Welcome!
Getting Warmed-Up

- Please find all members of your group.
- Introduce yourself to other members of the group.
- Reflect on the cartoon in your group. Be prepared to share your reflection.

“I expect you all to be independent, innovative, critical thinkers who will do exactly as I say!”
Engagement & Inquiry Based Learning

Rima Garg
Mentor Teacher
The Office of Talent Development
Prince George’s County Public Schools
Session Goals

By the end of the session, participants will:

- Examine the critical attributes of engaging activities.
- Compare direct instruction vs. inquiry based instruction.
- Engage in inquiry based learning.
- Identify the process of inquiry based learning.
- Evaluate the benefits of engagement.
Agenda

- Welcome and Introduction
- Let’s get engaged
- What is Engagement and Motivation?
- Critical Attributes of Engaging Activities
- The Shift!!!!
- What is inquiry based learning?
- Process and Research-Inquiry Based Learning
- What Stuck with me and What is Sticky?
Let’s Get Engaged !!
Getting Engaged: Metaphorical Thinking

- How is engaging students like getting engaged?
Engage Me Now!!!

- Each group will participate in a tower building activity.
- Follow directions at your table in order to complete the activity.
- Identify a Director, Time Keeper, Scriber, and a Builder in your group.
- You may pick an (only one) additional item from the front table to help you build your structure.
- Remember you have 20 minutes to complete the activity.
- As a group, reflect on the easiest and the most challenging part of the activity. Record your reflection on your chart paper.
- Timer: http://www.online-stopwatch.com/countdown-timer/
Engagement & Motivation

- “Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime.” - Chinese Proverb

- "Tell me and I forget, show me and I remember, involve me and I understand.” - Confucius

“Student engagement is the product of motivation and active learning. It is a product rather than a sum because it will not occur if either element is missing.”

- Elizabeth Barkley
Critical Attributes of Engaging Activities

- Emphasize problem-based learning
- Permit student choice and initiative
- Encourage depth rather than breadth
- Require student thinking (apply, analyze, evaluate, create)
- Offer multiple levels of challenge
- Designed to be relevant and authentic
UDL is a set of principles for curriculum development that give all individuals equal opportunities to learn. It provides multiple means of representing the “What”, “How”, and “why” of learning

The Shift!!
Direct Instruction vs Inquiry Based Instruction

So how has the teacher’s role shifted?

VS
What is Inquiry-based Learning?

“A student-centered, active learning approach focusing on questioning, critical thinking, and problem-solving. It's associated with the idea - involve me and I understand.”

http://annettelamb.com/tap/topic43.htm
Why Inquiry Based???

- Students **learn more deeply if they have engaged** in activities that require **applying classroom-gathered knowledge to real-world problems** and when they take part in projects that require sustained engagement and collaboration.

- **Active-learning practices** have a **more significant impact on student performance** than any other variable, including student background and prior achievement.

- Students are most **successful when they are taught how to learn as well as what to learn**.

---

ADAPTED FROM POWERFUL LEARNING: WHAT WE KNOW ABOUT TEACHING FOR UNDERSTANDING, A NEW BOOK REVIEWING RESEARCH ON INNOVATIVE CLASSROOM PRACTICES, BY LINDA DARLING-HAMMOND, BRIGID BARRON, P. DAVID PEARSON, ALAN H. SCHOENFELD, ELIZABETH K. STAGE, TIMOTHY D. ZIMMERMAN, GINA N. CERVETTI, AND JENNIFER L. TILSON, PUBLISHED IN 2008 BY JOSSEY-BASS, PUBLISHED WITH SUPPORT FROM THE GEORGE LUCAS EDUCATIONAL FOUNDATION. AVAILABLE AT AMAZON.COM.
Inquiry-based Learning - Research

- “Several Studies have found that inquiry-based teaching & learning methods positively affect student performance (e.g., Thacker et al. 1994; Magnussen Ishido, and Itano 2000), and education reforms recommend incorporating inquiry into the classroom (NRC 2000)” Ciancioio 2006.


- Cianciolo, J. Flory, L. Atwell, J. (2006). Evaluating the use of inquiry-based activities: Do student and teacher behaviors really change? Study found inquiry behaviors occurred more frequently during inquiry-based activities than during recitation sessions where traditional teaching methods were implemented. Study also found that that teachers can also foster inquiry even in traditional settings.

- National Science Education Standards: Focus on Scientific Inquiry and Scientific Literacy……….. http://www.nap.edu/read/4962/chapter/1
An Inquiry-Based Process

Learner asks question or questions

Questions lead to the desire for answers to the question (or for solutions to a problem) and result in the beginning of exploration and hypotheses creation

Hypotheses lead to an investigation to test the hypothesis/es or find answers and solutions to the question and/or problem

The investigation leads to the creation or construction of new knowledge based on investigation of findings

The learner discusses and reflects on this newly-acquired knowledge, which, in turn leads to more questions and further investigation

http://www.inquirylearn.com/Inquirydef.htm
Scientific Explanation

There are three major components of scientific explanation:
- Make a claim about the problem.
- Provide evidence for the claim.
- Provide reasoning that links the evidence to the claim.

