

ACTIVITY TITLE: Patterns of the Mind – Visualizing Emotions through Mathematical Art

Activity code: ncEDE03



 DURATION	90 minutes
 AGE RANGE	16-17
 TOPICS	#ART #MATHEMATICS #MENTALHEALT #GEOMETRY



Description of the project

In this creative, reflective, and interdisciplinary STEAM activity, students will become emotional cartographers, mapping their inner experiences through mathematical patterns and visual storytelling. Using geometric structures such as symmetry, fractals, polar grids, and coordinate-based art, students will explore how abstract mathematical forms can serve as powerful tools for emotional expression and mental well-being.

The activity begins with guided self-reflection where students identify recent emotions, assign them values or symbols, and translate them into mathematical language, colors, shapes, numbers, and visual structures. They will then use artistic techniques and math-based templates (mandalas, graphs, spirographs) to create emotionally expressive artworks that represent personal or collective states such as anxiety, calm, joy, or confusion.

By the end of the session, students will have not only created a visual artifact but also deepened their emotional literacy and appreciation for how mathematics can communicate what words sometimes cannot. This activity fosters empathy, inclusion, and creative confidence by connecting emotional awareness to mathematical and artistic reasoning in a safe, student-centered environment.

By the end of the session, students will:

- Understand how mathematical forms (e.g., symmetry, scale, pattern) can represent abstract emotional concepts.
- Represent emotional states using geometry, color theory, and structured visual templates.

- Reflect on the connection between mental states, structure, and aesthetics.
- Develop empathy by observing peers' artworks and recognizing shared or diverse emotional experiences.
- Collaborate in a respectful space that integrates mathematical thinking with creative and personal expression.



Objectives: What will I learn?

- **Learn how mathematical structures can be used to model and visualize emotional concepts** by applying them in the creation of personal artwork to develop an analytical yet expressive language for abstract feelings such as calm, anxiety, or joy.
- **Learn to represent emotional states** by applying mathematical tools and artistic techniques to produce visual representations.
- **Analyze how geometry, proportion, and visual balance affect emotional interpretation** by experimenting with shapes, symmetry, and spatial arrangements to connect mathematical reasoning with emotional impact and develop a deeper understanding of visual perception.
- **Translate their own or group-generated emotional data into artistic outputs** by using predefined scales (e.g., emotion-intensity ratings) and visual coding systems to gain experience in data interpretation, abstraction, and non-verbal communication.
- **Promote empathy and inclusivity** by observing, interpreting, and responding to each other's emotional artworks in a peer-based gallery walk to encourage emotional awareness and respectful dialogue.
- **Explore how color, pattern, and form influence perception and mood** by the application of color theory and structured experimentation to foster intentional artistic decision-making and reinforce the connection between visual choices and emotional storytelling.



Materials: What do I need?

1. **Provided by the teacher/institution:**
 - Printed templates (polar grid, blank graph, mandala base)
 - Colored pencils, markers, rulers, compasses
 - Samples of math-based art (e.g., spirographs, fractals, tessellations)
 - Small post-its or index cards for writing emotions
2. **Provided by students:**
 - Personal reflection journal or notebook
 - Computer (optional – for creating digital art or mood tracking)
3. **Downloadable resources:**

- [Fractal Drawing Guide](#)
- [Student Guide](#)
- [How Emotions Are Represented Visually Across Cultures, Styles and Gender](#)
- [Artist Statement Card](#)
- [Printed templates](#)



Previous preparation

- **Introduce Purpose and Context**

Begin by framing the activity as an exploration of the intersection between emotions, mathematical structures, and visual storytelling. Explain how mathematical patterns such as symmetry, fractals, and data mapping can become tools for expressing feelings that are often hard to articulate.

Introduce the following videos: [“The Emotions of Mathematics”](#) and [“Math is the hidden secret to understanding the world”](#) to spark interest.

- **Activate Prior Knowledge and Curiosity**

Lead a brief class discussion to connect prior experiences with emotion and visual design. Have students reflect on a time when a color, pattern, or image made them feel something. Ask guiding questions:

- “Have you ever drawn something to express a mood?”
- “What kinds of shapes feel chaotic vs. peaceful?”
- “Do certain colors feel warm, cold, anxious, or joyful?”

