

Welcome!

NGCP National Webinar:

Supporting Equitable Approaches to Early Science Education



National Girls
Collaborative Project





20 YEARS TRANSFORMING STEM

Supporting Equitable Approaches to Early Science Education

March 9th, 2023

NGCP Vision

The vision of the National Girls Collaborative Project is to **support and create STEM experiences** that are as **diverse as the world we live in.**



Our Goals

Connect + Create + Collaborate

1

Build and sustain a network of advocates to provide equitable and inclusive STEM opportunities.

2

Catalyze equity in STEM from research to practice by providing actionable knowledge that transforms the STEM experience.

3

Increase our collective impact by strengthening organizational effectiveness and enhancing our fiscal sustainability.



NGCP Activities

- Network Partnerships
- IF/THEN Collection
- FabFems
- Youth Advisory Board
- State Leadership Teams



National Webinars

- Offered monthly on topics to help our networks grow and thrive
- Speakers include educators, researchers, authors, and diverse STEM professionals
- Sign up: <https://www.ngcproject.org/events-announcements>

"I have gotten more out of this than the dozens of other presentations I have attended this summer."

"I found this useful and enjoyable."

"I really like all the resources placed in the chat that I can go and flip through to find what is most helpful to my organization"



NGCP Newsletter

- National in-person and online events
- STEM resources for engaging girls and youth, professional development opportunities for educators, and opportunities for youth
- Research and reports related to STEM and equity, informal STEM education and learning
- NGCP updates and events, including webinars, knowledge products, and tools





NGCP

20 YEARS TRANSFORMING STEM

Supporting Equitable Approaches to Early Science Education

March 9th, 2023

Speakers



Amanda Cardarelli

Researcher



Amanda Strawhacker

Pre-K – 8 STEAM Coordinator



Harnessing Language to Increase Girls' Science Engagement

Amanda Cardarelli

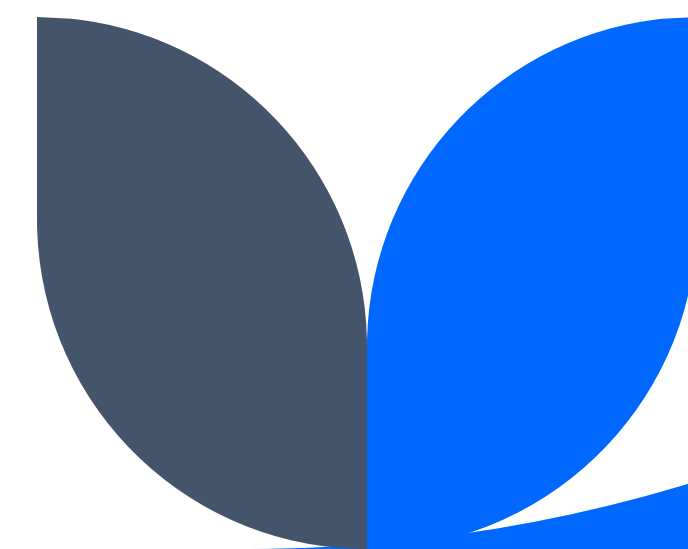
Senior Research Associate

Education Development Center (EDC)



