

Activity Flow for the 5th/6th Grade Desert Tortoise Education Trunk



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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:

During this activity, students will discuss ethics concerning the desert and the desert tortoise.

Goals:

Students' goal during this activity is to gain an understanding of, and appreciation for, appropriate interaction with the desert landscape and organisms in the desert landscape, specifically the desert tortoise.

Objectives:

Upon successful completion of this activity, students will be able to:

- Explain appropriate human interaction with a desert tortoise in the wild.
- Explain how human activity can negatively impact the desert tortoise.

FIFTH GRADE STANDARDS:

Next Generation Science Standards:

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

SIXTH GRADE STANDARDS:

Next Generation Science Standards:

MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

Teacher Resources:

- <http://www.deserttortoise.org/answeringquestions/chapter3-1.html>
- <http://www.desertusa.com/reptiles/tortoise-rescue.html>
- <http://www.blm.gov/ca/st/en/fo/cdd/deserttortoise.html>

Teacher Materials Needed

- 8 chairs

Materials in kit:

- Leash
- Binoculars

It's the Desert - Role Playing Desert Ethics

- 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. (Script begins on the following page)

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

It's the Desert - Role Playing Desert Ethics

SCRIPT

Characters: (*Names can be changed for male or female.*)

News writer: Nick/Nancy

Global: Gary/ Gloria

Champion: Charles/Chelsea

Snoopy: Sam/Sandra

Student 1

Student 2

Student 3

Ranger (can have 2)

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.

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 sea 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?

It's the Desert - Role Playing Desert Ethics

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?

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.

It's the Desert - Role Playing Desert Ethics

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 animal lives there but he could have injured or killed the animal. Or, he could have gotten hurt.

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.

It's the Desert - Role Playing Desert Ethics

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?

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.

It's the Desert - Role Playing Desert Ethics

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.

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.

It's the Desert - Role Playing Desert Ethics

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.

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.

It's the Desert - Role Playing Desert Ethics

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.

THE END

Habitat Map

Theme/Concept:

During this activity, students will identify the habitat of the desert tortoise in the Pacific Southwest.

Goals:

Students' goals during this activity are to

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

Objectives:

Upon successful completion of this activity, students will be able to:

- List facts and important information on the desert tortoise.
- Identify what a desert tortoise needs to survive.
- Identify what is causing the extinction of the desert tortoise in the wild.

FIFTH GRADE STANDARDS:

Next Generation Science Standards:

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

SIXTH GRADE STANDARDS:

Next Generation Science Standards:

MS-LS1-4: Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

Teacher Materials Needed

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

Habitat Map

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. Lay the vinyl sheet on the floor for students to add their drawings to.
6. 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 (the filled in vinyl floor mat) 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:

During this activity, students will learn that 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:

Students' goal during this activity is to understand the needs of the desert tortoise.

Objectives:

Upon successful completion of this activity, students will be able to:

- Differentiate between a need and a want.
- Identify what a tortoise needs in its habitat in order to survive.

FIFTH GRADE STANDARDS:

Next Generation Science Standards:

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

SIXTH GRADE STANDARDS:

Next Generation Science Standards:

MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

Teacher Materials Needed

- 1 Shoebox per student or group
- Paper
- Construction Paper
- Scissors
- Crayons/Coloring Pencils
- Craft Googly Eyes
- Glue

Materials in kit:

- None

Activity:

1. Students should research different animals that live in the desert and have an understanding of how they survive.
2. Students make a list of needs for 2-3 animals.
3. 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)

Desert in a Shoebox

4. 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 you are building.
5. Collect up to ten rocks, they should not be longer than 1 1/2 inches. Think about the animals found in this habitat as you collect. (Nut shells and/or nuts may also be used).
6. Pass out googly eyes (smallest size) along with yarn (tails), and paper (feet or wings). Have the students 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.
7. If students are working in groups, have them discuss their suggestions about their habitat before they glue anything. Students can glue items and animals into their habitat to form it. (Teachers should 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.
2. Students can write a brief summary (similar to what you would find in a museum diorama exhibit) to go along with their desert scene.
3. Students can write a short story about their diorama.
4. Students can research how their desert animal may impact the desert tortoise.