- **Form Working Groups**

If done collaboratively, create mixed groups of 3–4 students to foster peer support and inclusion, and assign rotating roles to promote engagement (e.g., Designer, Color Theorist, Emotional Analyst, Presenter). For individual work, ensure peer sharing still occurs during the reflection phase.

- **Print and Prepare Materials**

Ensure the following are printed or made accessible:

- **Templates:** Polar grids, mandala bases, graph paper
- **Downloadables:** “Color-Mood Association Chart”, “Fractal Drawing Guide”, “Student Guide”
...
- **Inspirational visuals:** High-quality printed or digital examples of math-based emotional art (fractals, spirographs, tessellations)

Provide enough drawing supplies per student: colored pencils, markers, rulers, compasses, and sticky notes

- **Set Up the Environment**

- Prepare a calm, inclusive space with minimal distractions.
- Play soft background music (optional) to support emotional introspection.
- Arrange desks or stations with sufficient space for visual creation and comfort.



RESEARCH



Have a look at these resources

Why This Matters – Context and Relevance

Emotions often feel abstract and hard to describe—yet through math, color, and visual forms, we can begin to structure and express them in powerful, personal ways. In this activity, students will explore how mathematical patterns, color theory, and artistic design can be used to map emotional states, creating visual representations of mental well-being.

Understanding the visual language of emotion not only builds self-awareness, but also connects students to fields like data visualization, psychology, architecture, and digital art, where math is used to communicate complex human experiences.

Throughout history and across cultures, visual structures like mandalas, labyrinths, and sacred geometry have been used to represent internal states, rituals, and healing practices. Today, graphic designers, therapists, and data scientists use fractal modeling, color coding, and symmetry to convey everything from stock market volatility to emotional resilience.

Real-World Examples: Math + Emotion in Action

- **Color Psychology in Marketing and UX Design:** Companies use color palettes to influence mood, behavior, and decision-making.
- **Fractals in Nature and Mental Health:** Research shows that viewing fractal patterns can reduce stress and lower heart rate.
- **Mandalas in Therapy:** Mandala drawing is used in art therapy to help individuals externalize emotion and achieve calm.
- **Symmetry in Religious Architecture:** Sacred spaces use proportion and geometry to evoke transcendence and emotional balance.
- **Data Visualization in Social Justice and Mental Health:** Artists and scientists use interactive visuals to share emotional trends, e.g., pandemic anxiety heatmaps.

Prompt Questions to Spark Inquiry and Engagement

- How can a mathematical pattern represent something invisible, like emotion?
- Why do certain colors make us feel calm, energized, or overwhelmed?
- Can emotions be visualized as data? What are the benefits or limits of that?
- How do different cultures use patterns and color to express identity or healing?
- Could you recognize someone's emotional state just by looking at their artwork?
- How might this kind of art be used in real professions—like therapy, advertising, or design?



CREATE



Some things you need before beginning

These ideas will help you understand why math, emotion, and visual design are more connected than you might think and why what you create in this activity can help you better understand both yourself and others.

- **Emotions can be mapped.**

Just like we use graphs and coordinates to describe the physical world, we can also use math to map emotional intensity, balance, and change over time. Therapists, data scientists, and designers use these methods to track mood patterns, visualize stress levels, and even design wellness apps.

- **Colors speak emotional language.**

Different colors evoke different feelings. Blue often represents calm or sadness; red can express passion or anxiety. These connections aren't just cultural; they're also rooted in neurology and visual psychology. By learning to use color intentionally, you gain tools to communicate without words.

- **Patterns can calm or energize.**

Fractals, symmetry, and geometric repetition appear throughout nature in leaves, shells, rivers, and even our lungs. Research shows that these patterns can have a relaxing effect on the brain. Artists and architects often use them to create spaces that promote peace, focus, or emotional healing.

