### **5E Lesson Plan: Cycles of Matter**

#### **Grade: 6**

#### **Standard: 6.L2U1.14 - Construct a model that shows the cycling of matter and flow of energy in ecosystems.**

**Engage:**

**Objective:** Capture students' interest and assess prior knowledge.

Get thinking question: Is a fish bowl or an aquarium an open or closed system?

**Activity:**

1. Begin with a short video on the Laws of Conservation of mass and energy.
2. Talk about systems and the components of the system.
3. Ask students what would you tell a classmate who claims that food is destroyed when you eat it?

**Time:** 10-15 minutes

**Explore:**

*Objective:* Students will construct a model of an ecosystem that shows the cycling of matter and flow of energy in the ecosystem.

* **Activity:** Create a Santa Cruz river bottle ecosystem using a 2L water bottle.

Materials Needed:

2L soda bottle with lids Tape

Scissors Rocks and pebbles from the Santa Cruz River

Soil/sand from the river Small plants from the river

Water from the river Journal

* **Discussion Questions:**
  + What did you observe when constructing the model?
  + How do these cycles seem to be important for living organisms?
  + Have you ever thought about where the water you drink or the air you breathe comes from?

**Time***:* 60 minutes

**Explain:**

**Objective:** Provide a clear and concise explanation of the cycles of matter, reinforcing students' discoveries.

**Activity:**

1. In the student’s journals have them draw or explain where they think we get our water from in Tucson.
2. Introduce where our groundwater comes from and how important it is to us in Tucson.
3. Have the students create their own water cycle from a plastic bag which simulates condensation and precipitation.

**Time:** 20-30 minutes

**Elaborate:**

**Objective:** Extend students' understanding through application and deeper exploration.

**Activity:**

1. **Groundwater Simulation:**
   * Use Project WET to come into the classroom and show the students the process of our groundwater.
   * Project WET will provide the students with hands-on experience with a groundwater simulation.

**Time:** 40-50 minutes

**Evaluate:**

**Objective:** Assess students' understanding of the cycles of matter.

**Activity:**

1. **Quiz or Test:**
   * Administer a quiz or test with questions covering key concepts, such as the steps of the water, carbon, and nitrogen cycles, and the role of different organisms in these cycles.
2. **Reflection:**
   * Have students write a short reflection on what they learned about the cycles of matter and why they are important for ecosystems.

**Time:** 20-30 minutes

### **Materials Needed:**

* Video or animation on cycles of matter
* Materials for water cycle experiments (water, heat source, cold surface, containers)
* Journals

### **Standards Addressed:**

* 6.L2U1.14: Construct a model that shows the cycling of matter and flow of energy in ecosystems.

### **Crosscutting Concepts:**

* Systems and System Models
* Energy and Matter
* Stability and Change

### **Science and Engineering Practices:**

* Developing and Using Models
* Planning and Carrying Out Investigations
* Analyzing and Interpreting Data
* Constructing Explanations and Designing Solutions
* Engaging in Argument from Evidence