Tortoise Mobile of Cause and Effect

Theme/Concept:

During this activity, students will identify what is causing the demise of the desert tortoise.

Goals:

Students' goal during this activity is to become aware of the reasons that the desert tortoise is listed on the Endangered Species List as a threatened species.

Objectives:

Upon successful completion of this activity, students will be able to:

- Identify cause and effect relationships in relation to the desert tortoise and its environment.
- List three reasons that the desert tortoise is threatened.
- Identify how different factors affect the desert tortoise.

FIFTH GRADE STANDARDS:

Next Generation Science Standards:

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

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.

SIXTH GRADE STANDARDS:

Next Generation Science Standards:

MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

Tortoise Mobile of Cause and Effect

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.

Tortoise Mobile of Cause and Effect

Example:

Tortoise	
Cause	Effect
Poaching, Fire, Predators	Extinction
Urban growth	Habitat Loss/Fragmentation
Release of Captive Tortoises	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:

During this activity, students will learn that the survival of a species depends on how safely it can move around within its environment over time.

Goals:

Students' goal during this activity is to become aware of the limiting factors affecting the survival of desert tortoises.

Objectives:

Upon successful completion of this activity, students will be able to:

- Name something that can cause desert tortoises to die.
- Name something that can cause an accumulation of stressors that could lead to the death of a desert tortoise.

FIFTH GRADE STANDARDS:

Next Generation Science Standards:

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

SIXTH GRADE STANDARDS:

Next Generation Science Standards:

MS-LS1-4: Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

For 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.*

Tortoise Trails

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)
- 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 - to represent the year zones
- 2 Hula-hoops - to represent the burrow, safe zones

Materials in kit:

- Laminated Identity Cards Limiting Factors
- Laminated Identity Cards for Tortoises
- Clothespins (to attach identity cards to students clothing)
- Ping Pong Balls
- Rope - divider between the First Five Year zone and the Desert zone
- 3 bags of Poker Chips (white, blue, and red chips)

Tortoise Trails

Activity: (see map of area to set up the game)

- 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 (groups will switch after first round)
 - One group will be the “Tortoises” and one group will be the “Limiting Factors”
 - The “Tortoise” students will receive:
 1. A laminated Tortoise # card and clothespin (to attach card to their shirt)
 2. The corresponding labeled Tortoise # bag with 10 ping pong balls in it
 - The “Limiting Factor” students will receive:
 1. A laminated Limiting Factor card and clothespin (to attach card to their shirt)
 2. An empty canvas bag for collecting ping pong balls in, the other group will receive a limiting factor card and an empty bag for collecting ping pong balls

- Explain the rules

Tortoise Rules:

1. “Tortoises” (students with bags of ping pong balls) must “hatch” (cross into the field of play from the “Nesting Area”) and attempt to cross the “First Five Years” zone 5 times, while avoiding being tagged by “Limiting Factor” students.
 - Each time a Tortoise make it across the “First Five Years” zone, they collect one white poker chip.
2. Once the “Tortoises” have accumulated 5 white poker chips, they may cross over to the “Desert” zone.
3. Tortoises spend 5 years in the open “Desert” zone. During this time, “Tortoises” attempt to cross between the year zones on either side of the “Desert” zone, while avoiding being tagged by “Limiting Factor” students.
 - “Tortoises” will collect one blue poker chip each time they successfully cross the “Desert” from one year zone to the other year zone.
 - Burrow areas are safety zones, where “Limiting Factor” students cannot touch a “Tortoise”, but “Tortoises” cannot stay in the burrow for more than 2 minutes at a time.
4. When/if a “Tortoise” is tagged by a “Limiting Factor” student (in either zone of the field of play), he/she must give up 1 ping pong ball to the “Limiting Factor” student.
5. Any “Tortoise” that loses all 10 balls is dead, and becomes part of a housing development.
 - If a “Tortoise” becomes part of the housing development, then he/she must find a place in the playing area and stay there.
6. After “Tortoises” have reach 10 years old (collected 5 white and 5 blue chips), they return to the nesting area to collect 5 more ping pong balls, and they will turn in their 10 chips and receive one red chip, indicating 10 years of life.

