

Supplemental Material

CBE—Life Sciences Education

Ovid *et al.*

SUPPLEMENTAL TABLES AND FIGURES

Supplementary Table 1. Performance, Competence, Interest, Recognition (PCIR) prompts (adapted from Godwin, 2016). Recognition (4 items), Interest (2 items), and Performance/Competence (5 items) using 5-point Likert items, from *Strongly disagree* to *Strongly Agree*.

Construct	Item	Item Prompts
<i>Recognition</i>	R1	I see myself as a 'science person'
	R2	My family members see me as a 'science person'
	R3	My instructors see me as a 'science person'
	R4	My peers see me as a 'science person'
<i>Interest</i>	I1	I enjoy learning new scientific concepts and ideas
	I2	I am interested in learning more about science and scientific concepts
<i>Performance/ Competence</i>	PC1	I understand scientific concepts I have previously studied
	PC2	I can overcome setbacks I encounter when studying and practicing science
	PC3	I am confident that I can understand scientific concepts and ideas outside of class
	PC4	I can do well on exams relating to scientific concepts and ideas
	PC5	Others ask me for help with scientific concepts and ideas

Supplementary Table 2. Summary of Scientist Spotlights assigned at each school.

Teacher-Researchers could choose from the >300 featured scientists to find research topics that connected to their course content. The biographical and research resources could be abridged or adapted by teachers as needed. The original assignments are freely available, searchable by topic and national standards, and downloadable from the online database: <https://www.scientistspotlights.org>.

School A	Hector Aguilar-Carreno	Marciela DeGrace	Kizzmekia "Kizzy" Shanta Corbett	Shinya Yamanaka	Augustus White	
School B	Darlene Cavalier	Kizzmekia "Kizzy" Shanta Corbett	Cecilia Martinez-Gomez			
School C	Rose Tran	Keith L. Black	Irma Gigli	Augustus White		
School D	Erika Zavaleta	Jennifer Fraizer	Blake Riggs			
School E	Mercedes López	Vivien Thomas	Crash Course Hank & John Green	Emmeline Jean Hanson		
School F	Christopher Schell	Clare Fieseler	Kiara Nirghin	Xiaohui Feng	Zheng-Hui He	Nergis Mavalvala
	Shinya Yamanaka	Tu Youyou				
School G	Carlos A. Peres	Maydianne Andrade	Kiara Nirghin	Ravinder Sehgal	Cecilia Martinez-Gomez	Caroline Hu
School H	Ynes Enriqueta Julietta Mexia	Robert Bullard	Qaali Hussein	Alfredo Quinones-Hinojosa		
School I	Sally Pasion	Jasmine Sims	Lawrence David	Yee-Hung Mark Chan	Shantá D. Hinton	Amber Moore
	Márcia Barbosa	Jennifer Doudna				
School J	Juan Manuel Vazquez	Sally Pasion	Jennifer Doudna	Olveen Carrasquillo	Rick Kittles	Hector Aguilar-Carreno
School K	Hector Aguilar-Carreno	Christopher J. Schell	Donald R. Hopkins	Mariel Vasquez	Augustus White	Lawrence David
School L	Alejandro Vélez Meléndez	Tyrone B. Hayes	Shane Campbell-Staton	Brian Gill	Sofia Prado-Irwin	Chris Schnell
	Jane Cooke Wright	Keith L. Black	Edith Perez	Barbara McClintok	Sally Pasion	Caroline Hu

Supplementary Table 3. Coding rubric for the Stereotypes Prompt, “Describe the types of people who do science” (adapted from Schinske *et al.*, 2016 and Aranda *et al.*, 2021). Student Evidence consists of representative examples. Please note that Student Evidence (right column) is not intended to align with descriptions (left column). Asterisks (*) indicates new language emerging from high school student responses.

