LESSON 6

CAN MY HABITAT SURVIVE WITHOUT ME?

GRADE LEVEL: 6

SCIENCE CONCEPT:
The lesson focuses the impact of the disappearance of the turtles and tortoises on the ecosystems that they live in through the concept of conservation.

RELATIONSHIP TO CALIFORNIA SCIENCE CONTENT STANDARDS:
5.b) Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.

LEARNING OBJECTIVES:
Students will explain the transfer of energy in an ecosystem by studying the habitat of a Texas Tortoise.

EVALUATION IDEAS:
Formative:
A. Pair-share about classification of organisms
B. Presentation about the new food web
Summative:
Students will work in pairs to complete a project of their choice.
A. Write a biography about a Texas tortoise from its birth till death and its various experiences with its friends, enemies with respect to the food web.
B. Enact the experiences of a Texas tortoise in its habitat.
C. Interview a Texas Tortoise about it's parents' life.

CONCEPTUAL BACKGROUND:
Ecosystems are the surroundings in which organisms live in. They obtain their food, shelter and other basic needs from the ecosystem that they live in. All organisms that inhabit an ecosystem are inter-dependent on each other, either directly or indirectly. This transfer of energy within an ecosystem ensures the survival of an organism and sustains the ecosystem, in turn. The ecosystem can cease to exist due to various natural reasons or destruction by mankind.

The Texas Tortoise, one of the tortoises native to North America, is a threatened species living in the Texas desert grasslands, mostly in brushy areas. The major cause for its decline is habitat loss owing only to human invasion. At times, it is found several miles outside its natural habitat and can die easily in such a situation. It is a common sight in South Central Texas to see a tortoise crossing a road, miles away from its home. With its main food source of cacti being destroyed the tortoise population is quickly dropping and is slowly beginning to affect the ecosystem.
Another organism that is affected widely due to the destruction of the brushes and antler-hunting is the White-Tailed Deer. Like the Texas Tortoise, it relies on the cacti for its food, although it can survive on grasses, leaves and stems of plants. There has been a decrease in the numbers in this area and the existing deer are now slowly migrating East towards the open plains for their survival.

Post-Lesson: The concept of decomposers in the food web will be reviewed and students will conduct an inquiry on the relationship between the physical environment and the survival of the Texas tortoise. The study can involve to place the Texas tortoise in a habitat other than the desert grasslands to study the effect of the climate, temperature and adaptation behavior, on its survival.

Extension: This lesson can be extended to study other types of ecosystems that have threatened species.

LESSON IMPLEMENTATION PLAN:
Students will conduct a structured group inquiry on the habitat of a Texas Tortoise to explore the transfer of energy in a food web between the organisms and the physical environment. They will work in pairs throughout the lesson.

ENAGAGE:
Introduce Governor to the students. Have students ask questions about him. Have students pair-think-share about tortoises. Ask students the following questions:
"What do you know about tortoises?"
"Which category of animals do they belong to?"
"Where do you think tortoises live?"
"What is the major difference tortoises and turtles?"
"If Jeremiah eats only plants, what is he called?"
"What do you call the animals that eat meat?"
"Where do animals get their energy from?"

EXPLORE:
Provide groups of students all the listed materials. Students will match the organisms from the flash cards to the level in the pyramid that they fall under. Discuss with students and ask them the following questions:
"Where do you think the Texas tortoise lives?"
"What level is he on?"
"Is he the only animal in his category who lives in the same habitat as him?"
"Name a few animals that you can find in his habitat?"
"What do you think about the levels in the pyramid?"
Students will pair-share about the classification of the organisms in the food pyramid. Ask students the following questions:
"Name the groups that organisms are classified into."
"What are all the plants called and why?"
"Who are omnivores?"
Create a poster outlining the key academic vocabulary as discussion with students progresses.

Students will complete the worksheet by labeling each level in the pyramid and in the simple food chain.

EXPLAIN:
Students will work on creating a food web for the habitat of the Texas Tortoise. Ask students the following questions:
"Who do you think is at the beginning of the food web?"
"From where do you think all organisms get their energy in the food web?"
"Do food webs exist in other types of ecosystems?"
"Where will you place humans in this ecosystem and why?"

ELABORATE:
Have students explore the survival of the habitat if the Texas Tortoise was removed from it by creating a new food web without it. Provide each group an opportunity to present their new food web and their reasoning. Ask students the following questions:
" What will happen to the population of the prickly pear cacti without the Texas Tortoise?"
"How will it affect the growth of the other plants and grasses? "
"How will it affect the herbivores?"
"What is its impact on the food web?"
"What will happen to the transfer of energy eventually?"
"Is there another animal that eats cacti?"

EVALUATE:
1. Formative:
   A. Discussions following pair-share activities provide information about students' prior knowledge.
   B. The pyramid and simple food chain worksheets will provide information about students' understanding about producers and consumers (herbivores, omnivores and carnivores).
   C. Presentation of their drawing about the new food web without the Texas Tortoise in the desert grassland habitat.

2. Summative: Students will work in pairs on one of the following assignments:
   A. Write a biography about a Texas tortoise from its birth till death and its various experiences with its friends, enemies with respect to the food web.
   B. Enact the experiences of a Texas tortoise in its habitat.
   C. Interview a Texas Tortoise about it's parents' life.

Rubric:
The total project is 10 points. Each criteria listed below for the respective choices is 2 points.