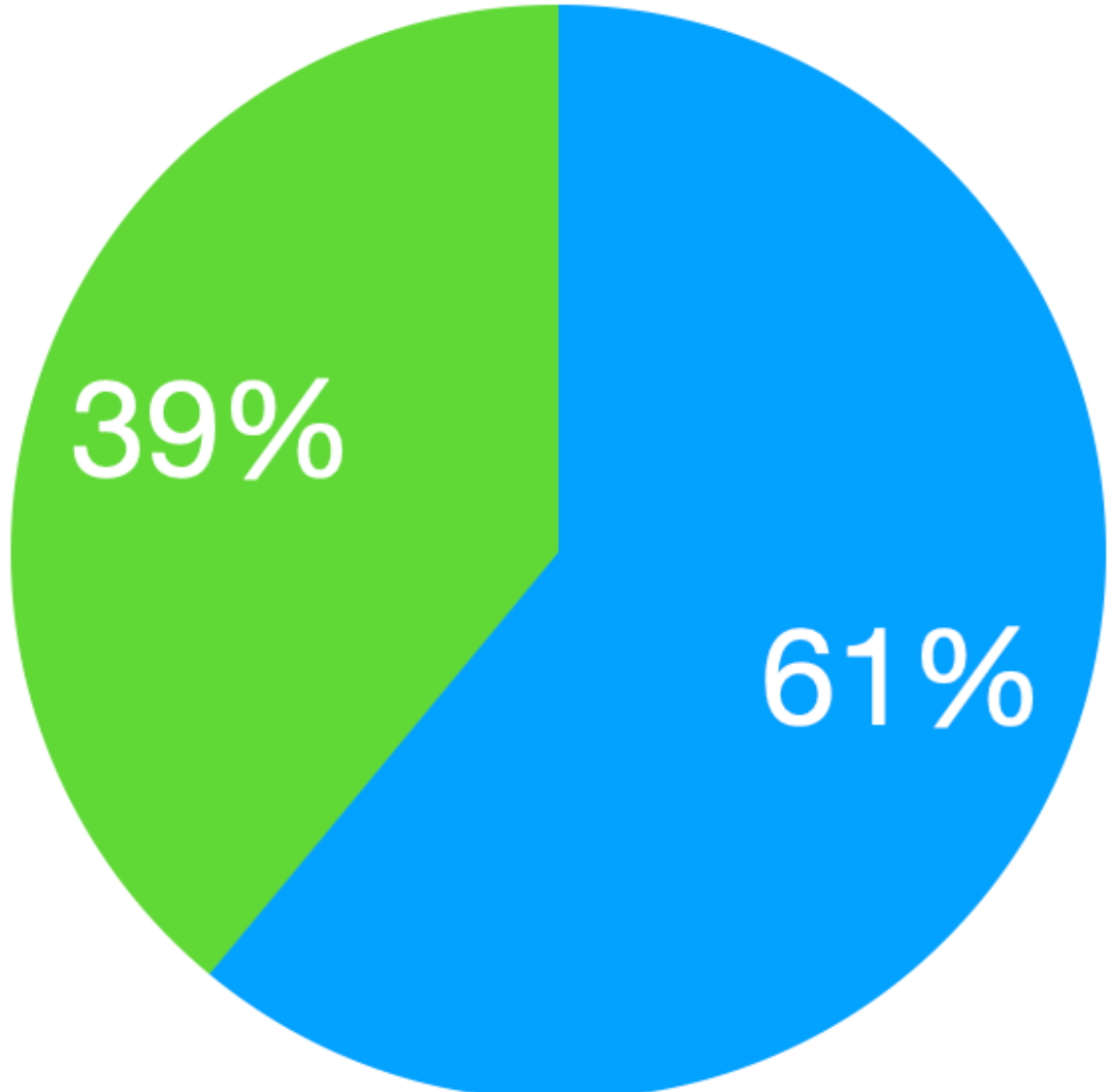
CDSC

March 9th, 2023

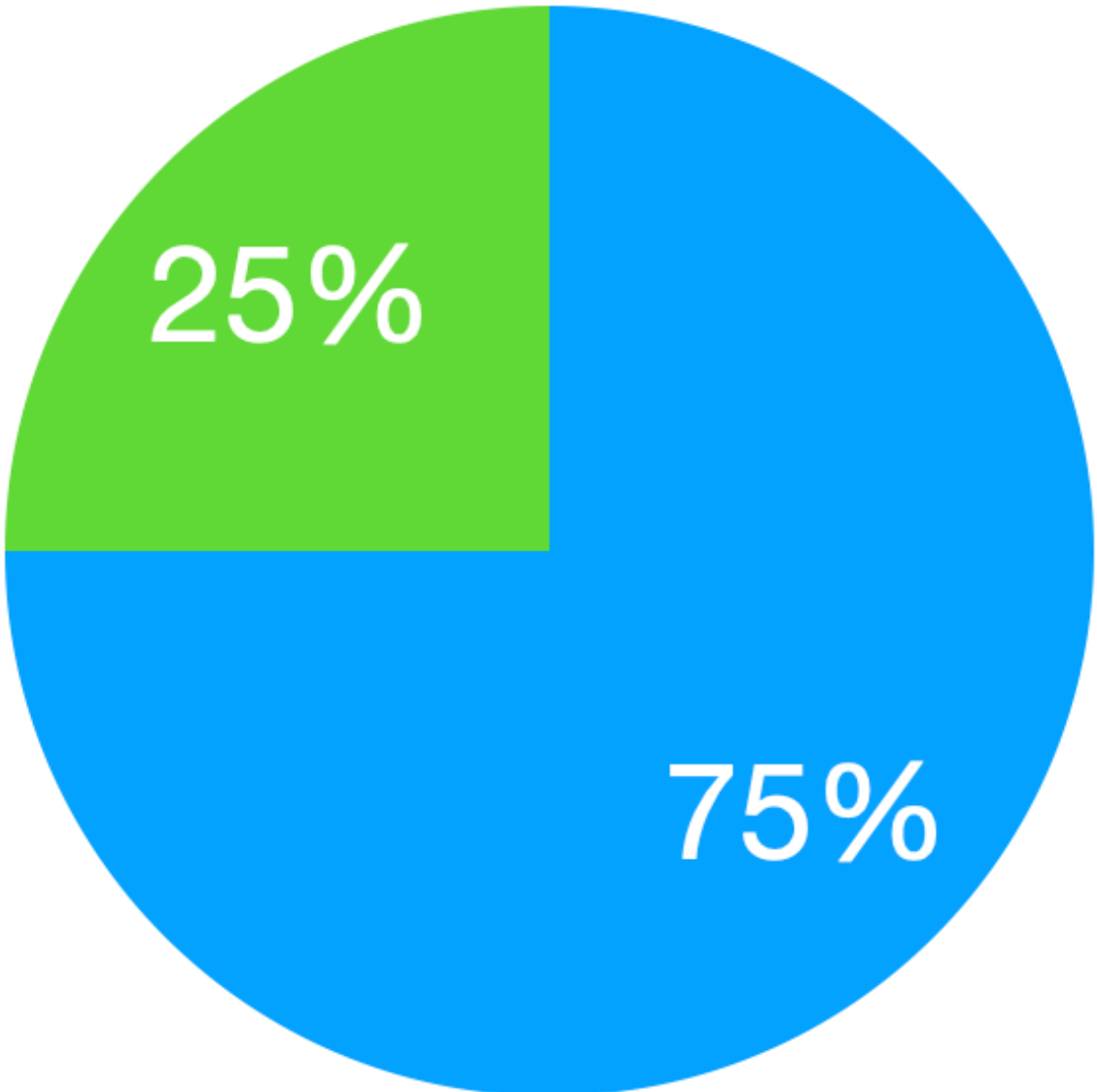


Women in STEM

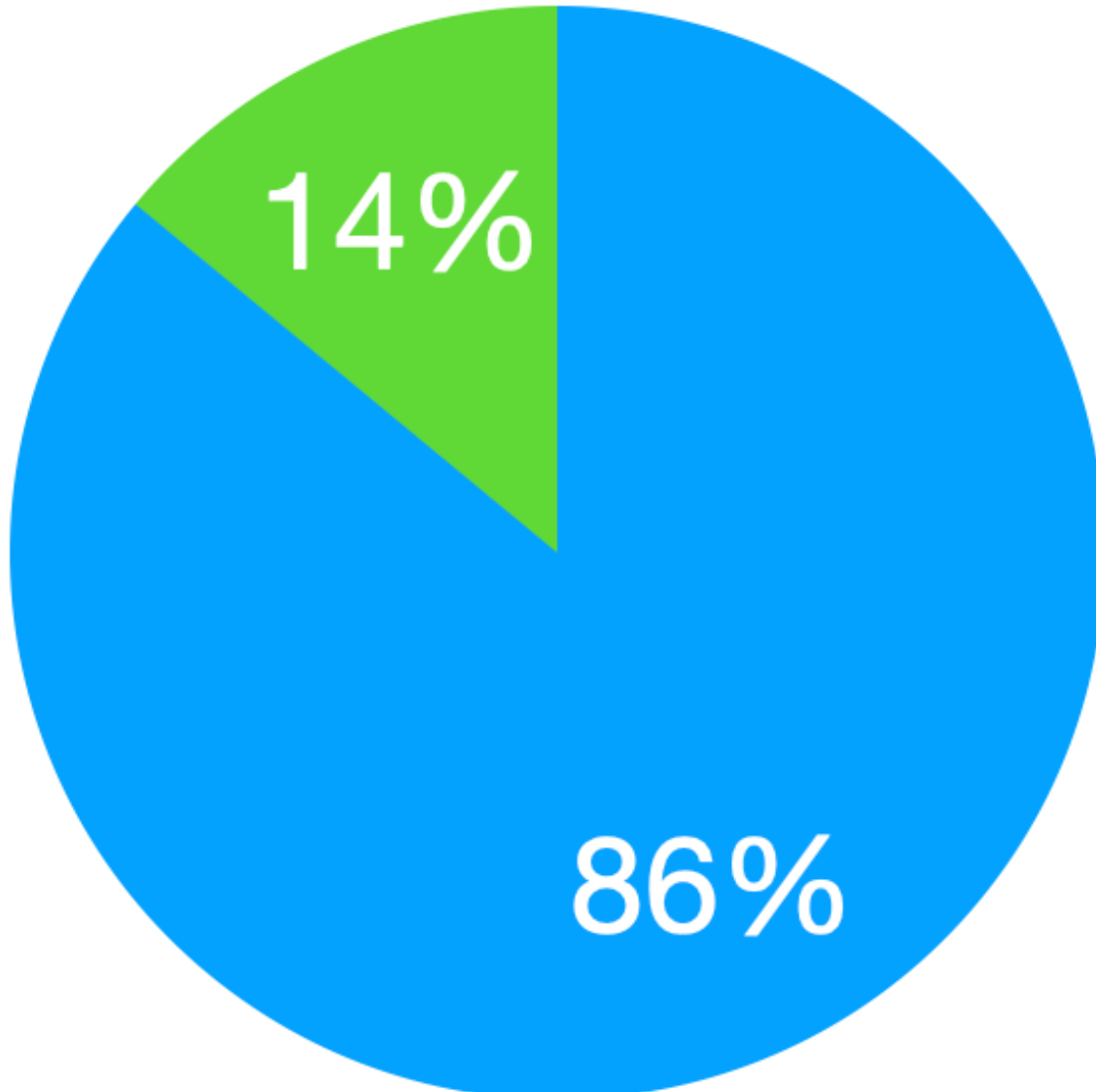
● Men ● Women



Physical Science

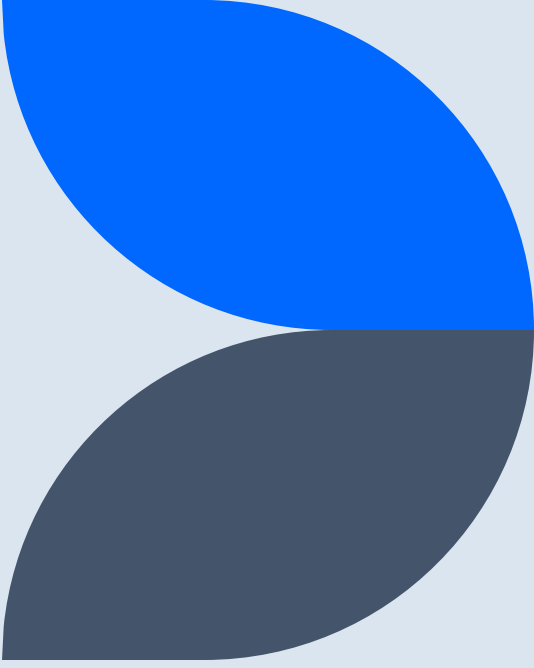


Computer Science



Engineering

Gender stereotypes about science develop early and impact engagement



- Children develop stereotypes associating scientists with males by age 7
- Stereotypes hinder girls' science engagement

