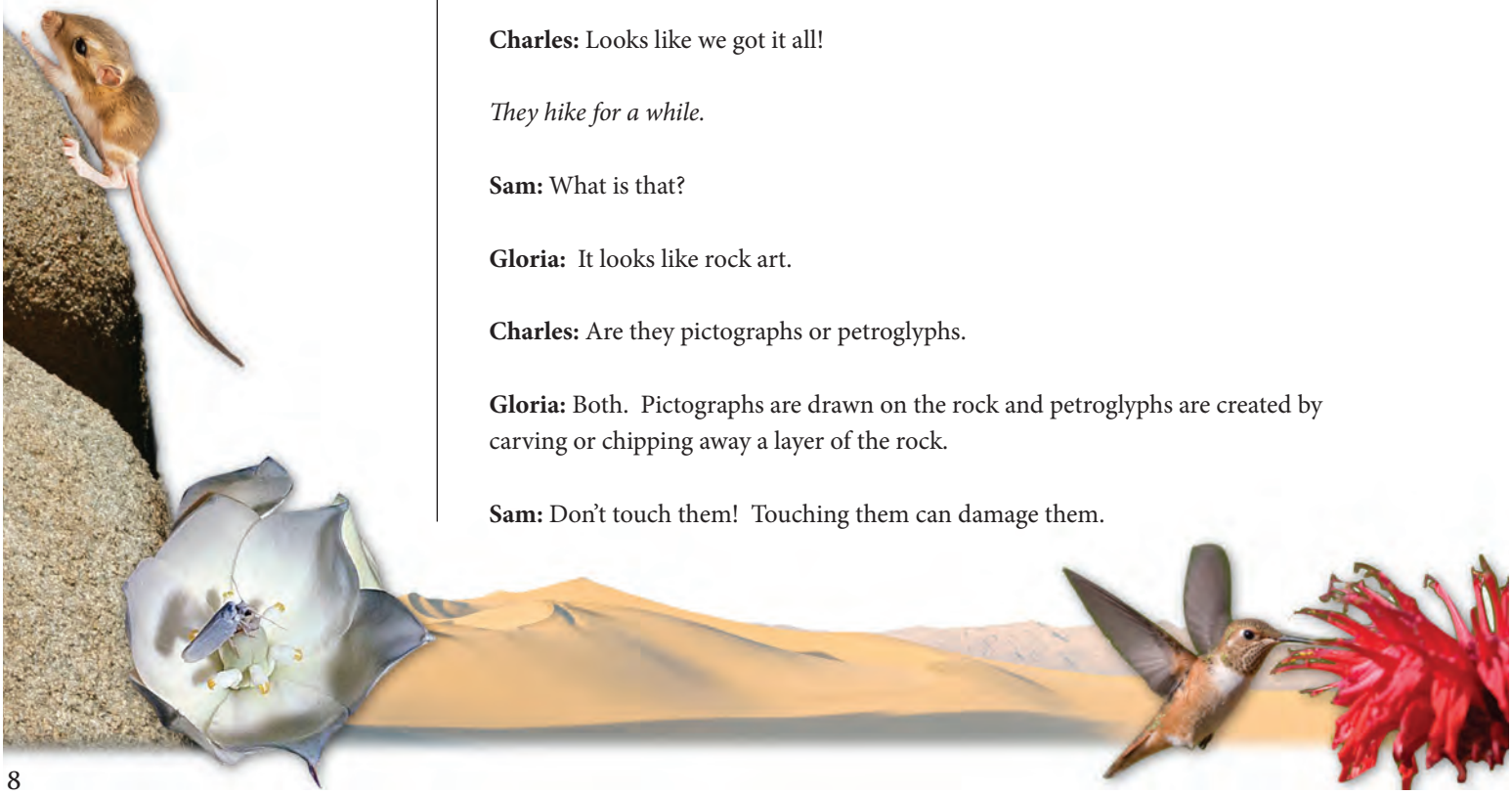
Sam: What is that?

Gloria: It looks like rock art.

Charles: Are they pictographs or petroglyphs.

Gloria: Both. Pictographs are drawn on the rock and petroglyphs are created by carving or chipping away a layer of the rock.

Sam: Don't touch them! Touching them can damage them.



Activity: *(continued)*

Nick: It looks like no one has been here for a while. Let's take some photographs.

Charles: I'm going to see if I can find this on the map.

Sam: Good idea! Maybe no one knows about this!

They all walk around and take pictures for a while.

Nick: It is getting late in the afternoon, we should start heading back. We didn't bring any gear to stay over night.

Charles: What about the treasure.

Gloria: Well, I think that we found something just as good as treasure. It may not be gold, but it is definitely important.

Sam: What are you talking about?

Gloria: The rock art!

Nick: You're right, it may not be gold, but I think that it is more important than gold!

All nod/agree.

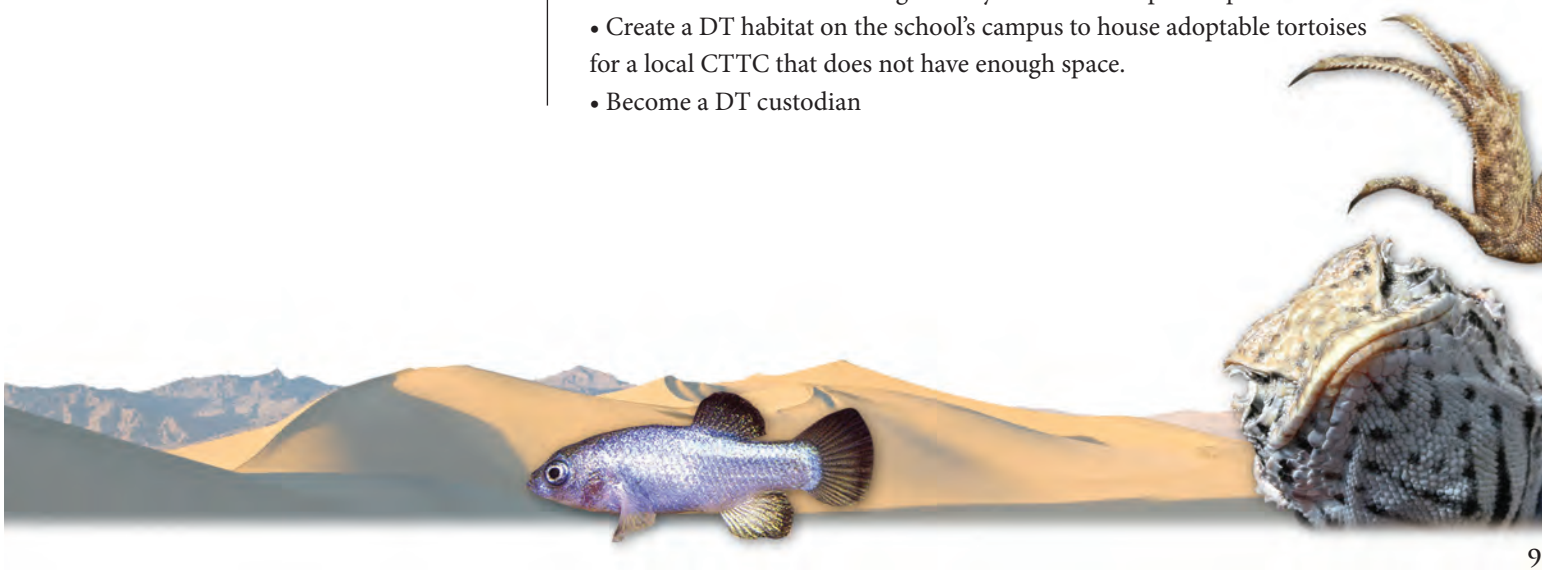
Charles: Let's start heading back. Maybe we can stop at the Ranger Station and ask them about this rock art.

Extensions:

1. Create an "easy to go and show or stow" message (i.e. sticker, laminated card, refrigerator magnet, brochure etc.) that gets the message of this lesson out to desert dwellers, land, home and car owners, students and educators.

2. Other possible activities that could be used to extend this lesson include:

- Visit a local adoption center,
- Attend a local California Turtle and Tortoise Club (CTTC) meeting (or consider becoming a member). For more information about the CTTC go on line to http://www.tortoise.org/
- Invite a DT custodian/care giver to your class as a special speaker
- Create a DT habitat on the school's campus to house adoptable tortoises for a local CTTC that does not have enough space.
- Become a DT custodian



Habitat Map

Theme/Concept: Identify the habitat (distribution) of the desert tortoise in across the Pacific Southwest.

Goals:

- Students will be able to identify characteristics of a desert.
- Students will be able to identify animals that live in the desert.
- Students will be able to identify what might be contributing to the decline and possible extinction of the desert tortoise.

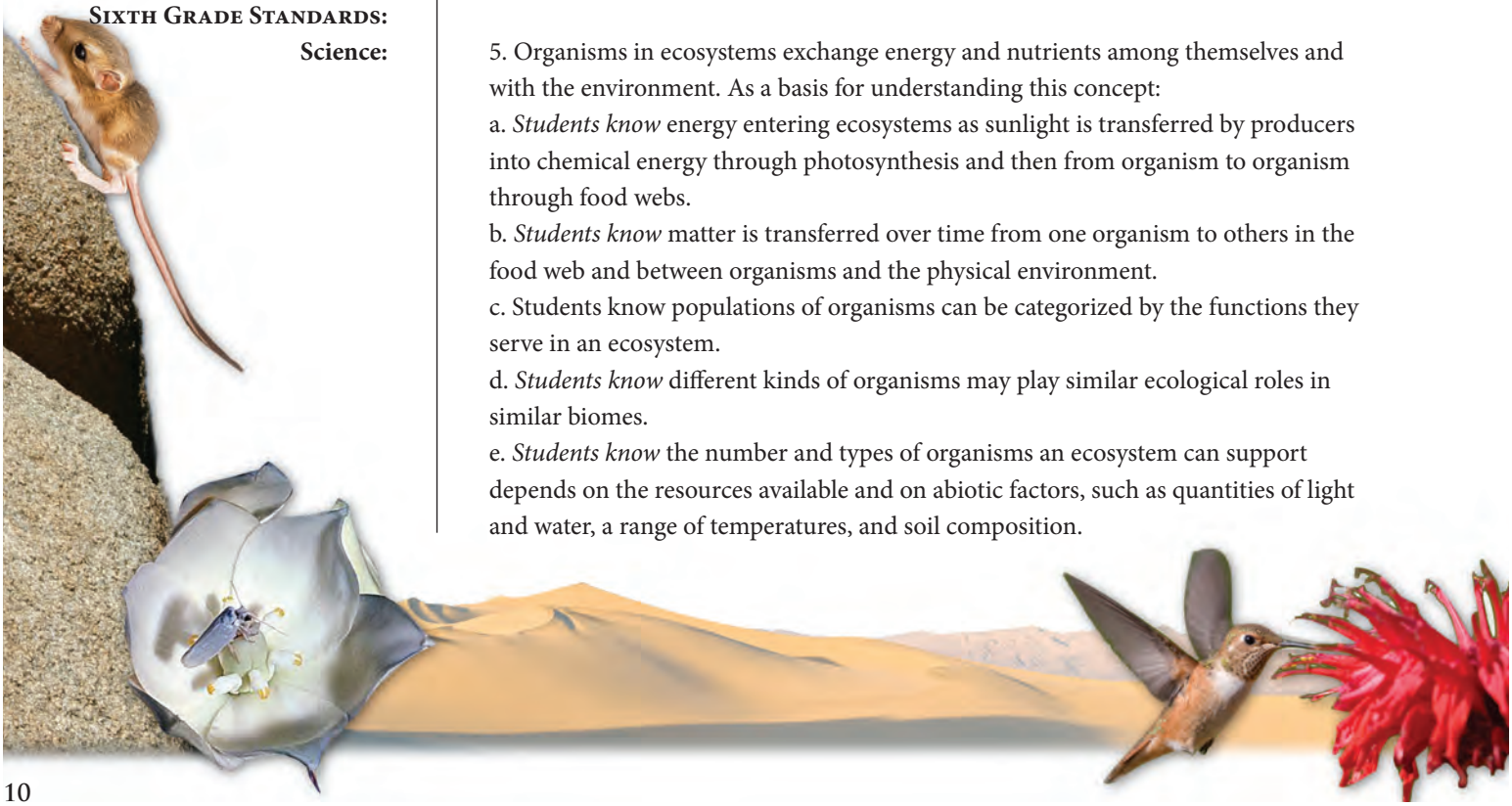
Objectives: Students will learn facts and important information on the desert tortoise.
Students will be able to identify what a desert tortoise needs to survive.
Students will be able to identify what is causing the extinction of the desert tortoise in the wild.

