### **5E Lesson Plan: Human Impact on Tucson's Environment**

**Grade Level: 6th Grade**

**Subject: Science**

**Duration: 5 days**

**Objective:**

* Students will analyze data to determine how Tucson’s population has changed since 1910.
* Students will evaluate textual evidence to describe the chain of reasoning that includes ideas such as the impact of human population growth on natural resources and possible mitigation strategies.

**Standards:**

* 6.L2U3.14: Develop and use models to demonstrate how living systems operate and interact.

#### **Engage**

**Day 1: Introduction to Tucson's Population Growth**

1. **Essential Question:**
   * What impact do we have on our environment in Tucson, Arizona?
2. **Activity:**
   * Begin with a discussion on the essential question.
   * Show a historical timeline of Tucson's population growth using visuals from the PDF.
   * Discuss the significant milestones in Tucson’s population history.
3. **Prompt:**
   * How many people do you think live in Tucson today?
   * How has the population changed over the past century?

**Materials:**

* Historical timeline from the PDF
* Whiteboard and markers

#### **Explore**

**Day 2: Analyzing the Impact of Population Growth**

1. **Activity:**
   * Provide students with graphs and data on Tucson's trash from the PDF.
   * Ask students to observe and record at least three things they notice and three things they wonder about the graphs.
2. **Discussion:**
   * What do the graphs tell us about Tucson's trash?
   * What might be the consequences of such growth on natural resources?
3. **Prompt:**
   * Write in your notebook what you notice or wonder about the provided graphs.

**Materials:**

* Graphs and data from the PDF
* Student notebooks

#### **Explain**

**Day 3: Understanding Human Impact on the Environment**

1. **Activity:**
   * Watch the video “The impact of the population boom in Tucson” and “How much trash do you think you produce in one day?”
   * Discuss the environmental impacts of population growth, focusing on trash production and resource consumption.
2. **Prompt:**
   * How does an increase in population lead to greater consumption of natural resources?
   * How does the scarcity of natural resources limit human activity?
3. **Task:**
   * Write down as many things that impact Tucson when the population increases.
   * Estimate your own daily trash production and discuss how it compares to the average.

**Materials:**

* Videos from the PDF
* Student notebooks

#### **Elaborate**

**Day 4: Mitigation Strategies**

1. **Activity:**
   * Explore Tucson’s initiatives to manage its environmental impact by watching the videos about Tucson's wastewater plants and reclaimed water efforts.
2. **Discussion:**
   * What strategies are being implemented in Tucson to address the effects of population growth on natural resource consumption?
   * How do these strategies help mitigate the impact on the environment?
3. **Project:**
   * In groups, students will design a conservation plan that includes strategies to reduce the negative impacts of population growth and promote sustainability.

**Materials:**

* Videos from the PDF
* Student notebooks
* Chart paper and markers

#### **Evaluate**

**Day 5: Presentations and Reflections**

1. **Activity:**
   * Students present their conservation plans to the class.
   * Each group will explain their strategies and how they address the challenges discussed throughout the week.
2. **Reflection:**
   * What changes can you imagine doing that will impact the Santa Cruz River and other local environments?
   * How can individuals contribute to mitigating human impact on the environment?
3. **Assessment:**
   * Use a rubric to evaluate the group presentations based on clarity, creativity, feasibility of strategies, and understanding of the concepts discussed.

**Materials:**

* Student presentations
* Rubric for assessment

### **Assessment Rubric**

| **Criteria** | **Excellent (4)** | **Good (3)** | **Fair (2)** | **Needs Improvement (1)** |
| --- | --- | --- | --- | --- |
| **Content** | In-depth analysis; covers all aspects of the problem and solutions | Covers most aspects with some analysis | Basic coverage with minimal analysis | Incomplete or inaccurate content |
| **Creativity** | Innovative and unique strategies | Some original ideas presented | Few original ideas | Lacks originality |
| **Feasibility** | Strategies are realistic and well thought out | Most strategies are practical | Some strategies are impractical | Strategies are unrealistic |
| **Presentation** | Clear, engaging, and well-organized | Clear and organized | Understandable but lacks organization | Unclear and disorganized |
| **Understanding** | Demonstrates deep understanding of concepts | Shows good understanding | Shows basic understanding | Lacks understanding |