The Barnes Foundation's Art of Math Challenge 2017

Submission deadline: Friday, February 24

The Challenge

Use mathematic strategies to design and build a 3D scale model of one of the paintings below. Collaborate as a class to build the model and write a description of your mathematical process. The competition culminates with a display of all submitted models at the Barnes Foundation's Free First Sunday STEAM Fair on March 5, when prizes are awarded.

Each participating class must provide

- A 3D scale model of one of the 3 paintings below, created using student-led mathematical strategies and artistic design
- A written statement describing the mathematical strategies and artistic design that students used to make the scale model
- One photograph of the model taken from an angle that represents the best viewer perspective

Contact Colleen Wilson to sign up for the Art of Math Challenge and Intro to Art of Math Challenge Teacher Workshop: cwilson@barnesfoundation.org or 215.278.7319.

Horace Pippin. *Giving Thanks*, 1942. BF990

Henri Matisse. *The Music Lesson*, summer 1917. BF717. © 2016 Succession H. Matisse/Artists Rights Society (ARS), New York

Paul Cézanne. *The Card Players*, 1890–1892. BF564

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THE BARNES FOUNDATION

FAQ

What is the Barnes Foundation's Free First Sunday STEAM Fair?

The Barnes Foundation grants free admission on the first Sunday of every month. On March 5, 2017, the Barnes hosts its second annual STEAM (Science, Technology, Engineering, Art, Math) Fair, with booths, hands-on activities, and demonstrations. Though the event is free for all, students who participate in the Art of Math Challenge are provided tickets to ensure access to the collection.

How is the competition judged?

There are two competitions: one for creative math strategy and one for artistic design. The creative math strategy contest is judged by Barnes Foundation Education staff and educators from The Math Forum, now part of National Council of Teachers of Mathematics, based on the written explanation of the students' math strategy and its use in the model. The artistic design contest is judged by Barnes visitors' votes.

What materials and experiences are provided?

Each participating teacher is given the Art of Math Challenge Instructions and FAQ, a cardboard box as a suggested base for the 3D model (if using a different base, please do not exceed 2.5 feet in any dimension), a set of Barnes Foundation teaching posters, and suggested lesson plans to help prepare students. The Barnes Foundation and The Math Forum are also hosting a free teacher workshop where participating teachers pick up their materials and learn how to support this student-led math project. The workshop is at the Barnes on October 13, 2016, 4:30–6:30 pm. Contact Colleen Wilson at cwilson@barnesfoundation.org to register for the Intro to the Art of Math Challenge Teacher Workshop.

What is a 3D scale model?

As defined by Science Daily, it's a "representation or copy of an object that is larger or smaller than the actual size of the object being represented. Very often the scale model is smaller than the original and used as a guide to making the object in full size." Students create a diorama-style 3D scale model of the room depicted in a painting, using math to make sure that their copy is proportional to the room in the painting.

What is expected of the written statement?

The written statement is a critical element for the judges to assess how students used math to solve the problem. Judges expect students to express their thinking using math language appropriate to their grade level and to include specific numerical or formulaic examples. Entries aren't judged on the precision or complexity of the math, but on the explanation of the mathematical investigation and process. The best entries show a clear connection between the scale model and the mathematical strategy described in the written statement.

What is student-led math?

Student-led math is when students evaluate a problem and decide on a math strategy to solve it, with no prescribed math model. This method encourages creative problem-solving and reinforces the idea that there is often more than one way to solve a problem. Depending on the age level and math proficiency of the group, solutions may be more or less precise. In the competition, students aren't judged on math precision, but on how they demonstrate their solution in their model and their written explanation of why and how they used their math strategy. Many math models can be successful, from addition and subtraction to ratios and proportion, as long as students argue why that method accomplished their goal.

Notice and Wonder® Activity

Students don't always notice the math in the world around them. They haven't learned to see with a mathematician's lens, or worse, they've learned to turn off that lens because they don't trust their own thinking. The Math Forum's "I Notice, I Wonder" activity starts with removing the question to help create a safe environment where students focus on sharing their thoughts without any pressure to answer or solve a problem.