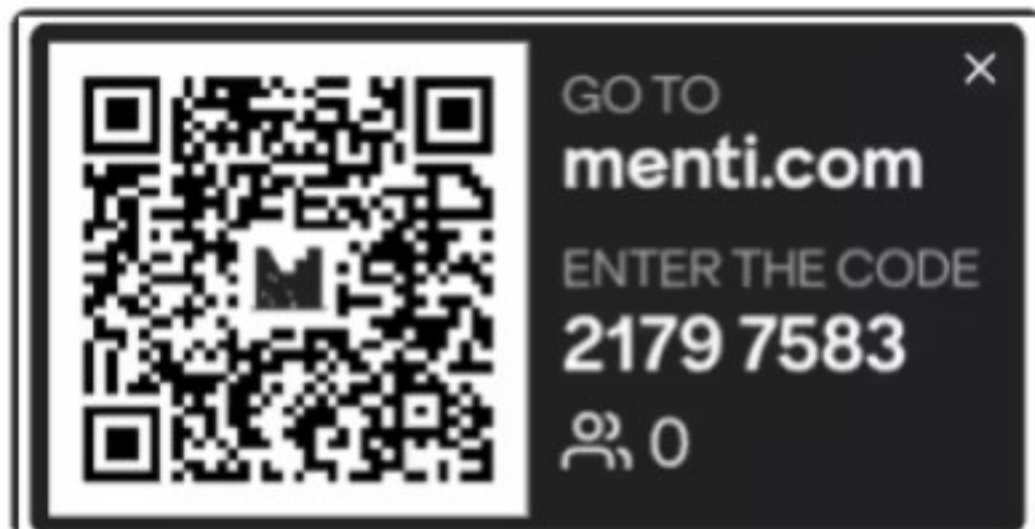




Power Up Phenomena-Driven Inquiry and Discovery

Lisa Kerscher



Join on menti and get ready to share your observations of this image, including patterns you may notice.



What Is Happening?

What Is Happening?

24 responses

It's a gas and a liquid

Color exchange
Different sizes

One by one
Different colors

2 bubbles
Surface tension

There are pretty colors. The colors are mainly on the top and bottom of the bubble.

Colors, perfectly round

Multicolored

Color change

There are a rainbow of colors. Different colors for each bubble..

What Is Happening?

24 responses

I see different colors. One big bubble and one small

The different colors indicating light spectrum differentiations.

color on the edge rainbow colors

Light reflects of the bubbles surface; different colors

Light is being refracted

Bubble collides

Texture- sticky

Connectivity

Haze

What Is Happening?

24 responses

Reflection

Surface tension

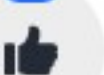
Emptiness

Emptiness

Density and air resistance

something in the back?

