

Integrated Lesson Plan from Module 3: Environmental Justice and Data Literacy

Grade Level

High School (Grades 9–10)

Content Areas

This lesson plan integrates four key subject areas:

- Science: Environmental Chemistry focusing on pollution, ecosystems, and human impact.
- Social Studies: Civic engagement and movements related to environmental justice.
- Mathematics: Data interpretation through graphing, calculating percentages, and determining mean/median.
- Literacy: Writing Across the Curriculum (WAC) with a focus on Claim-Evidence-Reasoning (CER) structures.

Lesson Duration

Three 45-minute class periods.

Lesson Objectives

By the end of this lesson, students will be able to:

1. Analyze how human activities contribute to environmental degradation using scientific evidence.
2. Interpret and visually represent real-world environmental data through graphs and statistical summaries.
3. Investigate environmental justice issues and explain their social implications.
4. Construct well-supported written arguments using the Claim-Evidence-Reasoning (CER) framework.
5. Synthesize knowledge from science, math, and social studies to understand and propose solutions for environmental issues.

Standards Alignment

- Science TEKS 112.39(c)(10)(A): Analyze and evaluate the relationship between human activities and the environment.
- Math TEKS 111.39(c)(3)(A)(B): Represent data using graphs and interpret data sets using measures of center.
- ELA TEKS 110.36(c)(7)(A): Compose informational texts with appropriate structure and development.
- Social Studies TEKS 113.41(c)(25)(A): Evaluate the impact of government policy on the environment and society.

Materials

- Chromebooks or laptops with internet access
- Real-world environmental data sets (e.g., from EPA.gov)
- CER graphic organizers and data analysis worksheets
- Chart paper, markers, and sentence stems
- Rubrics for writing and data interpretation
- Access to tools like Google Docs, Canva, Kahoot!, and Padlet

Lesson Procedure

Day 1: Launch and Research

Begin with a bell ringer asking students to reflect on a local environmental issue they have seen or heard about. Introduce the concept of environmental justice through a mini-lesson using visuals and short case studies. Students will then examine datasets on pollution or environmental quality using laptops. In small groups, they will create bar graphs or line plots to represent trends they observe. Students conclude with a quick write summarizing their findings using sentence stems tailored for English language learners.

Day 2: Data Literacy and Social Impact

Start with a mini-lesson on how to interpret data to support arguments. Students analyze how pollution levels vary by demographics and income using the provided data. Next, they review a case study on environmental injustice (e.g., Flint, Michigan) and discuss its impact. Students begin drafting a CER-based argument that connects the data with real-world social implications, using graphic organizers to structure their writing.

Day 3: Writing and Presentation

Focus on writing strategies and revision. Students peer review each other's drafts using a feedback checklist. They finalize their CER response, choosing between a traditional essay or a digital infographic. Wrap up the lesson with a gallery walk or student presentations, where they share their products and reflect on their learning.

Differentiation Strategies

- For English Language Learners: Use visuals, sentence frames, and bilingual glossaries.
- For students with IEPs: Provide chunked instructions, extended time, and simplified rubrics.
- For culturally diverse learners: Offer choice in case studies and encourage personal/community connections.
- For gifted students: Include extension activities such as creating local action plans or conducting independent research.

Assessment

Formative:

- Quick writes summarizing data insights
- Observations of group discussions
- Peer review notes

Summative:

- Final CER essay or infographic project
- Presentation or gallery walk participation
- Exit reflection on the guiding question: 'How can data shape our understanding of justice?'

Technology Integration

Technology is woven throughout the lesson to support accessibility and engagement. Students use Google Docs for writing, Canva for designing infographics, and platforms like Padlet or Kahoot! for formative assessment and interactive reflection.

Extension Opportunities

- Invite a local environmental activist for a virtual Q&A.
- Have students write letters to local officials, using their research and analysis to advocate for change.

Reflection Prompt

How can data shape our understanding of justice? Why is it important to combine science, math, and social studies when discussing environmental issues?

References

- EPA.gov environmental data resources
- Campbell, Y. C., & Filimon, C. (2018). Supporting the argumentative writing of students in linguistically diverse classrooms.
- Saulnier, B. (2016). The application of writing across the curriculum (WAC) techniques.
- Fogarty, R. (1991). Ten Ways to Integrate Curriculum.
- McGlynn, K., & Kozlowski, J. (2017). Kinesthetic Learning in Science.
- CAST. (2011). Universal design for learning guidelines version 2.0.
<http://udlguidelines.cast.org>

Integration Model

This lesson uses the Shared Model of integration (Fogarty, 1991), where multiple subjects are coordinated around a central theme — environmental justice. It emphasizes real-world relevance, sociocultural responsiveness, and accessibility through differentiated instruction and Universal Design for Learning (UDL) principles.