Below is a description of a generic template teachers can use to help students develop quality scientific explanation. On the following page is a copy of the template teachers can use in the classroom.

Quality communication:
- Uses precise and accurate scientific language.
- Articulates sources, inferences, and logic used to develop the claim.
- Written clearly so that anyone interested in the explanation can understand it.

<table>
<thead>
<tr>
<th>What is the question that you want to answer?</th>
</tr>
</thead>
<tbody>
<tr>
<td>List the sources used for the evidence that will be used to support your explanation.</td>
</tr>
</tbody>
</table>

**Evidence to support your explanation**

<table>
<thead>
<tr>
<th>Claim(s) that you think answer the question</th>
<th>Evidence that supports your claim(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claims are what you can assert about the problem. Your claims address the question you are considering about the phenomena and should be based on evidence. You should be able to support and defend your claims.</td>
<td>Evidence is the data you select and interpret to form your claim. It is not all data available, only those you select.</td>
</tr>
</tbody>
</table>

**Explanation for your answer to the question = Claim + Evidence + Reasoning**

I think __________ (Claim)_________ answers the question because __________ (Evidence + Reasoning)_________.

Reasoning is the logic that is used to show why the data counts as evidence to support the claim. It is often necessary to apply appropriate scientific principles in order to make the link between the evidence and the claim.
Graphic Organizer for Developing a Scientific Explanation

What is the question that you want to answer?

List the sources used for the evidence that will be used to support your explanation.

Evidence to support your explanation

<table>
<thead>
<tr>
<th>Claim(s) that you think answer the question</th>
<th>Evidence that supports your claim(s)</th>
</tr>
</thead>
</table>

Explanation for your answer to the question = Claim + Evidence + Reasoning

I think (Claim) answers the question because (Evidence + Reasoning).

Source: Institutes for Learning, © 2006 University of Pittsburgh
Claims, Evidence and Reasoning = Quality Scientific Explanations

Big Question:

<table>
<thead>
<tr>
<th><strong>Claim:</strong> A scientific sentence that answers the “big” question</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Reasoning/Science background:</strong> Describe the important science ideas or definitions you thought about to make your claim.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Evidence (data)</th>
<th>Evidence (data)</th>
<th>Evidence (data)</th>
</tr>
</thead>
</table>

| **Scientific Explanation:** I found (describe evidence). That supports my claim that ______________. Because of (scientific ideas you understand), __________________________________________________________________. [Write a complete paragraph] |
| --- | --- | --- |

Template by Kevin Anderson, Cooperative Educational Service Agency #2, Wisconsin. Adapted from Eric Brunsell, University of Wisconsin-Oshkosh.
Claims, Evidence and Reasoning

Joseph Griffith’s, The Surrender, was painted for the 225th anniversary of the Battle of Yorktown. The Battle of Yorktown ended with British forces surrendering to American and French forces. It was the last major engagement of the Revolutionary War. [http://www.peachstapler.com/index.html](http://www.peachstapler.com/index.html) [http://img220.imageshack.us/img220/9972/washingtontriceratops15dy3.jpg](http://img220.imageshack.us/img220/9972/washingtontriceratops15dy3.jpg) (image only)

Data (Observations)
What do you observe in this painting?

Claim
What is the meaning of this picture?

Evidence (from your data)
Evidence (from your data)
Evidence (from your data)

Reasoning
(connect evidence to claim)
Reasoning
(connect evidence to claim)
Reasoning
(connect evidence to claim)

Adapted from Gallagher, K. (2011) Write Like This. Portland, ME: Stenhouse Publishers
CER worksheet by Eric Brunsell, University of Wisconsin Oshkosh
C.E.R (Claim, Evidence, Reasoning)

- Watch the video clip carefully and as a group complete the C.E.R. sheet in your folder.

- [https://youtu.be/WQTsue0lKBk](https://youtu.be/WQTsue0lKBk)

Explaining the C.E.R Inquiry Based Model

Why Engaging Students in Learning?

- Increases learner’s retention and understanding of contents
- Improves students attitudes
- Increases students attention span and time on task
- Increases student skills such as critical thinking, communicating, reading, and writing
- Prepares students for college and career
- Reduces behavior problems in class.
Inquiry-based Learning - Resources


Other Resources & Credits

- https://www.stevespanglerscience.com/
- http://www.nap.edu/read/4962/chapter/8#107