2



16



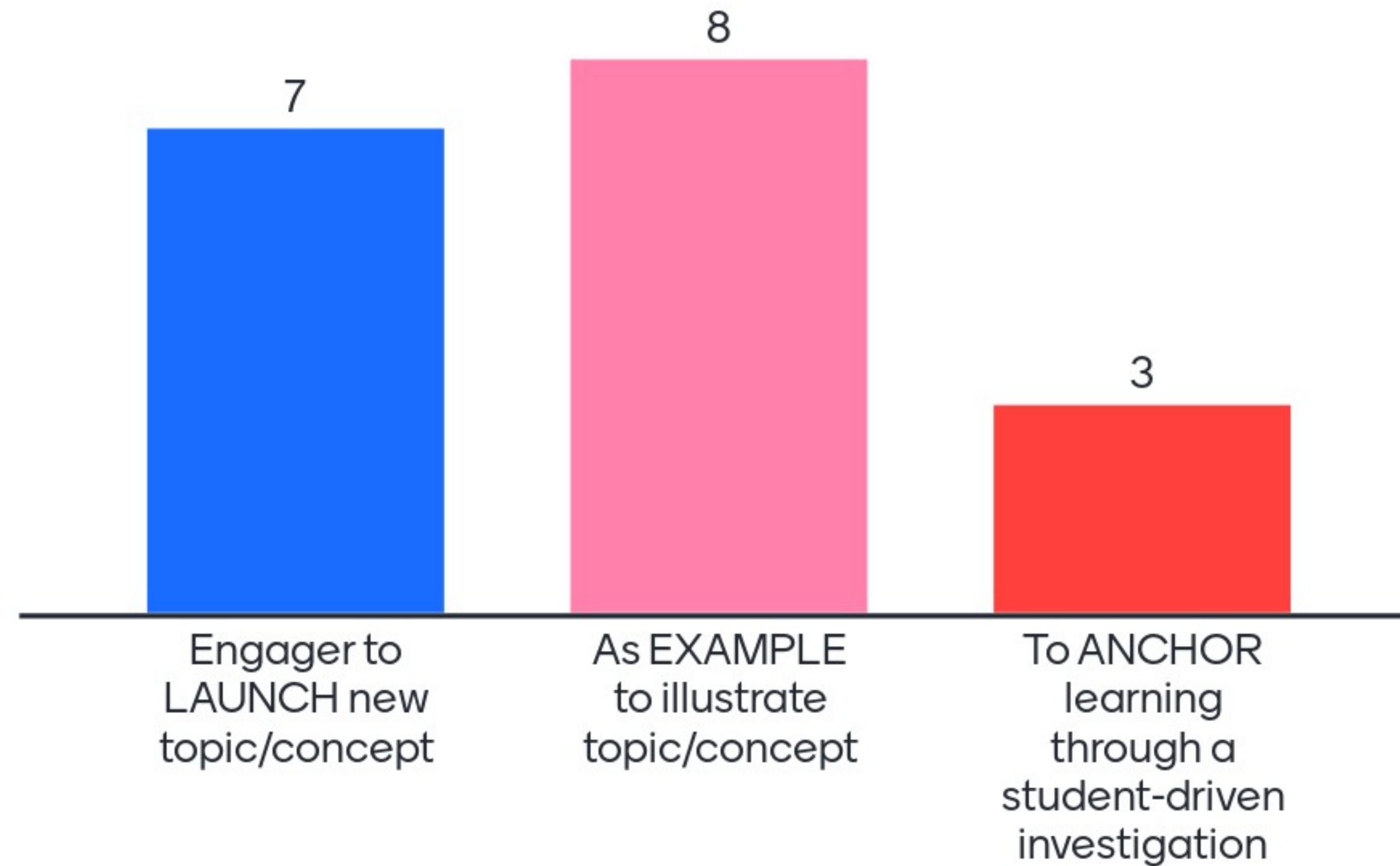
What is a “phenomenon”?

- In the scientific context, a phenomenon is **an observable event** that can range from bubbles to a seasonal hazard to a tech issue.
- In the engineering context, a phenomenon is **a problem that can be solved** by extending their knowledge of science.

Different Ways to Use Phenomena

- Engager to LAUNCH new topic/concept
- As EXAMPLE to illustrate topic/concept
- To ANCHOR learning through a student-driven investigation

When/how do you use phenomena in your practice? (check all that apply)



Why use phenomena?

- 1. Makes Science Engaging and Relevant**
- 2. Encourages Inquiry-based Learning**
- 3. Connects Concepts and Disciplines**
- 4. Fosters Collaboration and Communication**

