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Inclusion and Diversity in STEAM

Lesson Plan

Exploring STEM through Architecture and Environmental Sustainability

Grade Level: Middle School (8th Grade)

Subject Areas: Mathematics, Science, Technology, Engineering, Art

Duration: 3 class periods (45 minutes each)

Objectives:

Students will understand the principles of bioclimatic architecture.
Students will apply mathematical concepts to real-world architectural problems.
Students will learn about the role of women in STEM and be inspired by career paths in this field.
Students will develop problem-solving and critical thinking skills.

Materials:

Interview excerpt with Anna Papageorgiou
Document on calculating areas and volumes

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Measuring tapes
Tablets or smartphones with measurement apps (PLNAR or ImageMeter)
Graph paper
Calculators
Projector and computer for presentation
Images and diagrams of the Anna Papageorgiou STEM Center

Total Time: 3 Class Periods (135 Minutes)
Period 1 (45 Minutes): Introduction to Bioclimatic Architecture

Warm-up (10 minutes):

Discuss architecture and the role of architects.
Introduce the concept of bioclimatic architecture and its significance.

Activity 1 (20 minutes):

Present images and diagrams of the Anna Papageorgiou STEM Center.
Highlight the bioclimatic features of the building (e.g., energy efficiency, natural light, sustainable materials).

Activity 2 (15 minutes):

Divide students into groups to identify different shapes in the building's design.
Each group presents their findings to the class.
Period 2 (45 Minutes): Mathematical Applications in Architecture
Warm-up (5 minutes):

Recap bioclimatic architecture concepts discussed in the previous period.
Activity 1 (20 minutes):

Use the provided document to guide students through calculating the area of different parts of the Anna Papageorgiou STEM Center.
Example problems: Calculate the area of the left and right roofs of the building.
Discuss the importance of accurate measurements in architectural design.

Activity 2 (20 minutes):

Practical Measurement Activity:
Students measure dimensions of a classroom or school building using measuring tapes.
Students measure the same dimensions using a measurement app on tablets/smartphones.
Compare and discuss any differences between manual and digital measurements.

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Period 3 (45 Minutes): Women in STEM and Career Exploration

Warm-up (10 minutes):

Discuss the importance of diversity and inclusion in STEM fields.

Activity 1 (20 minutes):

Read and discuss excerpts from the interview with Anna Papageorgiou focusing on her journey, achievements, and advice for young women in STEM.

Engage students in a discussion about their own interests and potential career paths in STEM.

Activity 2 (10 minutes):

Reflective Writing:

Students write a short essay on how they can contribute to sustainable development through a career in STEM.

Encourage students to think about the challenges and opportunities in pursuing a career in this field.

Closure (5 minutes):

Summarize key points from the lessons.

Encourage students to think about how the concepts learned can be applied to their everyday lives and future careers.

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Assessment:

Participation in group activities and discussions.

Accuracy and completion of area and volume calculations.

Quality and thoughtfulness of reflective writing.

Extension Activities:

Plan a field trip to a local bioclimatic building or a session with a guest speaker who works in sustainable architecture.

Have students design their own bioclimatic building using the concepts learned in class.

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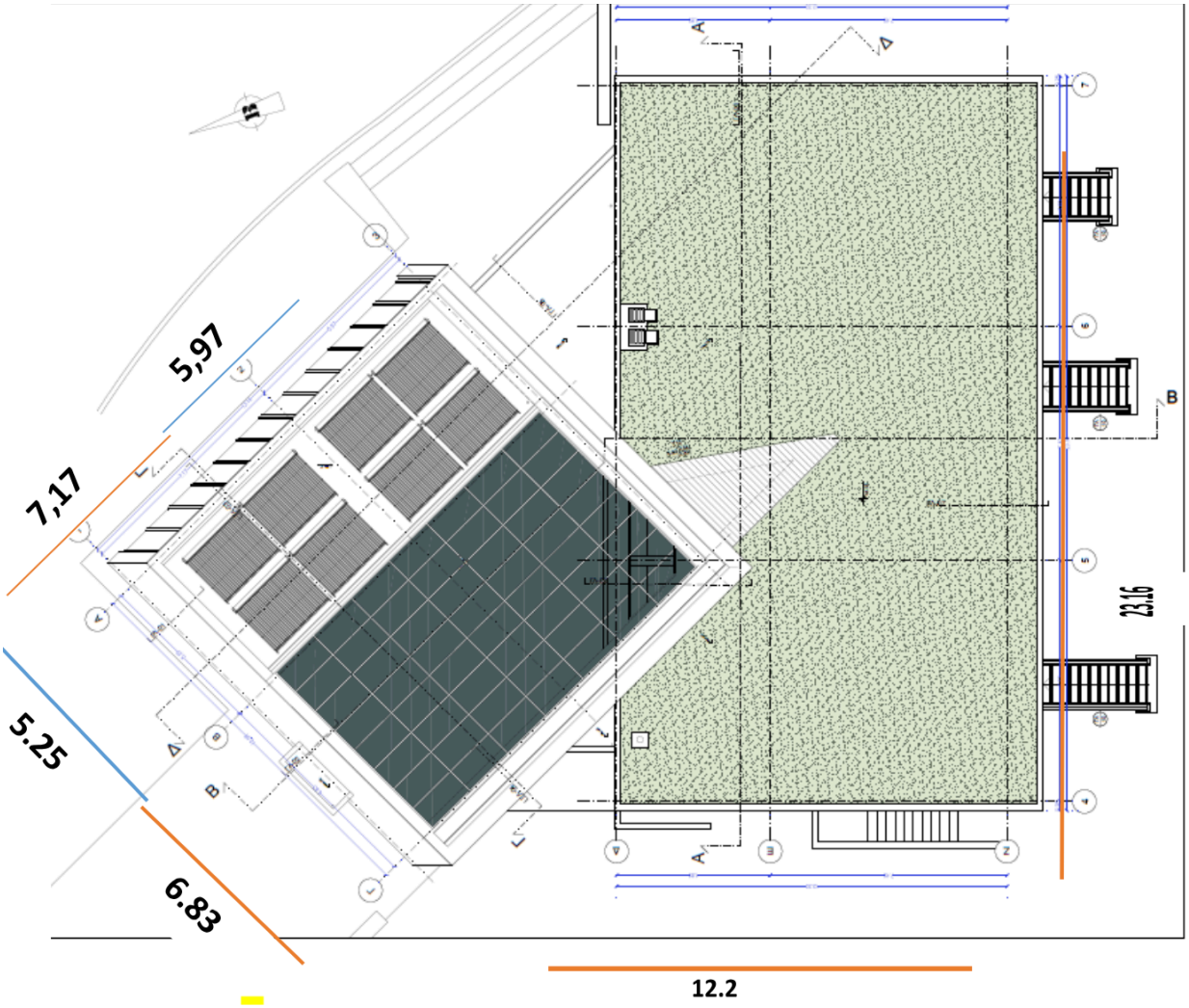

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