Teacher Preparation Lesson Plan

Subject Area: Environmental Science
Unit Title: Climate Change and Marine Ecosystems
Grade Level: 9th Grade
Lesson Number: 1 of 10

Duration: 60 minutes
Date: March 10, 2023
Teacher: Ms. Jane Smith
Room: Science Lab

Curriculum Standards Alignment

Content Standards:

- Understand the concept of climate change and its impact on marine ecosystems
- Analyze data related to ocean temperature, acidity, and sea level rise

Skills Standards:

- Critical thinking and problem-solving
- Communication and collaboration

Cross-Curricular Links:

- Science, Technology, Engineering, and Math (STEM)
- Environmental Education

Essential Questions & Big Ideas

Essential Questions:

- What are the causes and effects of climate change on marine ecosystems?
- How can we mitigate the impact of climate change on marine ecosystems?

Enduring Understandings:

- Climate change has a significant impact on marine ecosystems
- Human actions can mitigate the effects of climate change on marine ecosystems

Student Context Analysis

Class Profile:

- Total Students: 25
- ELL Students: 5
- IEP/504 Plans: 3
- Gifted: 2

Learning Styles Distribution:

- Visual: 40%
- Auditory: 30%
- Kinesthetic: 30%

Pre-Lesson Preparation

Room Setup:

- Arrange desks in a U-shape to facilitate discussion
- Set up a projector and screen for presentations

Technology Needs:

- Computer with internet access
- Projector and screen

Materials Preparation:

- Whiteboard markers
- Handouts with guided notes

Safety Considerations:

- Ensure students are seated safely during presentations
- Monitor student behavior during group work

Detailed Lesson Flow

Introduction (10 minutes)

- Introduce the topic of climate change and marine ecosystems
- Ask students to share prior knowledge and experiences

Direct Instruction (20 minutes)

- Present information on climate change and its impact on marine ecosystems
- Use visual aids and graphs to illustrate key concepts

> **Engagement Strategies:**
>
> - Think-pair-share to encourage discussion
> - Graphic organizer to guide note-taking

Guided Practice (20 minutes)

- Have students work in pairs to analyze data related to ocean temperature, acidity, and sea level rise
- Circulate around the room to provide guidance and support

> **Scaffolding Strategies:**
>
> - Provide sentence stems to support writing
> - Offer one-on-one support for struggling students

Independent Practice (20 minutes)

- Have students create a visual project (e.g. poster, infographic) to illustrate the impact of climate change on marine ecosystems

- Allow students to work independently and circulate to provide support as needed

Closure (10 minutes)

- Have students share their visual projects with the class
- Facilitate a class discussion to summarize key concepts and takeaways

Differentiation & Support Strategies

For Struggling Learners:

- Provide additional support during guided practice
- Offer one-on-one support during independent practice

For Advanced Learners:

- Provide additional challenges during independent practice
- Encourage students to create a more complex visual project

ELL Support Strategies:

- Provide visual aids and graphic organizers to support language development
- Offer one-on-one support during guided and independent practice

Social-Emotional Learning Integration:

- Encourage students to reflect on their own emotions and experiences related to climate change
- Facilitate a class discussion to promote empathy and understanding

Assessment & Feedback Plan

Formative Assessment Strategies:

- Observe student participation during group work
- Review student visual projects for understanding

Success Criteria:

- Students can explain the impact of climate change on marine ecosystems
- Students can analyze data related to ocean temperature, acidity, and sea level rise

Feedback Methods:

- Provide written feedback on student visual projects
- Offer verbal feedback during one-on-one support

Homework & Extension Activities

Homework Assignment:

Have students research and write a short essay on a local marine ecosystem and how it is affected by climate change

Extension Activities:

- Have students create a public service announcement about climate change and marine ecosystems
- Invite a guest speaker to talk to the class about climate change and marine ecosystems

Parent/Guardian Connection:

Send a letter home to parents/guardians explaining the lesson and asking for their support in encouraging students to learn more about climate change and marine ecosystems

Teacher Reflection Space

Pre-Lesson Reflection:

- What are my goals for this lesson?
- What challenges do I anticipate?
- What strategies will I use to support struggling learners?

Post-Lesson Reflection:

- What went well during the lesson?
- What would I change for next time?
- What additional support do students need?

Data Analysis

Data Sources:

- National Oceanic and Atmospheric Administration (NOAA)
- Intergovernmental Panel on Climate Change (IPCC)

Data Analysis Tools:

- Graphing calculators
- Computer software (e.g. Excel, Google Sheets)

Data Interpretation

Guiding Questions:

- What trends do you see in the data?
- How do the data support or contradict your prior knowledge and experiences?

Graphic Organizers:

- Venn diagram to compare and contrast data
- Concept map to illustrate relationships between data

Creative Activity

Project Options:

- Poster
- Infographic
- Public service announcement

Materials:

- Paper and markers
- Computer and software (e.g. Adobe Creative Cloud)

Presentation Guidelines

Presentation Requirements:

- Clearly communicate the impact of climate change on marine ecosystems
- Include visual aids and graphics to support presentation

Presentation Tips:

- Practice presentation before class
- Speak clearly and confidently

Assessment

Assessment Types:

- Formative assessment
- Summative assessment

Assessment Tools:

- Quizzes and tests
- Class discussions and participation

Grading Rubric

Content Knowledge:

- Accuracy and completeness of information
- Depth of understanding and analysis

Communication:

- Clarity and organization of presentation
- Effectiveness of visual aids and graphics

Conclusion

Summary:

This lesson plan aims to educate students about the impact of climate change on marine ecosystems and promote critical thinking and problem-solving skills.

Future Directions:

- Invite a guest speaker to talk to the class about climate change and marine ecosystems
- Have students create a public service announcement about climate change and marine ecosystems

References

Textbooks and Articles:

- National Oceanic and Atmospheric Administration (NOAA)
- Intergovernmental Panel on Climate Change (IPCC)

Online Resources:

- National Geographic
- Science Daily