Using Student Questions to Drive Instruction

Exploring Driving Question Boards and the Question Formulation Technique
Driving Question Boards

Visual Organizer for Project Based Science
Driving Question Boards

- Exploring Essential Questions, allowing for:
  - Making Connections
  - Getting Organized
  - Scaffolding Question-Asking
  - Imparting Ownership
  - *Fortus et al 2008* - paper on DQBs
Driving Question Boards

- Making Connections
  - Visual reminder
  - Allows students to share prior knowledge
  - Creates a coherent story from disconnected experiences
  - Connects small ideas to essential question
Driving Question Boards

- Getting Organized:
  - Assists in connecting and synthesizing ideas
  - Similar to concept maps
Driving Question Boards

**Scaffolding Question-Asking:**
- Anchoring phenomena serves as a trigger for question generation
- Sorting questions into categories creates focus, helps connect them to the main idea and allows them to vary the type and level of questions asked
- Students can ask questions at higher levels of complexity
Driving Question Boards

- Imparting Ownership
  - Students develop the questions and investigations, creating a sense of ownership over the process and learning
  - DQBs vary between class to reflect the learning of the groups
Driving Question Boards in Action

- Let’s explore a *phenomena*
- **Background Information** on this Chain Behavior Phenomena
- A Fantastic [Ted talk by Steve Mould](https://www.ted.com/talks/steve_mould)
After creating the DQB:

- Work with students to summarize the essential question
- Organize questions into categories (optional, but recommended)
- Investigate questions within storyline, then collect answers and evidence on Summary Table.
Another Example of a Driving Question Board

(In this example, the class categorized their questions in relation to the three parts of the initial model they developed in Lesson 1.)
Example DQBs- Wendy Johnson
@WendyJohnsonMI

How does a baby grow from a single cell?

Our Ideas

- The fertilized egg divides many times to create many cells.
- Egg yolk contains DNA from the parents.

Our Questions

- How do the cells divide so that each cell has all the DNA?
- How do cells know which type (tissue, muscle, skin, etc.) to become?
- Do cells grow bigger?

What We Figured Out

- Cells divide by copying DNA, organizing new chromosomes, and then splitting in half.
- Cells differentiate (become different) by having specialized proteins.
- The way of accumulating sugar (A, C, T, G) is how tells cells how to make proteins.
QUESTION FORMULATION TECHNIQUE

http://rightquestion.org/

The Right Question Institute makes it possible for all people to learn to ask better questions and participate more effectively in key decisions.

Learn more about our work: Teaching & Learning  Schools & Families  Health Care

"This book begins with the seemingly simple request to get students to ask their own questions, but at heart it's a book about creating a classroom alive with dialogue, inquiry, and respect for students' minds.

—Mike Rose, author of Why School? Reclaiming Education for All of Us"

Make Just One Change by Dan Rothstein and Luz Santana

MAKE JUST ONE CHANGE
Teach Students to Ask Their Own Questions
DAN ROTHSTEIN and LUZ SANTANA
Foreword by WENDY D. PURIEFOY
Steps of the Question Formulation Technique

1. Educator presents the Question Focus (QFocus)

2. Students generate their own questions while following the rules

3. Students identify different types of questions and transform questions

4. Students prioritize questions

5. Educator and students discuss next steps

6. Students reflect and move into next steps
Step 1

With your group, write down as many questions as you can about the focus.

Rules

❖ Do not stop to discuss, judge, or answer any question.
❖ Write down every question exactly as it was stated.
❖ Change any comments to questions.

What might be difficult about following these rules for us? For our students?
Step 2

- Follow the rules for producing questions.
- Number your questions.
Step 3

Categorize each question as closed (C) or open (O)

- A closed question has short, direct answers
- An open question requires more explanation.

*Could also use explanation and argument
  - Explanation – researchable and can be reported as fact
  - Argument - choose a position and defend it with evidence

*Many thanks to Emily Crement for the alternate wording suggestion!
Step 4

- Are there any questions you want to revise?
- Choose at least one question to change from **closed** *(explanation)* to **open** *(argument)*?
- Choose one question to change from **open** to **closed**?

Discuss the value of each type of question:
- Students identify advantages & disadvantages of closed-ended questions.
- Students identify advantages & disadvantages of open-ended questions.

Add those new questions to your list too.
Step 5

Select the 2 most interesting questions you think the group should discuss.
Please share...

- What were your two priority questions?
- Your rationale for selecting those questions.
What do I do with questions generated?

Several options exist for how these questions can be used in the classroom to guide inquiry:

- Students are divided into groups, different groups focus their inquiry on different questions
  - Based on groups they used to do QFT
  - Based on student choice of question to investigate

- Use questions generated to “drill down” to one essential question to guide the whole class
  - Other questions generated could become supporting questions
How can these be used across the content areas?

▪ What are some modifications you see as needed for different subjects or grade levels?
▪ In what other content areas do you see these techniques be helpful?
▪ How could you use both DQB and QFT together to guide/launch an investigation?
Where can I see examples?

- **Science Storylines:**
  - www.nextgenstorylines.org

- **QFT options:**
  - Right Question Institute – FREE Educator Network
    www.rightquestion.org
    - Videos from of QFT with various applications
      http://rightquestion.org/educators/videos/
    - Forums on Educator Network – LOTS of educators sharing examples directly
      in forum, including a few links to external tables of ideas (some overlap exists between these two links):
      - https://docs.google.com/document/d/1ozW5f9xDOgqlJdixGNCLtj0XS7zDPATdLSG87vKBDk/edit
      - https://airtable.com/shrA5rmCFDP4gx46/tblo6B8GwEBn8c9dk
Resources and Contact Information

Driving Question Board
- Phenomena Based Instruction Workshop
- Science Teachers in Action http://www.scientificteachersinaction.org
- Jeanine Sheppard, Math and Science Content Specialist jsheppa@ilstu.edu

Question Formulation Technique
- Right Question Institute: http://rightquestion.org/education/
- IL Social Science in Action: http://www.ilsocialscienceinaction.org/
- Katie Elvidge, Social Science Content Specialist kelvidge@isbe.net
- Kathi Rhodus, ELA/SS Content Specialist krhodus@isbe.net

http://www.ilclassroomsinaction.org/