How Mystery Science Offers Equitable Science Instruction for All Students

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The Mystery Science mission: helping all children stay curious

At Mystery Science, our mission is to help children stay curious. We want to help the next generation of children grow up viewing the world as an amazing place where they can solve problems by thinking for themselves.

Each child is unique. It is our job to create a science curriculum that is not only accessible to all children but is also a celebration of their individuality, their curiosity, and their identity. All students should feel seen and included in the world of science, regardless of their gender, race, ethnicity, religion, physical or learning ability, or socioeconomic status. We want to help each child see themselves as capable of becoming scientists and engineers, but more importantly as critical thinkers who can approach the world with a growth mindset.

Our inclusivity principles

Mystery Science is a living curriculum, and we're working every day to make it the most robust, enriching, and engaging science program for teachers and their students. And to achieve our mission of engaging and supporting every child, we are constantly evaluating our program to ensure that everyone feels included and welcomed when they're learning with Mystery Science.

This work is ongoing and ever-evolving. We eagerly listen to and incorporate feedback from educators, parents, and students. We ask critical questions when we're updating our existing lessons or creating new content or resources. Most importantly, our entire team is passionately committed to making sure that everything we create at Mystery Science is consistent with a set of firmly held principles about inclusivity.

Making diversity visible through representation

Students all over the world are already learning with Mystery Science, and we're reaching more and more children every year. So it's even more important than ever that every child can see themselves represented in our lessons. The stories we tell, the images we show, and the characters we portray and how we portray them all send signals to students about who is included, who is valued, and whose voices are heard.

As science educators, we are also sending signals about who participates in and excels at science. We take this responsibility very seriously, and we work to make sure that all students can identify with our lessons. By doing so, we hope to inspire all students to stay curious, think critically, and view themselves as capable scientists.

How we put this principle into practice:

- ***We show real kids from diverse backgrounds asking questions in our mini-lessons***. We want all students to feel empowered to be curious, use their voices, and ask questions—no matter how they identify, where they live, or what language they speak.
- ***We purposefully feature people from diverse backgrounds in the stories we tell***. We're mindful of showing all kinds of people in all kinds of roles and including people from diverse backgrounds among the scientists and other inspirational figures who appear in our lessons. We've also recently begun to invite diverse guest scientists and experts to answer some of the questions we feature in our weekly mini-lessons. We want *all* students to think, "I could be the next person to solve this kind of problem and to make the world a better place!"
- ***We carefully select the visuals we show to be inclusive and representative*** of the diverse populations that learn with Mystery Science.

A few examples from our lessons:

"How do scientists know so much?" is an intro-to-science hands-on lesson that showcases the contributions made by female scientists.

"What do people who are blind see?" is a 4th grade lesson where students hear from a film critic who is blind as they learn about how our eyes work.

In the mini-lesson, "What causes the Northern Lights?" our narrator shares an experience with auroras in Northern Canada and discusses the insights of local indigenous people who identified the similarity of Northern Lights and electric sparks.

What teachers say:

"This comment is so overdue: THANK YOU, Doug and your fabulous team, for including people of all colors, all shapes, sizes, and nationalities in your videos. This may not be something that everyone notices, but as a teacher to inner-city kiddos- we happen to be mostly African American in my school- I notice it right away!!! My heart smiles as my students see scientists that look like them. But not only that, even just the example pics are diverse and inclusive. Well done, Mystery Science. Sometimes the little things are BIG." – Christine J., OH

"Thank you SO MUCH for including a guest scientist expert who kids can identify with! They LOVE Doug, but introducing kids to diverse scientists is so important! I want my students to be able to see themselves as scientists, regardless of their ethnic background. Thank you for this first big step towards diversifying Mystery Science and for always being a company that is so responsive to the needs of teachers and students.😊" –Jen W., multi-grade teacher, MA

Making all students feel welcome and included through conceptual and linguistic accessibility

Inclusivity is held at the center of our lessons. All students come to the classroom with a broad range of background knowledge and experiences, and that mix of knowledge and experience serves as a starting point for each lesson. As Dr. Sharroky Hollie from

the Center for Culturally Responsive Teaching and Learning puts it, each student is embedded in layered rings of culture from age/youth culture, to gender, religion, class, nationality, orientation, and ethnic culture. When we keep these rings of culture in mind, students feel seen and valued as the unique individuals they are, and they are set up for success throughout the sense-making process in each lesson.

How we put this principle into practice:

In Mystery Science lessons, we are mindful that students are children and don't have the same context adults bring to lessons. We work to foster discussions and create explanations that meet them where they are, at a level they can understand, while being thoughtful of the range of background knowledge they may bring to a lesson. We may use phrasing like, "You might have thought that…" or "When I was a kid, I had no idea that…" to set students at ease. Students are meant to feel welcome with prompts to participate, discuss, and imagine themselves as part of the stories we tell and situations we present.

To ensure that the academic discourse is accessible to all students, we start with visuals and introduce vocabulary words only after we help students understand the concept. We want students to engage with the world, to observe, to experiment, to discuss ideas with each other, and to reason from evidence. With Mystery Science, learning is primarily about the world, not the words, so that vocabulary acquisition isn't a barrier but rather a tool to cement new knowledge in a child's mind.