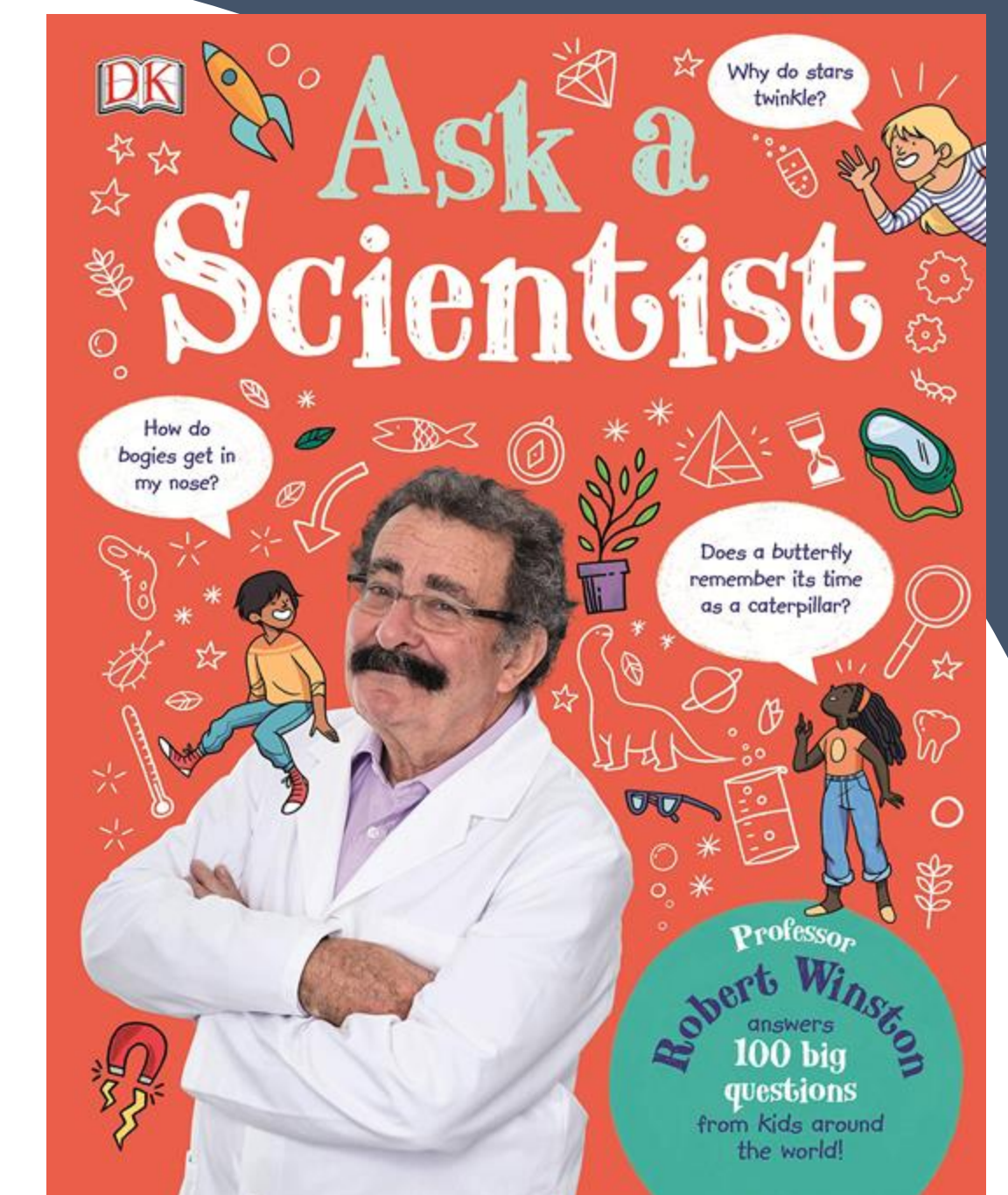
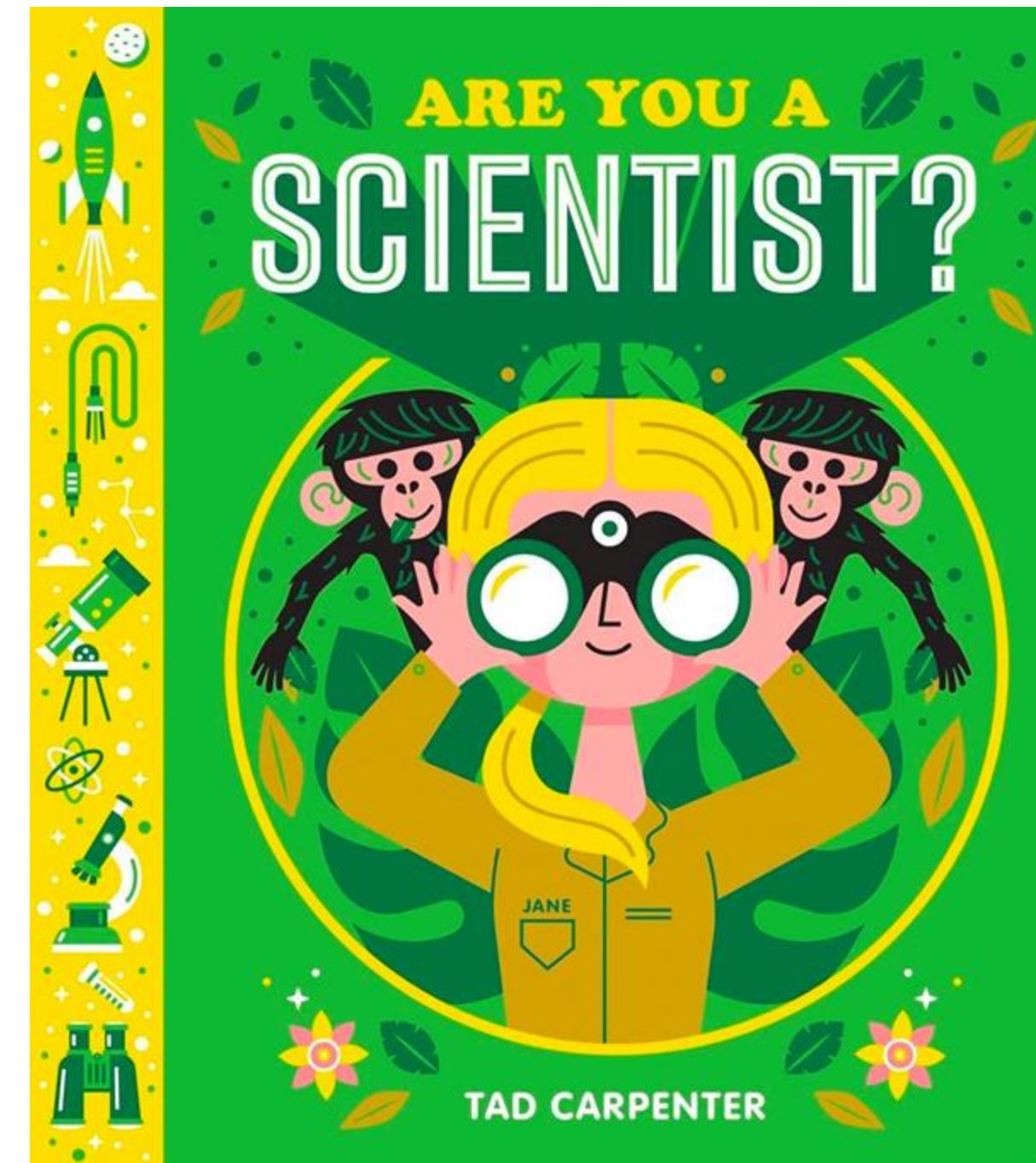
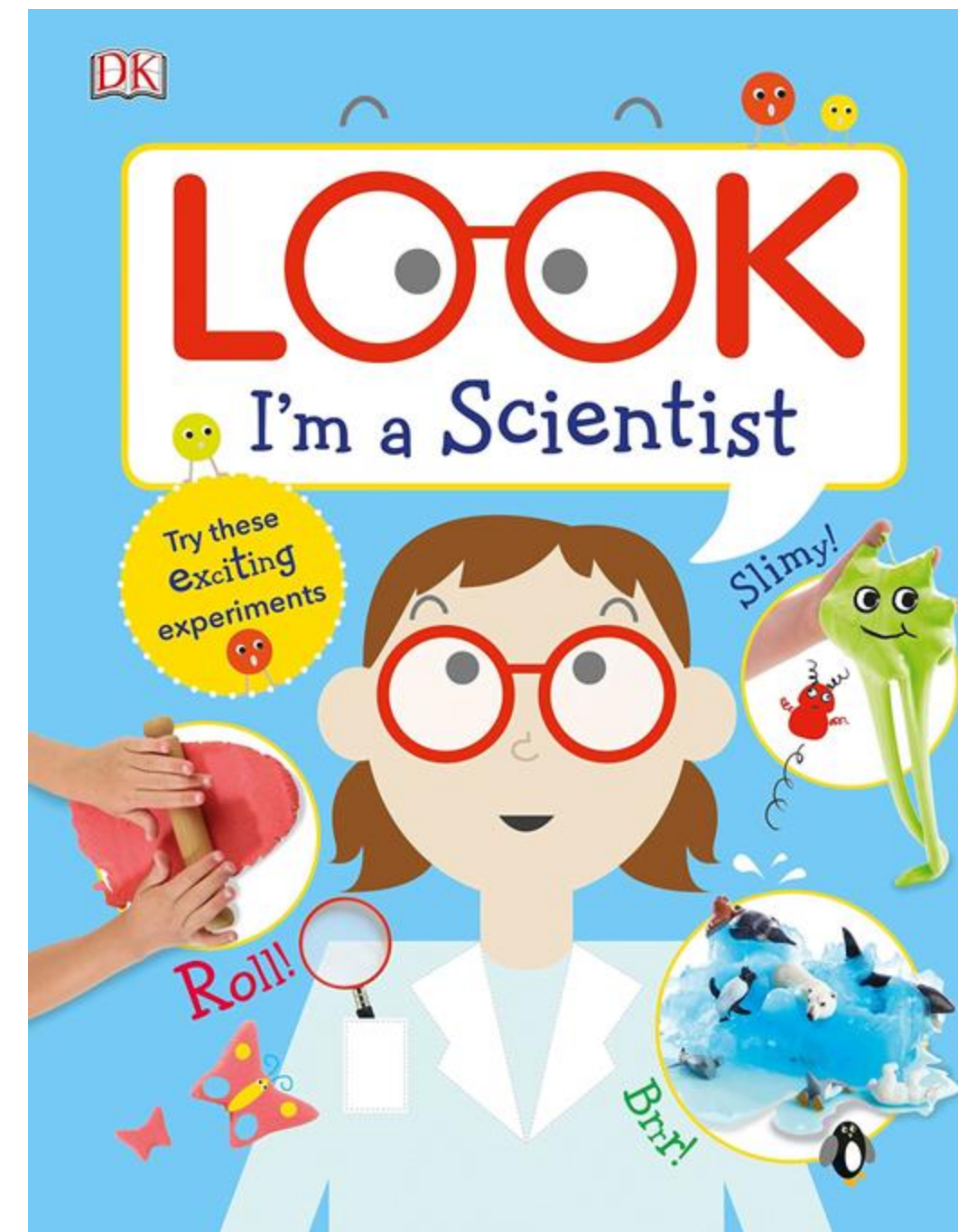
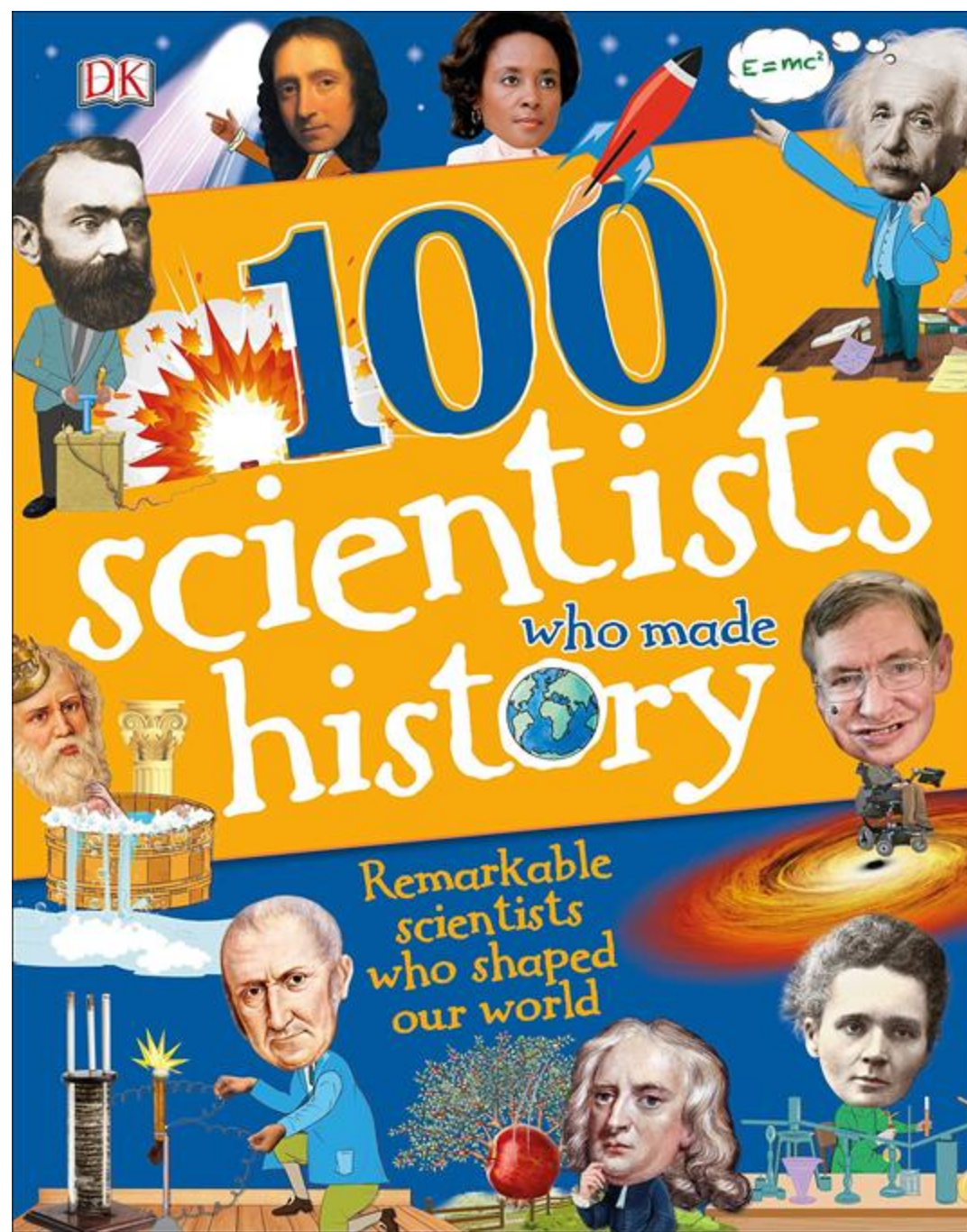


Levine et al., 1999; 2005; Master 2021; Master et al., 2021; Miller et al., 2018; Penner & Paret, 2008

How do children develop this stereotype and why does it affect girls?

Language.





