CO-TEACHING IN THE SECONDARY SCIENCE CLASSROOM: STRATEGIES FOR SUCCESS

Kristina J. Doubet, Ph.D. doubetkj@jmu.edu
Angela W. Webb, Ph.D. webbaw@jmu.edu
James Madison University
Agenda for our Two Days

✓ Co-Teaching: Pros and Cons
✓ Exploring Foundational Frameworks
✓ Strategies for Capitalizing on Co-Teaching when...
  ✓ ...Collecting Formative Assessment
  ✓ ...Responding to Assessment Results
  ✓ ...Conducting Labs
  ✓ ...Implementing Alternative Assessments
✓ Logistics of Co-Teaching/Management
USING ASSESSMENT EVIDENCE TO DRIVE INSTRUCTION
What Next?

Examine the two tiered tasks:

• What do you notice about them?
• How are they similar? Different?
• What makes sense to you? What doesn’t?

Now answer the prompt at GoFormative

1. Go to goformative.com/join
2. Enter this code: SUGLBZ
Assessment Analysis

- Examine the assessment results and try to find patterns among the assessment results.
- Determine if there is something EVERYONE needs. This will be your review, warm up, or mini-lesson.
- Next, form groups according to the DIFFERENT patterns you discern.
- For your own clarity, define the group in some way (distinguishing misconceptions or insights, what they need next, etc.).
- For your own clarity, identify some representative responses for each group.
# Symbiosis Formative Assessment

<table>
<thead>
<tr>
<th></th>
<th>Mutualism</th>
<th>Commensalism</th>
<th>Parasitism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who benefits?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Both, One, or none)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Who is hurt?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Both, One, or none)</td>
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<td></td>
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<tr>
<td>Provide one example in</td>
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<tr>
<td>nature and explain why</td>
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<td></td>
<td></td>
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<tr>
<td>it is an example</td>
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<td></td>
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</tbody>
</table>

On the back, record another example of symbiosis (any of the 3 types) from the world around you (economics, literature, entertainment, etc.)

**Patterns:**
- Some students grasped the content and could make connections to areas outside science (on chart and extension).
- Others missed or could not transfer the content.
Assessment Analysis (cont’d)

- Figure out what **feedback** and practice/extension each group would need to
  - *address their misconceptions*
  - *help them move to the next level of sophistication with the content*

- Keep in mind that **good feedback**
  - *Provides both glow and grow information*
  - *Provides actionable steps*
  - *Is accessible to students independently*
  - *Is targeted and specific*
  - *Is assessable*
Assessment Analysis (cont’d)

- Devise (and record) a small-group activity for each group that will...
  - ...correct the misconceptions revealed by the assessment.
  - ...provide appropriate feedback
  - ...help them achieve the same learning goals with appropriate degrees of support and challenge

- **Important**: Start with the top task first and scaffold up
Addressing Patterns

1. For those who grasped the content and could make connections to areas outside science: Provide a link to a description of a new kind of symbiosis recently discovered ("Bacteria eat Ammonia in Fish Gills") and ask them to analyze the new discovery for the kind of symbiosis being demonstrated, complete with a discussion and diagram of the interactions among all of the species affected.

2. For those who missed or could not transfer the content, present a new but clear cut scenario of each symbiotic relationship (mutualism, commensalism, and parasitism) and ask students analyze and distinguish among the three types, labeling and justifying their answers.
Adjusting Tasks for Student Readiness

Greater Leap from what is familiar  
More Expert-Like  
More Abstract  
Multiple Facets  
“Fuzzy”/Open Problems or Tasks  
Loosely-Structured Process  
Smaller Leap from what is familiar  
More Novice-Like  
More Concrete  
Fewer Facets  
Well-Defined Problems or Tasks  
Highly-Structured Process

Adapted from Tomlinson’s “Equalizer”, 2015
### Show Me the Money! Homework

**Assignment:** Problems on textbook pgs. 135–136

**Completion Amount:** $1500

<table>
<thead>
<tr>
<th>Problem/Task Values</th>
<th>Amount (each)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems 1–5</td>
<td>$100</td>
</tr>
<tr>
<td>Problems 6–10</td>
<td>$200</td>
</tr>
<tr>
<td>Problems 11–15</td>
<td>$300</td>
</tr>
<tr>
<td>N/A</td>
<td>$N/A</td>
</tr>
</tbody>
</table>

**Guidelines:**

You must complete no more than one $100 problem, at least two $200 problems, and at least one $300 problem.