While we don't yet narrate Mystery Science in languages other than English, we have translated all of our worksheets and assessments into Spanish—a first step toward a broader effort underway in 2021-22 to create a Spanish-narrated version of all the lessons in our K-5 science curriculum.

A few examples from our lessons:

- In the bonus episode, "Top 5 Surprising Re-Uses of Plastic," students are encouraged to think like inventors, with prompts like this: "You could try to make a tiny plastic bottle boat for your bathtub. Think like an inventor! What could yours look like?"

- In the mini-lesson, "Why is the sky blue?" we acknowledge a common misconception that the sky reflects back the color of the ocean, and we carefully direct students to look at different-colored skies, rather than overloading them with abstract terminology like Raleigh's scattering.
- This performance task worksheet from the Anchor Layer *Watery Cave* for 3rd grade is available in both English and Spanish, as are all of our worksheets and assessments.

What teachers say:

"Last year I used your unit on water and how it helped site communities during Westward Expansion. It led my kids to wonder about why Los Angeles is here, since water really isn't. So we went with that. It inspired a semester-long, student-driven study of Mulholland, aqueducts, wells, water treatment plants, the LA River, and the future of water acquisition in Southern California, which is about conservation. That took them through the next semester, because they wanted to learn about conservation and new ways of producing energy. All of that came from one unit in Mystery Science. You might want to share that with your developers. Thanks for making science accessible to kids." –Jennie P., CA

"My students and I LOVE Mystery Science. With our virtual learning model, I have been using the mini-lessons and extension activities. Today I used the one, "How Old is the Earth?" since we just finished a geography unit in social studies. I also liked the extension activity of a scavenger hunt so the kids could get up and move around. Being on Zoom all day is hard! When the students were sharing their "old" objects, it was one of the best virtual sharing times we have had, plus what they found was so connected to their families and the stories they were sharing were wonderful. It was an unintended positive consequence of this activity. Thanks and keep them coming!" –Lynne C., PA

Offering pedagogical support for a wide range of learning styles and abilities

Mystery Science lessons are purposefully designed to be accessible to students with a wide range of abilities, including neuro-typical and neuro-diverse students as well as students at, behind, or ahead of grade level.

How we put this principle into practice:

- ***Looping videos in step-by-step activity instructions*** enable students to see exactly what they should do and to revisit instructions as they work.
- ***Hands-on activities*** allow students to experience the scientific concepts by "doing," in addition to providing opportunities for reading, writing, and discussion. Teachers are also able to assess understanding in a multi-modal way.
- ***Discussion questions are built into every single lesson***, facilitating highly engaged peer conversations.
- ***The video-first design*** of our lessons enables students who aren't yet proficient readers to participate fully in all science lessons.

What teachers say:

> "I want to say thanks for putting out such a wonderful product. I teach at a Title 1 School in the Bay Area. My students deal with a great deal of trauma on a daily basis plus most are reading a year to two years behind their 4th-grade level. The last thing they need is for me to give them a science textbook and ask them to read text that they aren't capable of understanding YET. Mystery Science brings science to life for them in a fun and attainable way. In the beginning, my students could not sit together...without getting into physical and/or verbal fights. Now they are able to sit through an entire Mystery Science lesson and have thoughtful discussions too." –Brandon C., CA
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> "You are amazing!!!!!! My new students will LOVE this news!!! It is a WONDERful program- so quirky, insightful, and full of smart science that connects my scholars to the world around them. I work with kids with special needs, and the

way that Doug explains everything, and connects the dots is so clear, and really engages students (and adults!) Not to mention, that kids in the Bronx suffer from Nature Deficit Disorder, and Mystery Science really gives them super schema on the natural world." –Jac O., NY

"I just recently found Mystery Science, and as a Science teacher at a rotational model elementary school where I teach grades K-5th, I have to say I am IN LOVE! Many of my students have dealt with trauma over the course of their young lives, and it is important to have hands-on and kinesthetic learning to keep up their engagement in the subject matter. I noticed a huge difference on just the first day that I tried out Mystery Science. Our class sizes are large, and we have a large population of Tier 2 and Tier 3 intervention students. There is one class that presents problems to all teachers. I have been to the point of frustration with them many times this year, but when I did a Force Olympics lesson with them, I had 100% engagement and 100% learning! I nearly cried during the lesson (for the first time of happiness instead of stress). I just want to say THANK YOU THANK YOU THANK YOU! I will be singing the praises of Mystery Science for the rest of my teaching career." –Kaycie L., WI

"We are a self-contained special education high school program which includes students with autism, cognitive impairments and emotional impairments within a general education high school. I was able to use the 4th and 5th grade curriculum to meet the learning needs of the students. I am currently providing virtual instruction to a classroom of the students in this program and use 'Mystery Science' to provide a modified curriculum to our students with multiple impairments who do not follow the traditional diploma curriculum." –Kristen S., MI

Creating a resource that supports teachers and schools wherever they are in their science teaching journey

Just like students are all individuals, teachers and schools have their unique circumstances. A new teacher in their first few years as a generalist in kindergarten or 1st grade has different needs than an upper-grade veteran science specialist who is deeply immersed in the best practices for teaching standards-aligned science. Schools can also have vastly different resources regarding budget, time, space, and/or equipment.