Fifth Grade Standards:
Science:

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:
a. *Students know* many multi-cellular organisms have specialized structures to support the transport of materials.
b. *Students know* how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO2) and oxygen (O2) are exchanged in the lungs and tissues.
c. *Students know* know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.
d. *Students know* the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder.
e. *Students know* how sugar, water, and minerals are transported in a vascular plant.
f. *Students know* plants use carbon dioxide (CO2) and energy from sunlight to build molecules of sugar and release oxygen.
g. *Students know* plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO2) and water (respiration).

Sixth Grade Standards:
Science:

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:
a. *Students know* energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.
b. *Students know* matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.
d. *Students know* different kinds of organisms may play similar ecological roles in similar biomes.
e. *Students know* the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.



Teacher Materials Needed:

Pencils, pens, colored pencils or markers
Writing paper
8 ½ x 11 Tan Drawing paper
Scotch tape (double-sided if possible)

Materials in kit:

Vinyl sheet to use as a floor mat (3 X 3 ft grey or tan mat)
Field guides (desert plants, animals, insects, tracks and burrow guides)

Activity:

Part 1

1. Students will take a trip into a desert setting if possible.
2. Working in groups of 2-4 they will draw the desert plants and animals that they see and identify the adaptations that the plant or animal uses to survive (teachers use a field guide to identify plants).
3. In the classroom the gathered information will be listed or posted on the board.
4. Students will write a descriptive paragraph about the plants and animals that they saw.
5. Students will draw the plants and animals they saw.
6. Lay the vinyl sheet on the floor for students to add their drawings to.
7. Divide vinyl sheet into small sections with tape. Each group of students will take the plants and animals they drew and add to the vinyl floor mat.

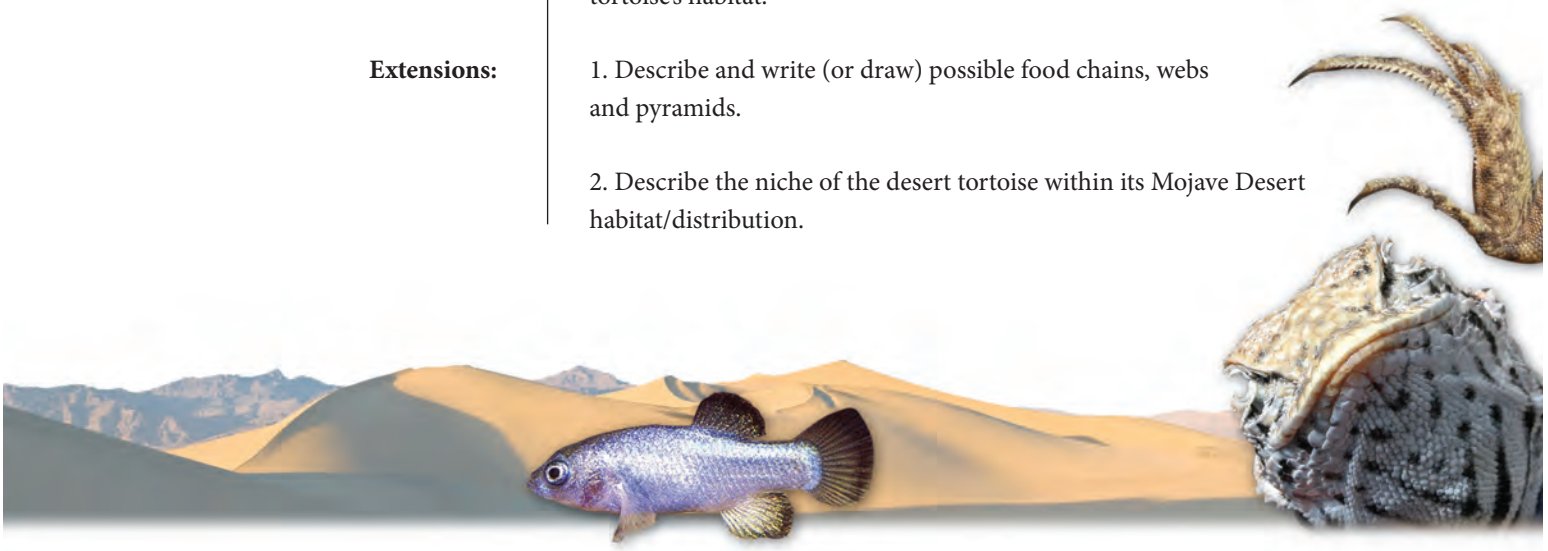
Part 2

1. Students review the desert plants and animals that they found.
2. The teacher shows pictures and gives information on 5+ animals and plants specific to the area.
3. The last animal presented is the desert tortoise. Teacher shares specific information about the desert tortoise. (See binder in kit on Desert Tortoise Background)
4. Teacher will add a desert tortoise shell to the vinyl floor mat.
5. Teacher will ask the students what the tortoise needs to survive: plants, burrows, water.
6. Draw a burrow and a water source to add to the floor mat.
7. The teacher will explain that this is the desert tortoise's habitat.
8. What things might disrupt a tortoise habitat? Examples: off-road vehicles, bulldozers, roads, houses, cars, ravens, trash, dogs, invasive plants or wildfires.
9. Students need to draw some of the things that disrupt the habitat and place them on the mat.
10. Teacher leads a discussion on how certain activities and animals affect the tortoise's habitat.

Extensions:

1. Describe and write (or draw) possible food chains, webs and pyramids.

2. Describe the niche of the desert tortoise within its Mojave Desert habitat/distribution.



DESERT IN A SHOEBOX

Theme/Concept:

The requirements to maintain a desert tortoise are met by its habitat. (An intact habitat, however, does not guarantee the survival of a species).

Goals:

- To help students understand the needs of the desert tortoise.

Objectives:

- Students will be able to differentiate between a need and a want.
- Students will be able to identify what a tortoise needs in its habitat in order to survive.

Standard Connections:

Fifth Grade

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a. Students know many multi-cellular organisms have specialized structures to support the transport of materials.
b. Students know how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO2) and oxygen (O2) are exchanged in the lungs and tissues.
c. Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.
d. Students know the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder.
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g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO2) and water (respiration).

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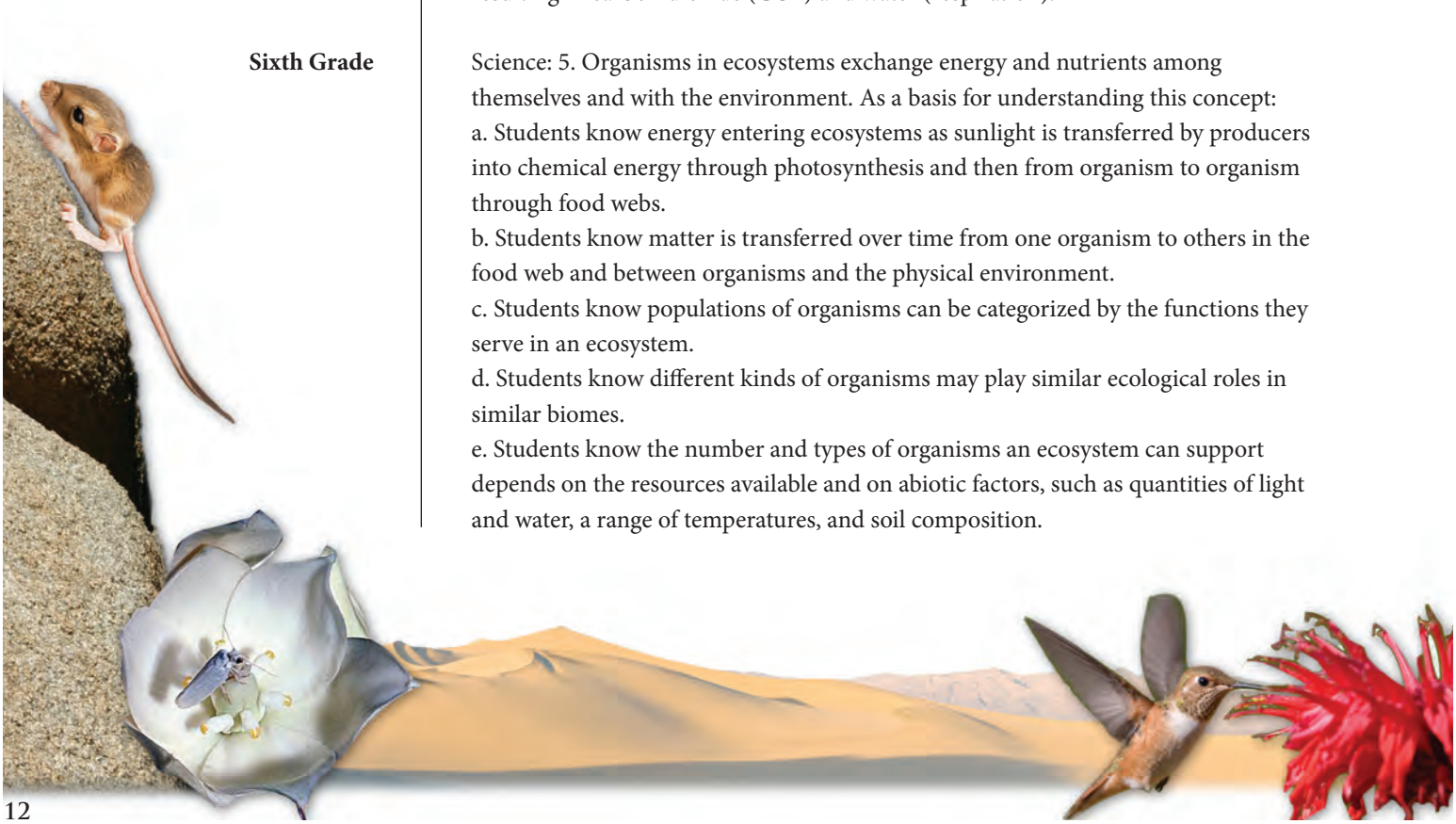