Category	Description	Student Evidence
<p style="text-align: center;">Positive Stereotype Descriptors</p>	<ul style="list-style-type: none"> ● Curious/Asks Questions* ● Formulates conclusions based on evidence* ● People that do experiments (hypothesize...) ● Especially Intelligent ● Discovers things ● Interested in Science/Work ● Enjoy Learning ● Passionate ● Patient/Persistent ● Good at Subject ● People that investigate the natural world ● Make the world better 	<p><i>The type of person that does science is an organized and curious person.</i></p> <p><i>The types of people who do science are very intelligent.</i></p> <p><i>The types of people that do science are people that are really really interested in science.</i></p> <p><i>Scientists are smart people that are good at math.</i></p> <p><i>Scientists use logic, evidence, and reasoning in order to prove certain claims or ideas.</i></p> <p><i>Hard-working, persistent, smart, and dedicated.</i></p> <p><i>Scientists are people that want to try to make the world a better place and improve the life of its inhabitants.</i></p> <p><i>Scientists are people that want to try to make the world a better place and improve the life of its inhabitants.</i></p>

Category	Description	Student Evidence
Negative Stereotype Descriptors	<ul style="list-style-type: none"> ● USUALLY*...Affluent Background (e.g., rich parents, educated family) ● USUALLY*...Dominant culture (e.g., white) ● Working Long Hours* ● Asocial/Introverted ● Always wearing lab coat and goggles ● Other negative stereotype descriptions (e.g., Scary*, Crazy*, Competitive) 	<p><i>Scientists are usually well educated people who were wealthy enough to go to top tier universities and colleges.</i></p> <p><i>People who are scientists are usually white males.</i></p> <p><i>They tend to be a little more closed off socially.</i></p> <p><i>When I think of a scientist I think of a person wearing a long white lab coat and a pair of goggles.</i></p> <p><i>There's a very big stigma that Biologists study a lot, are very smart, and are very competitive.</i></p>
Non-Stereotypical Descriptors	<ul style="list-style-type: none"> ● ANYONE with a desire*/Interest to do science* ● People who were not always interested in science* ● Good communicators/Share ideas and findings*/Teaching a new group of scientists* ● All types of people...do science/No one type of person...does science/Anyone/everyone does science ● Any/all [<u>Personal Characteristic</u>] (e.g., all races, all ages, any gender, etc.)/Many different [<u>Personal Characteristic</u>] (e.g., many different types of people, countries, etc.) ● Other non-stereotypical descriptions (e.g., compassionate, creative) 	<p><i>I think anyone can do science. Although many may think that only "smart" people can do science, I think as long as you are interested in it, then you can do it.</i></p> <p><i>Anyone can do science, and your race, gender, religion, education level, etc, don't actually matter that much.</i></p> <p><i>[S]he did not identify herself as a "science" person from an early age yet grew to develop that passion.</i></p> <p><i>They work well with each other to share ideas and take failure as a learning opportunity.</i></p> <p><i>I believe anyone can do science. Scientists don't need many types of degrees or any to be successful. They can be from any culture, any race and any gender.</i></p> <p><i>The types of people that do science are very creative and come from a variety of cultures and backgrounds.</i></p>

Category	Description	Student Evidence
Stereotypical Scientists	<ul style="list-style-type: none"> ● Albert Einstein ● Isaac Newton ● Charles Darwin ● Sigmund Freud ● Thomas Edison ● Benjamin Franklin ● Leonardo di Vinci ● Galileo Galilei ● James Watson ● Francis Crick ● Bill Nye* ● Anthony Fauci* ● Other Stereotypical Scientist (e.g., Elon Musk*, Dr. Franken Stein*, Jeff Bezos*) 	<p><i>The types of people that do science include Albert Einstein, Nicolas Copernicus, Isaac Newton are all scientists.</i></p> <p><i>People like Sir Isaac Newton, Albert Einstein and Charles Darwin.</i></p> <p><i>Scientists like Einstein and Benjamin Franklin both discovered concepts that had never been discovered before.</i></p> <p><i>For example, Watson and Crick performed experiments on DNA to figure out its structure.</i></p> <p><i>They persevere to do their best to help the people, like Bill Nye or Dr. Fauci.</i></p>
Non-Stereotypical Scientists	<ul style="list-style-type: none"> ● Marie Curie ● Nikola Tesla ● Neil DeGrasse Tyson ● Family Member/Friend ● Teachers* ● Students* ● Other non-stereotypical scientists (e.g., Kizzmekia Kizzy Corbett*, Rosalind Franklin*, Jane Goodall...) 	<p><i>Marie Curie was a French-Polish scientist who was a chemist and a physicist. She was also one of the first pioneers in radioactivity.</i></p> <p><i>A scientist is someone who studies something and conducts experiments. My mom is a food scientist at See's candies.</i></p> <p><i>They are very smart since Kizzmekia Kizzy Corbett can work fast and diligently on the vaccine.</i></p> <p><i>My classmates, my teacher, and my friends all do science.</i></p> <p><i>Science teacher because they teach science everyday.</i></p>

