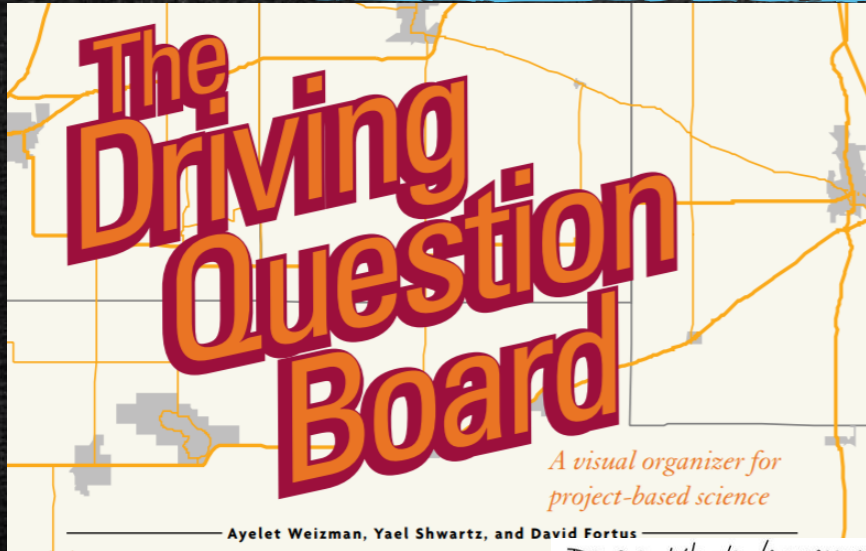


Using Student Questions to Drive Instruction

Exploring Driving Question Boards and the Question Formulation Technique



Driving Question Boards



Visual Organizer for Project Based Science

DOB: What happens to stars?

do they burn out? lifespan?
do they burn? how? how do stars affect planet formation?
how long does it take to get information about stars?
why will it engulf earth? (Sun) different colors? solar flare?
what are they made of?
how do stars form? temperature?
why do they give off light? atmospheres on stars?
explode? black holes? nebulae?

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



Driving Question Boards in Action

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.

Example DQBs - Next Gen Storylines

Lesson 1: How can we hear so many different sounds from across the room when we spin the record?
 Middle School Unit: How Can We Sense So Many Different Sounds From a Distance?

Teacher Guide v2.1
 Feb. 2018

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 over and over to create many cells.
- Egg + sperm contain DNA from the parents.
- Chromosomes/DNA determine the sex of the baby.

Our Questions

- How do the cells divide so that each cell has all the DNA?
- How do cells know which type (blood, muscle, skin, etc) to become?
- Do cells grow bigger?
- What determines the baby's sex?
- How are twins formed?
- What are chromosomes?
- Why does it take 9 months for the baby to be born?

What We Figured Out

- Cells divide by copying DNA, organizing the chromosomes, and then splitting in half.
- DNA is replicated by separating the two strands of nucleotides and matching complementary bases to form a new strand along each old strand.
- Cells differentiate (become different) by making specialized proteins.
- The order of nucleotide bases (A, T, C, G) in DNA tells cells how to make proteins.

QUESTION FORMULATION TECHNIQUE

<http://rightquestion.org/>



RQI The Right Question Institute
A Catalyst for Microdemocracy

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

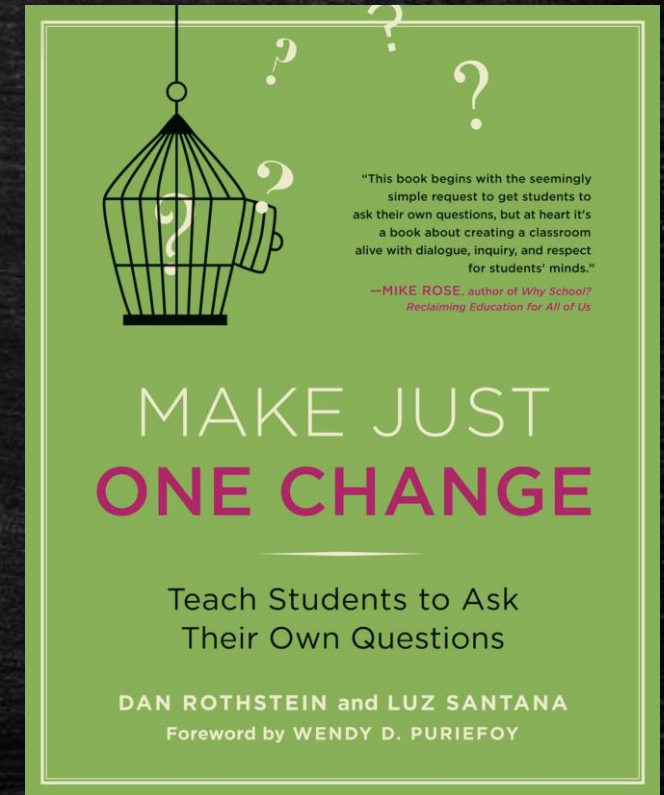
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“This book begins with the seemingly simple request to get students to ask their own questions, but at heart it’s a book about creating a classroom alive with dialogue, inquiry, and respect for students’ minds.”
— Mike Rose, author of *Why School? Reclaiming Education for All of Us*



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**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

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*?

OPEN

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/1ozW5fgxDOgqIJdixGNcLIjoXS7zDPATdDLSG87vKBDk/edit>
 - <https://airtable.com/shrA5rmCFDP4gxg46/tblo6B8GwEBn8c9dk>

Resources and Contact Information



<http://www.ilclassroomsinaction.org/>

Classrooms in Action

The screenshot shows the homepage of the Classrooms in Action website. At the top, there is a navigation bar with 'ISBE HOME' and social media icons for Facebook and Twitter. Below this is a 'BACK TO SCHOOL!' banner with the text 'Available HERE- Back to school packets for all classroom levels, content areas, and connecting to additional resources.' The main heading is 'Welcome to Illinois Classrooms in Action!' followed by a paragraph describing the website as a one-stop shop for K-12 educators. Below the text are several content area tiles: English Language Arts, Math, Science, Social Science, Virtual Networks For Teachers, Career Tech, Fine Arts, PE/Health, Balanced Assessment, Climate & Culture, and Curriculum & Alignment. Each tile includes a list of resources or topics. At the bottom, there is a section for 'Professional Learning Opportunities and Updates' with a 'Professional Learning' button.

Driving Question Board

- [Phenomena Based Instruction Workshop](#)
- Science Teachers in Action
<http://www.scienceteachersinaction.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
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- Kathi Rhodus, ELA/SS Content Specialist
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