

I N Q U I R Y S C I E N C E

Increasing Student Engagement and Productive Classroom Discussions: Teaching Your Students to Ask Their *Own* Questions



**LANL
FOUNDATION**

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Session Goals

- **Identify Powerful Questions**
- **Differentiate between Powerful Open-Ended Questions and Purposeful Close-Ended Questions**
- **Learn a Protocol for Teaching Your Students How to Ask Questions**

Why ask questions?

“What would the world look like if I were riding on the end of a light beam at the speed of light?”

-Einstein

“What might DNA look like in a 3d form?”

**-James Watson and Francis Crick,
credited with discovery of double helix**

“Where can I get a good hamburger on the road?”

-Ray Kroc, Founder of McDonald's

What makes a question powerful?

1. **What time is it?**
2. **Did you take a shower?**
3. **What possibilities exist that we haven't thought of yet in terms of alternative energy?**
4. **What does it mean to be ethical?**

Powerful, Open- Ended Questions

- **Generate curiosity**
- **Stimulate reflective conversation**
- **Are thought-provoking**
- **Surface underlying assumptions**
- **Invite creativity and new possibilities**
- **Generate energy and forward movement**
- **Channel attention and focuses inquiry**
- **Stay with participants**
- **Evoke more questions**
- **Incite Action**

Purposeful, Close- Ended Questions

- **Quick**
- **Clear information**
- **Very specific answer**

Question Continuum Activity

Place the following words on the question continuum:

**Which, Are, What, Who, Why, Can, Will, Where, When,
How, Is**

**Open-Ended
Powerful**

**Close-Ended
Purposeful**

Architecture of Powerful Questions

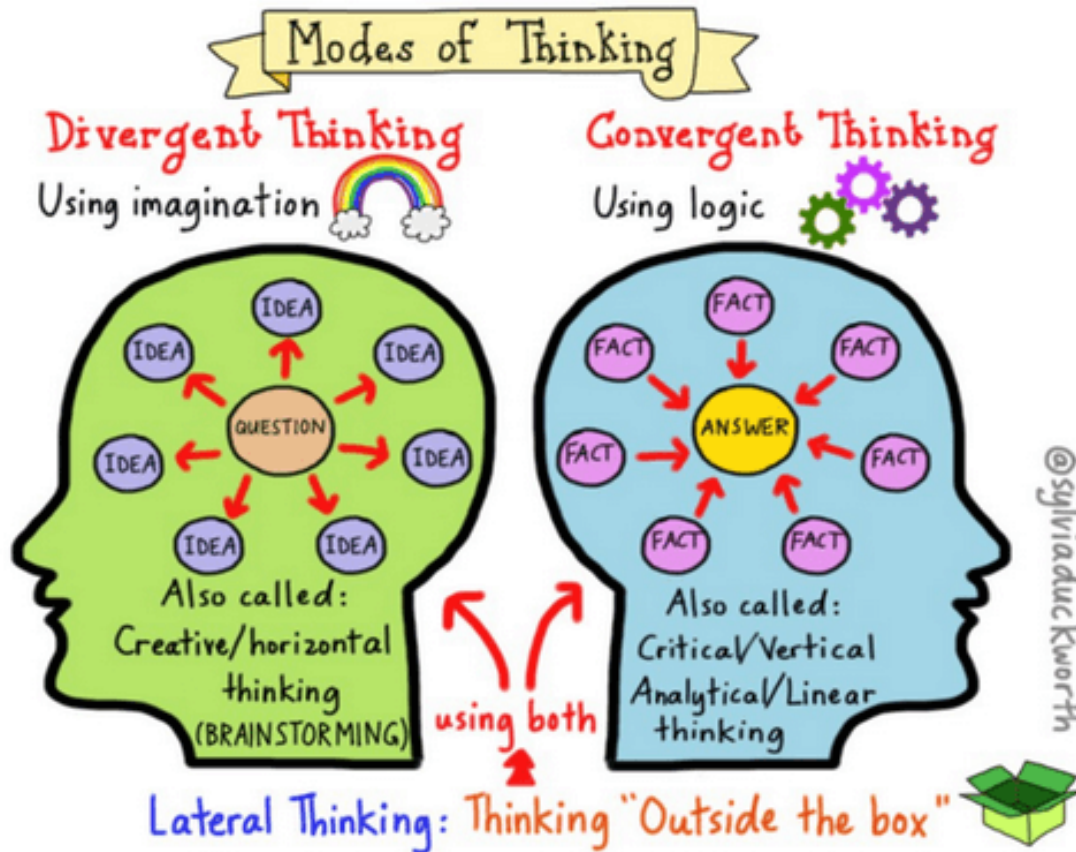
- **Construction**
- **Phrasing**
- **Assumptions**
- **Equity**



Progression of Powerful Questions Leads to more Reflective Thinking

- **Are** you satisfied with our working relationship?
- **When** have you been most satisfied with our working relationship?
- **What** is it about our working relationship that you find most satisfying?
- **How** might our working relationship improve?

Students Asking Their *Own* Questions



❖ Metacognition

Rules!

1. **Ask as many questions as you can.**
2. **Do not stop to discuss, judge, or answer any question.**
3. **Write down every question exactly as it is stated.**
4. **Change any statement into a question.**



Phenomenon

- <https://www.ngssphenomena.com/#/smart-crow/>

Phenomenon



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Northern New Mexico

INQUIRY SCIENCE!

EDUCATION CONSORTIUM

Categorizing and Improving Questions

Close-Ended Questions		Open-ended Questions	
Advantages	Disadvantages	Advantages	Disadvantages

**Choose three questions you need
to answer first.**

Thinking about our thinking...

➤ What did you learn?

➤ How did you learn it?

➤ How do you feel now about asking questions?

➤ How can you use what you learned about asking questions?

Question Formulation Technique

- 1) Question Focus
- 2) Rules for Producing Questions
- 3) Categorizing Questions
- 4) Improving Questions
- 5) Prioritizing Questions
- 6) Next Steps
- 7) Reflection



Thank You!

**You matter
until you multiply yourself by the speed of light
squared...**

Then you are energy.

-Neil Degrasse Tyson

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