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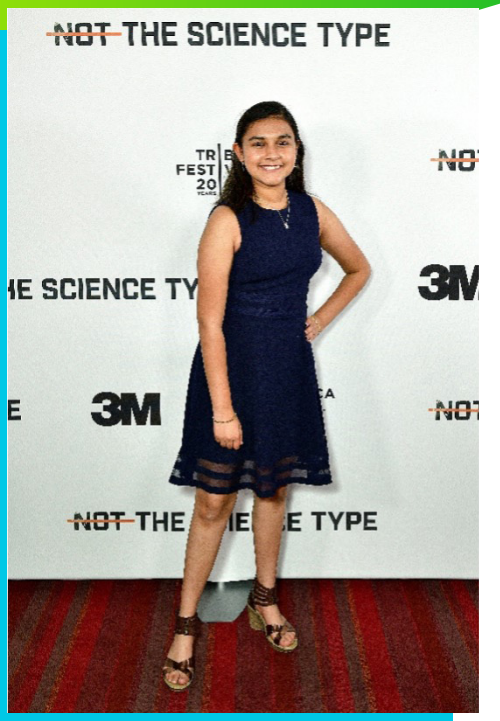
What Does a Scientist Look Like Anyway?



Gitanjali Rao

TIME's 2020 Kid of the Year

Gitanjali (Gi-ton-ja-lee) Rao is a 15-year old with many interests —baking, Indian classical dance, fencing and solving big problems through innovation, to name a few! With fearless pursuit, she challenges the 'single story' narrative about who a scientist is and how their work can be used to further social good. Like other women, and in particular women of color in the field of STEM, Gitanjali continues to quiet the voice in her head that says "I don't feel like I belong because my race, gender and age don't fit the biased stereotype of what others think a scientist should be". Gitanjali is beginning to embrace the fact that it is equal parts who she is and what she does that makes her absolutely undeniable. She is a self-starter and motivated by finding powerful solutions for the injustices that plague everyday people—whether it be designing innovations to detect dangerous levels of lead in the water of Flint, Michigan, creating an app to educate and call out cyber bullying right where it happens, or designing a device that helps to diagnose opioid addiction. Gitanjali Rao is a force for good—a change maker that inspires kindness and designs with purpose.

Each year, 3M's State of Science index explores global attitudes about science. Here are just a few findings unearthed about STEM equity from this year:

87% believe we need to do more to encourage and retain girls in STEM education

70% believe there are negative consequences to society if the STEM community fails to attract more women to STEM careers

The work that Gitanjali does as a young scientist, connects to the following Next Generation Science Standards Disciplinary Core Ideas (DCIs), Science and Engineering Practices (SEPs) and Computational Thinking Skills:

Framework	Corresponding Standards
Next Generation Science Standards (NGSS): Engineering Design	• 3-5.ETS-1. Define a simple design problem reflecting a need or want that includes specified criteria for success and constraints on materials, time or cost. • HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints including cost, safety, reliability and aesthetics as well as possible social, cultural, environmental impacts. **Computational Thinking Skills:** Pattern Recognition: Creating Algorithms, Making Meaning with Data Practices

Directions for Classroom Discussion: Prior to showing the profile video, engage students in activity 1 below — activating their prior knowledge and misconceptions about who a scientist is or can be. The goal is that by the end of this learning engagement, students begin to see themselves as aspiring innovators and scientists capable of solving important problems in the world.

Pedagogical Approach	Classroom Activities & Directions
Visualize an image of a scientist. *(before watching the profile video)*	**Student Directions:** *"Close your eyes and consider your favorite cartoon, or all the news coverage you have watched on the global pandemic COVID-19, or even your favorite social media celebrity that creates and acts out seemingly outrageous experiments. In each of these scenarios, there is someone doing science. Keeping your eyes closed, see if you can get a clearer picture of what a scientist looks like. Now open your eyes and recreate that image on your paper. You have 10 minutes. Be as creative and as detailed as you can be".* *Allow students to return to their image after watching the profile video to add to their image responding to the prompt: Who else might a scientist be? What might they look like? What might they do to improve the world around them?* **Materials:** 8" x 11" copy paper, fine markers, access to skin color crayons, some art supplies (felt paper, pipe cleaners, stencils, etc.)
Think. Pair. Share. *(pause video at 5:44)*	Respond to the prompt 'What problems do you have a personal connection to? Why?'
Makerspaces. *(post video activity)*	*All students (those with large learning gaps and those with specific disabilities) can design and create and think deeply through inquiry based learning.* **Elementary grades:** • Use artificial intelligence (AI) an/or coding to program a classroom robot like sphero or dash. • Design a circuit to turn lights on/off or sound an alarm **Middle/High School grades:** • Use the Design Thinking process to prototype multiple solutions for the problem you named in your Think. Pair. Share activity. • Learn how to design an app to increase accessibility to the solution prototype
Additional Resources	• The Danger of a Single Story - Chimamanda Adichie TED Talk (2009) • Early Learning Strategies for Developing Computational Thinking Skills • The Case for School Makerspaces • 'A Young Scientist's Guide to Problem Solving' - A TED Talk by Gitanjali Rao (2020) • Culturally Relevant Mathematical Practices (CRMPs) #5 • Digital Promise Micro-credential in Computational Thinking