Tortoise Trails

7. “Tortoises” must then return to the “Desert” zone and continue to play, attempting to reach 20 years of age (1 red chip and 10 blue chips). When a “Tortoise” reaches 20 years of age, they return to the nesting area to once again collect 5 more ping pong balls and one red chip (by turning in 10 blue chips).
8. This is repeated a third time when a “Tortoise” reaches 30 years of age (2 red chips and 10 blue chips).
9. After collecting 3 red chips, the “Tortoise” has reached maturity and does not return to the nesting area.
10. The game ends when all “Tortoises” are either dead (run out of ping pong balls), or reach maturity at 40 years (3 red chips and 10 blue chips).

Limiting Factor Rules:

11. “Limiting Factor” students will move about the playing field tagging “Tortoises” (students).
12. When a “Limiting Factor” student tags a “Tortoise,” the “Tortoise” will give them one ping pong ball. “Limiting Factor” students can carry their collected ping pong balls in their collection bag.
13. “Limiting Factor” students cannot tag the same tortoise twice in a row.
14. “Limiting Factor” students cannot tag tortoises handing a ping pong ball to another “Limiting Factor” student.
15. “Limiting Factor” students must stay at least 4 steps away from one another.

Limiting Factors

Human Factors

- Vehicles on Roadways (2)
- Dogs (1)
- Disease (2)
- Off-road vehicles (1)
- Making Pets of Wild Tortoise (1)
- Raven from landfill (1)
- Trash/Balloons (1)

Natural Factors

- Ravens (2)
- Coyotes (2)
- Birds of Prey (1)
- Red Harvester Ants (1)
- Poachers (1)

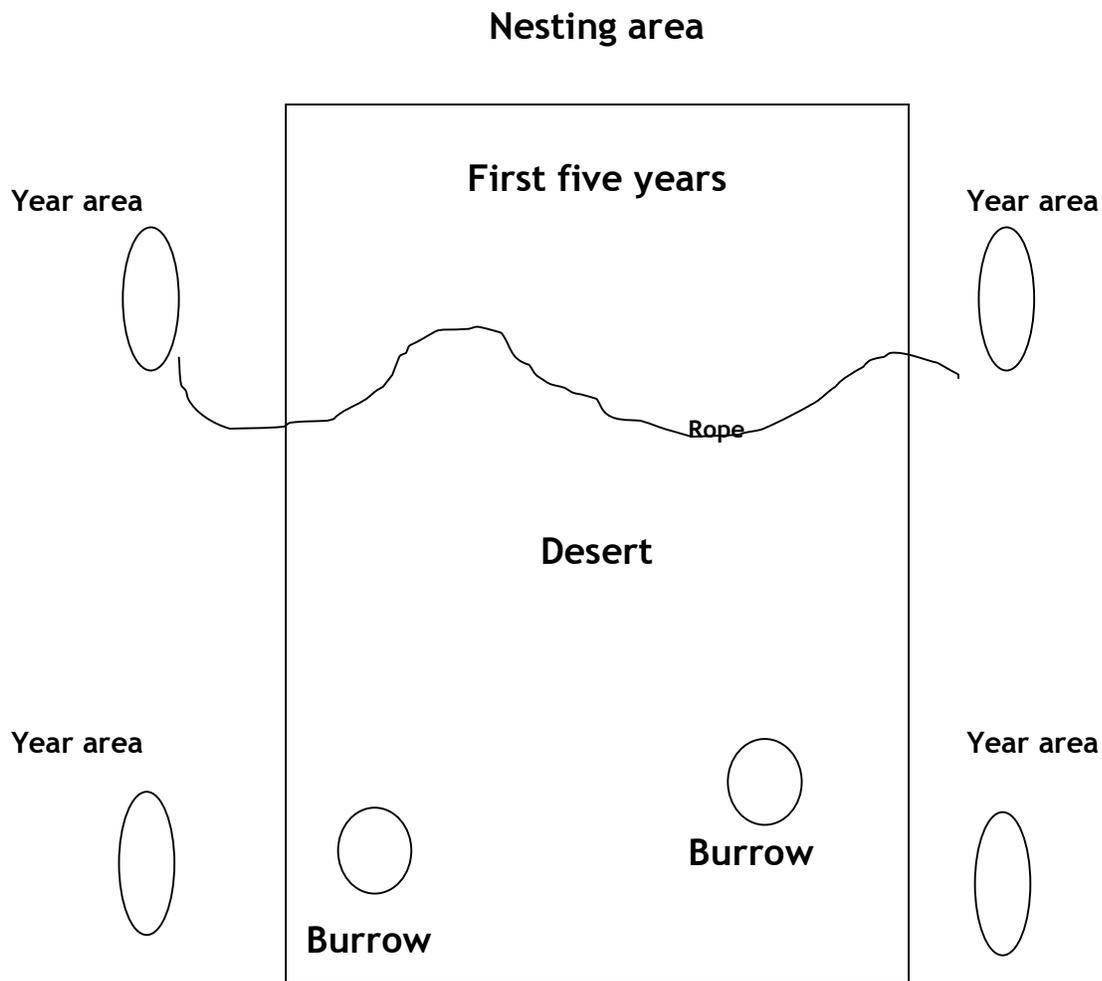
- Have students switch roles after one round