Launch

The WOW! factor



Example

The concept in action



Anchor

Drives inquiry & 3D Learning



Scientific & Engineering Practices



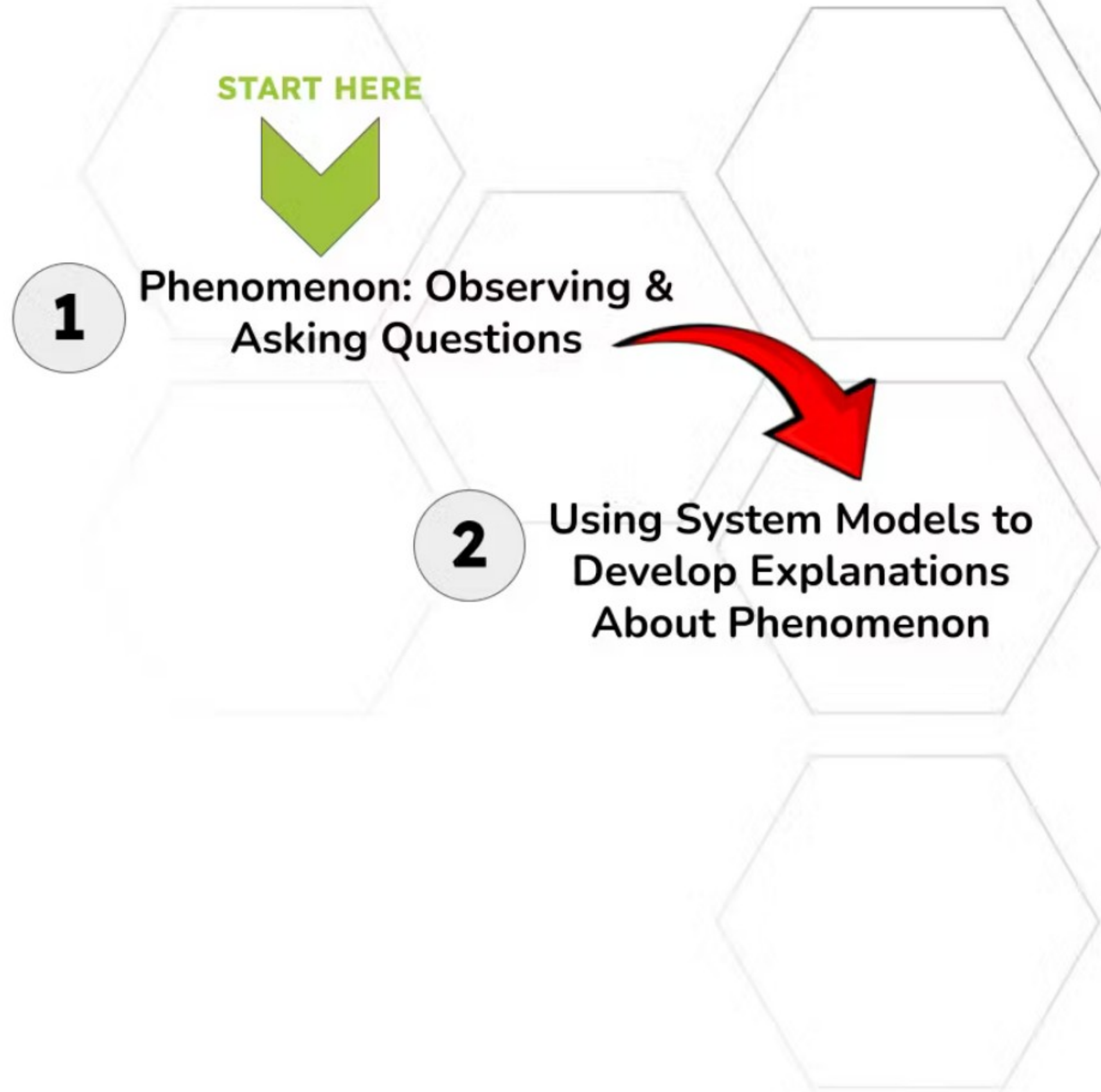
Recurring Themes & Concepts



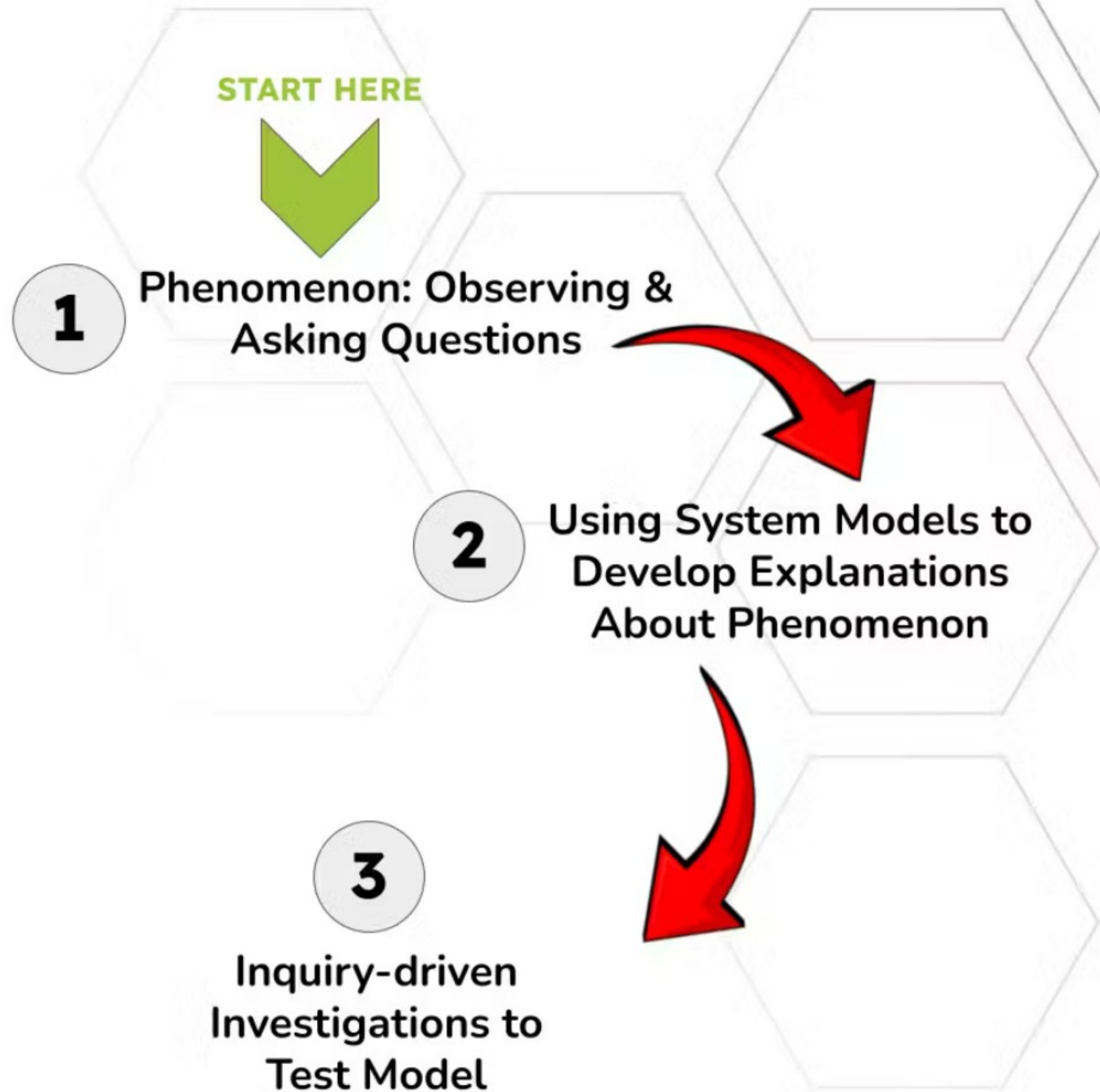
3D Learning Trails



3D Learning Trails



3D Learning Trails



3D Learning Trails



3D Learning Trails

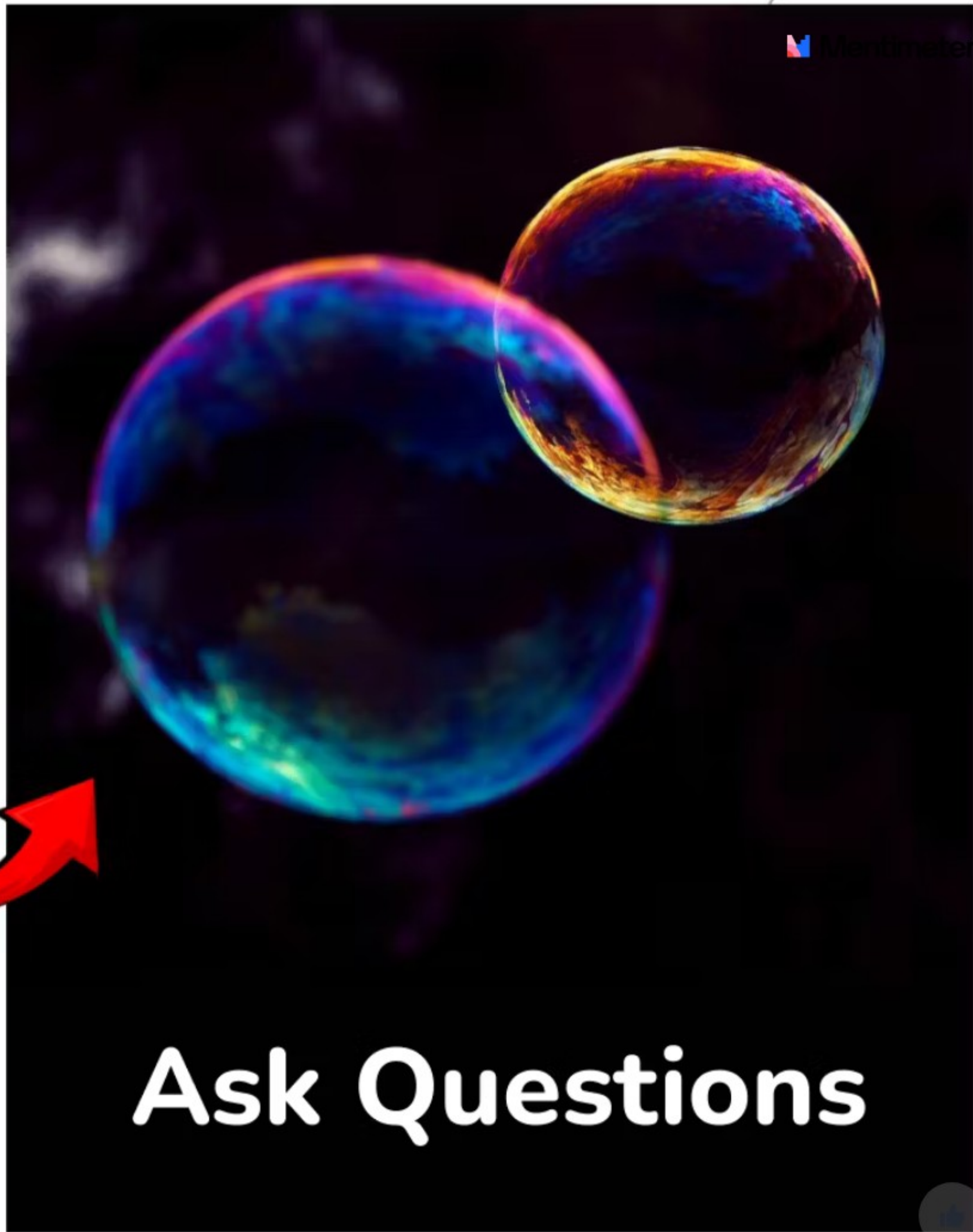


1. Observing & Asking Questions



GO TO
menti.com
ENTER THE CODE
2179 7583
0/0

Based on observations, what might your students wonder?



Ask Questions

Ask Questions

19 responses

Why are there different colors.

How do the bubbles stay together and not pop?

How does it make that color?

soap?

How do the colors form?

Why are they different colors

Where are they going?

Where did they come from?

Why are bubbles spheres

1



12



Ask Questions

19 responses

What are they made of

Why do they float?

How do they form?

How high can they go?

Why are they different sizes

How long until they pop

How do we make really big bubbles

Why are they round?

Is over water

1



12



Ask Questions

19 responses

How did they get out there?



