

Google Earth Education

Lesson Title : Three D Geometry

TIME [140 minutes]

OVERVIEW

Learners would explore the properties and application of geometrical shapes in constructing sustainable architecture. Learners would learn how architects use math principles like surface area and volume ratio, among other variables, to build sustainable structures.

SUBJECT/TOPIC - Mathematics / Geometry	AGE LEVEL 13 - 15 years
 Learning Objectives The student will demonstrate the ability to use fundamental concepts of geometry, including definitions, basic constructions, and tools of geometry. The student will able to connect real-life based examples and formulate its application. 	 Inquiry How does the size of the base affect the ratio of the surface area of the volume ratio? Enumerate and analyze critically how shapes and structures change the sustainability of the architecture? What is the relation of one side with the other and how it affects the whole geometrical structure?
 Materials Needed Access to Google Voyager Access to internet Protractor scale sheets divider compass pencil sketch pen colour sheets 	 Lesson Summary Engage: Examine basic geometry shapes and structures. Brainstorming on 2D and 3D shapes. Explore: Understanding and exploring various 3D figures Explain:We will use the volumes of familiar solids, like right rectangular prisms, to help us find the volumes of more unusual

	 figures, like prisms that lean to one side, all sorts of pyramids, and figures with different shapes of bases Revise: learners will create their own hypotheses for the construction of the architecture. They would come up with their own idea of properties that would make architecture self-sustainable and reliant. Apply: creating their own architecture which looks at the geometric considerations that architects must contend with in building to the skies.
Sustainable Development Goals SDG - 9 SDG - 11 SDG - 12	Culminating Task/Assessment Architecture Model Making/presentation on Designing own sustainable building

Textbook Chapter Geometry (Mathematics - Grade X)

Engage (5 minutes)

- learners would identify 2D and 3D shapes from the figures shared with them.
- Ask them to name some shapes they see around them.
- Ask students to think about the characteristics of each shape and how it determines how the shape could move. For example, can the shape roll? Can it be stacked?
- Review the number of sides, edges, and vertices each shape has once more.
- Can these 3D shapes joined together to form an architecture that is self-sustainable?

Explore (25 minutes)

- Teachers first introduce and explain google earth and the voyager stories.
- Teachers introduce the concept of 3D using a <u>Voyager Story</u> that is "The Geometry of sustainable Architecture".
- students recorded important observations and points that were related to the concept.
- Students record observations or evidence as it relates to the inquiry.
- Explain about the area, surface area, volume of various 3D shapes.
- Students identify relationships or patterns and form a hypothesis based on information gained.

Explain (20 minutes)

- 1. Teachers organize students into 4 groups.
- 2. Each student shares its hypothesis with the each other and then come up with a consensus and finalize the important properties of the architecture.
- 3. Teachers facilitate whole group discussion in which students share their hypotheses and reason behind it.

Revise (10 minutes)

1. Students will make adjustments to their hypothesis based on information gained in discussion or test findings.

Revise (10 minutes)

- 1. Students will make adjustments to their hypothesis based on information gained in discussion or test findings.
- 2. learners would formulate the key findings which they want to inherit in there model or presentation.

Apply (80 minutes)

- 1. Learners create a model or prepare a presentation of self-designed sustainable architecture.
- 2. The model or design of the architecture should follow sustainability goals and learners should able to identify and design that architecture keeping in mind the surface area and volume ratio.

Evaluate: Exemplar Response and/or Rubric

- Tools for assessing mastery of learning objectives to be used by teachers or students for self or peer assessment.
- Refer the site for the rubric <u>https://in.pinterest.com/pin/570127634061601449/?nic_v2=1aTGi8ku2</u>

Additional Resources

- <u>https://in.pinterest.com/pin/570127634061601449/?nic_v2=1aTGi8ku2</u>
- khan academy

Credits

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