- **Math can express what words can't.**

You don't always need language to explain how you feel. Through grids, symmetry, and fractal design, you can externalize feelings like joy, confusion, or stress in ways that are personal and powerful. This is one reason data artists, mental health advocates, and educators are using visual math to build emotional understanding.

- **You are a visual storyteller.**

In this activity, you're not just drawing, you're building a map of your emotional landscape using logic, color, and form. The choices you make in pattern, spacing, and hue will help others see what's inside your mind.



Now, follow these steps

1. **Emotional mapping and cultural inspiration**

- Begin with a guided mindfulness exercise: ask students to identify 2–3 emotions they've felt recently (e.g., anxiety, calm, joy, confusion).

- Provide small post-its or index cards. Students write each emotion, then associate:
 - A color (from the Color-Mood Chart)
 - A symbol or shape (e.g., spiral, zig-zag, wave)
 - Aa value on a scale from 1–10 (emotional intensity).
- On a shared wall or board, they post their emotional data anonymously to create a visual map of the class's collective state.
- Present biographies about female or gender-diverse creators who use math, emotion, and data to express internal states, and ask: *"What do these creators help us understand about emotional patterning? What emotions or experiences do their artworks reveal that you've also felt?"*
- Introduce the research resource sheet titled *"How Emotions Are Represented Visually Across Cultures, Styles and Gender"*. Ask them to work on that worksheet, to read it and research what they are asked.
- Students choose one emotion they want to represent in their artwork and complete:
 - 1 color inspired by a culture or theory
 - 1 shape or pattern based on research
 - 1 symbolic strategy (e.g., layering, asymmetry, balance)
 - 1 design choice inspired by a woman artist, designer, or data-visualizer whose work expresses emotion through structure, pattern, or color

Step 2: Design and Visual Composition

- Students select a visual format:
 - Mandala (layered emotions, radiating balance)
 - Fractal (expansion of intensity or chaos)
 - Bar graph (emotional fluctuations as visual rhythm)
- Before starting, students choose one of two creative modes:
 - Sustainable Analog: Use recycled paper, repurposed materials, and found objects (e.g., packaging, old notebooks)
 - Digital Visual: Use free tools (Canva, Google Drawings, open-source fractal generators) to create an entirely paperless version
- Design must reflect:
 - At least one cultural/artistic influence (from Step 1)
 - At least one math-based structure (symmetry, scaling, repetition)
 - Intentional color and layout choices based on emotional logic



COMMUNICATE

Gallery Walk and Emotional Dialogue

- Display artworks on desks, walls, or digital platforms.

- Each student completes an Artist Statement Card including:
 - Title of the piece
 - Emotion represented and its origin
 - Math concepts used (e.g., symmetry, scaling)
 - Cultural/artistic and female/gender-diverse inspiration
 - Material choice and sustainability rationale
- Gallery walk:
 - Each student views 3–4 artworks and leaves one empathetic comment using sticky notes or digital forms:
 - Prompts: “This reminded me of...”, “I saw your emotion in...”, “Your design choice really showed...”
- Final discussion: “How can this kind of artistic-mathematical expression be used in design, activism, or mental health awareness?”

Personal Reflection and Real-World Connections

Students respond in writing or digitally:

- What was the most powerful design choice you made?
- How did math help you express something hard to say?
- How did your artist influence your emotion mapping?
- How did you make your piece more sustainable or intentional?



It is time to share!

Share your amazing work and inspire others!

#PatternsOfTheMind #MathForMentalHealth #STEAMexpression

- LinkedIn: <https://www.linkedin.com/company/steambrace-project/posts/?feedView=all>
- Instagram: https://www.instagram.com/steambrace_eu/
- X: https://www.instagram.com/steambrace_eu/



KEEP ON LEARNING



How can I make a similar project by myself?

- Could you design a wearable artwork (e.g., t-shirt, tote bag, patch) that uses your emotional patterns and colors? How would math (symmetry, repetition) and storytelling be part of it?
- Can you turn your emotional map into an interactive data visualization using digital tools? How could you animate or code it to reflect shifting moods over time?
- Could you co-create a mural or digital collage with classmates using your collective emotional data? What shared patterns or contrasts might emerge?
- What would a sustainable art exhibit look like if it were made from only recycled, natural, or biodegradable materials? Could you redesign this project with zero waste?