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### Show Me the Money! Student Receipt

**Assignment:** Problems on textbook pgs. 135–136

**Completion Amount Required:** $1500

**Problems I've Completed:**

<table>
<thead>
<tr>
<th>Problems</th>
<th>Amount (each)</th>
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</thead>
<tbody>
<tr>
<td>Problem 3</td>
<td>$100</td>
</tr>
<tr>
<td>Problems 7–10</td>
<td>$200</td>
</tr>
<tr>
<td>Problems 11–12</td>
<td>$300</td>
</tr>
<tr>
<td>N/A</td>
<td>$-$</td>
</tr>
</tbody>
</table>

**Total:** $1500

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1 Realization and 1 Remaining Question:

R = If I don’t show my work, I make stupid mistakes.

? = What would happen if the variable were a decimal?
Reflecting and Co-Planning

- Alone or with colleagues, review your curriculum and identify areas where students seem to be “all over the place”. Pick those areas with the greatest “spread”.

- Create pre- or formative assessments for each of those areas. Make sure those assessments adhere to what you learned yesterday about effective assessment.

- Hypothesize patterns that may emerge.

- Discuss how you and your co-teacher could “divide and conquer” to address these patterns/the diverse learning needs of students.
The Models

• One Teach/One Support
• One Teach/One Gather Data
• Station Teaching
• Team Teaching
• Parallel Teaching
• Alternative Teaching
GOFORMATIVE in ACTION

Mary Hawkins

Goal: Convince fellow policymakers in town or state to implement or not implement an immigration policy (choose a side)
Role: Policymaker on the floor of the "House"
Audience: The rest of the governing body
Situation: Voting will be coming up on a bill/policy regarding immigration
Performance: Written persuasive paragraph
Standards: Following CCSS for ELA writing in

Andrew Holt

My idea for students to show me they have successfully learned information about the colonies surrounds ideas of presenting a persona. This leaves the freedom of students to decide what they are most interested in but also allow students to do research as well as present to their peers. Presentation is a big part of life after the

Prices of shirts and pants. You are asked to find out how much a store can charge for shirts and pants in order to break even. First you need to come up with and individual equations for the shirts and pants. You can then use these to create a polynomial and graph it. Your final answer should be the points where the store will break even.

Laura K

Role: Architect
Goal: Use properties of triangles to show relationships to design a building of choice.

Audience: The target audience is building designers. The students will make a portfolio project as if they are trying to present it to someone who would want to build their design.

Using the GRAPPS standard for performance assessment, I would give the following activity to my students.
Using the unit that I am working on for class (Civil Rights Movement) I would have the students pretend they are the area a news anchor and that they have to give a television report about
Talk with colleagues:

*How might you use this model?*
THE 5E INSTRUCTIONAL MODEL
Respond to the Following Prompts:
Lab

Materials

- Dish soap
- Small beakers/test tube
- Plastic bag
- Strainer
- Tweezers/stirring rod
- Strawberries
- Measuring spoons
- Salt
- Isopropyl alcohol
- Water
- Petri dish, or something similar

Procedure

1. Measure 90mL of water into a small glass container.
2. Add 10mL of dish soap to the water.
3. Stir in $\frac{1}{4}$ tsp salt and mix until salt dissolves. [This is the extraction mixture.]
4. Place one strawberry into a plastic zipper-lock bag.
5. Pour extraction mixture into the bag with the strawberry.
6. Remove as much air from the bag as possible and seal it closed.
7. Use your hands and fingers to mash the strawberry inside of the bag. You don’t want any large pieces remaining.
8. Pour the resulting strawberry pulp and extraction mixture through a strainer and into a medium glass bowl or similar container.
9. Use a spoon to press the mashed bits of strawberry against the strainer forcing even more mixture into the container. Transfer the extraction mixture into a smaller glass beaker (one that holds 50-100mL). [This will help to isolate the DNA on the surface of the mixture.]
10. Add 5mL of chilled isopropyl alcohol to the solution and hold the mixture at eye level. [What do you notice?]
11. Use the tweezers or stirring rod to gently remove the precipitated materials.
Post-lab Discussion and Explanation

- What is the material we extracted? How did the steps in the procedure help us do this?
- Could we use this procedure to extract DNA from human cells? Why or why not? What considerations would need to be made?
- What could be done with the extracted DNA?
- How is DNA extraction useful to scientists? When do they use such a protocol, and why is it important?
STRUCTURED ACADEMIC CONTROVERSY (SAC)
STATEMENT:

“The most potent use of the new gene editing technique CRISPR is also the most controversial: tweaking the genomes of human embryos to eliminate genes that cause diseases. We don’t allow it now. Should we ever?”
Steps of Academic Controversy

- **Step 1**: Prepare your position
- **Step 2**: Present and advocate your position (pro then con); take notes on opponents’ points
- **Step 3**: Engage in open discussion in which you refute the opposing position and rebut attacks on your own position
- **Step 4**: Reverse positions and repeat steps 1-3
- **Step 5**: Synthesize and integrate the best evidence and reasoning from BOTH sides to create a joint position statement.
Step 1: Prepare your Position

- Gather evidence from your readings and experiences to support your assigned position.

