TEACHING
AI Literacy
ACROSS THE CURRICULUM
A K-12 Handbook

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Please enjoy this complimentary excerpt from Teaching AI Literacy Across the Curriculum.

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MP8. Look for and express regularity in repeated reasoning.

Students who are mathematically proficient notice if calculations are repeated and look for general methods and for shortcuts. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. As they work to solve a problem, students who are mathematically proficient maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Grade 8: Geometry

8.G.A. Understand congruence and similarity using physical models, transparencies, or geometry software.

8.G.A.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

Overview:

Provide students with examples of tessellations in architecture and in arts. Let students explore properties of tessellations and identify different geometric transformations in tessellations created using basic geometric shapes. Discuss how AI might "see" these patterns:

- Identifying basic shapes

- Recognizing repetition and orientation

- Breaking down images into recognizable components.

Show students incomplete tessellation patterns and let them complete the patterns, discussing their reasoning. Draw a parallel between their process of completing the patterns and AI pattern recognition.

Have students create a training dataset of tessellations for AI. Students can create five to seven simple tessellation patterns and list key characteristics of each pattern: shape(s) and transformations used (rotation, reflection, translation). Explain how these characteristics are similar to features AI might extract from images.

To simulate how AI learns from the training dataset, have student groups exchange their datasets. Each group now acts as an "AI model," analyzing the new dataset to generate two to three new tessellation patterns based on their analysis. Discuss how this simulates AI learning from data and generating new content.

DISCUSSION QUESTIONS

- How did analyzing multiple examples help in creating new patterns?

- How might real AI systems learn and generate tessellations?

- What are the similarities and differences between human and AI pattern recognition?

RESOURCES

GeoGebra book: *Exploring Tessellations* (qrs.ly/8dgtm5w) to explore tessellations created by basic geometric shapes, for example, square (Figure 6.3a), equilateral triangle (Figure 6.3b), regular hexagon (Figure 6.3c), kite (Fgure 6.3d), and to create new patterns.

(Continued)

FIGURE 6.3 ● Exploring Tessellations with GeoGebra
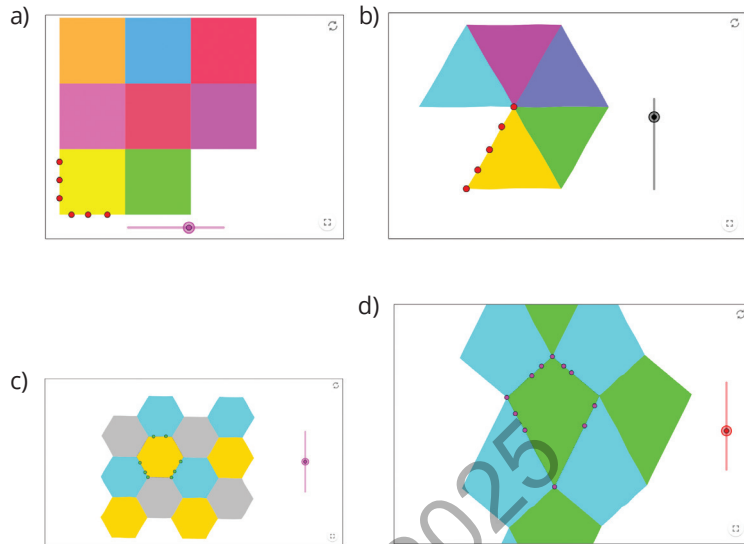
Credit: Created with GeoGebra®, by Steve Phelps. GeoGebra® is a registered trademark of GeoGebra GmbH.

By simulating AI processes, students gain insight into how machines learn patterns, simultaneously deepening their understanding of the geometric transformations in tessellations. This approach provides dddA a rich, interdisciplinary learning experience that connects traditional geometry with AI concepts.

BIG IDEA #4: NATURAL INTERACTION

In this elementary school lesson, students explore properties of operations by creating and identifying true and false statements. They then train and test AI to recognize these properties, reinforcing their own understanding in the process.