Unit Circle Lab

Math Concept(s): Unit Circle Coordinates

Source / Text:

Developed by: Holli Dexheimer Adapted by: Jeremy Torres

E-Mail: torresf@issaquah.wednet.edu

Date: Summer Conference 2023

Attach the following documents:

- Lab Instructions: (See attached)
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

This lab is done after we go through special right triangles and how it correlates with the unit circle.

Lab Plan

Lab Title: Unit Circle Art Project

Prerequisite skills: None

Lab objective: Physical representation of the unit circle in an artistic medium to show understanding.

Standards: *(Note SPECIFIC relationship to Science, Technology, and/or Engineering)*

Mathematics K–12 Learning Standards:

- HSF-TF.A.1, HSF-TF.A.2, HSF-TF.A.3, HSF-TF.A.4

Standards for Mathematical Practice:

- MP1, MP3, MP4, MP5, MP6, MP7, MP8

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- Speaking and Listening. Comprehension and Collaboration.
- Work with peers to set rules for collegial discussions and decision making.
- Propel conversations by posing and responding to questions that relate to the current information.

Technology

- Student Dependent

Engineering

- Student Dependent

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

☐ Global Awareness ☐ Financial/Economic/Business/Entrepreneurial Literacy ☐ Civic Literacy
☐ Health/Safety Literacy ☐ Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION

Creativity and Innovation
☒ Think Creatively
☐ Work Creatively with Others
☐ Implement Innovations

Critical Thinking and Problem Solving
☐ Reason Effectively
☐ Use Systems Thinking
☒ Make Judgments and Decisions
☒ Solve Problems

Communication and Collaboration
☒ Communicate Clearly
☒ Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy
☐ Access and Evaluate Information
☐ Use and manage Information

Media Literacy
☐ Analyze Media
☐ Create Media Products

Information, Communications and Technology (ICT Literacy)
☐ Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability
☐ Adapt to Change
☒ Be Flexible

Initiative and Self-Direction
☒ Manage Goals and Time
☐ Work Independently
☐ Be Self-Directed Learners

Social and Cross-Cultural
☒ Interact Effectively with Others
☒ Work Effectively in Diverse Teams

Productivity and Accountability
☒ Manage Projects
☐ Produce Results

Leadership and Responsibility
☒ Guide and Lead Others
☐ Be Responsible to Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Student Choice

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Think Creatively, Make Judgements and Decisions, Solve Problems, Communicate Clearly, Collaborate with Others, Be Flexible, Manage Goals and Time, Interact Effectively with Others, Work Effectively in Diverse Teams, Manage Projects, and Guide and Lead.

Expectations:

- Students should work productively on their project, adhering to timelines.

Timeline:

- Students will be given one week for the project. There will be a “check-in” 3 days after the project is assigned to ensure students are on a track to completion.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab.

- How does the unit circle affect us on a daily basis?
- What can the unit circle represent?
- How does previous information connect with the unit circle?

Optional or Extension Activities

- Create 4 30-60-90 triangles with color, that will be put into your design and place them for 30, 150, 210, and 330 triangles.
- Create 4 30-60-90 triangles with color, that will be put into your design and place them for 60, 120, 240, and 300 triangles.
- Create 4 45-45-90 triangles with color, that will be put into your design and place them for 45, 135, 225, and 315 triangles.

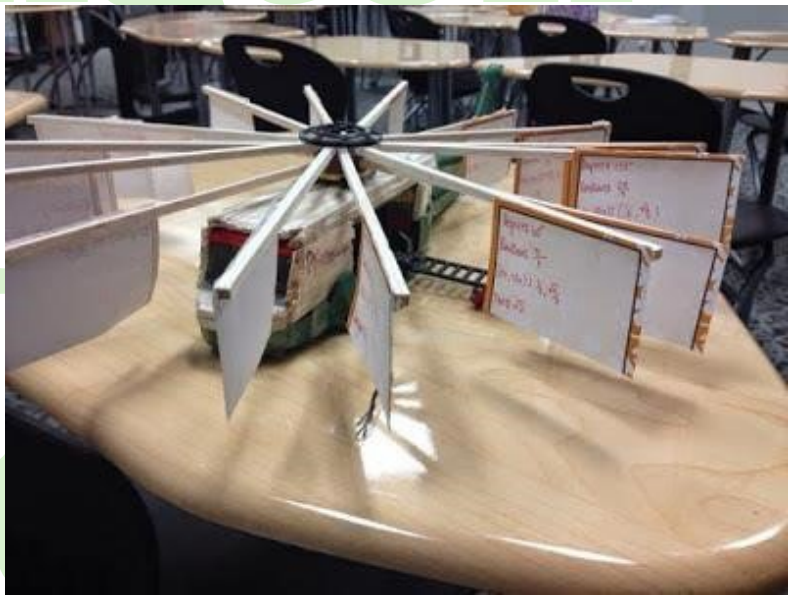
Unit Circle Art Project

Directions: You are to create an artistic representation of The Unit Circle (Either on your own or in a group of no more than two.)

