Lesson Plan
3D Geometric Art

Summary

1. Subject(s): STEAM Project
2. Topic: 3D Modeling, Visual Programming, Geometry, and Creative Art/ Design
3. Grade/Level: 8th Grade
4. Objective:

   The goal of this lesson is to teach the students about advanced geometry by revealing the interesting mathematical relationships, intriguing visual qualities, and various design applications. While geometry is often taught as a math topic conventionally, its application to visual art and engineering are apparent. Not only will students learn to model different 2D and 3D geometric shapes digitally, they will also get to explore the mathematical formula and how the form will be affected when they adjust the variables in the formula through visual programming platform.

5. Time Allotment: 45min Instruction > 10min Break > 45min Practice

Implementation

Learning Context

The lesson will start with an introduction and/or revision of the following topics in 3D geometry in Question and Answer Format before moving into 5E Lesson Plan:

- Points, Lines and Planes in Solids
- 2-D Representations of Solids
- Nets and Panelization
- Symmetries of Solids
- Euler Formula
- Cone
- Pyramid
- Sphere

5E Lesson Plan		Media/Platform
Engage The purpose for the ENGAGE stage is to pique student interest and get them personally involved in the lesson, while pre-assessing prior understanding.	Watch educational TV on Khan Academy on 3D geometry to engage students on sharing their understanding on the topic	Educational TV Math Corner HKETV Khan Academy
Explore The purpose for the EXPLORE stage is to get students involved in the topic; providing them with a chance to build their own understanding.	Introduce students to Rhino and Grasshopper to begin the modeling of 3d shapes like Cone, Pyramid, Sphere, and Platonic Solids	3D Modeling: Rhino Visual Programming: Grasshopper
Explain The purpose for the EXPLAIN stage is to provide students with an opportunity to communicate what they have learned so far and figure out what it means.	Demonstrate the use of Rhino and Grasshopper for students to learn about basic commands of the software, the formula that drives the size and dimension of the 3D shapes.	Presentation: Power Point Live Demonstration
Elaborate/Extend The purpose for the EXTEND stage is to allow students to use their new knowledge and continue to explore its implications.	Students are asked to pick one 3D shape to do their in depth research on and construct it in Rhino with the help of Grasshopper. Rubric will be given to students as guidelines and instructions for the work.	3D Modeling: Rhino Visual Programming: Grasshopper
Evaluate The purpose for the EVALUATION stage is for both students and teachers to determine how much learning and understanding has taken place.	Students will present their research and learning progress and be graded according to the previously assigned rubric	Online Survey: Google Forms