- Organize what you know into a reasoned position and persuasive argument by...
  - ...constructing a thesis statement or claim that asserts something is “true.”
  - ...arranging the supporting facts, information, experiences, and other evidence into a coherent, reasoned, valid, and logical rationale that addresses all aspects of Mr. DuBois’ grading and homework policies
  - ...citing sources to increase credibility
  - ...making the conclusion that your claim is true
  - ...dividing the “talking points” evenly between partners
Step 2: Present your Position (Pro then Con)

Guidelines for helping present the best case:

- Begin and end with a strong, sincere, and enthusiastic appeal for the listeners to agree with your position
- Present your points – with evidence - in a logical way
- Expand on pivotal points by using examples, stories, and anecdotes
- Restate important points
- Make eye contact with audience
- Make sure each partner contributes equally

As you listen to the opposing presentation, take notes on that view so that you can

- Refute the argument
- “Steal” ideas to use when you switch positions
Step 3: Engage in Open Dialogue

- **Prepare**: Analyze the points in your opponent’s argument as being strong or weak. Make notes of “muddy points” that you want the opposing team to clarify.

- **Refute** the evidence of the opposition.
  - Refute the reasoning of the opposition based on errors of perception and judgment.
  - Rebut the arguments of the opposition by presenting counter arguments, clarifications, and extensions.

- Continue to advocate your position by emphasizing facts, evidence, and rationale.

- Continue to take notes on the opposing view.
Step 4: Reverse Positions

- **Switch Positions**: (if you were Pro, you are now Con)
- **Repeat Step 1**
  - Gather evidence from your readings, experiences and notes on your opponents’ points to support your new position
  - Organize a persuasive argument by...
    - constructing a thesis statement or claim that asserts something is “true.”
    - arranging a coherent, reasoned, valid, and logical rationale that addresses all aspects of Mr. DuBois’ grading and homework policies
    - citing the opinions of experts
    - constructing a strong conclusion
- Decide who is going to say what during the debate
Present your Position (Pro then Con)

- Guidelines for helping present the best case:
  - Begin and end with a strong, sincere, and enthusiastic appeal for the listeners to agree with your position
  - Present your points – with evidence - in a logical way
  - Expand on pivotal points by using examples, stories, and anecdotes
  - Restate important points
  - Make eye contact with audience
  - Make sure each partner contributes equally

- As you listen to the opposing presentation, take notes on that view so that you can
  - Refute the argument
  - “Steal” ideas to use when you switch positions
Engage in Deliberation

- **Prepare**: Analyze the points in your opponent’s argument as being strong or weak. Make notes of “muddy points” that you want the opposing team to clarify.

- **Refute** the evidence of the opposition by constructing claim/counterclaim statements:
  - You claimed: ____________________ (point made by opponents)
  - Which we applaud because: ___________ (area of partial agreement)
  - However we believe: ________________ (your opposing view on the topic)
  - Because: _______________________ (reason/citation)
What do you really think?
What is your genuine opinion?
What are you still questioning? Jot down your thoughts.
Step 5: Synthesis

- Synthesize and integrate the best evidence and reasoning from BOTH sides into a joint position statement.

- This can be in paragraph form, a bulleted list, or a combination of both.

- Provide this by logging into https://padlet.com/DoubetKJ/SAC
The Models

- One Teach/One Support
- One Teach/One Gather Data
- Station Teaching
- **Team Teaching**
- Parallel Teaching
- Alternative Teaching
Team Teaching

- Doesn’t require any modification of classroom set-up.
- While one teacher explains, the other models, demonstrates, or role-plays*.
- Both teachers are responsible for planning and instruction
- +/−
  + capitalizes on both teachers’ areas of comfort
  +/− requires mutual trust, commitment and teaching styles that complement one another
  - requires extensive planning time and/or shared expertise

*One potential role – “The Clarifier”
ALTERNATIVE ASSESSMENT
Alternative Assessments in Science

Poll Everywhere
Characteristics of Alternative Assessments

- Nontraditional format
- Often require student construction, demonstration, or performance
- Provide opportunities to generate multiple solutions; usually not simply right or wrong
- Provide opportunities for students to demonstrate what they learned, how they learned it, and how they can connect their knowledge to the real world

<table>
<thead>
<tr>
<th>Performance-based</th>
<th>Student-focused</th>
<th>Teacher-directed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills tasks</td>
<td>Graphic organizers</td>
<td>Demonstrations</td>
</tr>
<tr>
<td>Investigations</td>
<td>Portfolios</td>
<td>Group visuals</td>
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<tr>
<td>Extended investigation</td>
<td>Oral presentations &amp; debate</td>
<td>Skills checklist</td>
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<tr>
<td></td>
<td>Skills checklist</td>
<td>Self, pair, and peer evaluations</td>
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<td>Technological applications</td>
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</tbody>
</table>
Investigating Alternative Assessment Formats