Teacher Materials Needed:

1 Shoebox per student or group
Paper
Construction Paper
Scissors
Crayons/Coloring Pencils
Moving Eyes
Glue

Materials in kit:

None

Activity:

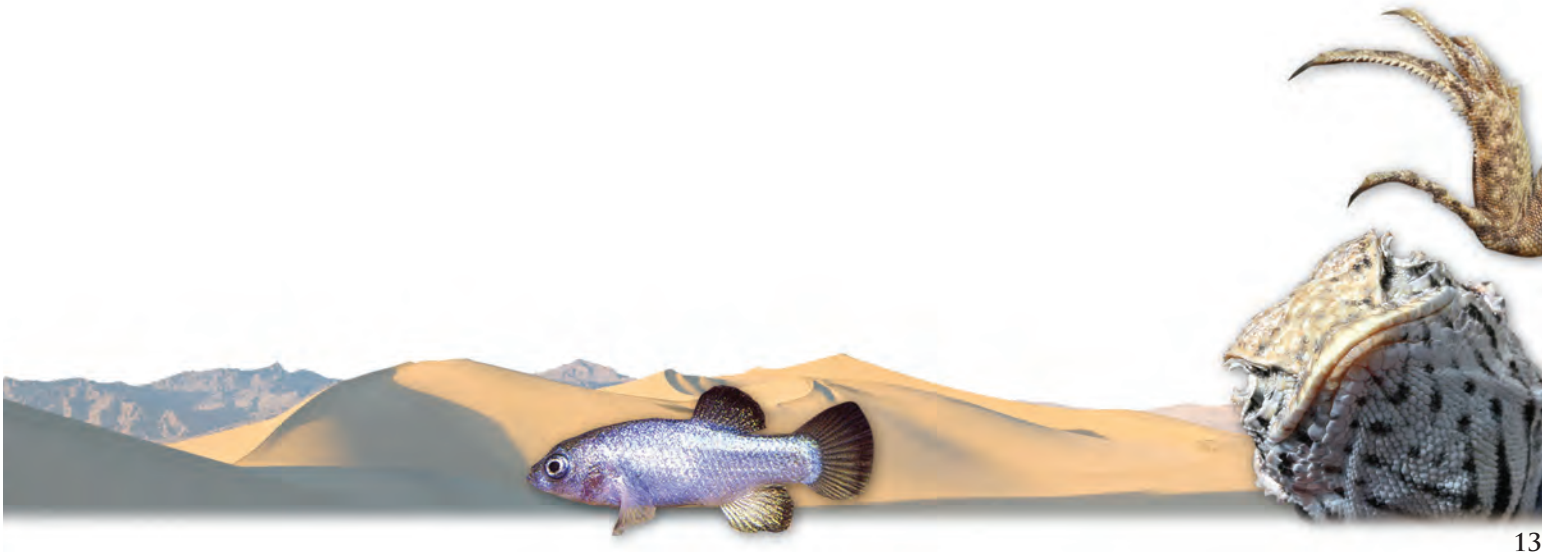
Students should research different animals that live in the desert and have an understanding of how they survive.

Students make a list of needs for 2-3 animals.

- Using paper, markers and/or crayons, design and make backdrop scenery for your habitat. Glue this in the bottom of the shoebox. (The bottom of the box will become the backdrop)
- Take a plastic bag and gather items from outdoors. (May be done at home and brought back to school). Gather twigs, leaves, stones, bark, shells, moss, lichen, nuts, small pinecones, and other items according to the habitat your are building.
- Collect up to ten rocks, they should not be longer than 1 1/2 inches long. Think about the animals found in this habitat as you collect. (Nut shells and/or nuts may also be used).
- Obtain movable eyes (smallest size) from your teacher and along with yarn (tails),. paper (feet or wings), use the rocks to make 2 or 3 animals to go into the habitat. Use glue such as carpenters glue to put your animals together.
- Using the suggestions from your group, glue items into your habitat to form it. Add the animals to the habitat. (Ask your teacher for help if a hot or warm glue gun is needed to hold items in place.)

Extensions:

1. When most of the class has completed their dioramas, teachers can allot a time for students to view what other desert animals their classmates have researched. Students can write a brief summary (similar to what you would find in a museum diorama exhibit) to go along with their desert scene.
2. Students can write a short story about their diorama.
3. 5th/6th graders can research how their desert animal may impact the desert tortoise.



Tortoise Mobile of Cause & Effect

Theme/Concept:

Identify what is causing the demise of the desert tortoise.

Goals:

Students will become aware of the reasons that the desert tortoise is listed on the endangered species list as threatened

Objectives:

Students should be able to:

Identify cause and affect relationships
List three reasons that the desert tortoise is endangered
Identify how the different factors affect the tortoise

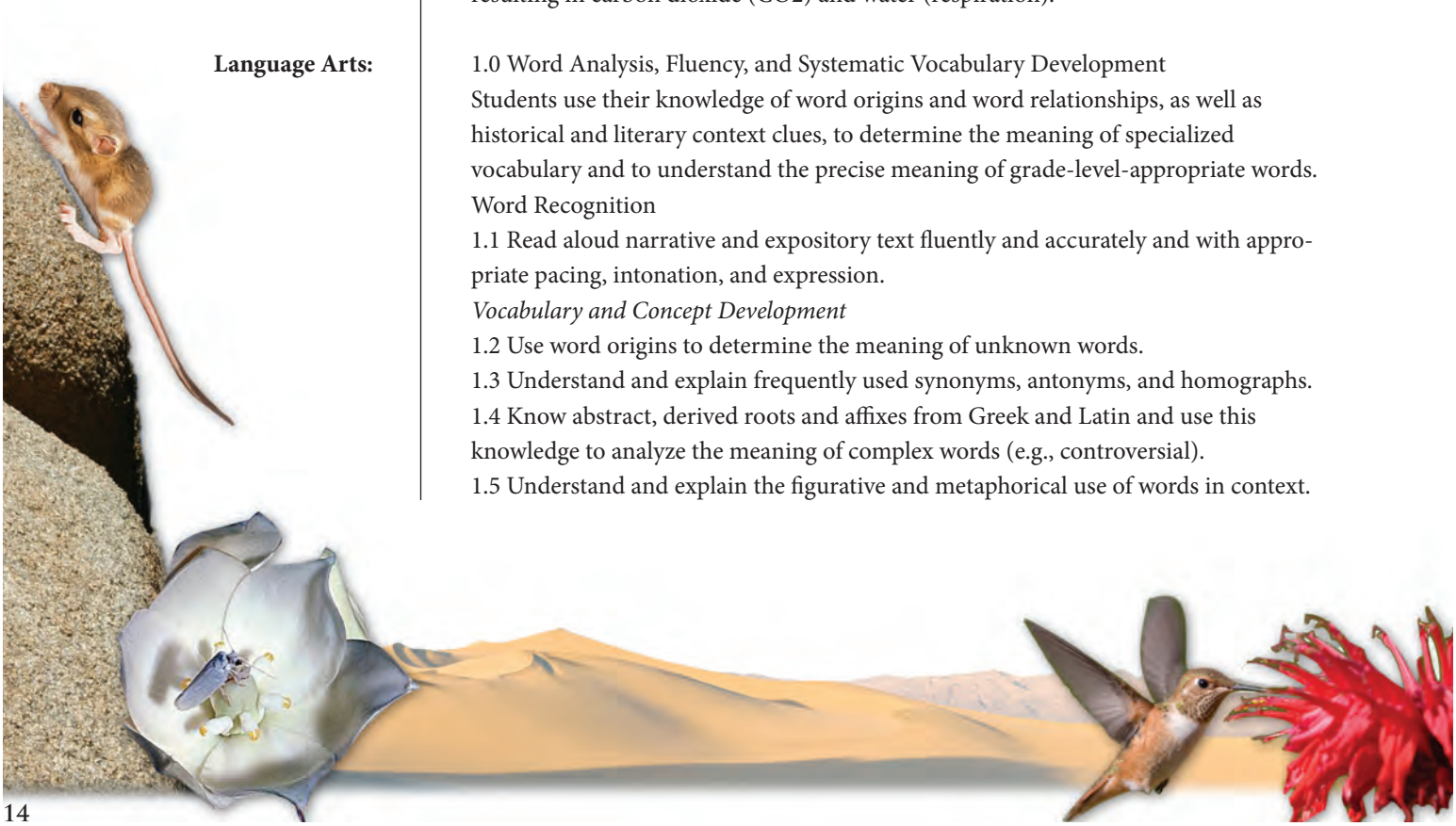
Fifth Grade Standards:

Science:

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:
a. *Students know* many multi-cellular organisms have specialized structures to support the transport of materials.
b. *Students know* how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO2) and oxygen (O2) are exchanged in the lungs and tissues.
c. *Students know* the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.
d. *Students know* the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder.
e. *Students know* how sugar, water, and minerals are transported in a vascular plant.
f. *Students know* plants use carbon dioxide (CO2) and energy from sunlight to build molecules of sugar and release oxygen.
g. *Students know* plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO2) and water (respiration).

Language Arts:

1.0 Word Analysis, Fluency, and Systematic Vocabulary Development
Students use their knowledge of word origins and word relationships, as well as historical and literary context clues, to determine the meaning of specialized vocabulary and to understand the precise meaning of grade-level-appropriate words.
Word Recognition
1.1 Read aloud narrative and expository text fluently and accurately and with appropriate pacing, intonation, and expression.
Vocabulary and Concept Development
1.2 Use word origins to determine the meaning of unknown words.
1.3 Understand and explain frequently used synonyms, antonyms, and homographs.
1.4 Know abstract, derived roots and affixes from Greek and Latin and use this knowledge to analyze the meaning of complex words (e.g., controversial).
1.5 Understand and explain the figurative and metaphorical use of words in context.



Fifth Grade Standards:

Science:

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:
a. *Students know* energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.
b. *Students know* matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
c. *Students know* populations of organisms can be categorized by the functions they serve in an ecosystem.
d. *Students know* different kinds of organisms may play similar ecological roles in similar biomes.
e. *Students know* the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

Language Arts:

1.0 Word Analysis, Fluency, and Systematic Vocabulary Development Students use their knowledge of word origins and word relationships, as well as historical and literary context clues, to determine the meaning of specialized vocabulary and to understand the precise meaning of grade-level-appropriate words.
Word Recognition
1.1 Read aloud narrative and expository text fluently and accurately and with appropriate pacing, intonation, and expression.
Vocabulary and Concept Development
1.2 Identify and interpret figurative language and words with multiple meanings.
1.3 Recognize the origins and meanings of frequently used foreign words in English and use these words accurately in speaking and writing.
1.4 Monitor expository text for unknown words or words with novel meanings by using word, sentence, and paragraph clues to determine meaning.
1.5 Understand and explain "shades of meaning" in related words (e.g., softly and quietly).