Mystery Science is currently the only science curriculum that differentiates its resources to meet the needs of teachers and schools no matter what their starting point may be.

How we put this principle into practice:

- ***We have a range of resources for teachers to meet them where they are.*** Our lessons support teachers who have only 15 minutes per week for science instruction (mini-lessons and Top 5 bonus content), teachers who have an hour or so for hands-on science (the core K-5 science curriculum), and teachers who are ready to guide their students through more complex phenomena that take an entire unit to fully investigate (the Anchor Layer with its phenomena-based instruction that integrates across multiple lessons).
- ***Hands-on science activities are designed to use readily available materials*** teachers can find in their classroom, or at local retailers or online. No expensive specialized kits are required. The built-in supply calculator and master supply lists make it easy to prep at a classroom or school level. Mystery Packs offer the added convenience of having supplies delivered, organized by unit and lesson, which reduces prep time and increases the ability of all teachers to offer an outstanding hands-on science experience to even more students.
- ***The program does not require student accounts or 1:1 devices.*** All that's needed is infrastructure available in most US schools: wireless internet access, a computer, access to a black and white printer, and a projector.

- ***During the coronavirus pandemic, we invested heavily in supporting distance learning.*** We built features like easy sharing to learning management systems, added mini-lesson extensions that are perfect for asynchronous learning, created no-prep activities that are easy to do without printers at home, and began offering virtual PD to support teachers transitioning into this different way of teaching.
- ***We strive to make the program accessible to all teachers and schools, even those with limited budgets.*** We offer year-long free trials for teachers, as well as district pilots, to enable schools to decide whether this resource is right for them, without upfront costs. Our pricing is fully transparent and low-cost relative to typical science programs. Schools that qualify can receive additional financial aid to make purchasing possible for low-income schools.

What teachers say:

"I love Mystery Science because everything is so well done and organized. Our district kit-based curriculum takes me hours every week to prepare and the discoveries are chaotic nightmares with 28 2nd graders. Mystery Science is soooo much more interesting to the students. It really keeps their attention and since science is really still a mystery to me, I appreciate the detailed instructions and visuals as well as the activity supply lists and steps. My kids and I love Mystery Science!"–Susan L., 2nd grade teacher, NV

"Besides how much we as teachers love it, the kids love it more. They love the topics, but are more fascinated with the information about the topic and how it is presented. I use the mini-lessons, the extra holiday lesson, and of course the lessons that match our core. I wish I could make sure that every lesson I teach is as engaging and memorable as every one of the Mystery Science lessons. You are welcome to use any of my statements to promote your product. A big thumbs up to you and your company." –Louise W., UT

"I have just finished planning for 'How Much Water Is In The World?' as a 2-day lesson. This is my first year teaching science and until now I had not found a resource that my students would be interested in and that would also make

planning easy. I extend my absolute gratitude to you and your colleagues at Mystery Science!!" –Michael H., OR

"Our resource kit just arrived. It is AMAZING! Thank you for taking the time to sort each lesson's materials out and group them in one bag. I've had totes upon totes in the past for teaching science where the materials were just thrown in. I continue to be blown away by the superior quality of Mystery Science." –Carrie H., KS

Our ongoing commitment to diversity and inclusion work

As creators of a living curriculum, we actively listen to teachers, families, administrators, and other customers who use Mystery Science—whether through surveys we send out, individual teacher interviews, the feedback we receive via our help requests, or through our online Insider community for teachers who are active users. While we are proud of all we've already done, we know there is so much more to do!

Here are some of the initiatives on the horizon:

- ***Make all of Mystery Science available with Spanish narration.*** Building on the worksheets and transcripts in Spanish that we already offer, we're embarking on an effort in 2021/22 to add Spanish narration to all of our full lessons and to new mini-lessons. (This mini-lesson is a Spanish-language prototype; you can switch between languages easily.) This will increase accessibility to Mystery Science for the ~2M elementary students in the US whose first language is Spanish.
- ***Increase the diversity of storytellers seen in our lessons.*** We will continue to invite a diverse range of guest scientists and other experts to share their stories in our mini-lessons. These guest narrators will allow students to see experts from many different backgrounds and with a breadth of interests as role models. We

also plan to increase the diversity of the people who write the stories for our program so that students can experience a wide range of storytelling perspectives. Each new narrator will bring the same welcoming, authentic, personal approach that teachers and children love about Doug, our co-founder and original storyteller.

If you have any thoughts or suggestions on how we can make Mystery Science more inclusive and accessible to more students, please email us at support@mysteryscience.com. Just like we encourage students to grow and get better each year, we also want to keep improving, and the feedback we receive from teachers, homeschooling families, education professors, and administrators is essential to make that possible!