Lesson Title	What Is Life?
Length of Lesson	50 Minutes
Created By	Adam Lenz
Subject	Earth & Space Science
Grade Level	7th Grade
State Standards	1d, 1h, 2a, 2e
DOK Level	2, 3
DOK Application	Identify, Categorize, Compare and Cite Evidence
National Standards	Inquiry – recognize the relationship between explanation and evidence; identify questions that can be answered through scientific investigation; make relationships between evidence and explanation. Life Science– Structure and function of living organisms, diversity and adaptation of organisms

Graduate Research Element
In my research with the reservoir proposal much of the plants and animal wildlife we interact with will be affected by the implementation of a reservoir. Much of the subsurface soil we research is very closely linked with past life because the geologic units were deposited in a shallow subsurface environment which is the habitat for a very diverse group plant and animal life.

Student Learning Goal:
The goal of the lesson is to teach students teach students four essential elements that define what living mean; must be able to grow, reproduce, react to stimuli, and metabolize. Once we define the difference between living and non-living we extend the learning principles to the difference between life, past-life, and non-life.

Materials Needed (supplies, hand-outs, resources):
Hand-out with blank tables (see attached), procedures sheet (see attached), and eight examples of life past-life, non-life used at separate stations including shark tooth, turtle shell, fossilized clam shell, wind-up toy, petrified wood

Lesson Performance Task/Assessment:
After a brief video and discussion about essential elements that define life, students will identify items determine if it meets any of the criteria for defining life, and then determine if it is life, past-life, or non-life. Students may work alone or in small groups and will rotate between the six to eight stations and fill in the information about each item

on the data table. Students should write their responses to as short descriptions of how the item does or does not follow those particular criteria for life.

Lesson Relevance to Performance Task and Students:
This lesson is intended to teach students to think about what it actually means to be living. This lesson lets them interact in a hands-on experience with items that will inspire thinking about the differences between life, past-life, and non-life.

Anticipatory Set/Capture Interest:
A short video (or slideshow) to give students a perspective of the diversity of life on earth and extreme habit conditions highlighting many kinds of animals they may not be familiar with/interact with on a regularly. The video is intended to get students excited about thinking about living organisms and the diversity of life.

Guided Practice:
After the short video the instructor should lead a guided discussion about the criteria necessary for life highlighting specific points about the differences between life, past-life, and non-life. Afterword the instructor will hand out and talk about the lab procedures sheet, and then let the students continue with the lab allowing a few minutes at each station before the students switch to a new station. The instructor can help with students as they are at their lab stations, to make sure they understand what exactly the items are. Afterword the instructor should lead a guided discussion with the entire class about each of the items and ask questions to spark interest and inspire higher levels of thinking about the items.

Independent Practice:
Individually or in small groups (depending on skill level and class size) students will rotate among the 6-8 stations looking at, examining, and identifying the items at each station. They will fill out a few descriptions of the item on their lab worksheet and categorize the item as life, non-life, or past-life.

Remediation and/or Enrichment:
Remediation: Students may work larger or smaller groups with the assistance of a secondary helper/instructor to guide them through the lab at their own pace.

Enrichment: During the post-lab discussion the instructor may ask questions that inspire higher level of thinking and inquiry.

Check(s) for Understanding:
Each student will have a lab worksheet and data table to fill out and hand in at the conclusion of the lab. A post-lab class discussion would also help the instructor know if real understanding of the scientific method took place.

Closure:
After completing the lab students will brainstorm about what may have caused the outcomes they achieved. Students will also be involved in an in-class discussion that may provoke critical thinking in their fellow students.

- How would you classify these items?
- What evidence can you find to support your opinion?
- Can you make a distinction between living and past-living?

Possible Alternate Subject Integrations:

- Earth Materials
- Cellular Biology
- Taxonomy

Teacher Notes:
Instructor may choose to use different items if he/she doesn't have access to the materials used in this lab, as long as there are examples from each of the three categories (life, non-life, past-life). Instructors may also choose to use a different video or a slideshow to highlight particular life that they find more applicable, memorable, or meaningful to students.