Teacher Materials Needed:

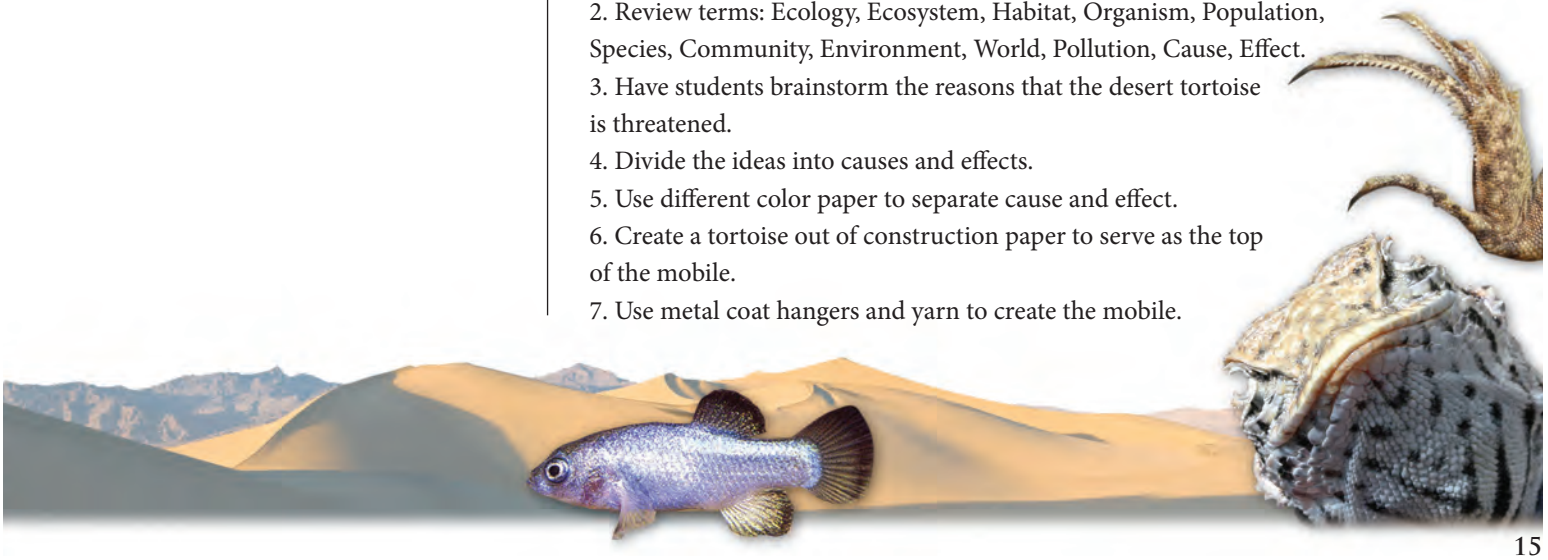
Metal clothes hanger
Construction Paper
Plain Paper

Materials in kit:

None

Activity:

1. Define and discuss the terms extinct, endangered, threatened and rare species.
2. Review terms: Ecology, Ecosystem, Habitat, Organism, Population, Species, Community, Environment, World, Pollution, Cause, Effect.
3. Have students brainstorm the reasons that the desert tortoise is threatened.
4. Divide the ideas into causes and effects.
5. Use different color paper to separate cause and effect.
6. Create a tortoise out of construction paper to serve as the top of the mobile.
7. Use metal coat hangers and yarn to create the mobile.



Example:

Tortoise

Cause	Effect
Poaching, Fire, Predators	Extinction
Urban growth	Habitat Loss/Fragmentation
Release of Captive Tortoise	Disease/Death
Off Highway Vehicles	Habitat Destruction
Landfills/Illegal Dumping	Predation/Ravens

(See or refer to http://www.deserttortoise.org/answeringquestions/chapter1.html)

Definitions:

Extinct – a species that is no longer in existence or has died off
Endangered – a species that is on the brink of extinction
Threatened – a species that has serious threats which could lead to its extinction
Rare Species – a species that is not easily found or is found few in numbers

Extensions:

Students could be challenged to create a "grassroots" campaign to raise student, school, and community consciousness of the plight of Desert Tortoises in the California Deserts. Their efforts can be combined with special speakers from the CTTC, NPS, BLM, DMG.

Tortoise Trails

Theme/Concept:

Survival of a species depends on how safely it can move around within its environment over time.

Goals:

To help students become aware of the limiting factors affecting survival of desert tortoises.

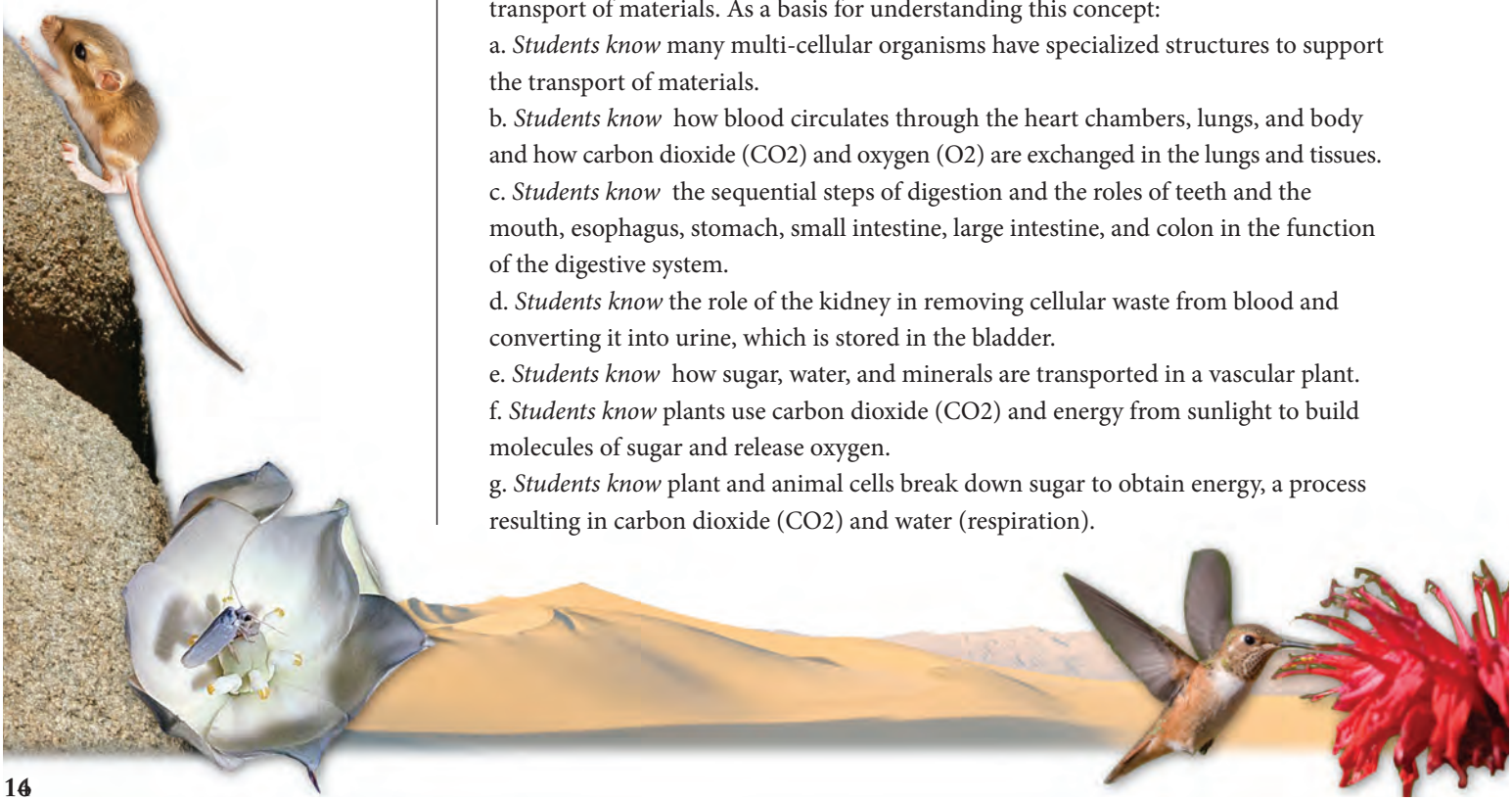
Objectives:

• Students will be able to name something that can cause Desert Tortoises to die.
• Students will be able to name something that can cause an accumulation of stressors that could lead to the death of a desert tortoise.

Fifth Grade Standards:

Science:

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:
a. *Students know* many multi-cellular organisms have specialized structures to support the transport of materials.
b. *Students know* how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO2) and oxygen (O2) are exchanged in the lungs and tissues.
c. *Students know* the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.
d. *Students know* the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder.
e. *Students know* how sugar, water, and minerals are transported in a vascular plant.
f. *Students know* plants use carbon dioxide (CO2) and energy from sunlight to build molecules of sugar and release oxygen.
g. *Students know* plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO2) and water (respiration).



Sixth Grade Standards: Science:

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:
a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.
b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.
d. Students know different kinds of organisms may play similar ecological roles in similar biomes.
e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

Teacher Reference:

http://www.deserttortoise.org/answeringquestions/chapter1.html

Liebig's Law of Minimum: *Put forth by German geochemist, Justus von Liebig, in 1840. It can be easy to conceive how a limiting resource (ie. food) controls a process (ie. growth) by running low or running out. However, some biological and ecological processes are controlled by too much of a factor (such as heat) rather than too little. Or, processes may be controlled by complex interactions of factors. A broad, restatement of the law of the minimum: The functioning of an organism is controlled or limited by that essential environmental factor or combination of factors present in the least favorable amount. The factors may not be continuously effective but only at some critical period during the year or perhaps only during some critical year in a climatic cycle.*

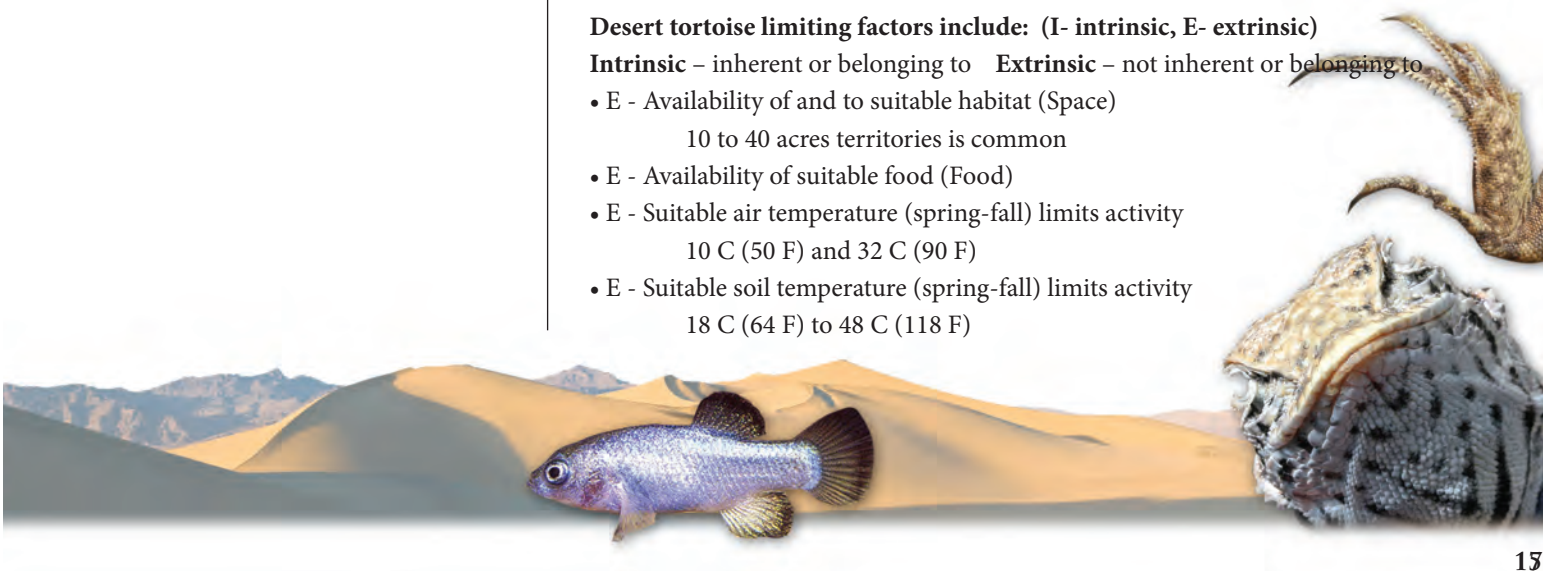
Definition:

Limiting Factor

• A factor whose ***absence*** exerts influence upon a population and may be responsible for no growth, limited growth (decline), or rapid growth.
• A factor present in an environment in such ***short supply*** that it limits growth or some other life process.
• A ***requirement*** such a food, cover or territory within a community of related species that is in shortest supply with respect to all resources necessary to sustain life and thus "limits" the size or retards production of a organisms population.
• One factor that controls a process, such as organism growth or species population size or distribution

Desert tortoise limiting factors include: (I- intrinsic, E- extrinsic)
Intrinsic – inherent or belonging to **Extrinsic** – not inherent or belonging to

• E - Availability of and to suitable habitat (Space)
10 to 40 acres territories is common
• E - Availability of suitable food (Food)
• E - Suitable air temperature (spring-fall) limits activity
10 C (50 F) and 32 C (90 F)
• E - Suitable soil temperature (spring-fall) limits activity
18 C (64 F) to 48 C (118 F)



Definition: *(continued)*

- E- Presence of soil suitable for digging burrows (Shelter)
  - Under bushes (summer shelters)
  - Banks of washes (winter shelters)
- E- Suitable wintering sites (Space & Shelter)
  - Low recruitment rate
- I – Health
  - Desert tortoises are sensual organisms (physical contact, face to face is common) within their populations; diseases spread quickly
- I -Clutch size
  - Low clutch size
- I -Time to maturity
  - Take 15-40 years to reach sexual maturity in the wild
- E - Predation (by burrowing and non burrowing species)
- E – Predation (High mortality of eggs and hatchlings up until the age of 5 years)

Teacher Materials Needed:

4 Cones
2 Hula-hoops

Materials in kit:

Identity Cards for Limiting Factors
Clothespins
Ping Pong Balls
Jump Rope
Poker Chips

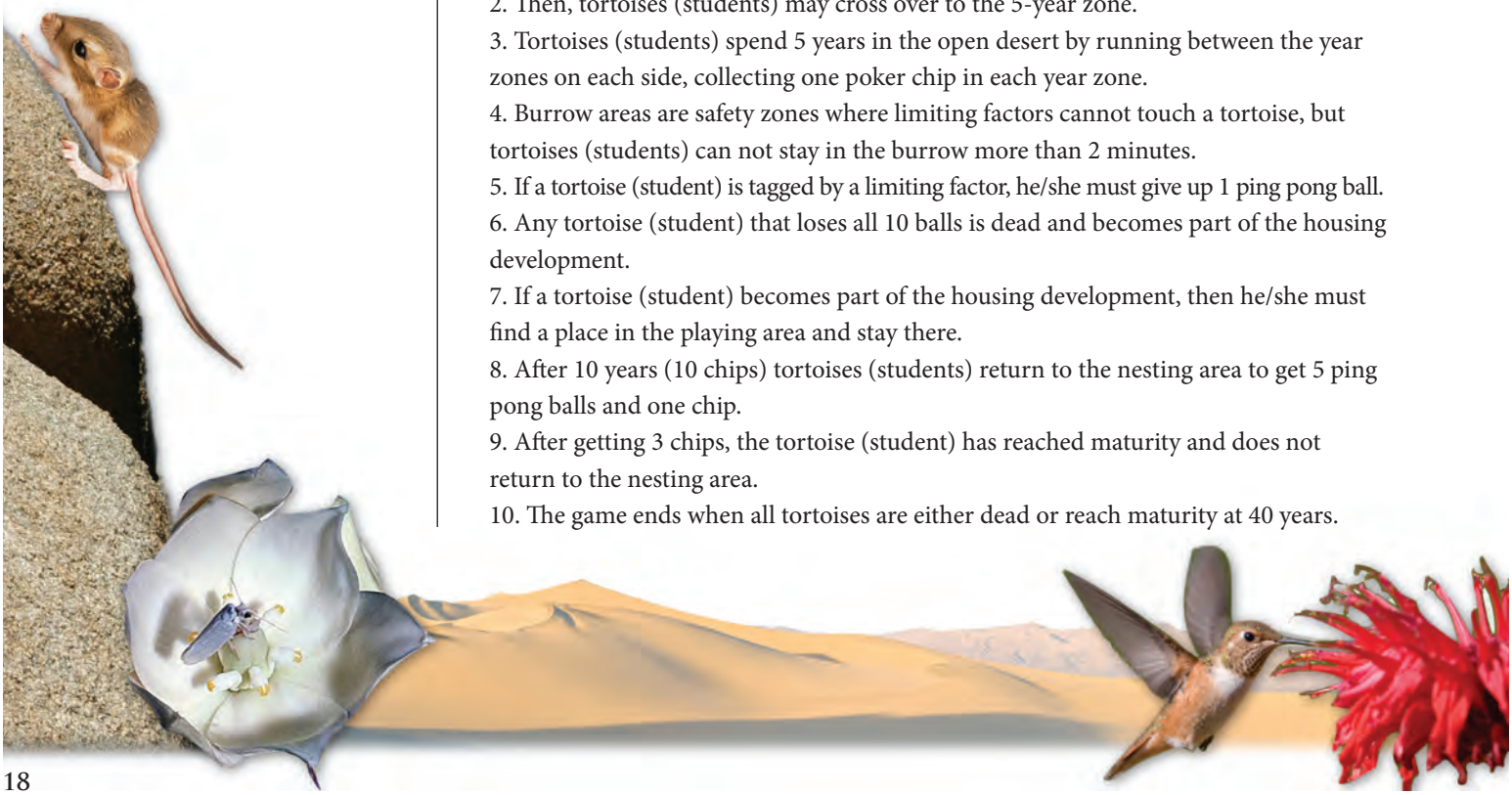
(see map of area to set up the game)

Activity:

- Review the term ***habitat***, and what the desert tortoise needs in order to survive in a healthy habitat. Use the student-created Tortoise Mobile of Needs.
- Divide the class in half - one group will receive bags with 10 ping pong balls each, the other group will receive a limiting factor card (groups switch after first round).
- Explain the rules

Tortoise Rules:

1. Tortoises (students) must "hatch" and go between the year zones on the hatching side 5 times, collecting one poker chip in each year zone.
2. Then, tortoises (students) may cross over to the 5-year zone.
3. Tortoises (students) spend 5 years in the open desert by running between the year zones on each side, collecting one poker chip in each year zone.
4. Burrow areas are safety zones where limiting factors cannot touch a tortoise, but tortoises (students) can not stay in the burrow more than 2 minutes.
5. If a tortoise (student) is tagged by a limiting factor, he/she must give up 1 ping pong ball.
6. Any tortoise (student) that loses all 10 balls is dead and becomes part of the housing development.
7. If a tortoise (student) becomes part of the housing development, then he/she must find a place in the playing area and stay there.
8. After 10 years (10 chips) tortoises (students) return to the nesting area to get 5 ping pong balls and one chip.
9. After getting 3 chips, the tortoise (student) has reached maturity and does not return to the nesting area.
10. The game ends when all tortoises are either dead or reach maturity at 40 years.



Limiting Factor Rules:

11. Limiting Factor students cannot tag the same tortoise twice in a row.
12. Limiting Factor students cannot tag tortoises handing a ping pong ball to another Limiting Factor student – students must stay at least 4 steps away from one another

Limiting Factors:

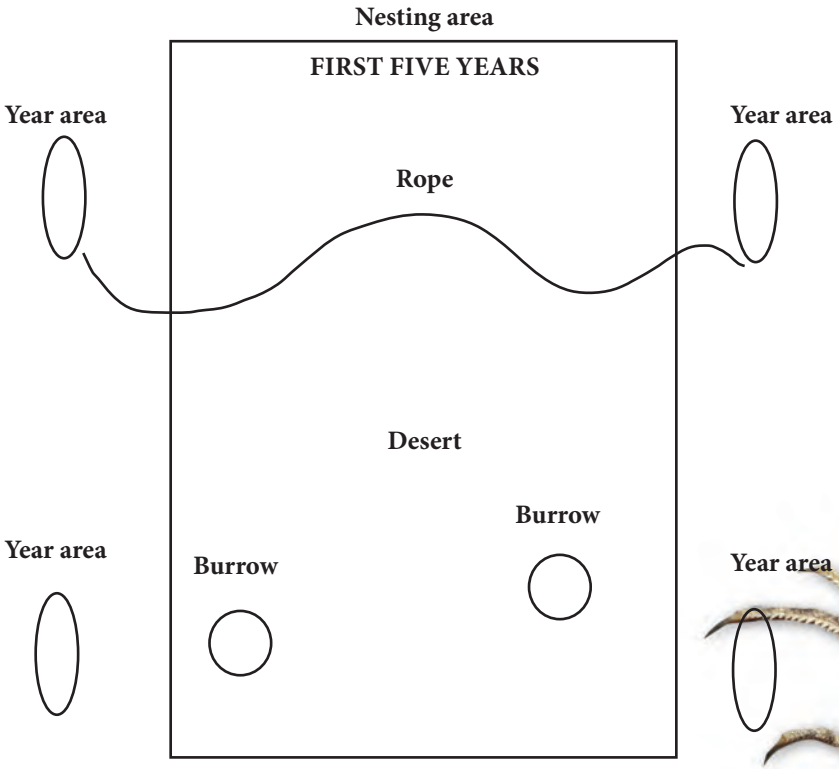
Human Factors	**Natural Factors**
Vehicles on Roadways (2)	Ravens (2)
Dogs (1)	Coyotes (2)
Disease (2)	Birds of Prey (1)
Off-road vehicles (1)	Red Harvester Ants (1)
Making Pets of Wild Tortoise (1)	
Poachers (1)	
Raven from landfill (1)	
Trash/Balloons (1)	