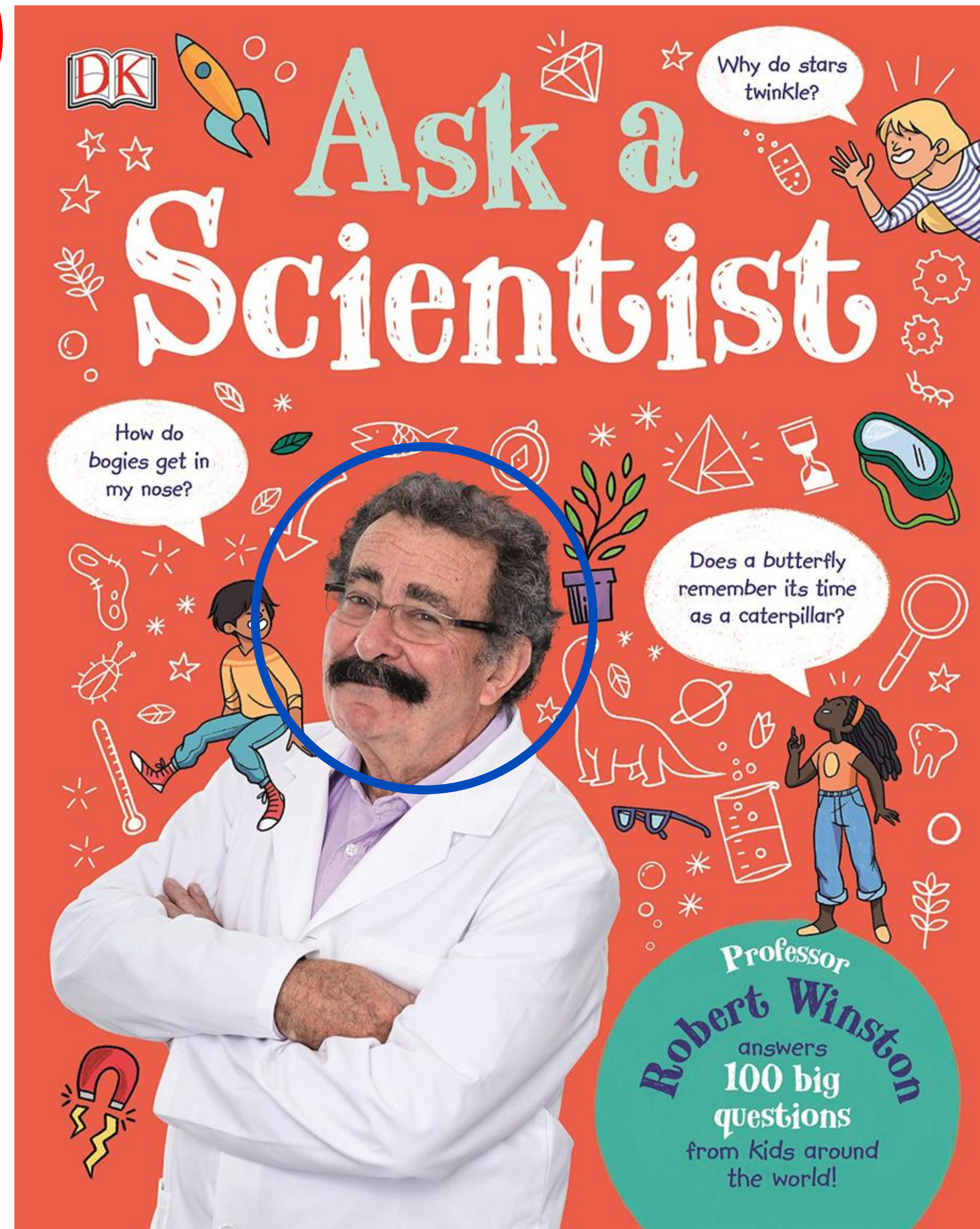
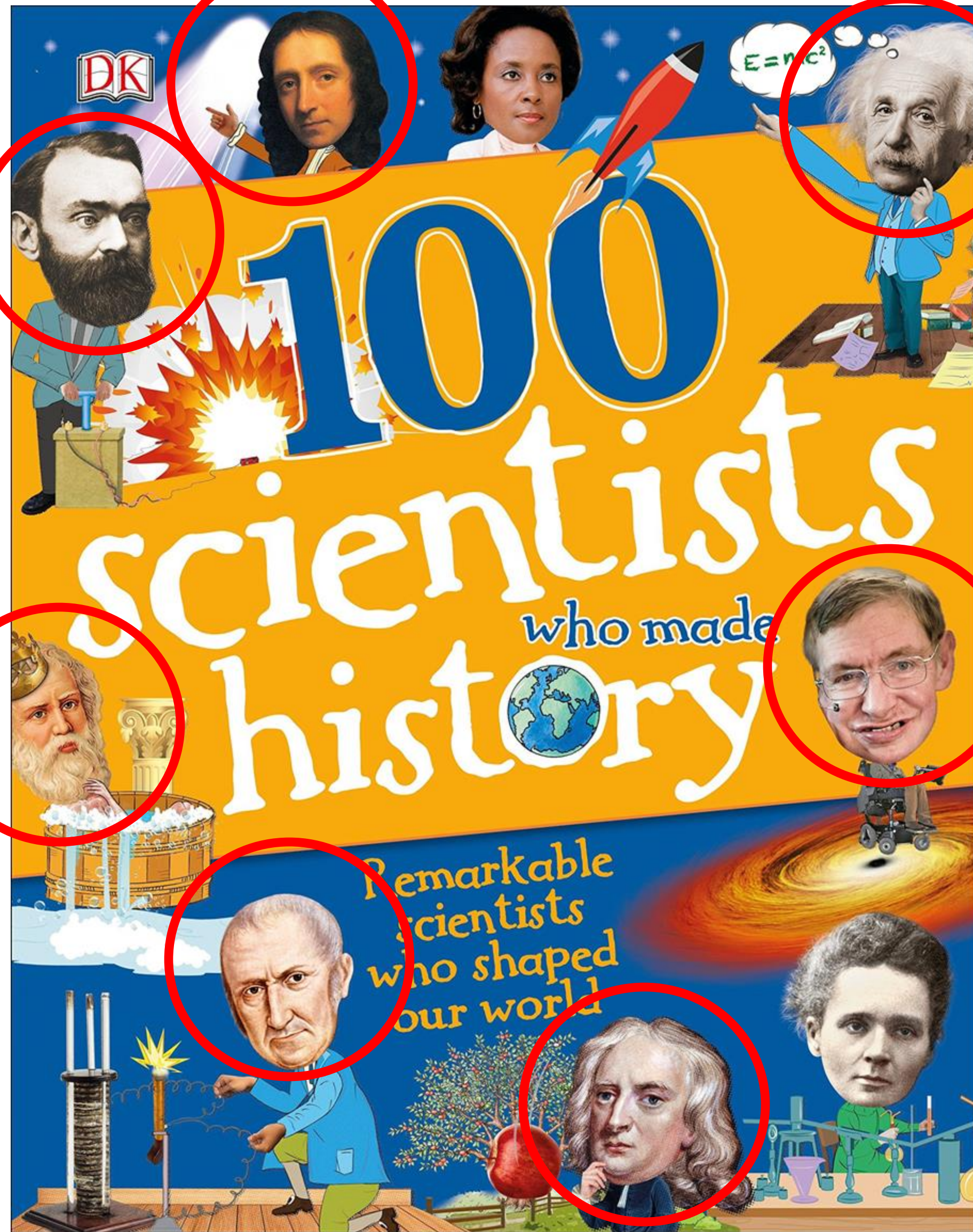
“**Scientists** think about problems and get ideas to solve them.”

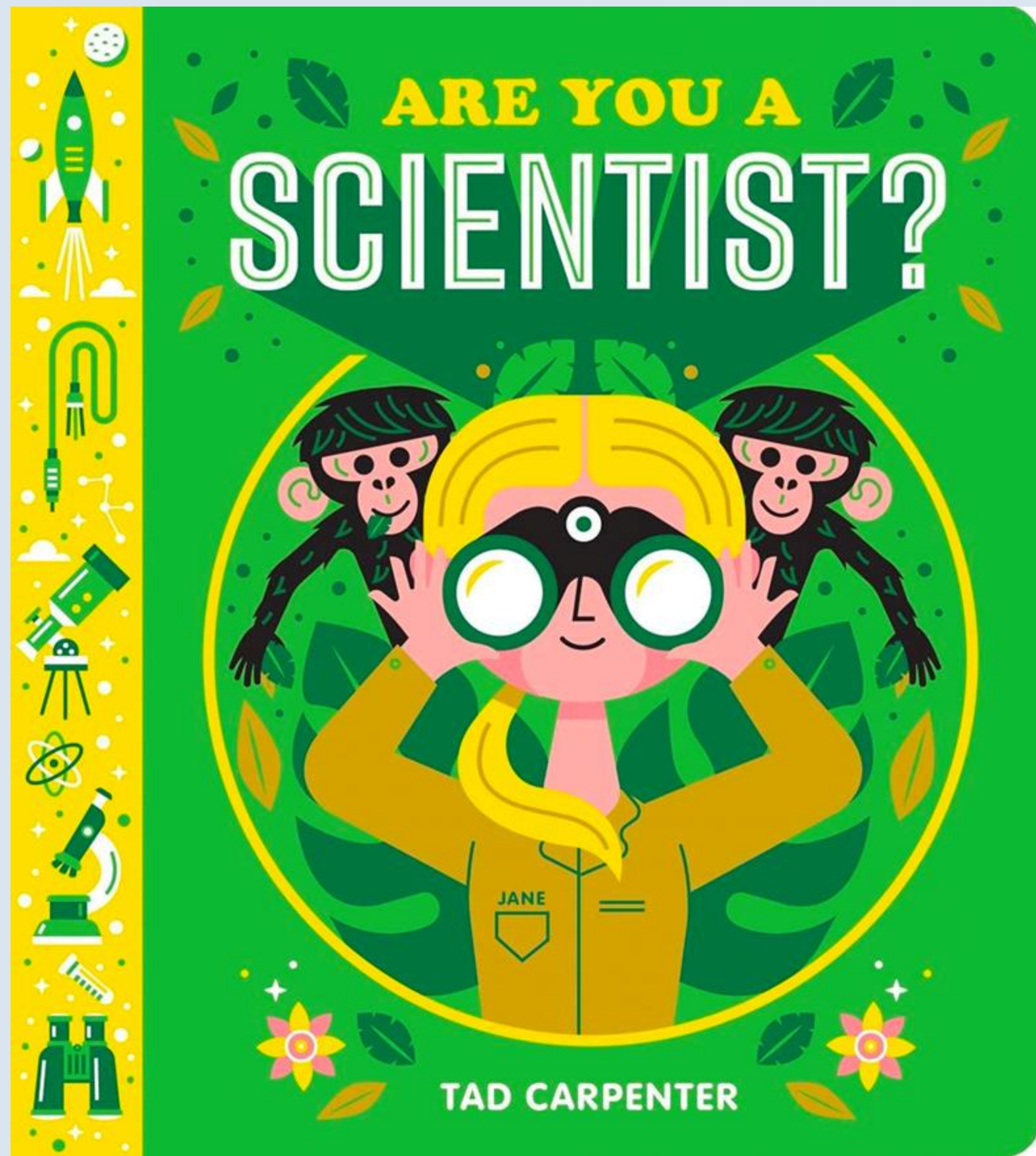
“It means you’re thinking like a **real scientist**”