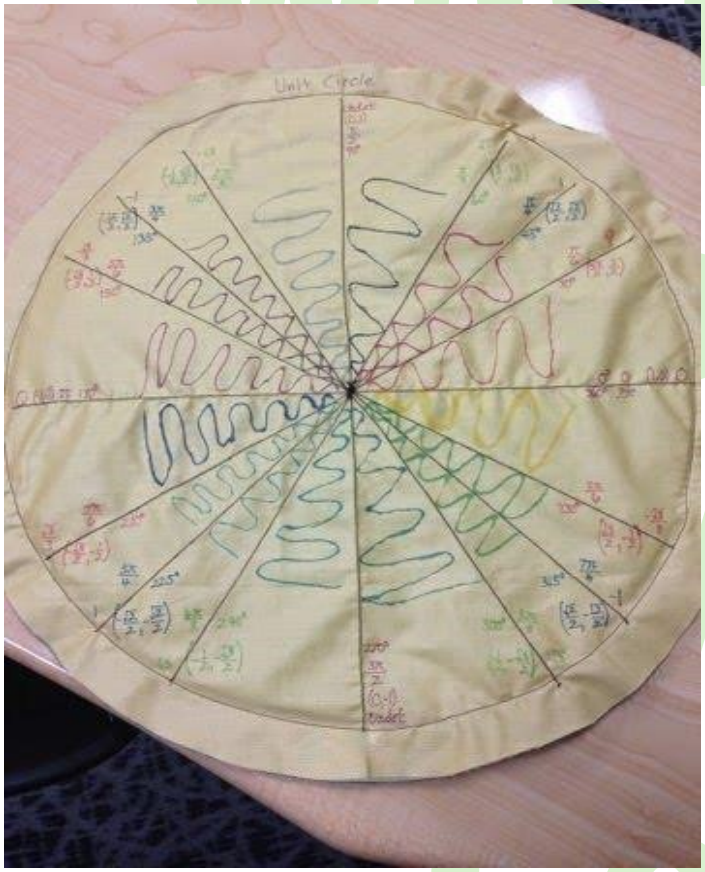
- **Using your choice of medium (if there is a chance that your medium is not school appropriate, please get prior consent)**
- **Your display should include all the angles in degrees AND radians. Please be sure to measure the angles with a protractor to ensure accuracy of your scale representation.**
- **You must also include sine, cosine, and tangent values for EACH angle for special right triangles for the angles.**
- **If you are in a group of two, one of you will lead the project while the other oversees time management.**
- **Fewer points may be given if your object is only a circle, or it appears you put forth very little effort.**
- **Be creative and have fun!**
- **You may receive bonus points for going "above and beyond."**
- **Projects are due day, date.**

Category	Points Possible	Points
Accuracy	10	
Neat/Organized/Legible Labeling	5	
Creativity/Uniqueness	10	
Evidence of Effort	5	
	Total	_____/30

Some Ideas:

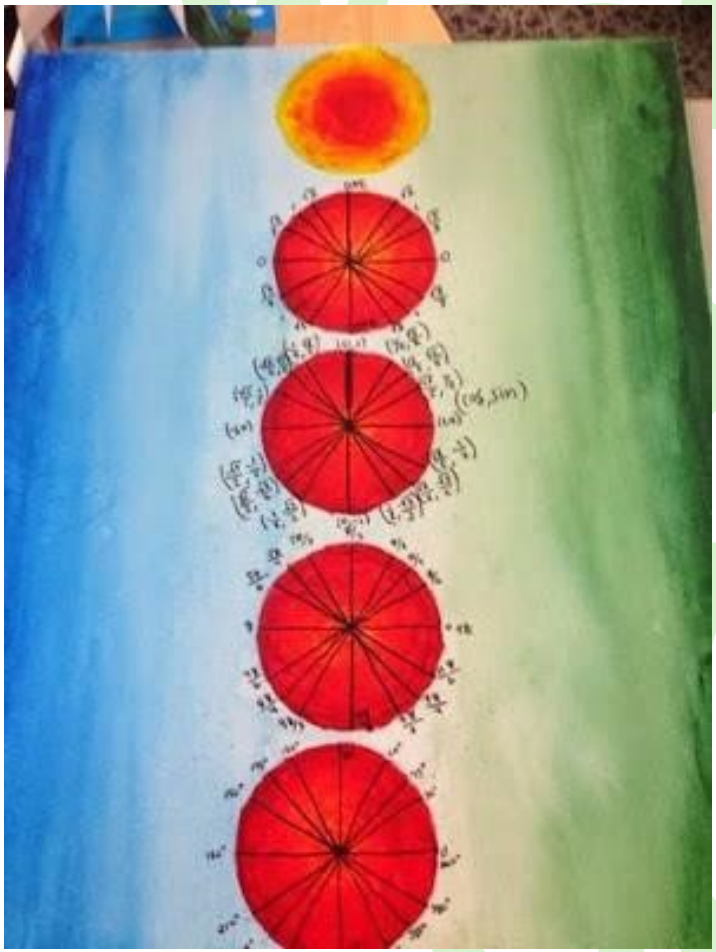


Helicopter



Hand Sewn

Origami Style!



Painted on canvas or 3-D Model

Category	Points Possible	Points
Accuracy	10	
Neat/Organized/Legible Labeling	5	
Creativity/Uniqueness	10	
Evidence of Effort	5	
	Total	0/30