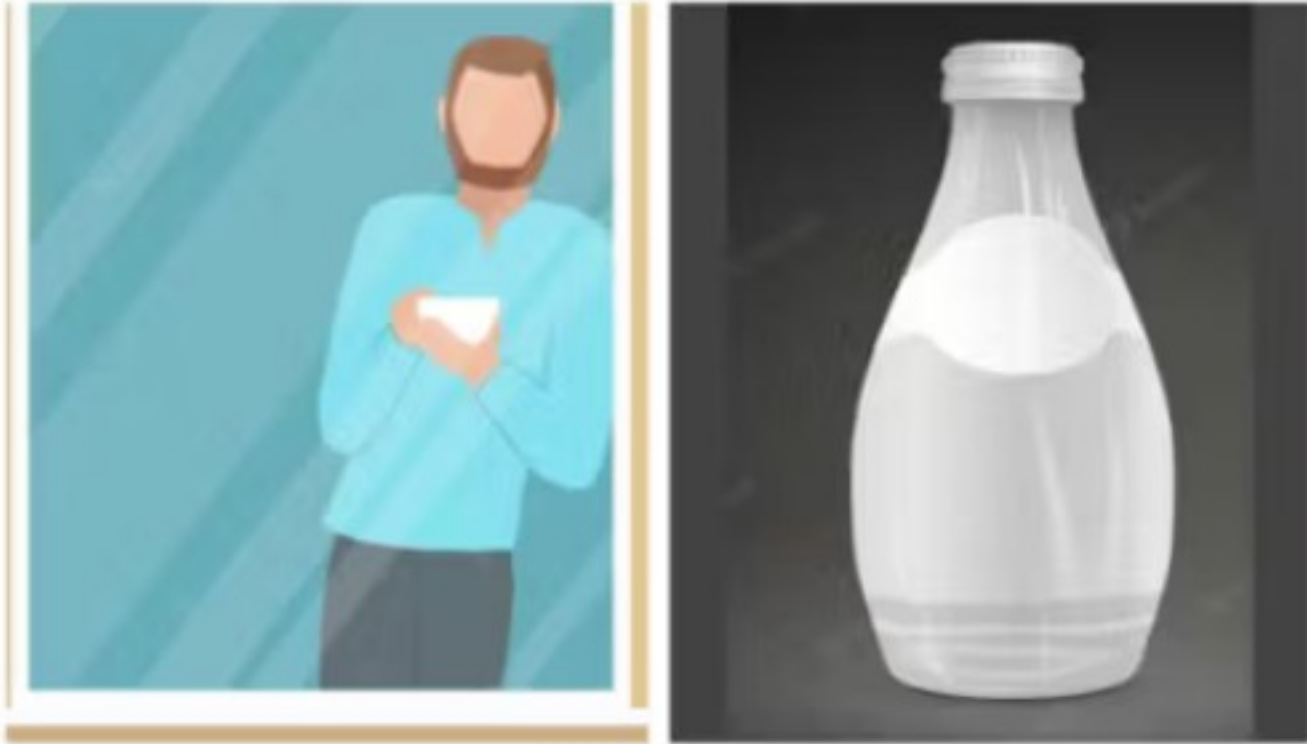
Driving Question:

“Why do we sometimes see colors from light?”

2. Describing System
Models to Develop
Explanations

Develop an Explanation

1. Identify the system and its components and their relationships to each other;
2. Use the model to describe and make predictions about the phenomenon; and,
3. Identify and describe a scientific cause.



Why are we studying this?

Light is a form of energy that can be visible and will have different behaviors. Light always travels in straight lines. When light hits an object, three things can happen. Light can be absorbed by what it strikes, it can be bent, or it can be reflected.

The type of material and the shape of the surface determines what happens to the light. For example, in this simulated investigation, two clear glass optical lenses with different shapes will be used:



3. Inquiry-driven Investigation



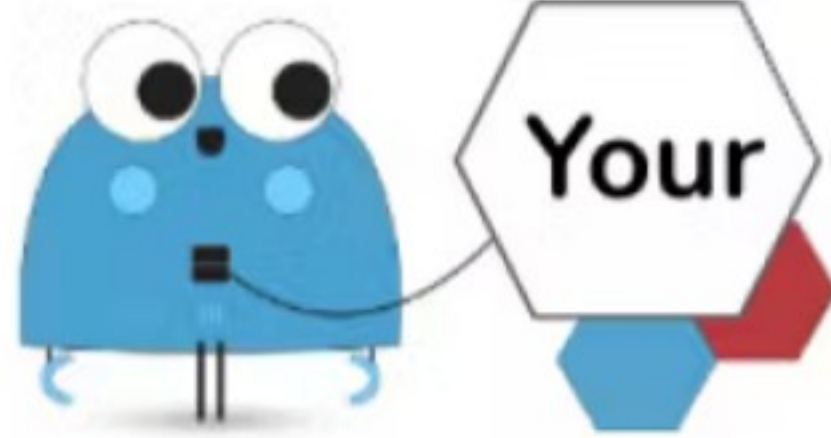
Concave Lens



Convex Lens

You will compare and describe light's behavior when striking those lenses, along with a flat mirrored surface, in order to answer the research question.