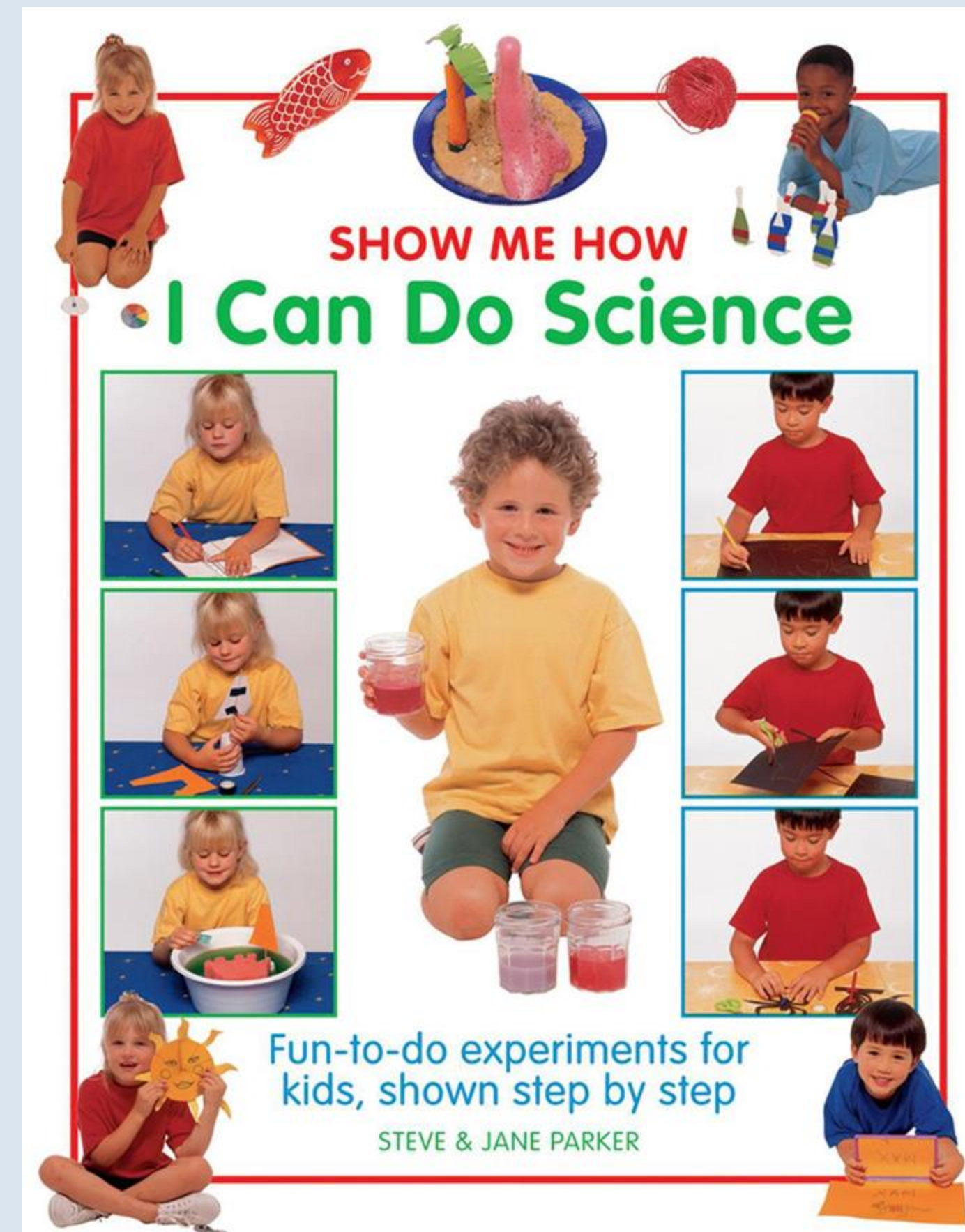
Describing *scientists* as a kind of person or **identity**

Gelman et al., 1999; 2010; Rhodes & Leslie, 2017; Rhodes et al., 2012; Wang et al., 2022; Waxman, 2004; 2010



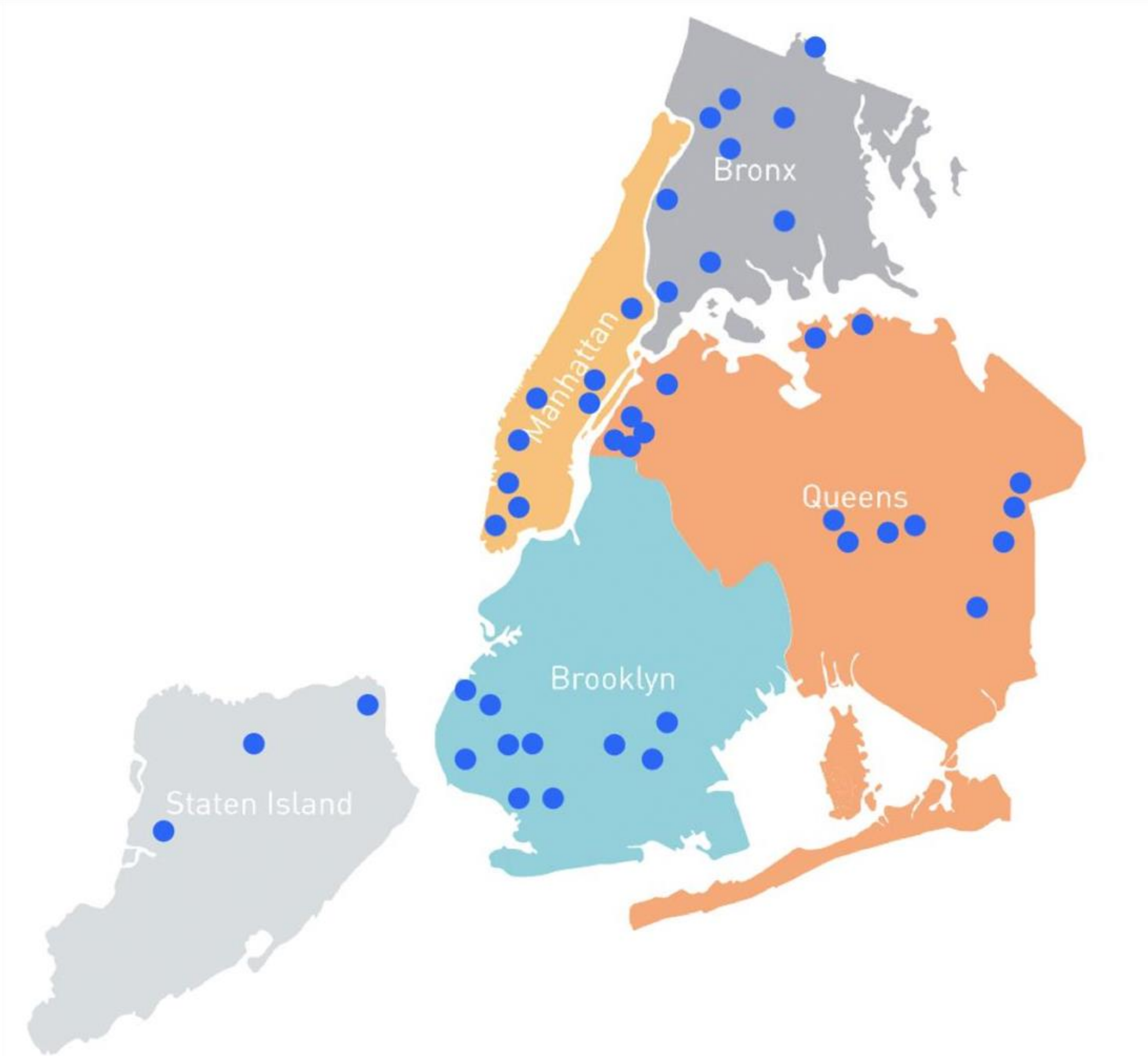


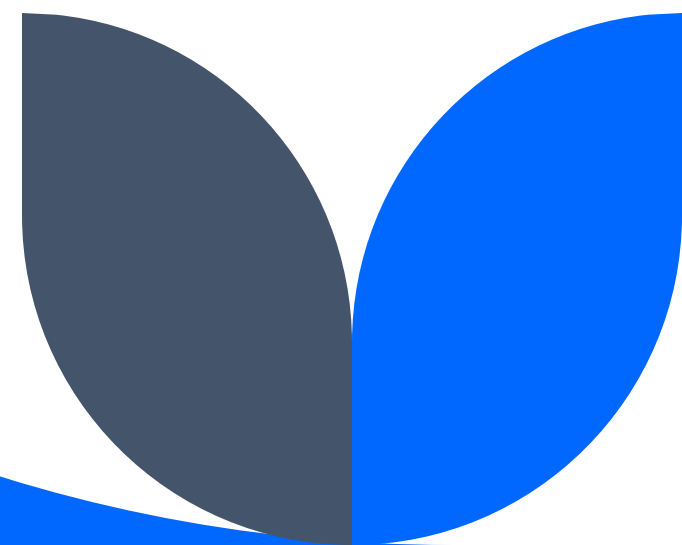
Describing scientists
as a kind of person or
identity



Describing science as
an **action** that people
do

Participating NYC PreK-for-All Sites





“

“Scientists have a really cool job. They think about something and they create a smart thought ... But it's really cool because today as a scientist, you're going to ask yourself a big question. And the big question that you're asking yourself is, what is friction?”

- Teacher

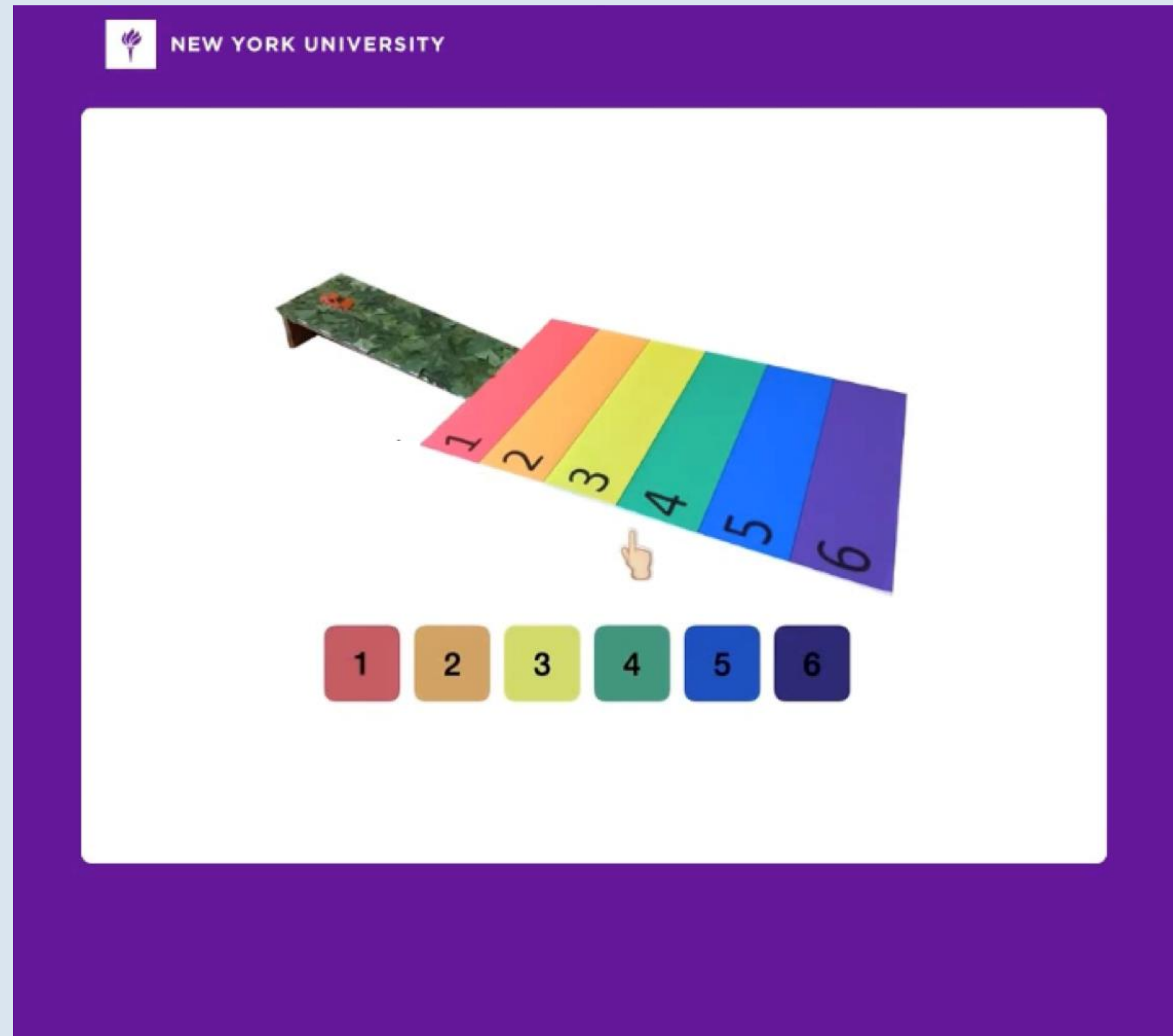
“

“Okay, so today we're going to do science. Doing science means exploring the world and using our five senses. Today, we are going to be doing science and learning about something called friction.”

