STEAM &Sports

Lesson 13 - Stamping on the Carbon Footprint in Sports

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Stamping on the Carbon Footprint in Sports

Concept

This lesson explores the environmental impact of sports, particularly focusing on the carbon footprint of major sports events. Students will engage in a game-based activity to understand the sustainability aspects of sports, such as transportation, stadium lighting, waste management, and food consumption.

Learning objectives and Outcomes

Upon completion of this lesson, students will:
- Understand the concept of a carbon footprint and its relevance in sports.
- Identify key sources of environmental impact in major sports events.
- Analyze data on carbon emissions related to transportation, energy, and waste.
- Develop strategies to reduce the environmental impact of sports.
- Work collaboratively to solve sustainability-related problems.

Methodology

Students will be divided into groups based on their favorite football teams. They will participate in a pair card game focused on four sustainability aspects (light, travel, waste, and noise pollution).
- Each team will research, discuss, and present solutions for reducing the carbon footprint in sports.
- The teacher will facilitate discussions, provide real-world data, and evaluate students' responses.
- The lesson will integrate problem-solving, critical thinking, and data analysis.

Educational standards in connection with sports

The lesson fosters environmental responsibility by encouraging students to critically evaluate their role in reducing the ecological footprint of sports activities.
Students will meet educational standards related to sustainability, applied physics, and data interpretation, all within the real-world context of sports.
Students will apply scientific principles to
- analyze the sustainability of sports events,
- use mathematical models to calculate carbon footprints, and
- develop engineering-based solutions to minimize environmental impact.

This lesson includes elements of these school subjects

1. Environmental Science: Sustainability and climate change.
2. Physics: Energy consumption and efficiency.
3. Mathematics: Carbon footprint calculations and data analysis.

Timeframe

The expected total duration of the lesson is 90 minutes

Students Age

10-15 years

Material needed

1. Pair cards (printed or digital version on Smart Board), 2 cards for each topic, 8 cards in total.
2. Information cards. These cards are provided by teachers and contain relevant data to solve the game's problems. For example, data on energy consumption, transport emissions, and waste statistics.
3. Calculators for footprint calculations.
4. Whiteboard or Smart Board.
5. Online access for additional research.

Short description of the content

Students will participate in an interactive game to analyze the environmental impact of sports. They will discuss solutions for reducing carbon footprints in football and other sports, applying concepts from science, technology, and mathematics. They are divided into teams.

Game description:

The teams take turns picking a card, revealing a symbol related to one of the four topics. The team must explain the topic based on their knowledge and solve a given problem. They receive 1–5 points based on their explanations and results. The team picks a second card:

- If it matches the first, they answer an advanced question and can gain more points.
- If it does not match, the next team takes their turn.

The game continues until all pairs have been matched.

The team with the highest points wins.

Sequence of Lesson

1. Engage (10 minutes)

Introduction to carbon footprints in sports through discussion and brainstorming session. Students will answer guiding questions:

- What is the ecological footprint?
- How do sports contribute to environmental impact?

The teacher will explain the structure and the rules of the game

2. Explore (20 minutes)

Group activity using pair card games on four sustainability aspects.

Game Example:

Suppose a team picks the Travel card. The teacher asks:

- What do you know about the carbon footprint?
- How much CO_2 is emitted when 40,000 fans travel by train, bus, bike, or plane to a football match?

The team calculates emissions using information cards and explains their findings.

If they answer correctly, they get points and continue playing by selecting another card. If the team picks a matching card (e.g., Travel), they must solve an advanced problem using provided data. The game continues until all pairs are matched, with the highest-scoring team winning.

3. Elaborate (35 minutes)

Teams will calculate carbon footprints based on real-world data and develop proposals for making sports events more sustainable.

4. Evaluate (15 minutes)

Each group presents findings and solutions. The teacher facilitates a discussion, and awards points based on accuracy and creativity.

5. Extend (20 minutes)

Students reflect on how they can implement sustainable practices in their own sporting activities. Homework: Research how a local sports team is addressing sustainability.

Lesson Developer

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Tips for age group differentation (for older/younger kids than indicated in the lesson)

Younger students (10-11):
1. Replace calculations with simple sorting tasks (e.g., ranking transport types by eco-friendliness).
2. Use pre-filled tables instead of expecting original data entry.

Older students (12-15):
1. Require full carbon calculations using online data.
2. Debate actual policies or analyze sustainability reports of sports teams.

To which SDG(s) does the lesson relate most

SDG 12 – Responsible Consumption and Production (through analysis of waste and resources).

SDG 13 – Climate Action (via carbon footprint awareness and reduction strategies).

What Inclusivity and Accessibility measures can or should the teacher take for this lesson

1. Group students strategically to support language, gender and ability differences.
2. Use large-print and color-coded cards for students with visual processing challenges.
3. Allow digital participation for students with mobility impairments (e.g., using tablets).

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