Educatech team

Presents

Guide book

SDG

In classroom

NASA SPACE APPS RECIFE

Presentation

In an era marked by rapid change and pressing global challenges, the need for sustainable solutions has never been more urgent. The United Nations' Sustainable Development Goals (SDGs) provide a comprehensive framework for addressing issues such as climate change, inequality, and environmental

degradation. As educators, we play a crucial role in preparing the next generation of leaders to navigate these complexities and contribute positively to our world.

This eBook is designed as a resource for high school educators seeking to integrate the SDGs into their science curriculum. By aligning scientific concepts with the global goals, we can foster critical thinking, inspire action, and empower students to understand their role in creating a sustainable future.

Within these pages, you will find detailed lesson plans tailored to each of the 17 SDGs, complete with objectives, activities, and assessment strategies. Each lesson emphasizes hands-on learning, encouraging students to engage with real-world data and collaborate on solutions. We have also included valuable resources from NASA, highlighting how Earth observation and remote sensing can enhance our understanding of the challenges we face.

Our goal is to provide educators with the tools they need to spark curiosity, promote environmental stewardship, and encourage civic responsibility among students. Together, we can cultivate informed, motivated individuals ready to take action for a sustainable tomorrow.

Let's embark on this journey toward a more sustainable world, one lesson at a time.

Introduction

Introduction

As we navigate an increasingly complex world, the importance of sustainability has taken center stage. The United Nations' Sustainable Development Goals (SDGs) serve as a universal call to action, addressing critical issues such as poverty, inequality, climate change, and environmental degradation. These 17 interconnected goals provide a comprehensive framework for creating a more equitable and sustainable future for all.

This document aims to equip educators with practical tools and resources to integrate the SDGs into high school science curricula. By intertwining scientific concepts with the principles of sustainability, we can engage students in meaningful learning experiences that foster critical thinking, problem-solving, and civic responsibility.

Within these pages, you will find a series of lesson plans, each aligned with a specific SDG. These plan not only cover key scientific content but also encourage students to explore real-world data and case studies, particularly utilizing resources from NASA. By examining environmental data and engaging in hands-on activities, students will develop a deeper understanding of how science informs our efforts to achieve the SDGs.

Our objective is to inspire educators to empower their students as informed citizens, ready to address the challenges of today and tomorrow. Together, we can cultivate a generation that is not only knowledgeable about science but also passionate about sustainability and social justice.

Join us on this journey to inspire and equip future leaders who will make a positive impact on our planet.

Lesson Plan: SDG in classroom

Grade Level: High School students (Age 13-17).

Duration: 1 class period (approximately 60-90 minutes).

Objective: Learn and ACTION, understanding about SDG.

Specific Objectives:

1 - Understanding the SDGs:

- Define and Explain SDGs; Students should be able to define the Sustainable Development Goals (SDGs) and explain their importance in a global and local context.
- Relate to Science; Students should identify how the SDGs directly relate to the scientific concepts covered in the unit.

2 - Integration of Scientific Content:

- Thematic Connection: Students should be able to connect topics from the science unit with the SDG, recognizing the interdependence between science and sustainable development.
- Case Studies: Utilize relevant examples and case studies that demonstrate how scientific issues impact the SDGs and vice versa.

3 - Tools and Measurement Methods:

- Exploration of Tools: Students should be introduced to tools and monitoring methods that can be used to measure progress toward the SDGs, including Earth observation data and remote sensing from NASA or others knowledge base.
- Practical Application: Students should engage in a practical activity illustrating how these tools can be used to assess progress on a specific SDG.

4 - Development of Research and Analysis Skills:

- Data Collection: Students should learn to collect and analyze data related to an SDG, using reliable sources, including information from NASA.
- Critical Thinking and Problem-Solving: Encourage students to develop critical thinking and problem-solving skills by proposing solutions to challenges related to the SDGs based on scientific evidence.

5 - Engagement and Presentation:

- Project Creation: Students should create a final project (such as a video, interactive game, or presentation) that explains a scientific topic through the lens of an SDG, integrating the knowledge gained throughout the unit.
- Presentation and Sharing: Students should present their projects to the class or at a larger event, promoting idea exchange and encouraging engagement with sustainability issues.

6 - Motivation and Action:

- Personal Reflection: Students should reflect on how they can contribute to achieving the SDGs in their local community, developing a personal commitment to sustainable practices.
- Community Action: Encourage participation in community projects or initiatives that address the SDGs, fostering a sense of social and environmental responsibility.