Research Question: "How does the behavior of light change as it strikes different surfaces?"



Your Custom Investigation: _____

Name _____ Date _____ Period _____

Why are we studying this? To understand how light travels and behaves.

A

Research Question:

How does _____ compare to _____ ?

B

What evidence will you collect?

C

Prediction

What do you think you will observe?

D

Investigation: Plan

How will you answer your research question? Will you use descriptive science or an experiment to plan and conduct your investigation? Complete the section for the type of investigation you will complete.

I will do a descriptive investigation.

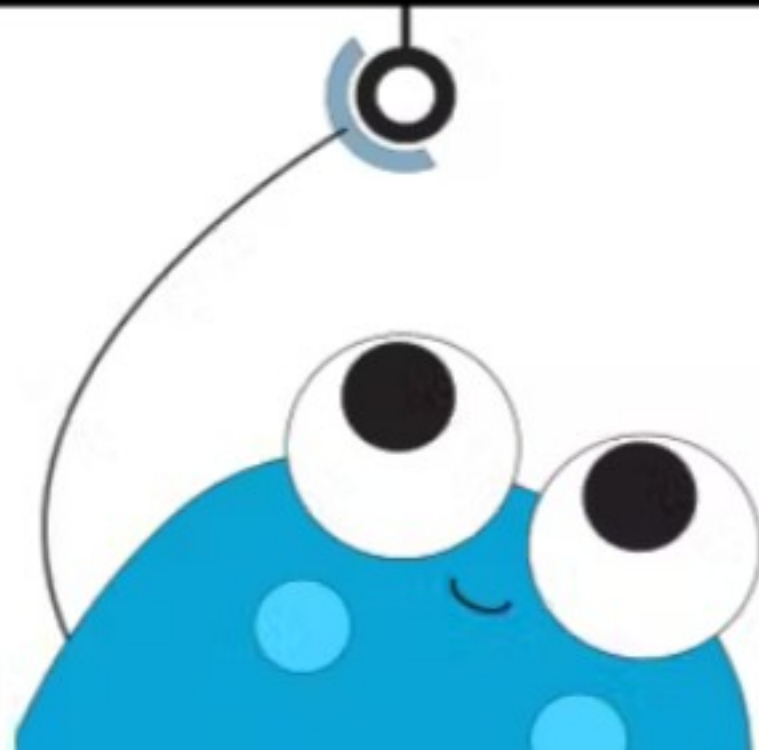
I will do an experimental investigation.

3. Inquiry-driven Investigation

What Happened?

How did this phenomenon support the development of your understanding of how the behavior of light is affected by the material with which it interacts?

4. Reflecting on connection between phenomenon & investigation



What Happened?

Blowing bubbles!

The colors of a soap bubble come from white light, which contains all the colors of the rainbow. When white light **reflects** from a soap film, some of the colors disappear, leaving certain colors to shine back. You can think of light as being made up of waves - like the waves in the ocean.

That is why each soap bubble never looks exactly the same when in the light. It depends on the angle of the light being **reflected** off its surface to your eyes.

What other questions do you have about light?