- Go to: https://tinyurl.com/y5e39ozw
- Select 3-5 alternative assessment types that interest you. Individually, read more about those types.
- If you have extra time, read about additional alternative assessments.
- Which alternative assessments most interest you? Why?
- What can you learn about student understanding that is difficult to glean from traditional assessments?
Developing Alternative Assessments

- Start with the 3 alternative assessment formats that most interest you.
- Develop an assessment task for your co-taught class based on your chosen formats.
- If you have time after developing 3 alternative assessments, consider developing a different type of alternative assessment (i.e., the 3 you developed were student-focused, so try your hand at a teacher-directed one).
Sharing out Alternative Assessments

- Share the alternative assessment you’re most proud of to Seesaw.
Performance Task Investigation

- Go to https://padlet.com/DoubetKJ/PTs
- Examine the science and STEM examples on that site. Take your time. Go “wide” first.... Then choose a few examples to examine in more depth.
- Which tasks are you drawn to? Why? Which are best suited for your students? Why?
- What are the similarities among the examples you examined? What are the differences?
### Models – PTs and PBL

<table>
<thead>
<tr>
<th>Performance-Tasks</th>
<th>Project-Based Learning (PBL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- A “learning activity or assessment that that asks students to construct a</td>
<td>- A “pedagogical approach in which learning develops as students pursue answers to</td>
</tr>
<tr>
<td>multi-faceted response, create a product, or produce a demonstration. In other</td>
<td>complex questions through [collaborative] work on extended learner-directed projects.”</td>
</tr>
<tr>
<td>words, to perform with their learning.”</td>
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</table>

McTighe, Doubet, & Carbaugh, 2019

Now look back at your top choices from the Padlet examination. To which model were you more drawn? Why do you think that is?
PTs and PBL: What’s the Overlap?

- Performance assessments and projects have many common features; the lines between them can be blurry.
- Not necessarily dichotomous, “either or” choices.
- Better viewed in terms of a series of design variables, with each operating like a sliding control on a sound or lighting board. They vary according to...
  - targeted outcomes
  - purpose of the task or project
  - available resources (including time, materials, equipment)
  - nature and needs of the students
  - feasibility of implementation
Design Variables for Performance Tasks and Projects

1. **Time Frame** – How long will students be involved in this task or project (including time for presentations and evaluations)?
   - 1-4 Class Periods
   - 5-10 Class Periods
   - More than 2 Weeks

2. **Integration of Subjects** – To what extent is the task/project interdisciplinary?
   - Single Discipline
   - Two Disciplines
   - Multi-disciplinary

3. **Cognitive Demand/Rigor** – Where does the task/project fall on the Depth of Knowledge (DOK) scale?
   - DOK - Level 2
   - DOK - Level 3
   - DOK - Level 4

4. **Level of Inquiry** – Are students engaged in the process of answering a question, exploring an issue, or solving a problem?
   - Limited/No Inquiry
   - Structured/Guided Inquiry
   - Open Inquiry
### Design Variables for Performance Tasks and Projects

5. **Degree of Authenticity** – To what extent is the task/project authentic; i.e., featuring a real challenge, problem, issue; genuine product/performance; real-world constraints?

<table>
<thead>
<tr>
<th>Decontextualized</th>
<th>Simulates an Authentic Context</th>
<th>Fully Authentic</th>
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6. **Audience(s) for Student Product(s) /Performance(s)** – To whom will students present their products and performances?

<table>
<thead>
<tr>
<th>Classroom Teacher</th>
<th>Other Students/School Staff</th>
<th>Authentic Audience beyond School</th>
</tr>
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<tbody>
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7. **Access to Resources** – To what extent will the resources needed (e.g., information, supplies, equipment) be provided?

<table>
<thead>
<tr>
<th>All Resources Provided</th>
<th>Some Provided</th>
<th>Students Locate all Needed Resources</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

8. **Direction** – Who will direct the task/project?

<table>
<thead>
<tr>
<th>Teacher Directed</th>
<th>Teachers w/ Some Student Self-Direction</th>
<th>Student Directed</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

© McTighe, Doubet, & Carbaugh (2019), Authentic Tasks and Projects, ASCD.
Design Variables for Performance Tasks and Projects

9. **Student Choice** – To what extent will students have choices regarding any of the following:
   - task/project topic, question, problem, issue?
   - product(s)/performance(s)?
   - audience(s)?

   No Choice                                               Some Choices                                               Extensive Choices
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

10. **Degree of Scaffolding** – To what degree will students be provided with instructional support and scaffolding as they work on the task?

   Considerable Support                                               Some Support                                               No Support
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

11. **Performance Mode** – How will students work?