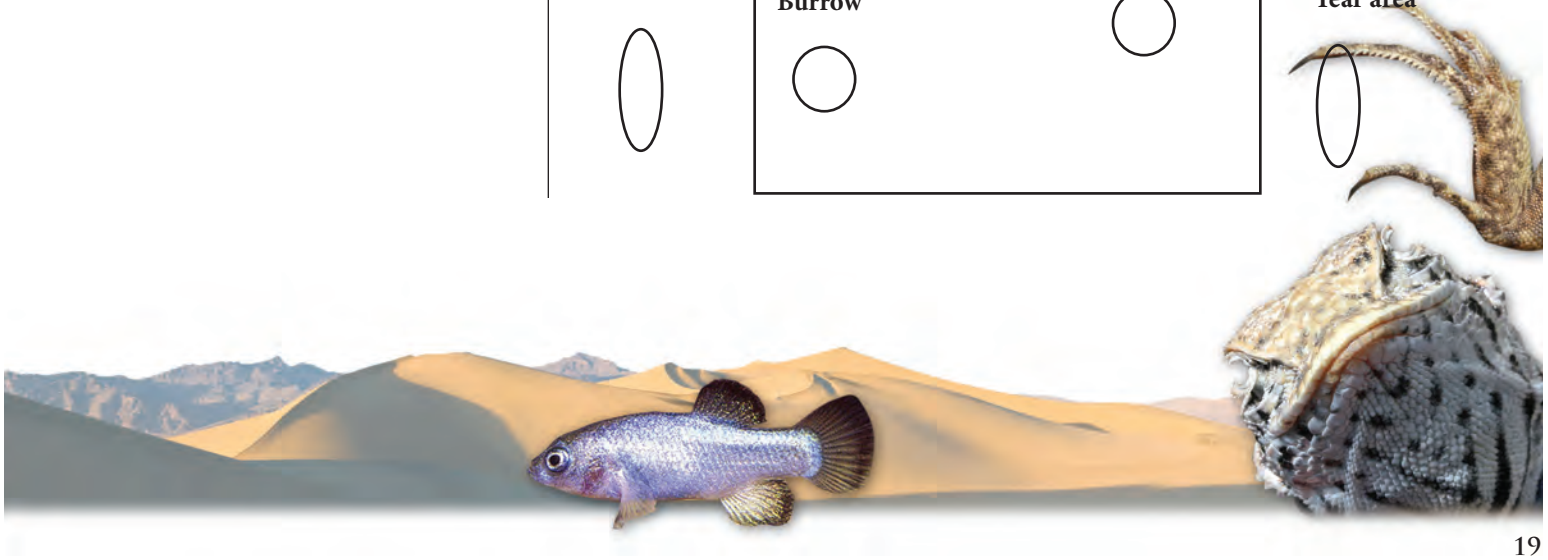
Have students switch roles after one round.

Discussion:

1. What did students notice was happening?
2. What would happen if all the tortoises survived? (overpopulation and loss of habitat)
3. Why do tortoises lay so many eggs? (increases odds of species survival)
4. What is the difference between human factors and natural factors?
5. Why do we want to reduce some factors? (to help the species survive)

MAP OF ACTIVITY





Extensions:

Have students research more information on-line about tortoise and other animals. Have students create a shoebox habitat of a desert animal.

Learn more about Deserts and Desert Animals @

- *http://www.nps.gov/jotr/nature/animals/reptiles/tortoise/tortoise.html*
- *http://www.girlsfirst.org/members/tortoise.pdf*
- *http://www.joshuatreevillage.com/229/kidst.htm*
- *http://creec.edgateway.net/cs/creec7p/view/creec_res/1095*
- *http://www.sdcoe.k12.ca.us/score/desert/deserttg.html*
- *http://www.lewiscenter.org/users/mhuffine/subprojects/tortoise_terrace/trackingkey.pdf*
- *http://www.uen.org/Lessonplan/preview.cgi?LPid=618*
- *http://www.fws.gov/nevada/desert_tortoise/dt_help.html*
- *http://library.thinkquest.org/26634/desert/introf.htm*
- *http://arthur.k12.il.us/arthurgs/desanim.htm*
- *http://teachers.net/lessons/posts/277.html*
- *http://www.ed.uiuc.edu/YLP/Units/Curriculum_Units/95-96/Desert_SPerri/table_contents.html*

Desert Song

Theme/Concept:

Many animals survive in the desert by adapting to the harsh environment of the desert.

Goals:

Students will understand that different plants and animals use different adaptations to survive in the desert environment

Objectives:

- Students will be able to name several ways that different animals survive in the desert.
- Students will be able to name several ways that humans impact the desert environment and the animals that live in it.

Fifth Grade Science Standards:

Life Sciences:

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:

a. Students know many multicellular organisms have specialized structures to support the transport of materials.

b. Students know how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO_2) and oxygen (O_2) are exchanged in the lungs and tissues.

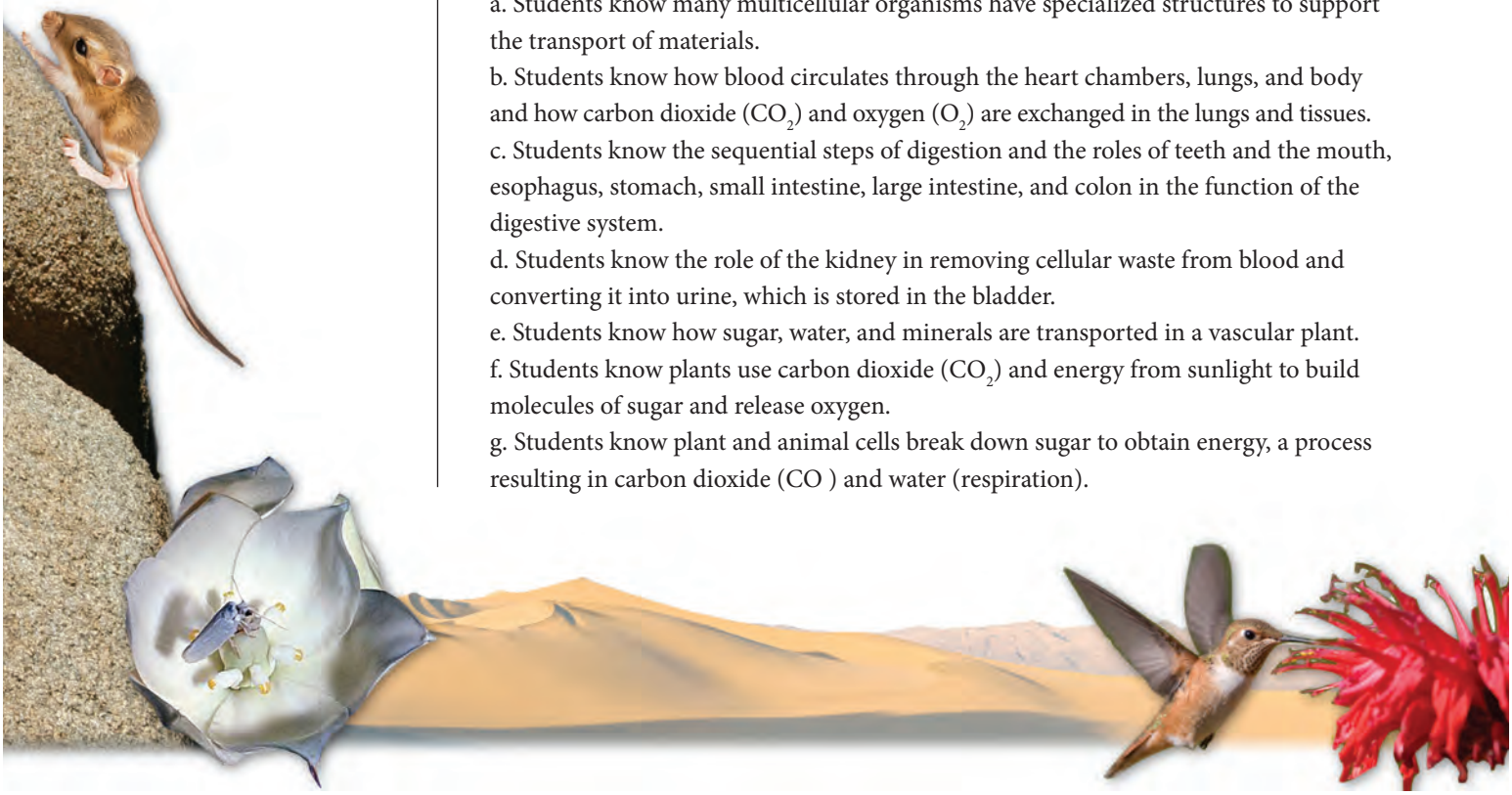
c. Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.

d. Students know the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder.

e. Students know how sugar, water, and minerals are transported in a vascular plant.

f. Students know plants use carbon dioxide (CO_2) and energy from sunlight to build molecules of sugar and release oxygen.

g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO) and water (respiration).



Sixth Grade Science Standards: Ecology (Life Sciences)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:
a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.
b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.
d. Students know different kinds of organisms may play similar ecological roles in similar biomes.
e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

Teacher Materials Needed:

None

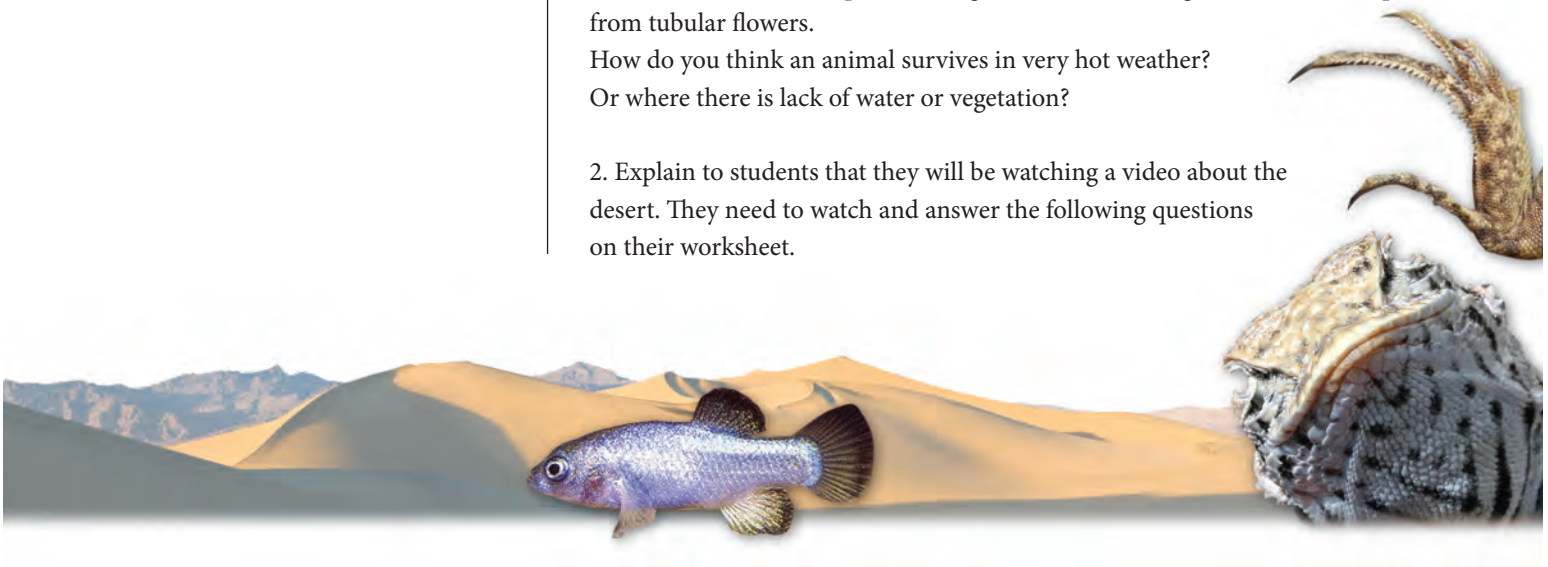
Materials in kit:

Worksheet: Desert Song
Desert Song Video

Activity:

1. Before Watching the Video have students answer the following questions on their worksheet.
What is a desert? (A desert is a place that gets less than 10 inches of precipitation annually.)
Where is the Mojave Desert located? (The Mojave Desert is located in California, Nevada, Arizona and Utah.)
Define adaptation. (An adaptation consists of a characteristic or characteristics that assist an organism to survive in its environment.)
Types of adaptations:
Behavioral - the way an organism behaves to survive in its environment. For example: the desert tortoise makes burrows to escape the heat or cold.
Physiological – biochemical reactions present in an organism's body that allows it to survive in its environment. For example: Kangaroo Rats retain water and secrete only uric acid instead of urine.
Morphological (Structural) – special body parts that help an organism survive in its environment. For example: The long beak of a hummingbird allows it to sip nectar from tubular flowers.
How do you think an animal survives in very hot weather?
Or where there is lack of water or vegetation?