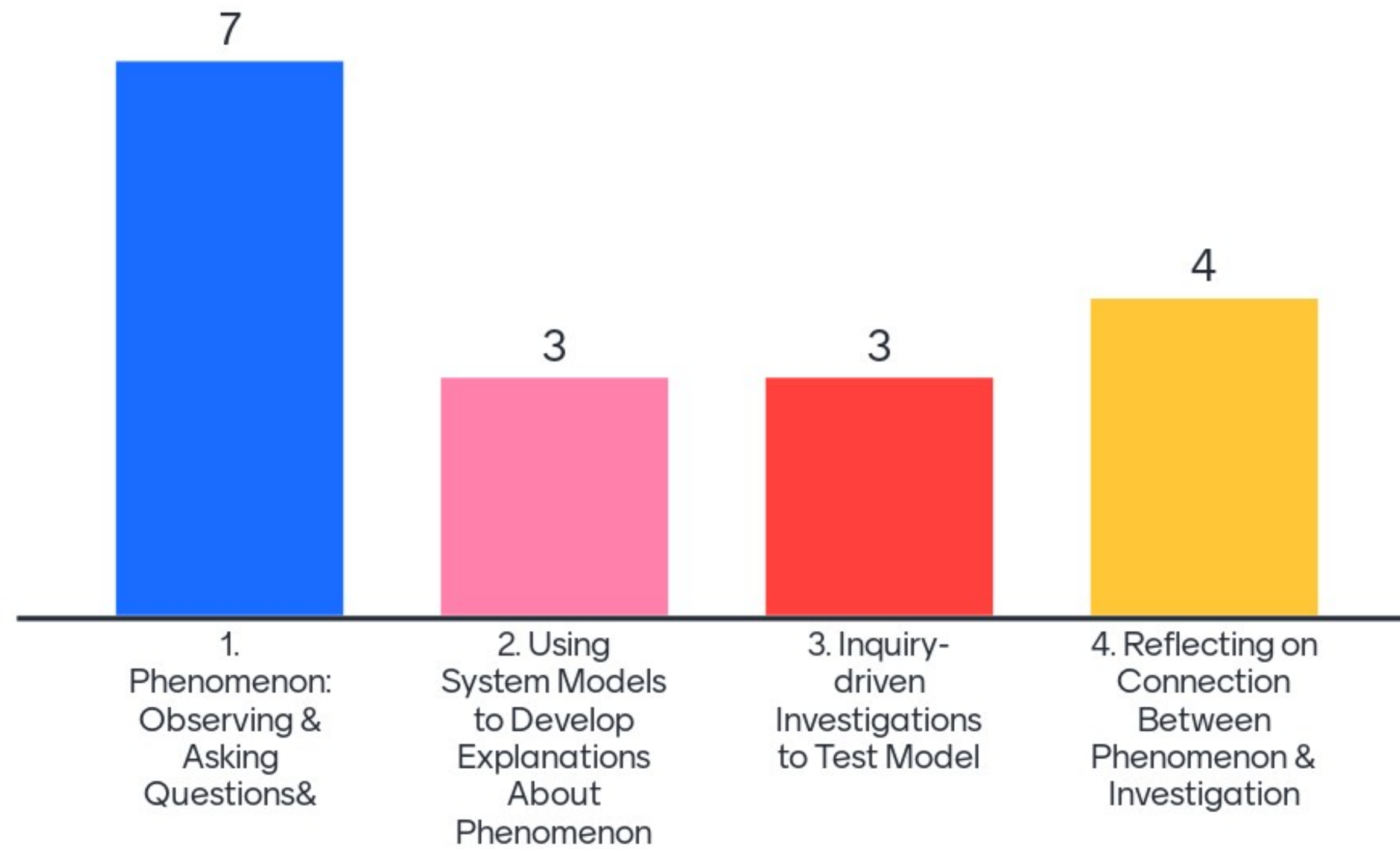
Return to 1.
Deeper Observations
& Questions



3D Learning Trails



Which point in the 3D Learning Trail will you start next week?






STAT Chats

Friday, November 10 | Room 362F

From Inspiration to Transformation: Fostering Science Initiatives That Represent a Diversity of Communities

 **Dr. Alicia Conerly** | 12:20 pm - 12:40 pm

Exploring Inquiry and Inclusion: Unlocking the Potential of EBs in the Science Classroom

 **Angie Maxey** | 1:00 pm - 1:20 pm

Workshops

Bridging Skills and Content: Connect the Practices and Recurring Themes and Concepts With Discourse

Friday, 11/10 | 2:00 pm - 3:00 pm | Room 372BE

 **Elizabeth "Liz" McMillan** | Explore how to guide students through active connections of science concepts with Scientific and Engineering Practices and Recurring Themes & Concepts. Join us for a research-based, collaborative workshop to authentically proceed through a 3D lesson, complete with active learning and teacher actions for enhanced classroom discussions.

Booth 214

Thursday, November 9, 11 a.m. – 5 p.m.

Friday, November 10, 9 a.m. – 5 p.m.

Saturday, November 11, 8 a.m. – 12 p.m.