   Individually                                               Some Group & Some Individual Work                       All Work Done in Groups
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

12. **Evaluation of Student Products/Performances** – Who will be involved in evaluating student products and performances?

   Classroom Teacher                                               Team of Teachers                                           External Evaluators/Experts
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
TOOL #1: GRASPS (RICH, AUTHENTIC TASKS)
TOOL #1: GRASPS

G ◆ What is the goal in the scenario?
R ◆ What is your role?
A ◆ Who is the audience?
S ◆ What is your situation (context)?
P ◆ What products/performances will you prepare?
S ◆ By what success criteria will your work be judged?
Middle School Science Task

- **Goal:** Apply scientific data to determine the impact a pollutant would have on an ecosystem; evaluate data in terms of stakeholder lenses.

- **Role:** A Given Stakeholder (Tourism board, fisherman, etc.)

- **Audience:** Local Government of Prince William Sound, Alaska

- **Situation:** The Exxon Valdez has crashed and the oil spill is spreading, and it will impact many sites throughout the community. Examine the data on currents, weather patterns, wildlife and human needs, etc. Then, taking all data into account, but through the lens of your stakeholder, make a decision about which site should be protected.

- **Performance/Product:** Use data and persuasive techniques to make a case for protecting a certain site in Prince William sound. You must submit a Cost-Benefit Analysis chart reflecting all stakeholders’ perspectives as well as a written proposal advocating for your site recommendation.

  Ms. Julie Martinek
TOOL #2:
PBL’S DRIVING QUESTIONS
Tool #2: PBL’s Driving Questions

Types of Projects/Questions
1. Solving a Real-World Problem
2. Meeting a Design Challenge
3. Exploring an Abstract Question
4. Conducting an Investigation
5. Taking a Position on an Issue

*These questions are open-ended, thought-provoking/engaging, raise additional questions and spark inquiry, require support and justification (not just an answer), and are worthy of debate or discussion.*

Buck Institute for Education, 2015
Example 2: Scientific Investigator

- Driving Question: How can we investigate the validity of a claim?
- Transfer Goal: Develop an investigation to test a claim
- Possible Knowledge and Skills to be acquired:
  - Knowledge: aspects of an investigation, elements of a quality report/presentation, jobs of lab investigators
  - Skills: be able to develop a quality report or presentation
- Task: The Pooper Scooper Kitty Litter Company claims that their litter is 40% more absorbent than other brands. You are a Consumer Advocates researcher who has been asked to evaluate their claim. Develop a plan for conducting the investigation to determine the accuracy of the kitty litter company’s claim. Your plan should be specific enough so that the lab investigators could follow it to evaluate the claim. You should also prepare a presentation or report that will clearly communicate your findings to potential consumers.
- Source: McTighe, 2013
For Both Tools - Authenticity Four Ways

<table>
<thead>
<tr>
<th>1) <strong>Context</strong> (e.g., what kinds of problems do historians solve?)</th>
<th>2) The use of <strong>real world processes, tasks, tools, and quality standards</strong> (e.g., what level of precision is necessary when designing a scientific experiment?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3) <strong>Impact</strong> on others (e.g. how might these findings help improve society?)</td>
<td>4) <strong>Personal authenticity</strong> (e.g. how does the media impact how my family perceives important issues?)</td>
</tr>
</tbody>
</table>

Buck Institute for Education, 2015
What’s your Plan?

Think about the alternate assessment examples you examined in both groups. What are you most likely to use? How (with what topics) and when (in the curriculum)? Take some time to record ideas.
Answer the following:

Plans for assessment – MC pie chart
The Models

• One Teach/One Support
• One Teach/One Gather Data
• Station Teaching
• Team Teaching
• Parallel Teaching
• Alternative Teaching
Parallel Teaching

- This classroom model has the students in 2 groups that gather at opposite sides of the room.
- Students are divided into mixed-readiness groups, both teachers coordinate to present the same material or skills (*NOTE: We modified this to “present different material; then students switch.”*)
- Sometimes, the teachers do identical work (e.g., test review), and sometimes different (e.g., different texts, two different strategies).
- +/-
  - more chances for students to participate
  - good for review and test practice
  - classroom noise
  - requires extensive planning time/shared expertise
Each Teacher Takes Half the Class: Heterogeneous OR Homogeneous According to Readiness OR Homogeneous According to Interest
LOGISTICS AND MANAGEMENT
Answer the following question:

Biggest classroom management roadblock – Word Cloud
LEARNING MENUS

Learning Menus outline a variety of instructional options targeted toward important learning goals. Students select and complete the assignment options that most appeal to them.