A. Write a biography about a Texas tortoise from its birth till death and its various experiences with its friends, enemies with respect to the food web.
   » Name the classification of all the organisms mentioned in the biography.
   » Provide appropriate reasoning for the classification with respect to the organism's diet.
   » Include a food web and food pyramid diagram relating to the biography.
   » Uses appropriate academic language with respect to the ecosystem.
   » Accurately places the organisms within the pyramid.

B. Enact the experiences of a Texas tortoise in its habitat.
   » Introduce the organism as the roles change.
   » Name the classification of the organism enacted.
   » Reasoning provided for classification.
   » Use of appropriate academic language.
   » Utilizes a food web and food pyramid diagram relating to the story enacted.

C. Interview a Texas Tortoise about it's parents' life.
   » Introduces the organisms as roles change.
   » Appropriate classify the organisms in the ecosystem.
   » Provide reasoning for classification with respect to the diet.
   » Utilizes a food web and food pyramid diagram with respect to the interview.
   » Use of appropriate academic language.

DIFFERENTIATION PLANS:

Behavioral: Student will work with a peer who he/she considers friend to ensure peer modeling. Moreover, the hands-on activities with the flash cards will motivate the student to focus on the lesson. The various choices for the project will create an enthusiastic learning environment for the student.

Cognitive (lower level): Student will be placed with a peer who is at a cognitive level that is one step higher than him/her to ensure peer assistance throughout the lesson. The worksheets and activity in the "Explore" section will help students review their prior knowledge. Pair-share activity will activate students' knowledge, prior or that discovered in the lesson. The visual about the food pyramid will also help the student to refer to it when required while working on the project. The student can choose one among the various choices for the project that is suitable to their pair. The scaffolded outline will also help to provide the student a reference.
Cognitive (higher level): Student will be placed with a pair who is on a cognitive level lower than him/her in order to provide peer assistance if required. Student will be able to choose a project that requires higher cognitive demands like the biography for the final assessment. During the lesson, student will be required to provide reasoning for the answer to the question in inquiry.

Language Demands: Student will be placed with a peer who is familiar with his/her L1 to ensure peer assistance throughout the lesson. A poster containing the key academic vocabulary that is required to be used in class will be created in the "Explore" section. A scaffolded outline will be provided to all students to note down previously learnt definitions in their own words through the "New Words" worksheet. It also serves as sentence frames that the student can use for providing reasoning during the "Elaborate" section and in the project. The visual of the food pyramid will enable student to build on the new one and use it as a reference for the project. Student along with peer can choose one of the project options that has least demand for language, like the interview option, that would allow student to reply with single-word responses. During class discussion, student will be encouraged to use the key vocabulary in complete simple sentences, like, "The Texas Tortoise is a herbivore." The student will also be allowed to use non-verbal actions, like thumbs-up for yes and thumbs-down for no. Moreover, the activities in the "explore" section utilize simple language with the flash cards and worksheets offering more visuals.

Affective: The hands-on activities with the pictures of the organisms increase student's urge to explore. The creation of the new food web works as a jigsaw puzzle to maintain the student's persistence. Moreover, the approach to the structured inquiry where students need to find the answer and justify it, operates like a detective solving a mystery and increases the desire to learn more.

LIST OF MATERIALS:
» Simple food chain
» Food Pyramid visual and worksheet
» Flash Cards
» Scaffolded Outline (New Words Worksheet)
» Scissors
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<tr>
<th><strong>COYOTE</strong></th>
<th><strong>GRAY FOX</strong></th>
<th><strong>HAWK</strong></th>
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<td>HABITAT: Brushy Areas</td>
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<td>HABITAT: Brushy Areas</td>
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<tr>
<td>DIET: jackrabbit, cottontail, tortoise, rats, insects, fruits.</td>
<td>DIET: cottontail, jackrabbit, birds, fruits.</td>
<td>DIET: insects, jackrabbit, cottontail, rat, gray fox, Bobcat kittens, tortoises</td>
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<td>PREDATOR: man hunting them for sport and their pets.</td>
<td>PREDATOR: Hawk</td>
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<tr>
<th><strong>JACKRABBIT</strong></th>
<th><strong>COTTONTAIL</strong></th>
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<tr>
<td>DIET: dried plants</td>
<td>DIET: grasses, green plants.</td>
<td>DIET: Jackrabbit, cottontail, rats and ground squirrels.</td>
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<td>PREDATOR: hawks, coyotes and gray fox.</td>
<td>PREDATOR: Coyote, gray fox and hawk</td>
<td>PREDATOR: Hawk(kittens only), coyote, and man hunting for sport</td>
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<td><strong>WHITE-TAILED DEER</strong></td>
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<td>HABITAT: Brushy Areas</td>
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<td>DIET: plants, cacti and grasses</td>
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<td>PREDATORS: Coyote, bobcat</td>
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<td>HABITAT: Brushy Areas</td>
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<tr>
<td>DIET: cacti (prickly pear) and watery plants.</td>
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<td>PREDATORS: Hawk, coyote and man for gaming and ornamental purposes</td>
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<th><strong>KANGAROO RAT</strong></th>
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<td>HABITAT: Brushy Areas</td>
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<td>DIET: seeds, stems, grasses</td>
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<td>PREDATORS: hawk, coyote, bobcat</td>
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<th><strong>SOUTH TEXAS AMBROSIA</strong></th>
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