- Could you write a poem or short story based on your artwork, using the structure of the piece (layers, symmetry, color shifts) as the story's structure?
- Could you research a woman or gender-diverse person in STEAM or design whose work transforms data, emotion, or visual storytelling—and create a project inspired by their method?
- What if your emotional design became a performance, a dance, or an installation? How would space, symmetry, rhythm, and color express inner feelings in 3D or movement?
- Could you design a simple emotion-tracking app or physical tracker inspired by your map? How might it help people understand themselves or support mental health?
- Can emotional design become activism? What social issue matters to you, and how could you use math-based visual art to make people feel something—and act?



Which are other connected projects?

1. Emotion Architecture – Building with Feeling

Design small paper models or 3D digital structures where architectural elements represent emotions:

- Use math-based patterns (symmetry, scaling, tessellation)
- Translate feelings into elevation, spacing, light/shadow
- Reflect emotional intensity using structure, not just color

Extension: Research female architects or designers (e.g., Zaha Hadid, Maya Lin) who express ideas through form and flow.

2. Visual Diaries – Mapping Mood with Data + Design

Track your mood, energy, or stress levels for one week and create a visual diary using:

- Gradients, shapes, fractals, or graphs
- Digital tools like Google Sheets, Canva, or Figma
- Recycled materials for a tactile version

Optional: Compare your design to Laurie Frick's data-art, or explore how gender influences emotional expression in media and science.

3. Psych-Art Installation – Emotion Meets Neuroscience

Partner with a psychology or science teacher to transform emotional or cognitive data into an immersive _____ group _____ installation.

Ideas include:

- Soundscapes that respond to color or mood inputs
- A digital wall of student-generated emotional mandalas
- Interactive AR filters or LED-responsive visuals tied to student surveys

Frame it as awareness activism for mental health, empathy, or identity.

4. Pattern Journals – Emotional Textile Design

Explore how cultural textiles (e.g., Andean weaving, African kente, Islamic tessellation) tell emotional or symbolic stories.

Then:

- Create a pattern-based journal using colors and shapes that represent your feelings over time
- Optional: Transfer your pattern to fabric or clothing using natural or digital methods
- Research women artisans who preserve symbolic textile traditions

5. Emotional Story Deck – From Feeling to Form

Design a deck of small cards or tiles that each represent:

- One emotion
- Its mathematical/geometric expression
- Its visual traits in different cultures
- An inspiring female or gender-diverse artist who explores this emotion

Use the deck to build new artworks or emotional design prompts for others.



LINKS FOR FURTHER INFORMATION

- **Dear Data** (Visual Diaries & Data as Art)
<https://www.dear-data.com/theproject>
- **Bridges Math-Art Gallery**
<https://gallery.bridgesmathart.org/>
- **The Story of Stuff Project**
<https://www.storyofstuff.org/>
- **EcoArtSpace**
<https://ecoartspace.org/>

Disclaimer

DOCUMENTACIÓN CONFIDENCIAL

Este documento contiene documentación confidencial y queda expresamente prohibida su divulgación, copia o distribución a terceros sin la autorización expresa de Academia de Inventores y la Universidad del País Vasco (UPV/EHU). Si ha recibido este mensaje por error, se ruega, lo notifique a Academia de Inventores enviando un mensaje al remitente o al correo electrónico info@academiadeinventores.com y proceda inmediatamente al borrado del mensaje original y de todas sus copias. Gracias por su colaboración.

CONFIDENTIAL DOCUMENT

This document contains confidential information and is only intended for the eyes of the addressee. Reception by any other than the intended recipient does not waive Academia de Inventores legal protection rights, and it is forbidden to report on, copy or deliver the information to third parties without Academia de Inventores and University of the Basque Country prior consent. Should you receive this communication by mistake, please immediately delete the original message and all the existing copies from your system and report to info@academiadeinventores.com or reply to sender. Thank you for your cooperation.