Book: pp. 253-262
Last’s delicious fractions restaurant menu

**Appetizer**
- **Bruschetta** - Whole class discussion about writing word problems for fraction division

**Main (Complete both)**
- **Sirloin Steak** - Lesson 8.5 writing word problems
- **Herb-encrusted breaded Fish** - Chapter 8 Review/Test

**Side dishes (Choose two)**
- **Green beans** - Dividing fractions worksheet
- **Lightly Roasted Asparagus** - Enrichment 8.5
- **Roasted Rosemary Potatoes** - [Khanacademy video](#) on dividing fractions
- **Whipped potatoes** - Pie picture worksheet (in pairs)
- **Tricolor Salad** – Standards practice 8.5

**Dessert (Choose one)**
- **Chocolate mouse** - Use Scratch to code a model for a dividing fractions problem
- **Ice cream Sundae** - Write a worksheet of dividing fractions problems based on food/sport/music
  - **Fruit salad** - Design a poster explaining how to divide fractions
  - **Pecan Pie** – Design a PowerPoint presentation explaining how to divide fractions.
How a Menu Works

- The teacher articulates learning goals and creates a “menu” of tasks (appetizers, main dishes, sides, and desserts)
- In most cases, students are assigned some (or all) of the Main Dishes, but they can typically choose their appetizers, side dishes, and desserts
- The menu’s design works best when each side dish addresses the same learning goals as the other side dishes (same principle applies to appetizers and desserts).
What it’s Good For

- Menus usually encompass what students will be doing over a period of time in the classroom – perhaps over the course of a whole curriculum unit – rather than in a single lesson.
- Menus can be used as sense-making supplements to whole class instruction (e.g., students move to menu work after a lecture/discussion).
- Menus can also serve as anchor activities (i.e., students move to menu work after completing other assigned tasks).
- Menus can serve as summative performance assessments, if designed as such (e.g., with a rubric that contains assessment criteria for every important learning goal).
The Courses

- **Appetizers**: Opening activities that can serve as “hooks” for the menu. They may be introductory videos, readings, or tasks.

- **Main Dishes**: Core tasks that you want all students to complete.
  - *The main dishes section could look the same for every student in the class, OR*
  - *There could be more than one version of a learning menu with different main-dish tasks on each version*

- **Side Dishes**: Tackle new objectives OR to deepen/expand the investigation of the main-dish objectives. Students select a specified number of side dishes (e.g., select 2 from a list of 4), generally based on interest or learning profile preferences.

- **Desserts**: Tasks that students will be very motivated to complete
  - *Appealing, engaging tasks that tap into students’ interests*
  - *May be enrichment activities that allow students to explore an area of interest not usually covered in the core curriculum.*
Tips for Success

■ Don’t be afraid to pull appropriate tasks from textbooks or other associated resources

■ For all four “courses”...
  – ...tasks can require students to work individually, in small groups, or with the teacher
  – ...the teacher can tailor choices to different readiness levels

■ Consider - and gather, if necessary - resources (including technology) that might be necessary for students to succeed in each step

■ Create a checklist for or rubric to ensure student success on the menu. If the menu is used as an assessment, create a more formal rubric that attends to the following:
  – Criteria should focus on students’ grasp of objectives (learning goals) rather than on the products they create
  – Descriptors should communicate what “Expert-,” “Developing-,” and “Novice-” levels of performance would entail.
Alternative Station

- **Get Help:** Talk with Angela about content-specific ideas for menus, ideas for resources, how to use a menu to serve as a compliment to a lab, etc.
  - and/or

- **Examine TriMind:** A framework for designing choices in the side dishes or desserts. System that helps you develop three assignment options aligned to creative, analytical, & practical thinking. All 3 options cause students to wrestle with the same learning goals. Based on the work of Robert Sternberg *(p.216-222).*
The Models

• One Teach/One Support
• One Teach/One Gather Data
• Station Teaching
• Team Teaching
• Parallel Teaching
• **Alternative Teaching**
Alternative Teaching

- This classroom model is used when small groups of students are taught by one teacher in the back of the room while the majority of students are in the main group of student desks.

- The teacher varies the small group make up so as not to stigmatize one learning group.

*Good when some students have missed critical content or to provide an enrichment activity; good for pre-teaching or re-teaching; good for gathering assessment data from small groups of students.*

- Both teachers lead, share responsibility for small designing the assessments, analyzing the assessment results, etc.

- +/ -
  - + Students have multiple chances to participate/autonomy
  - + Capitalizes on shared expertise of teachers
  - - Must vary what the station is used for or it can be stigmatizing.
Small Group is Homogeneous According to NEED for that Day (re-teach/missed class)

Doubet & Hockett (2017)
Please Break into TRIOS.

Thank You!
How do I get my Groups to Produce Quality Work?

- Detailed task cards/recordings/screens
- Something PRODUCED in group
- Interdependence/accountability
- Self-Check rubrics/grading criteria
- Between group peer checking
- Something to move to when we’re finished (so there’s not incentive to rush)
- System for asking for and receiving help

Doubet & Hockett - ASCD - 2015
Amelia Worthington (HS) – Louisville, KY

Colored Orbs hang over groups of desks to enable the teacher to group her HS students easily.

