



SYMMETRY IN MOTION

Duration	Age	Difficulty
90 min	13-14	Medium
#SYMMETRYINMOTION #GEOMETRYART		

DESCRIPTION

Students aged 13–14 will explore symmetry through artistic and digital creation, blending geometric reasoning with cultural inspiration. Inspired by artists like M.C. Escher, Piet Mondrian, and Islamic geometric design, students will create their own symmetrical artworks. The project promotes creative thinking, mathematical reasoning, and digital literacy. By the end of the session, students will produce a digital artwork that reflects both artistic intention and mathematical precision, to be presented in a virtual gallery.

KEY COMPETENCES (EU)

- Mathematical competence
- Digital competence
- Cultural awareness and expression

ACTIVITY OBJECTIVES

- Use geometric ideas like polygons, angles and symmetry to create your own original artwork.
- Discover how math and art work together – both need creativity and logic.
- Learn how to use digital design tools like GeoGebra or Canva to turn your drawing into a digital piece.
- Sharpen special thinking by arranging shapes, angles and patterns in a smart way.
- Explore how people from different cultures use math in beautiful ways.
- Grow creativity and problem-solving skills by making art that follows main rules.

MATERIALS



Computer



School Supplies
(Notebook,
pencil, ruler,
compass)



Downloadable
Elements

- Provided by students
- Provided by the teacher/institution
- Downloadable Elements



PREVIOUS PREPARATION

Preload visual samples on class projector or handouts

Prepare accounts for GeoGebra, Canva, or Sketchbook (if needed)

Share short bio profiles of diverse artists (e.g., Zaha Hadid, Maryam Mirzakhani)

CONTEXTUALIZATION AND ADAPTATION

Students will explore the role of symmetry in art and architecture across cultures. Through this lens, they'll examine how mathematics shapes visual language and how different traditions express balance and structure.

Cultural Connection: Students compare how Islamic design, modern art (Mondrian), and optical illusions (Escher) use symmetry, and are challenged to express their own values or identities through geometry.

Inclusivity Note: Group roles (designer, mathematician, presenter) should rotate to ensure balanced participation. Highlight contributions of women and underrepresented voices in geometry and design.

Complementary tools

Pre-selected drawing or geometry software, such as:

- Geogebra
- Canva
- Sketchbook
- Tickercard (for 3D geometry)
- Desmos Geometry

Classroom activity

Group Setup:

- Students work in groups of 3-4 (ensure mixed skills and gender balance)
- Suggested Roles (Visual Designer, Mathematical Strategist, Digital Creator, Cultural Researcher/Presenter)

Wrap-Up Discussion

- "Why is symmetry used so widely in design across cultures?"
- "What does symmetry communicate in nature or in human architecture?"
- "Can something be beautiful without being symmetrical?"



Note for the teacher

- Rotate roles or let students choose based on interest
- Encourage inclusive participation and leadership
- Use peer review or self-assessment tools at the end

Have a look of this resources

Escher Gallery: <https://www.mcescher.com>

Islamic Design Reference: <https://islamicart.museumwnf.org>

Mondrian Foundation: <https://mondriaanfonds.nl>

GeoGebra: <https://www.geogebra.org>

Sketchbook: <https://www.sketchbook.com>

Zaha Hadid Architects: <https://www.zaha-hadid.com>

UNESCO: Women in STEM reports

Canva for Education: <https://www.canva.com/education>

ACTIVITY

Proceed with the following these steps:

1. Artistic & Cultural Exploration

- Observe and analyse selected works from Escher, Islamic art, and Mondrian
- Identify symmetry types used and classify them using guides

2. Manual Symmetry Creation

- Create a sketch with at least two symmetry types on graph paper
- Optionally apply patterns to a fictional tile, window, or logo design

3. Digital Transformation

- Recreate or expand their sketch using digital tools (Use tools like GeoGebra or Canva to digitize the drawing, apply transformations, and stylize the design)
- Upload work to a shared online gallery with title and short caption

4. Gallery Reflection and Cultural Dialogue

- Students visit and comment on peer creations
- Reflect in small groups: "What does this design express? What values does it represent?"

EXTENSION OPTIONS:

- Research a female mathematician or designer and present her work visually
- Add colour using principles of contrast, harmony or symbolism
- Compare symmetry in nature vs. human-made design.



CONCLUSION AND SHARING

Students will present their artworks to peers and optionally publish them to a class website, exhibition wall, or social media.

Reflection Questions:

- What kind of symmetry did you use? Why?
 - What inspired your design?
 - How did cultural examples influence your decisions?
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- Use hastags **#SymmetryInMotion** and tag **@steambrace_eu** on social platforms



You can share the project social media if any teachers want to share with us their results using the following sentence and template with the links:

Don't forget to take a photo of your experience and share it with us!



[LinkedIn](#)



[Instagram](#)



[X](#)

BIBLIOGRAPHY AND REFERENCES

Digital Tools for Creating Geometric Art:

- Geometric Art with Constructions: <https://www.geogebra.org/m/fky22phg>
- Tessellation Artist - Math is Fun:
<https://www.mathsisfun.com/geometry/tessellation-artist.html>
- EscherSketch: <https://eschersket.ch/>
- Canva: Geometric Templates: <https://www.canva.com/templates/s/geometric/>
- Tinkercad: Learn to Use: <https://www.tinkercad.com/learn>
- ArDemos: Geometry Tool: <https://www.desmos.com/geometry>

Artistic and Cultural Inspiration – NGA: I.M. Pei and Geometry:

<https://www.nga.gov/educational-resources/new-angles-art/i-m-pei-and-geometry-nga->

- Google Arts & Culture: Islamic Art:

https://artsandculture.google.com/usergallery/islamic-art/BQIS_1Yn1yw1LQ

