

investigation
expanding
solving
word
knowledge
creativity
proving
research
difficult
complicated
facts
hands
life
hard
change
earth
ideas
testing
growth
inquiry
data
powerful
reality
interesting
understanding
universe
connection
conclusion
explaining
results
fun
exploring
health
logic
confusing
nature
patterns
intriguing
mystery
search
trial
plants
experiment
learning
world
frequency
collaboration
hypothesis
engaging
curiosity
brainstorming
thinking
theories
magical
exciting
interactive
future
replication
challenging
predictions

Science Education in 2020: How do you feel about it?

NGSS

Phenomena driven instruction

**Argumentation from Evidence
(Claims-Evidence-Reasoning) and using data**

Incorporating Engineering

Focusing more on *how* we teach and hold students accountable for their learning and less on what we teach (which mostly stays the same).

What does this look like in the classroom?

Students are talking more than the teacher.

Open ended questions and investigations

Examples first, instead of explanations first

**Use of technology in ways that enhance instruction,
not just replacing a textbook or paper and pencil with
a computer**

**Students learn through failure and bad data, focus on
redesign and problem solving**

What is happening in your classroom?

How do you feel about NGSS?

Kahoot Poll

The Regeneron STEM Teaching Fellowship

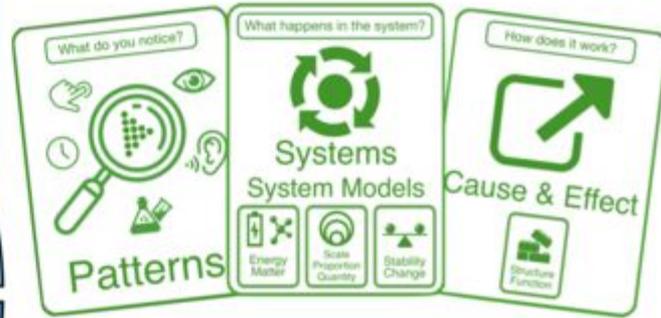
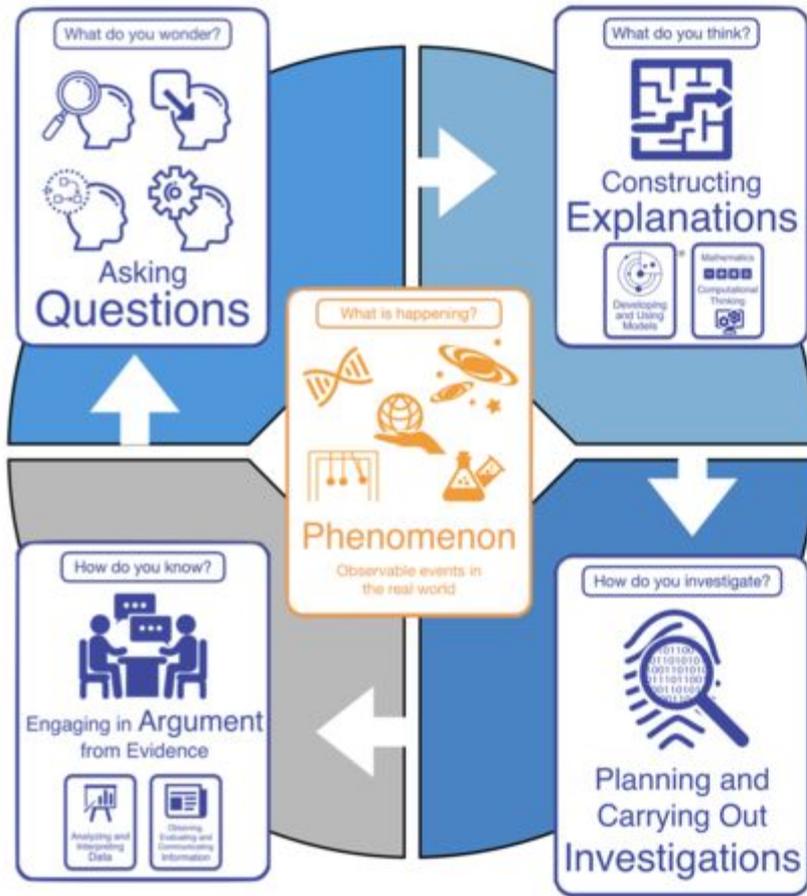
Fully funded, graduate STEM Certificate Program through NASA Endeavor at US Satellite Laboratory, Teacher's College and Regeneron.

3 online courses including a STEM Teaching Methods Secondary Course

Course choices

2 week summer internship at Regeneron in Tarrytown

Application for the 2020 cohort open in March.



Scientific Inquiry

Source of image: <https://thewonderofscience.com/teaching>

Using Phenomena in the Science Classroom

What are phenomena? Observable, relevant, interesting and require an investigation into science concepts to explain.

The phenomena could be presented as a still photo, a video clip, a graph, a map, etc.

Students ask why? How? They are curious.

[NGSS resources](#)

[The Wonder of Science resources](#)

You will work in subject area groups of your own choosing with 2-3 people per group.

Supplies needed: A chromebook, a white board, markers

Using the resources: Planning for engagement with important science ideas (pp. 7-12) and online resources

Choose 1 phenomenon and use the whiteboard to document:

- A description of the phenomenon
- the topic it relates to and how it can be explained
- another phenomena that relates to the explanation

We will do a gallery walk for you to share your work.

Science and Engineering Practices

- Asking questions (for science) and defining problems (for engineering)
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations (for science) and designing solutions (for engineering)
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Source of image: <https://iteamchicago.wordpress.com/category/the-scientific-method/>

Argumentation from evidence

Making a claim and using evidence (data or observations) to support it. This can be used as a review of content or to create an explanation of lab results and connect them to bigger scientific principles.

Many science teachers use a [Claims-Evidence-Reasoning](#) Model.

You will work in groups with a question, a source of data or observations and a CER rubric.

LE Teachers: How do vampire finches in the Galapagos Islands show evidence of evolution?

Earth Science Teachers: Can humans live on Mars?

Physics Teachers: How can the presence of Exoplanets be inferred? Background Info

Chemistry Teachers: Is there a relationship between CO₂ in the atmosphere and the pH of the Ocean? More info

Engineering design in the science classroom

How does engineering relate to science?

Science is the asking and answering of questions and engineering is the solving of problems.

Benefits for students: engagement, creative thinking, spatial and design skills, becoming familiar with the engineering design cycle, teamwork and communication.

Myths: Not enough time and too expensive.

Engineering Projects Examples and Resources

[Engineering resources from NGSS](#)

Engineering Resources from the Jet Propulsion Laboratory (JPL)

[Rover Races](#)

[Hot Coffee Project](#)

[Build a Cardboard Rover](#)



What engineering projects could you connect to your curriculum?

Think-pair-share

Large group sharing