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)

Tortoise Trails

Map of Play Area Set-up



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 at:

- <http://www.nps.gov/jotr/learn/nature/reptiles.htm>
- <http://www.joshuatreevillage.com/229/kidst.htm>
- <http://www.creec.org/>
- <http://www.lewiscenter.org/Local-Programs/Tortoise-Terrace/index.php>
- <http://www.uen.org/Lessonplan/preview.cgi?LPid=618>
- <http://ecos.fws.gov/speciesProfile/profile/speciesProfile?spcode=C04L>
- <http://teachers.net/lessons/posts/277.html>

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

Theme/Concept:

During this activity, students will learn that for everything taken out of an ecosystem there is an effect on the system as a whole.

Goals:

The students' goal during this activity is to understand that for an ecosystem to be healthy and cohesive, the organisms within the ecosystem must be present and healthy.

Objectives:

Upon successful completion of this activity, students will be able to:

- Understand that everything has a place in an ecosystem.
- 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 so, eventually causing the ecosystem to collapse or fail in some way.

5TH GRADE SCIENCE STANDARDS:

Next Generation Science Standards:

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

6TH GRADE SCIENCE STANDARDS:

Next Generation Science Standards:

MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affects populations.

Teacher Materials Needed:

- None

Materials in kit:

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

Eco-Blocks

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.
- 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 labeled with whatever category is on their Eco-card (*Tortoise = animal, Rock = non-plant/non-animals, Leaf = plant*) and place it on top of the pile.
 - No one can take a block from above the top layer of the initial pile (you can mark this with a strip of paper, etc.)
- When removing a block, each student reads his/her individual card. This card represents something that is being removed from the desert ecosystem.
 - First, have them read the front side of the card containing the name of the item being removed from the ecosystem (side with the symbol on it)
 - Second, have them read the back of the card. The back side contains a negative impact that either; (1) contributed to the loss of the item, or (2) was a result from the loss of the item in the ecosystem.
- Play the game until the tower falls. If all the students have not had a turn, ask them to 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 tower represents the ecosystem. The blocks represent components/parts of 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.

Definitions:

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 at:

- http://www.pbslearningmedia.org/search/?q=ecosystems&selected_facets=
- http://www.blm.gov/wo/st/en/res/Education_in_BLM/Learning_Landscapes/For_Teachers/science_and_children/mojave/index.html

Stepping Stone Tortoise

Theme/Concept:

During this activity, students will learn that captive tortoises and wild tortoises need different things to survive.

Goals:

The students' goals during this activity are to understand that captive and wild tortoises have different needs, and to create a "keepsake-remembrance" of their desert tortoise studies unit to keep at home.

Objectives:

Upon successful completion of this activity, students will be able to:

- Identify what wild desert tortoises' need to survive.
- Identify what captive desert tortoises need to survive.

FIFTH GRADE STANDARDS:

Next Generation Science Standards:

This activity does not specifically meet any of the Fifth Grade Next Generation Science Standards, however it does meet Common Core State Standards as listed below.

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:

Next Generation Science Standards:

This activity does not specifically meet any of the Middle School Next Generation Science Standards, however it does meet Common Core State Standards as listed below.

Stepping Stone Tortoise

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.*

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.