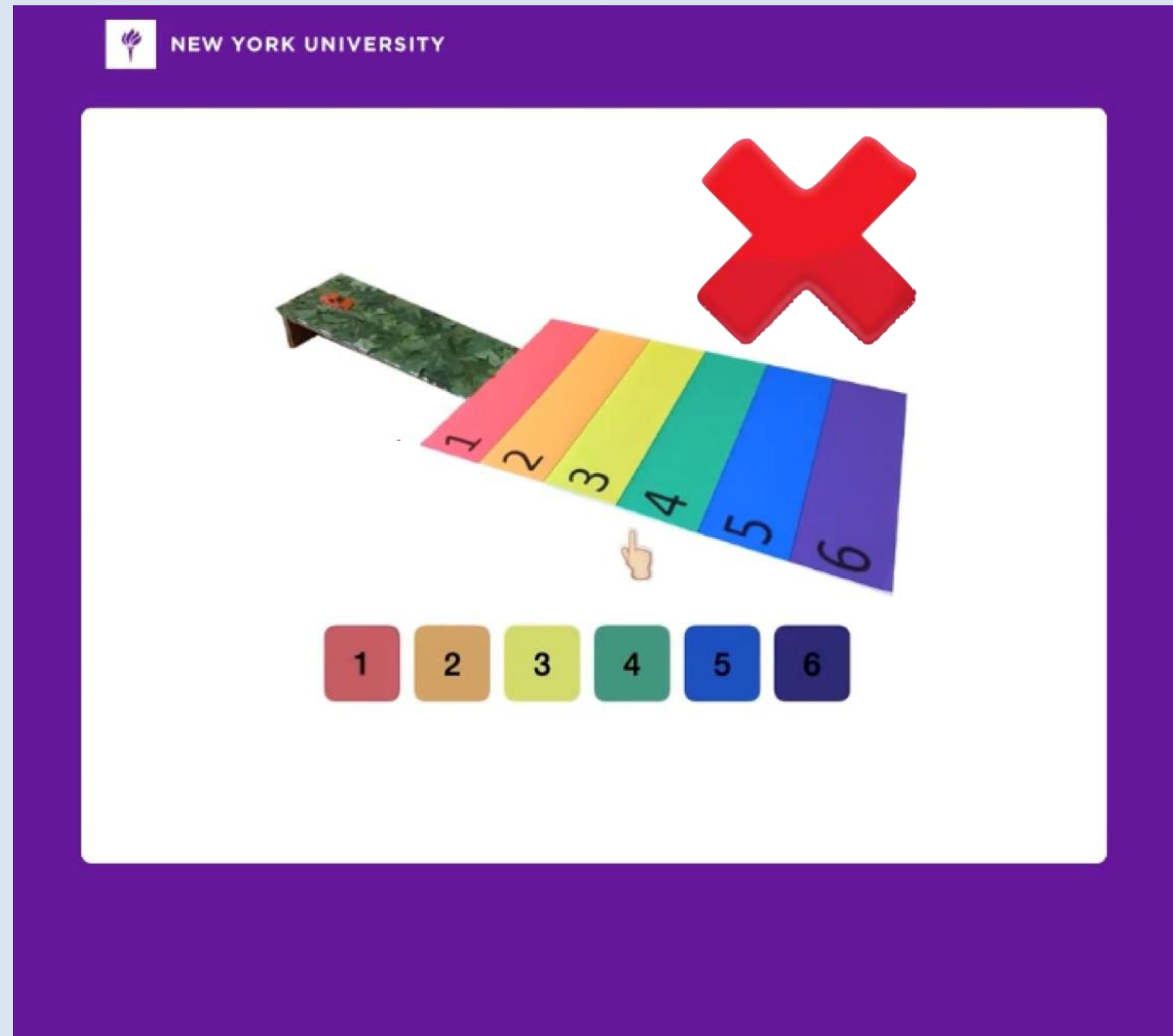
- Teacher

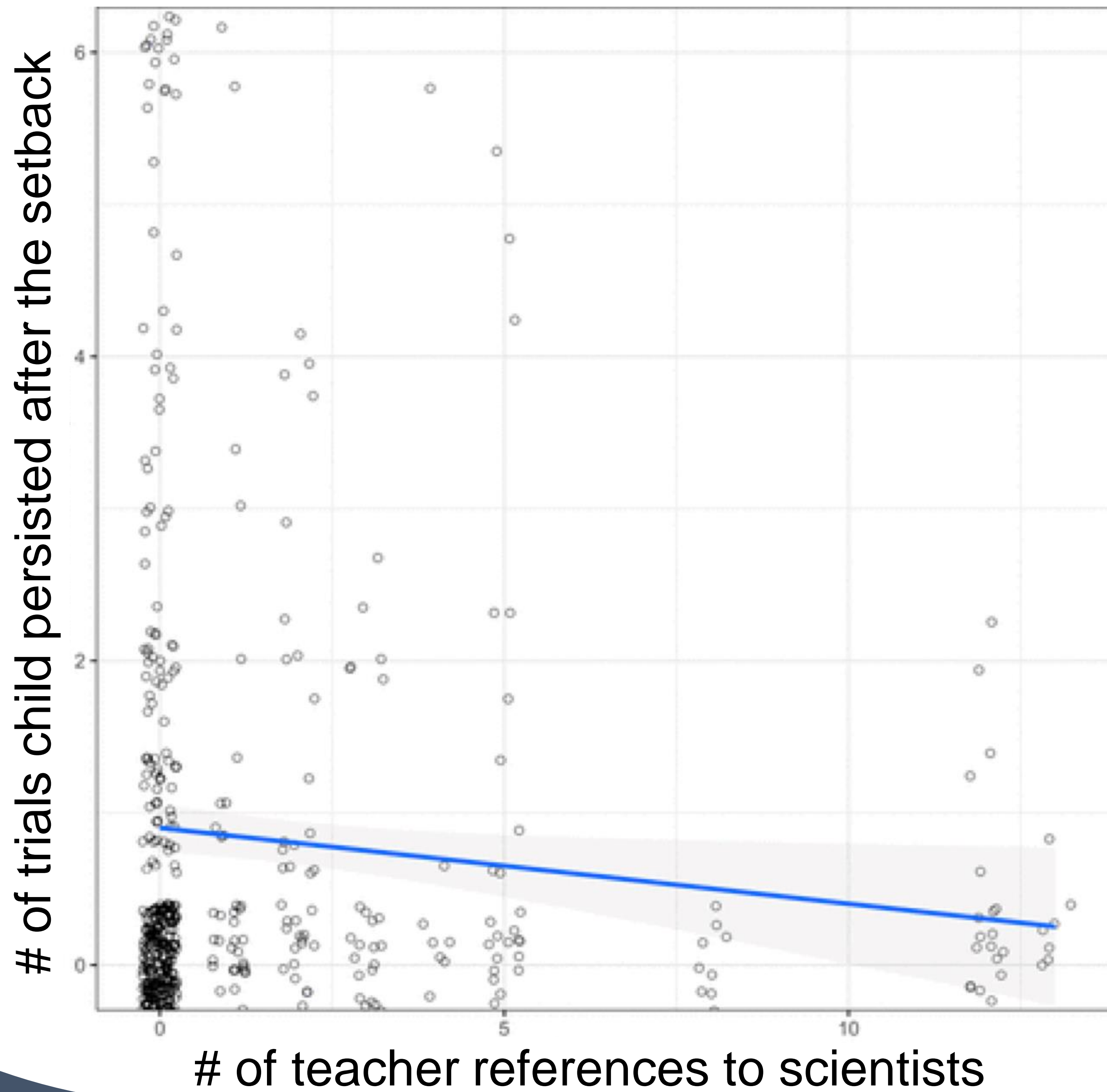
”

To measure persistence in science, we asked children to guess how far a toy car would go down a ramp on different textures. They could choose to make up to six guesses.



The game was rigged, so at the beginning children would get feedback that they had made an incorrect guess (“Hmm, that wasn’t quite the right guess”).





So, what can educators do?

- Use action-focused language
- Talk about science as a process that anyone can do
- Encourage questioning as part of doing science

Thank you! Let's DO Science!