Category	Description	Student Evidence
Fields	<ul style="list-style-type: none"> ● Person in the field (e.g. cardiologist) ● The field itself (e.g. cardiology) ● A description of the field (e.g. studies the heart) 	<p><i>Physicians do science as well as chemists and anyone who studies the human body, living organisms, chemicals, etc.</i></p> <p><i>Chemists, physicists, and biologists are the main 3 I think about when it comes to scientists.</i></p> <p><i>Science isn't just one little subject. Science included topics like chemistry, physics, and biology.</i></p>

Supplementary Table 4. Demographics of Student Body for Participating Schools - Percent of Total Enrolled based on School Accountability Report Card (SARC) Reports and Self-Reported on School Websites.

<i>% of total students enrolled</i>	Black or African-American	American Indian or Alaska Native	Asian	Filipino	Hispanic or Latino	Native Hawaiian or Pacific Islander	White	Two or More Races	Socioeconomically Disadvantaged	English Learners	Students with Disabilities
School A	5.5	0.2	48	3.8	24.9	0.4	9.5	2.6	53	15.7	10.3
School B	0.8	0.3	23	5.1	27.3	3.7	5.4	7.9	23.6	3.5	6.8
School C	2.3	0.2	1.2	0.4	0.4	89.3	4.9	0.9	88.2	14.3	12.5
School D	23	NA	NA	NA	71	6	NA	NA	NA	NA	NA
School E	1.8	0.1	52.1	7	10.4	0.4	18	3.8	37.5	2.7	4.3
School F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
School G	9.1	0.8	48.2	4.3	15.5	0.5	13.4	3.8	55.6	11.7	16.9
School H	0.9	0.4	15	5	32.6	0.6	7.1	7.5	23.2	10.8	10.2
School I	1.9	0.4	4.9	1.1	28.7	0.2	56.3	NA	28.3	5.5	NA
School J	0.8	0.1	23.1	5	42.4	2	3.3	4.5	38.8	15.4	8.8
School K	14.0	0.3	5.0	4.0	63.0	3.0	8.0	NA	75.0	7.0	NA
School L	12.2	0.5	21.7	11.3	16.2	1.3	28.3	7.9	41.2	11.3	10.4

Supplementary Table 5. Quantitative Assessment Items Constituting the Performance/Competence, Interest, Recognition (PCIR) Scale

Item	Factor loading
Factor 1: Recognition ($\alpha = 0.906$)	
I see myself as a 'science person'	0.568
My family members see me as a 'science person'	0.786
My instructors see me as a 'science person'	0.896
My peers see me as a 'science person'	0.903
Factor 2: Interest ($\alpha = 0.911$)	
I enjoy learning new scientific concepts and ideas	0.788
I am interested in learning more about science and scientific concepts	0.807
Factor 3: Performance/Competence ($\alpha = 0.852$)	
I understand scientific concepts I have previously studied	0.705
I can overcome setbacks I encounter when studying and practicing science	0.538
I am confident that I can understand scientific concepts and ideas outside of class	0.762
I can do well on exams relating to scientific concepts and ideas	0.846
Others ask me for help with scientific concepts and ideas	0.657

Note: N = 396, $\alpha = 0.927$ for entire measure

Supplemental Figure 1. Descriptors in Students' Responses about the Types of People that Do Science. Descriptors include Nonstereotypes, Positive Stereotypes, and Negative Stereotypes (see Methods for details). A) Proportion of students out of the total ($n = 797$) who provided at least one descriptor in their written response to the Stereotypes prompt. B) Normalized percentage of Nonstereotypes (top), Positive Stereotypes (middle), and Negative Stereotypes (bottom) among students who provided at least one descriptor (Pre = 591 students, Post = 714 students who provided at least one descriptor).