2. Explain to students that they will be watching a video about the desert. They need to watch and answer the following questions on their worksheet.



Activity: *(continued)*

1.) What do some animals do to protect themselves from the desert heat? (Some answers could include: desert tortoises digging burrows, cottontails, roadrunners and other animals finding shade under shrubs, fringe-toed lizard "swims" in the sand to protect himself from the heat, the scorpion and desert night lizard coming out at night during the summer to feed.)

2.) How have some animals adapted to the desert? (Some answers could include: Kangaroo rats don't urinate to conserve water; fringed-toed lizards have adaptable toes to move across the sand, pupfish can survive in water with a temperature over 100 degrees.)

3.) What impacts do humans have on the desert environment and the animals that live in it? (Some answers could include: Human interaction can disturb the desert's fragile ecosystem – motorbikes and building homes; animals can be deafened by the sound of dirt bikes.)

Desert Song Video – Animals and Adaptations Teachers' Page
Part I
Scorpions – stays under rocks during the heat of the day and comes out at night to feed

Desert Tortoises – the shell is used as protection, uses his burrow to escape the heat during the day, can fast during periods when there is little food/water - stores water and body fat for several months after eating

Roadrunner – is a ground dwelling animal so uses its speed (20 mph) to run from predators, conserves energy by lowering temperature at night and during the day roadrunners bask in the sun to restore lost heat

Fringe-toed lizard – scales on its toes assist him in moving on the sand, he also "swims" underneath the sand to escape the desert heat

Sidewinders – he has adapted to moving over the dunes by crawling sideways

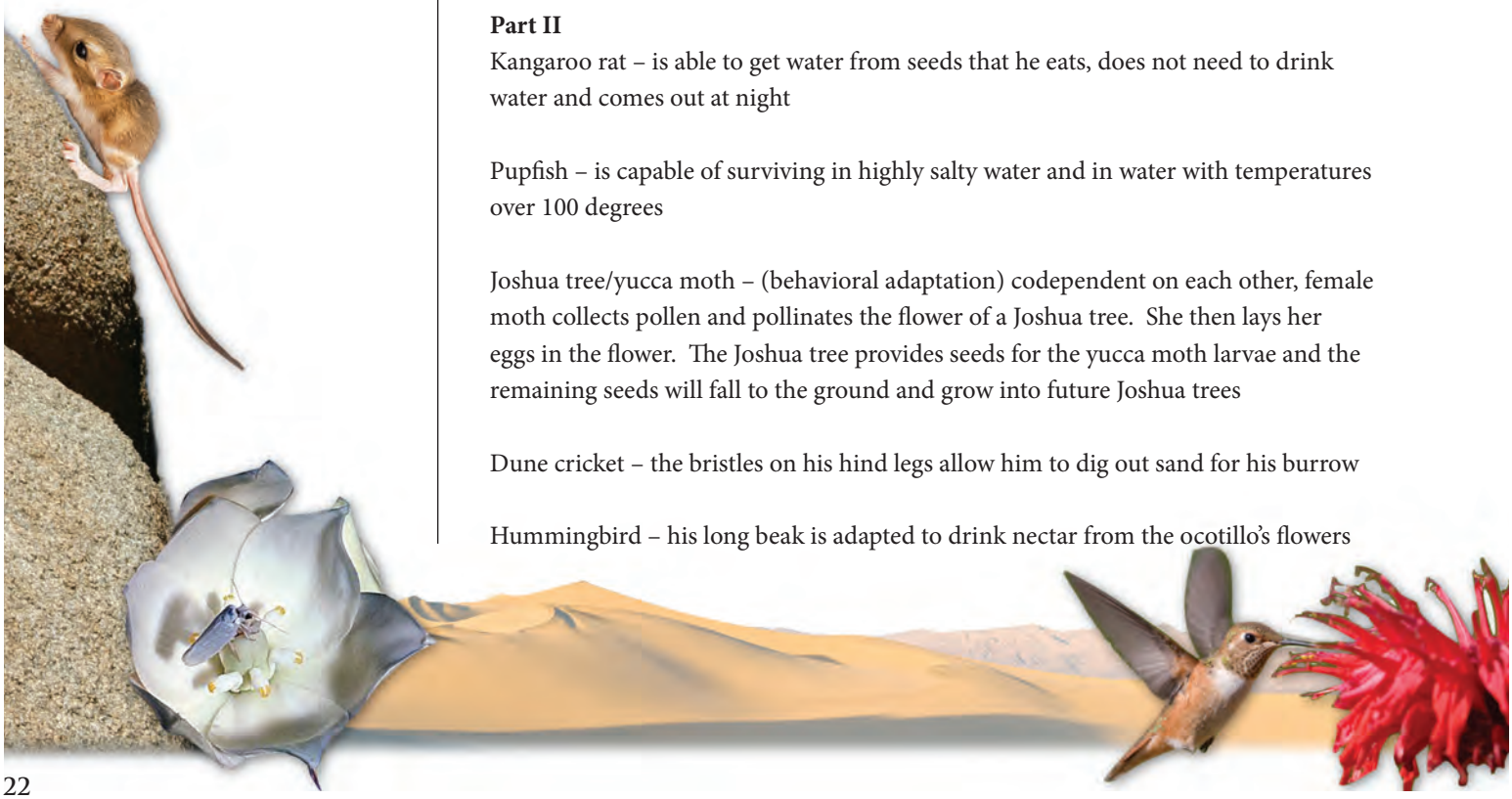
Part II
Kangaroo rat – is able to get water from seeds that he eats, does not need to drink water and comes out at night

Pupfish – is capable of surviving in highly salty water and in water with temperatures over 100 degrees

Joshua tree/yucca moth – (behavioral adaptation) codependent on each other, female moth collects pollen and pollinates the flower of a Joshua tree. She then lays her eggs in the flower. The Joshua tree provides seeds for the yucca moth larvae and the remaining seeds will fall to the ground and grow into future Joshua trees

Dune cricket – the bristles on his hind legs allow him to dig out sand for his burrow

Hummingbird – his long beak is adapted to drink nectar from the ocotillo's flowers



Extensions:

Have students do research on one animal or plant that lives in the desert for the type of adaptations and present to the group.

Eco-Blocks – Understanding the Importance of a Healthy, Cohesive Ecosystem

Theme/Concept:

For everything taken out of an ecosystem there is an effect on the system as a whole.

Goals:

Students will understand that for an ecosystem to be healthy and cohesive, the organisms within the ecosystem must be present and healthy.

Objectives:

- Students will be able to understand that everything has a place in an ecosystem.
- Students will be able to see that when we remove an organism from an ecosystem, it causes the system to try and balance out until it can no longer do it, eventually causing the ecosystem to collapse or fail in some way.

Fifth Grade Science Standards: Life Sciences

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:
a. Students know many multicellular organisms have specialized structures to support the transport of materials.
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g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO) and water (respiration).

Sixth Grade Science Standards: Ecology (Life Sciences)

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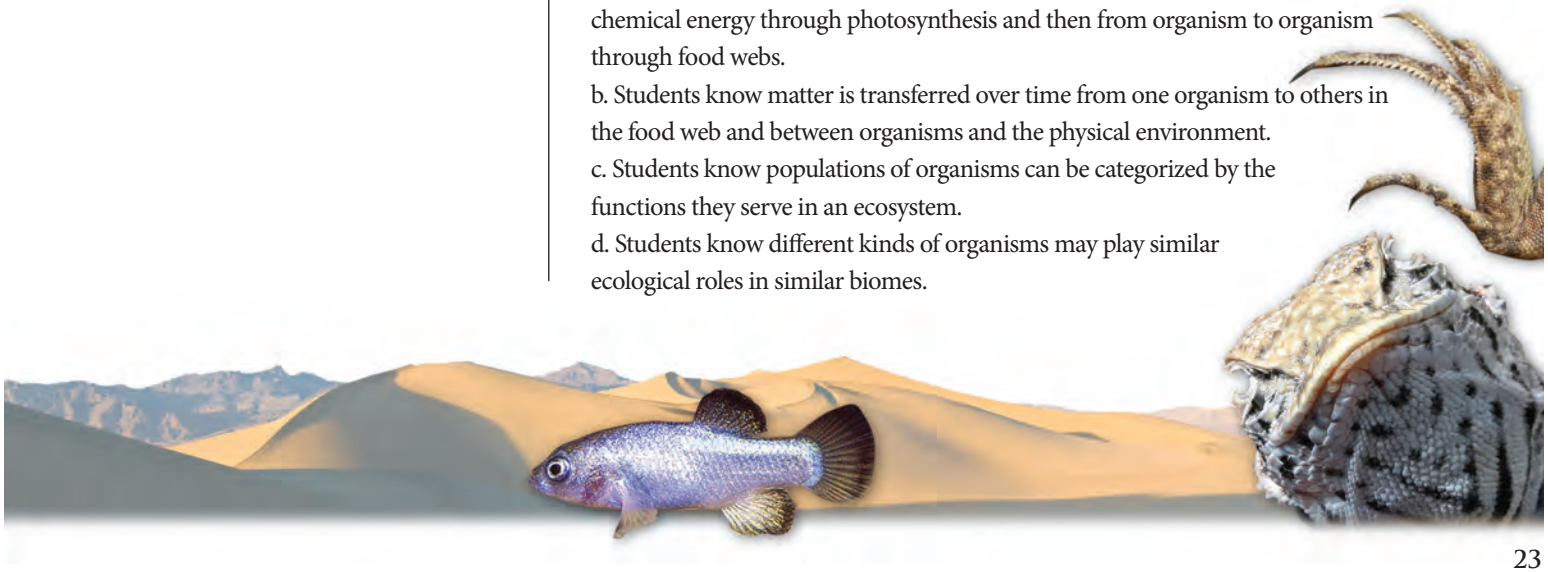


e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

Teacher Materials Needed:

none

Materials in kit:

Blocks set up in a tower, 3 by 3 going opposite ways
Eco Cards

Activity

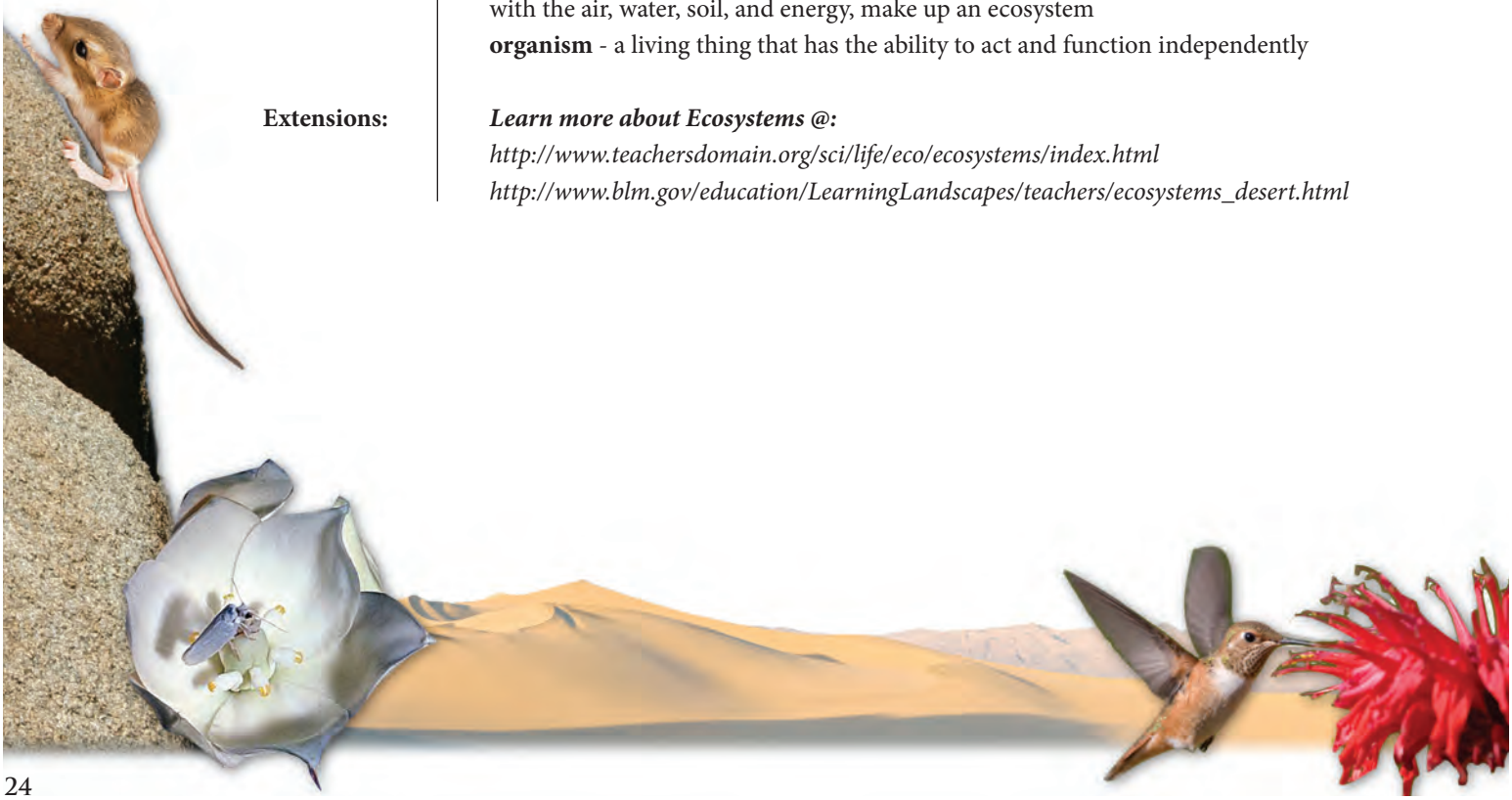
• Explain to students that they will be playing a game called Eco-Blocks, similar to the more popular game, Jenga. Set up the block tower. Place the lid on top of tower.
• Pass out one card to each student. Explain to students that they will come up one at a time to pull a block from the tower, and place it above the lid (no one can take a block from above the lid). When removing a block, each student reads his/her individual card. This card represents something that is being removed from the desert ecosystem. (Tortoise = animals Rock = non plants/animals, Leaf = plants). The back side of the card has something that is causing a negative affect on the ecosystem. When students put their block on top of the lid, they need to read the side of the card that states the negative affect.
• Play the game until the tower falls. If all the students have not had a turn, ask them read their cards out loud for the class.
• Ask students for reasons as to why the tower fell. Ask students how important each of the things were to the ecosystem. Did removing just one block cause the tower to fall, or was it caused by removing all the blocks? What did the remaining blocks have to do each time another block was removed? The blocks represent the ecosystem. Everything is connected. If we remove one component from an ecosystem, it impacts other pieces within the ecosystem. The ecosystem attempts to balance every time a piece is removed until it can no longer do so. Eventually the ecosystem becomes unhealthy, fails or collapses in some way.

Definitons:

ecosystem - The combined habitats and communities, as well as their relationship with the air, water, soil, and energy, make up an ecosystem
organism - a living thing that has the ability to act and function independently

Extensions:

Learn more about Ecosystems @:
http://www.teachersdomain.org/sci/life/eco/ecosystems/index.html
http://www.blm.gov/education/LearningLandscapes/teachers/ecosystems_desert.html



Stepping Stone Tortoise

Theme/Concept: Captive tortoises and wild tortoises need different things to survive.

Goals: Students will create a "keepsake-remembrance" of their desert tortoise studies unit to keep at home.

Objectives: Students will be able to brainstorm what wild desert tortoises' need to survive
Students will be able to brainstorm what captive desert tortoises need to survive

Fifth Grade Standards

Science:

Life Science: 2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials.
a. Students know many multi-cellular organisms have specialized structures to support the transport of materials.
Earth Science: 3. Water on Earth moves between the oceans and land through the processes of evaporation and condensation.
d. Students know that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.
4. Energy from the Sun heats Earth unevenly, causing air movements that result in changing weather patterns.
c. Students know the causes and effects of different types of severe weather.

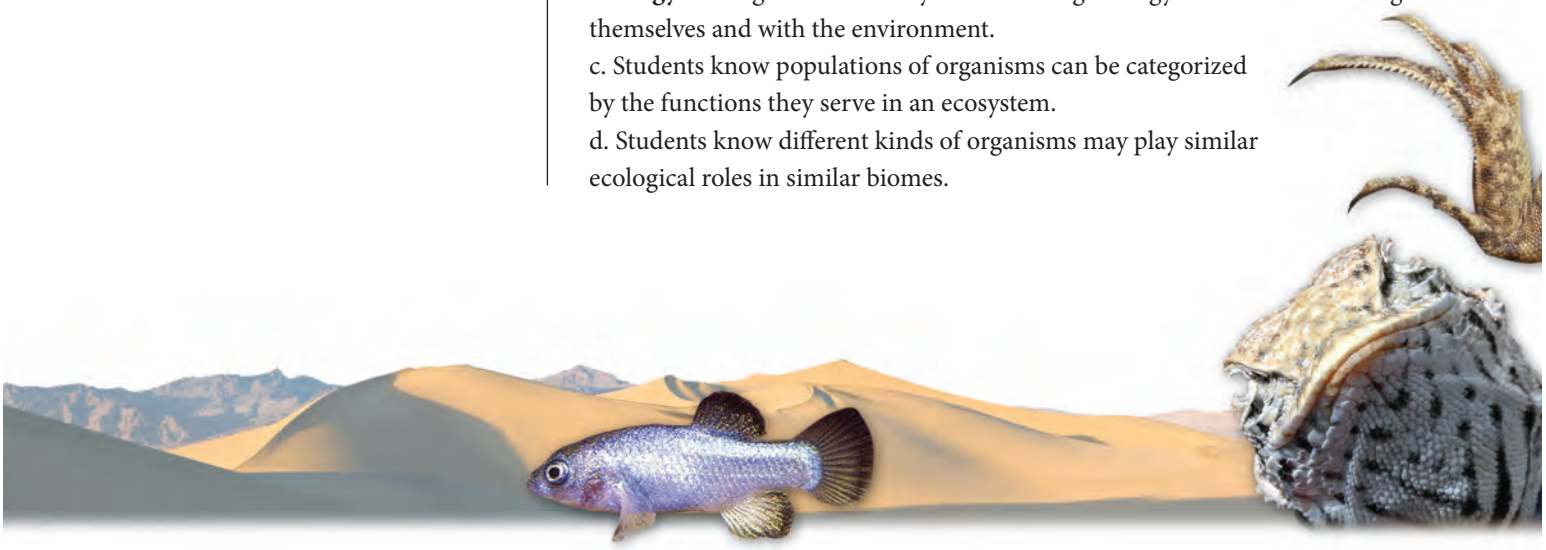
Language Arts:

1.0 Written and Oral English Language Conventions Students write and speak with a command of standard English conventions appropriate to this grade level.
Sentence Structure 1.1 Identify and correctly use prepositional phrases, appositives, and independent and dependent clauses; use transitions and conjunctions to connect ideas.
Grammar 1.2 Identify and correctly use verbs that are often misused (e.g., lie/lay, sit/set, rise/raise), modifiers, and pronouns.
Punctuation 1.3 Use a colon to separate hours and minutes and to introduce a list; use quotation marks around the exact words of a speaker and titles of poems, songs, short stories, and so forth.
Capitalization 1.4 Use correct capitalization.
Spelling 1.5 Spell roots, suffixes, prefixes, contractions, and syllable constructions correctly.

Sixth Grade Standards:

Science:

Ecology: 5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment.
c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.
d. Students know different kinds of organisms may play similar ecological roles in similar biomes.



Sixth Grade Standards:
Science: *(continued)*

e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

Language Arts:

1.0 Written and Oral English Language Conventions Students write and speak with a command of standard English conventions appropriate to this grade level.
Sentence Structure 1.1 Use simple, compound, and compound-complex sentences; use effective coordination and subordination of ideas to express complete thoughts.
Grammar 1.2 Identify and properly use indefinite pronouns and present perfect, past perfect, and future perfect verb tenses; ensure that verbs agree with compound subjects.
Punctuation 1.3 Use colons after the salutation in business letters, semicolons to connect independent clauses and commas when linking two clauses with a conjunction in compound sentences.
Capitalization 1.4 Use correct capitalization.
Spelling 1.5 Spell frequently misspelled words correctly (e.g., their, they're, there).

Teacher Materials Needed:

For this activity, self hardening/air dry clay or Model Magic Naturals, an air dry modeling clay can be used. This clay is sold at Michael's and other stores.
See the website below for ordering:
http://www.michaels.com/art/online/displayProductPage?productNum=kd0814

***Clay Tiles** with etched desert tortoises could also be made using a glued on magnet to make a fridge magnet*

Materials in kit:

None

Activity:

1. Brainstorm with students a list of what wild desert tortoises' need to survive. Brainstorm with students a list of what captive desert tortoises need to survive.
2. Stepping stones can be made using deep dish pie pans, or use muffin pans for paper weights.
3. Plaster of Paris: mix plaster, pour into pans, and let it set.
4. Draw or trace a desert tortoise onto a stepping stone and decorate. Take them home as a reminder of the desert tortoise.

OR

For cost effective method use flour/salt clay:
1 Part Salt, 2 Parts Flour, 1 Part Water
Mix and knead all the ingredients for about 2 minutes. Mold the clay into creations. Place them on a foil-covered cookie sheet, prick larger areas with a fork. Bake at 275 degrees Fahrenheit (140 degrees Celsius) for about 1 hour or until golden and hard. Cool and paint. Preserve by spraying with clear varnish.

Extensions:

1. Students can research more about desert tortoises at their local libraries or online.