Amanda Cardarelli

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www.kidconcepts.org

www.discoveriesinaction.org



panda
Princeton & NYU Discoveries in Action

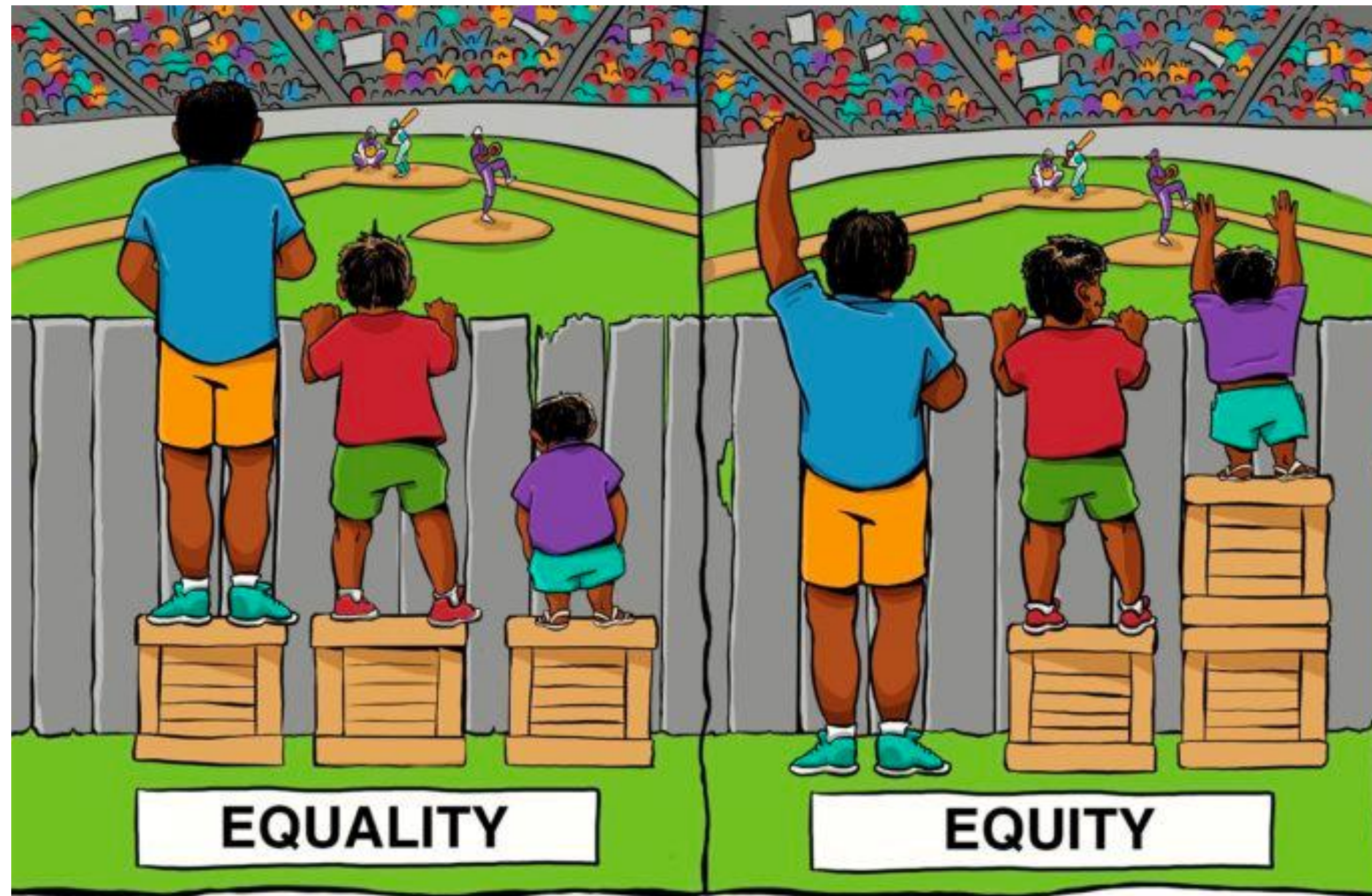


Supporting Equitable Approaches to Early Science Education

Amanda Strawhacker

Practical Tips for Inclusive Learning Settings

Inclusion means **planning** individually, but **teaching** collectively



the4thbox.com

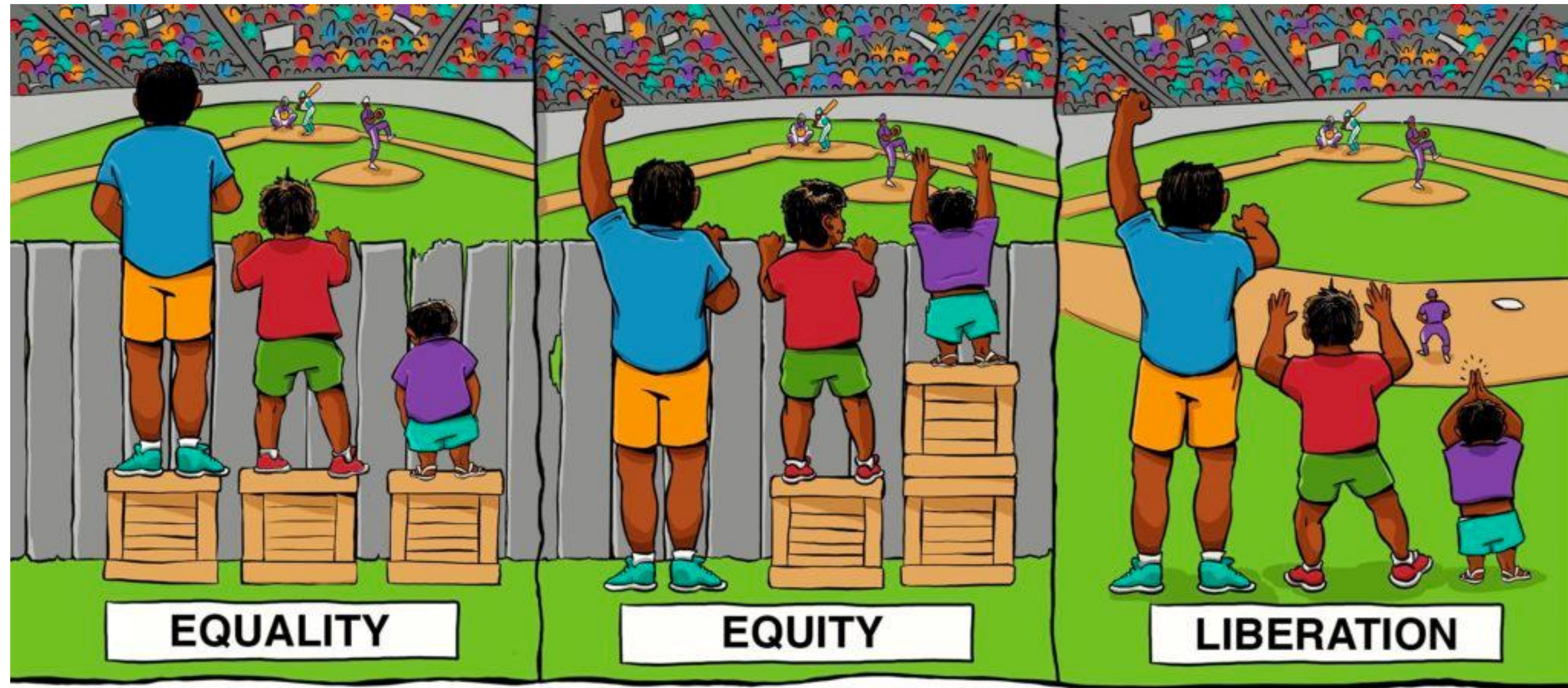


Interaction Institute
for Social Change

Original illustration
by Angus Maguire

Practical Tips for Inclusive Learning Settings

Inclusion means **planning** individually, but **teaching** collectively



the4thbox.com



Interaction Institute
for Social Change



Building Shared Language

Teacher: How does this snail protect itself?

Mona: They have a thingy on top.

Teacher: **Ok, can we be more specific...**

[Mona shrugs.]

Yuval: The shell.

Teacher: Yes! The shell! Ok, so what about how the snail moves...



Building Shared Language

Teacher: How does this snail protect itself?

Mona: They have a thingy on top.

Teacher: Interesting! **Mona sees something on top of the snail. Can you describe it?**

Mona: It's brown. And hard.

Teacher: Ah, so this "brown and hard" thing might be helping the snail stay protected. **Can we give this thing a name?**

Ellie: It's the snail's house!

Yuval: It's made of a shell.



Following Curiosity



Teacher: So what happens when we take food into the stomach?

Paris: It gets crunched! And wait is that how vomit happens?! You're spewing food—

Teacher: Paris, **that's not appropriate right now**

Paris: But wait, can I finish?

Teacher: First warning, Paris. Who can explain stomach acid?

Following Curiosity



Teacher: What happens when we take food into the stomach?

Paris: It gets crunched! And wait is that how vomit happens?! You're spewing food because there's too much acid and it bubbles up?

Teacher: **Interesting idea! What do folks think about Paris' question?** Do we have chemical reactions in our stomachs?

Audry: My dad has acid reflux and he says he feels acid come up his throat sometimes?

Paris: So yes! Stomach acid works like the vinegar and makes bubbles or something!

Distributing Expertise

Amaya: I have a question! Why does the moon change shape like that?

Teacher: **Actually it doesn't! It just looks that way because of the angle of the sun.**

Amaya: But what about when it's only a little curve like last night?

Teacher: **I don't have time right now to answer every question,** so let's talk about it after class.

Amaya: Ok.



Distributing Expertise

Amaya: I have a question! Why does the moon change shape like that?

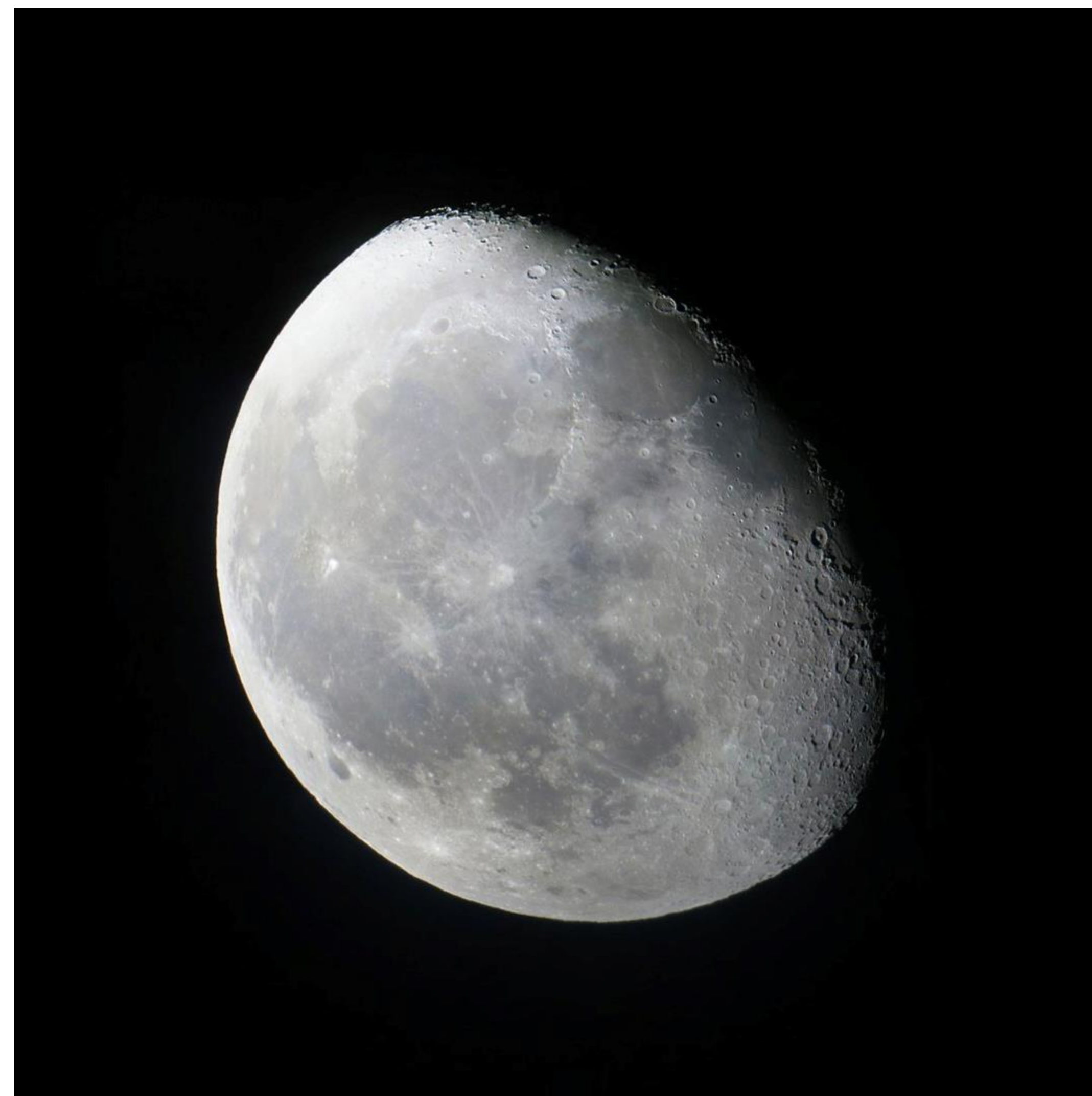
Teacher: **Interesting question! Does anyone have ideas about the moon changing shape?**

Rhea: It doesn't really, I think it's just the light like our basketball experiment.