She often hands them the correct color popsicle stick when they enter to send them to their groups.

They record answers on the white board using corresponding colored markers.

She can also call on groups randomly using the colored popsicle sticks.
Mamaroneck High School in New York

- **Index** Cards with color-coded names taped or in clear photo frames
- Easy to stack cards with different classes behind one another
- Serves as a signal

Photo Cred: Jessica Hockett
Getting Help During Group Work
**Rules for Using Talking Chips**

1. Each student or group gets a certain number of chips (e.g., 3)

2. 1 chip = 1 opportunity to make a point, pose a question to the group, etc.

3. During a group discussion, you must use all of your talking chips.
   - When you’re out, you’re out.
   - If more than one student begins to speak at the same time, yield to the person with the most chips.
QUESTION CHIPS

Rules for Using Question Chips

1. Each student or group gets a certain number of chips (e.g., 3)

2. 1 chip = 1 opportunity to ask the teacher a question; when you’re out, you’re out!

3. During group or independent work, students must decide if they need the teacher to answer their question. If they can figure it out together or ask another student/group for help, they should “reserve” their chip for a situation that seems more “urgent.”

From: Doubet & Hockett (March 2015) Strategies for Differentiation in Middle and High School. ASCD.
Green = We’re good to go!

Yellow = We need you over here, but we can continue working!

Red = S.O.S. We need you here right now, and we’ve stopped working!

COLORED CUPS FOR MANAGING GROUPS

You can post a sign like this in the room to teach students how to use the system.

Place cups on desks prior to the start of the period to “signal” students that they will be doing group work.
Group Work Guru

- [http://padlet.com/doubetkj/groupwork](http://padlet.com/doubetkj/groupwork)

- Follow the instructions on the screen. You will read, watch, and examine materials... and then report your findings to those who competed different Padlets.
TIME!!!

- [http://padlet.com/doubetkj/TIME](http://padlet.com/doubetkj/TIME)

- Follow the instructions on the screen. You will read, watch, and examine materials... and then report your findings to those who competed different Padlets.
Peer Relationships/Getting Along in Groups

- [http://padlet.com/doubetkj/community](http://padlet.com/doubetkj/community)

  - Follow the instructions on the screen. You will read, watch, and examine materials... and then report your findings to those who competed different Padlets.
Co-Teaching Models
MODELS OF CO-TEACHING

Structures for organizing the classroom, students, and interactions between the two teachers for one or more lessons in a co-teaching situation

Doubet & Hockett (2017)
The Models

- One Teach/One Support
- One Teach/One Gather Data
- Station Teaching
- Team Teaching
- Parallel Teaching
- Alternative Teaching
<table>
<thead>
<tr>
<th>Model</th>
<th>Symbol</th>
<th>Description</th>
<th>Good for</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Teaching/One Supporting-Assisting All</td>
<td>![emoji]</td>
<td>Students remain in a single group. One teacher leads instruction as the other teacher briefly interacts with students individually, answering their questions, reinforcing concepts, refocusing attention, and so on.</td>
<td>Little time to plan; when there needs to be one whole-group lesson (introducing a new concept; translation; when need for “intercepting”)</td>
</tr>
<tr>
<td>One Teaching/One Observing [Gathering Data] Aces</td>
<td>![emoji]</td>
<td>One teacher leads instruction; one teacher gathers observational data on one student, one group of students, or the entire class.</td>
<td>Collecting data for RtI, for IEPs. Assessing students. Problem-solving. Observing group work (or other work)</td>
</tr>
<tr>
<td>Parallel Teaching 2s</td>
<td>![emoji]</td>
<td>Students are divided into two groups, and each teacher works with a group. Sometimes, the teachers do identical work (e.g., test review), and sometimes they present instruction in two different ways (e.g., content at different reading levels, two different strategies for multiplication).</td>
<td>Providing different models/examples, when taking differentiated approaches, two group discussions, when you need smaller T-S ratio with a mini lesson</td>
</tr>
<tr>
<td>Station Teaching 3s</td>
<td>![emoji]</td>
<td>Students rotate through two or more stations; each teacher facilitates a station while other stations are independent.</td>
<td>Daily Five; Language Stations following WH lesson; interconnected math stations</td>
</tr>
<tr>
<td>Team Teaching 4s</td>
<td>![emoji]</td>
<td>Students remain in a single group and the teachers co-instruct, integrating their contributions throughout a lesson through modeling, demonstrations, or role-plays.</td>
<td>Independent – SG work set-up; science labs; math; showing “the mind of the students”</td>
</tr>
<tr>
<td>Interactive Teaching 4s</td>
<td>![emoji]</td>
<td>Both teachers teach together simultaneously (Ping-Pong).</td>
<td></td>
</tr>
<tr>
<td>Alternative Teaching 5s</td>
<td>![emoji]</td>
<td>Most students remain with one teacher, while the other teacher instructs a small-group for re-teaching, assessment, enrichment, extension, pre-teaching, or another purpose.</td>
<td>When students have been absent; opt-in based on interest or self-assessment</td>
</tr>
<tr>
<td>♡</td>
<td>• Which strategy has the most potential to be engaging to students?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>🎲</td>
<td><img src="image" alt="Dice" /></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>😞</th>
<th>• Which strategy has the most potential to encourage students to foster independence?</th>
</tr>
</thead>
<tbody>
<tr>
<td>🎲</td>
<td><img src="image" alt="Dice" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>⚽️</th>
<th>• Which strategy seems the easiest to implement (in terms of time, materials, management, etc.)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>🎲</td>
<td><img src="image" alt="Dice" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>🤔</th>
<th>• Which strategy seems the most difficult to implement (in terms of time, materials, management, etc.)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>🎲</td>
<td><img src="image" alt="Dice" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>🎁</th>
<th>• How might you change or adapt one of these strategies to make it a better fit for your students?</th>
</tr>
</thead>
<tbody>
<tr>
<td>🎲</td>
<td><img src="image" alt="Dice" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>💪</th>
<th>• Taking pros and cons into consideration, which strategy is strong enough that I’m willing to invest time and energy in order to implement it (even if later)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>🎲</td>
<td><img src="image" alt="Dice" /></td>
</tr>
</tbody>
</table>
THINKDOTS