Lesson Outline: SDG IN CLASSROOM

Suggestion: You can adapt according to your school and workload

Introduction (15 minutes)

1. Hook Activity: Start with a relevant video or case study related to the SDG.
2. Class Discussion: Introduce the SDG and discuss its significance.

Tip: You can ask questions to help understand which parts of the subject interest students most.

Main Activity (45 minutes)

1. Group Work: Divide students into small groups to research the SDG.
    - What is the goal?
    - Why is it important?
    - What challenges exist?
    - What actions can be taken?

Presentation (30 minutes)

1. Group Presentations: Groups present their findings.
2. Q&A: Allow time for discussion.

Reflection (15 minutes)

1. Individual Reflection: Write about how the SDG relates to their lives or local community.
2. Class Share: Invite students to share reflections.

Homework/Extension Activity:

- Identify a local initiative or project related to the SDG.
- Encourage your students to talk to community residents to understand the problems in their territory

Assessment:

- Participation in group work and presentations.
- Quality of research.
- Reflection paragraph.

Materials:

- Projector and screen for presentations
- Printed materials (handouts related to the SDG)
- Whiteboard and markers
- Access to the internet for research activities
- NASA site databases and information system

Tip: Teacher, always remember. You can adapt the entire plan according to the reality of your school.

Complementary Materials

1. NASA Earth Data
    - Resource: [NASA Earth Data]
    - Description: This platform provides access to a wide range of Earth science data, including satellite imagery and datasets related to climate, land use, and environmental changes. Students can explore data relevant to their assigned SDGs.

2. NASA’s Global Climate Change Website
    - Resource: Global Climate Change: Vital Signs of the Planet
    - Description: This site offers real-time data and visualizations on climate change indicators. It includes articles, videos, and interactive features that help explain the science behind climate change, directly relating to SDG 13 (Climate Action).
3. Earth Observing System Data and Information System (EOSDIS)
    - Resource: EOSDIS
    - Description: This system provides access to NASA's Earth science data, including imagery and analysis tools. Students can use this to gather data for projects related to SDG 15 (Life on Land) or SDG 14 (Life Below Water).
4. NASA’s GLOBE Observer Program
    - Resource: GLOBE Observer
    - Description: Students can participate in citizen science by contributing observations related to clouds, trees, and water. This can tie into discussions on SDG 15 (Life on Land) and SDG 6 (Clean Water and Sanitation).
5. NASA’s “Earth as Art” Collection
    - Resource: Earth as Art
    - Description: This collection showcases stunning satellite images of Earth, highlighting natural phenomena and human impacts on the environment. Use these visuals to engage students in discussions about sustainability and the environment.
6. NASA’s Eyes on the Earth
    - Resource: NASA's Eyes on the Earth
    - Description: An interactive visualization tool that allows students to explore Earth data from various NASA missions. They can see real-time data and how it relates to climate, atmosphere, and oceans, aligning with several SDGs.
7. NASA’s Climate Change and Health Resources
    - Resource: Climate Change and Health
    - Description: Explore how climate change affects health, tying into SDG 3 (Good Health and Well-being). This resource provides insights and data relevant to public health and climate.

8. NASA's Earth Science in Action
    - Resource: Earth Science in Action
    - Description: Features educational materials, including lesson plans and activities focused on Earth science and its relationship to the SDGs. Useful for integrating real-world applications in science education.

Suggested Activities Using NASA Data

1. Data Analysis Project:
    - Have students select a dataset from NASA Earth Data that corresponds to an SDG (e.g., land cover change for SDG 15). They can analyze the data and present their findings.
2. Visualization Challenge:
    - Students create infographics or visual presentations using NASA imagery or data related to a specific SDG, focusing on illustrating key concepts and statistics.
3. Citizen Science Project:
    - Engage students in the GLOBE Observer program, allowing them to collect local data on trees or clouds and compare it to NASA data, discussing the implications for their assigned SDGs.
4. Interactive Mapping:
    - Use tools like Google Earth along with NASA data to create a map showcasing changes in land use, climate effects, or water resources in relation to the SDGs.

You can also check these pages:

[UN - United Nations] https://sdgs.un.org/goals
[UN - United Nations] https://www.un.org/sustainabledevelopment/student-resources/
[NASA] https://appliedsciences.nasa.gov/what-we-do/sustainable-development-goals
[NASA] https://earthdata.nasa.gov/

SUSTAINABLE DEVELOPMENT GOALS

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