Teacher: Ok, so Rhea **are you remembering when we used flashlights to see the shadow on a basketball?**

Rhea: Yeah. The basketball didn't change shape it just had darkness on part of it.

Teacher: Rhea and Amaya, do you want to try that experiment again today at snack? We can pretend the basketball is the moon.



5 Tips to Try in Science Class

	Instead of...	Why not try...	Why the change?
1	“Can you be more specific?”	“OK, [repeat their words]. What other ways can we think of to describe this?”	-Help students build knowledge using observational skills . -Using advanced vocabulary can mask gaps in understanding.
2	“That’s not appropriate, please focus on our task”	“Tell me how you got there from our activity?”	- Offer trust that students are <i>trying</i> to make connections.
3	Directly answering a question	Crowdsource knowledge from our learning community and return to the same question with the original student	-Position yourself as co-investigator rather than an expert with all the answers. -“Teach someone to fish...”

5 Tips to Try in Science Class

	Instead of...	Why not try...	Why the change?
4	4) “Hm, not quite Lola...”	“Interesting! Does someone else have a response to Lola’s idea?”	-Foster dialogue among students rather than being a gatekeeper of correct responses
5	5) “I’m going to call on someone <i>besides</i> Zev, someone who hasn’t spoken yet...”	Just call on specific names at random times; If they don’t know the answer, allow them to choose a friend to call on.	-Everyone in class is a participant in our science dialogue , without having a knowledge-based identity or role attached to it.

Science takes time.

Offer it freely when you can.

Learning
~~Science~~ takes time.

Offer it freely when you can.

Inclusive Teaching Moves in Science Class

- **Help kids step up and step back** during group work and class discussions. Everyone should get a chance to try different science roles and activities.
- **Highlight diverse scientists** and their contributions (Bibha Chowdhuri, Mae Jamison, Temple Grandin)
- **Focus on collaborative investigations** over competitions

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black ants and buddhists

Thinking Critically
and Teaching Differently
in the Primary Grades



Mary Cowhey

Foreword by Sonia Nieto

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Foreword by
Dr. Marina Umaschi Bers, Tufts University

AMANDA ALZENA SULLIVAN



BREAKING THE STEM STEREOTYPE

REACHING GIRLS
IN EARLY CHILDHOOD

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Q & A

We'll take questions from the chat and from people using the 'hand raise' function.



Call to Action

Reconsider Your Language

- How will you make shifts in your language? **Share one idea in the chat!**
- **Example:** How might you talk to students about the scientific method in a way that uses action-focused language rather than identity-focused language? **Share in the chat!**

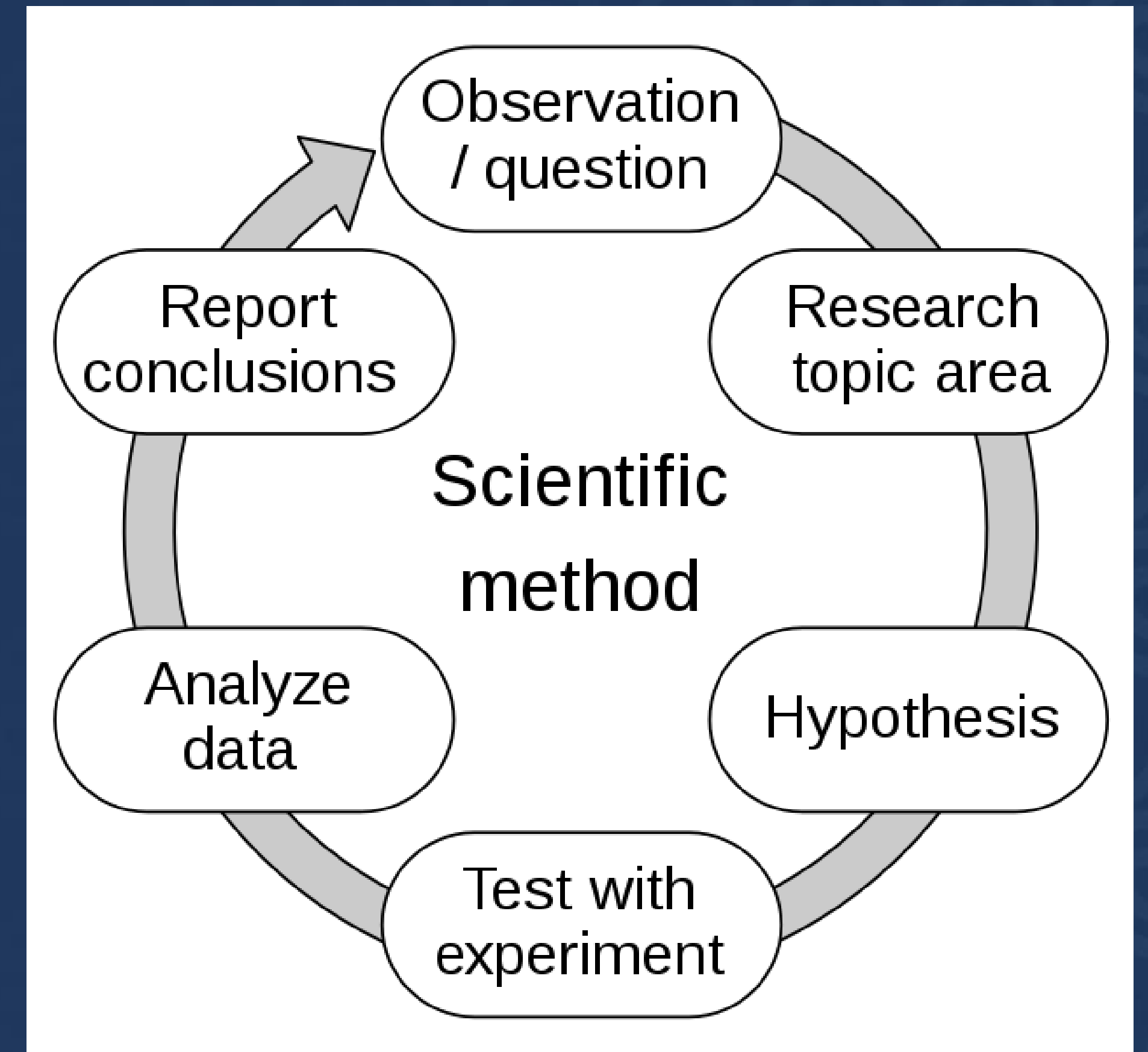
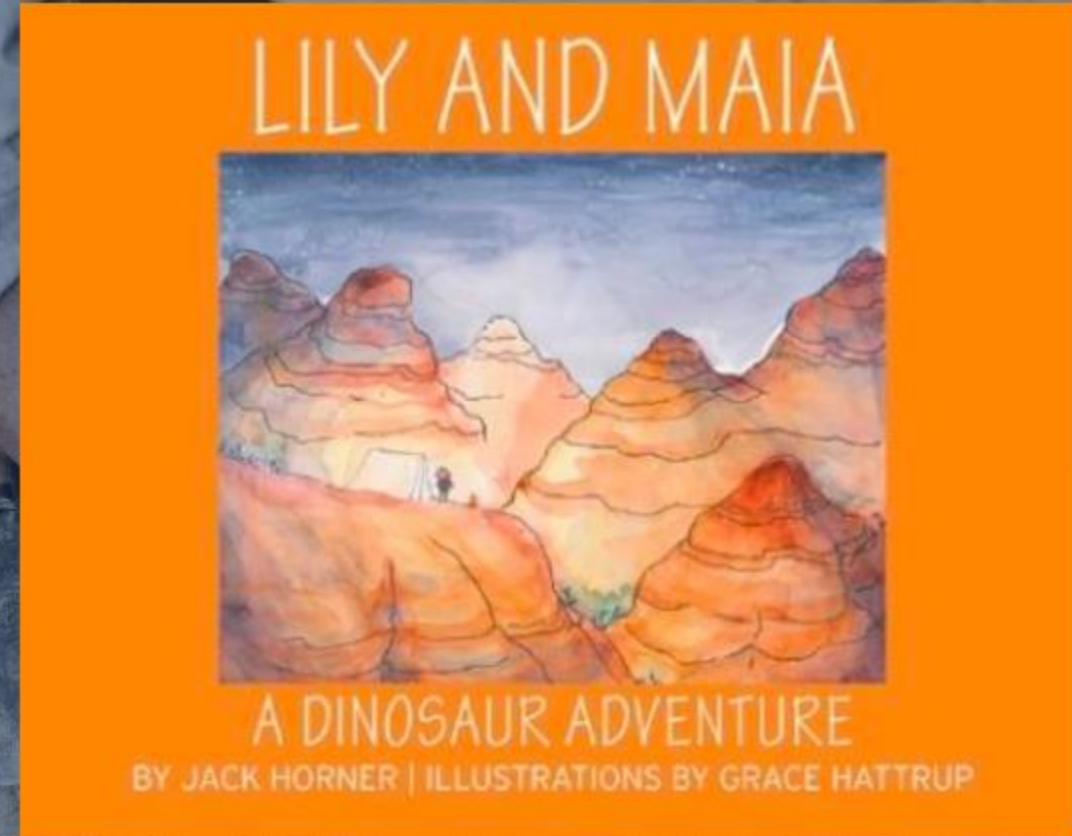


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Upcoming Webinar

Register: ngcproject.org/events-announcements



Exploring Paleontology to Spark Science Engagement from a Young Age!

March 30th, 2023
11am PT / 2 pm ET

Join us to learn about the newly released book Lily and Maia: A Dinosaur Adventure and Lily Y Maia: Una Aventura Dinosaurio authored by Jack Horner and published by the Horner Science Group, LLC (HSG).





20 YEARS OF TRANSFORMING STEM

Learn more at ngcproject.org