• A versatile interactive strategy for engaging students in small-group discussion and sense-making

*Doubet & Hockett Book: pp. 137-140*
## Test/Concept Review

<table>
<thead>
<tr>
<th>Explain It</th>
<th>Interpret It</th>
<th>Apply It</th>
</tr>
</thead>
<tbody>
<tr>
<td>How is ______ connected to _________? Give examples.</td>
<td>How would you explain _________ to an audience of _________?</td>
<td>Who uses _________? Why?</td>
</tr>
<tr>
<td><strong>Have Perspective On It</strong></td>
<td><strong>Empathize With It</strong></td>
<td><strong>Know What You Know About It</strong></td>
</tr>
<tr>
<td>Prove or provide evidence that ________________</td>
<td>What are some common misconceptions that _________ have about___________?</td>
<td>How has your understanding of ______________ changed since _________?</td>
</tr>
</tbody>
</table>
### Ecosystem ThinkDots

<table>
<thead>
<tr>
<th>What would happen if the top of this food chain disappeared? What would happen to the rest of the organisms? Diagram and/or write about how removing the top of the food chain affects the equilibrium of the system.</th>
<th>Compare this food chain to another system we’ve discussed in class (a band, our bodies, a dance team, etc.). How is the food chain like this system? How is it different? How do all the parts depend on each other in both systems?</th>
<th>How is this food chain like our own food chain? Think about what you eat on a typical day. What would happen if all of those food sources disappeared? What kinds of food would you have to eat to survive? How would this affect your environment?</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do you think is the most important part of this food chain? Why do you think so? Explain your answer using both words and pictures.</td>
<td>What do you think is the most important part of this food chain? Take on the voice of this animal and explain to the rest of the food chain why you are the most important. You can use words and/or pictures.</td>
<td>Find a way to explain to your younger brother, sister, cousin, or neighbor why your food chain is so important. Explain the parts and how they interact. Use both words and pictures in your explanation.</td>
</tr>
</tbody>
</table>
**Lunar Phases ThinkDots**

<table>
<thead>
<tr>
<th>Explain</th>
<th>Interpret</th>
<th>Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain what causes the different phases of the moon.</td>
<td>How would you describe the appearance of the moon during each phase of a lunar eclipse using NEW terms (other than waxing, waning, gibbous, crescent, etc.)?</td>
<td>How would you illustrate the relative positions of the moon, earth, and sun during each of the lunar phases in a way that elementary students would understand?</td>
</tr>
</tbody>
</table>

**Demonstrate Perspective**

What misconceptions might people have about what causes lunar phases and why might they carry those misconceptions?

**Display Empathy**

How would you explain the differences between the lunar phases and lunar eclipses to someone who is confused about their causes and/or believes they are the same?

**Self Reflect**

How have you grown in your grasp of the lunar phases? What was the most complicated aspect for you to fully understand?

Based on Wiggins & McTighe’s “Six Facets of Understanding”
**EQUATION THINK DOTS**

- The teacher can write one problem on the board for everyone to use (undifferentiated)
- The teacher can give a different problem to each small group, or write different problems on the backside of each card, differentiated for each group (should use formative assessment evidence to decide on different problems).
- Can be used as sense-making after the intro of a new concept/problem type, as a review, or as part of a homework check.

<table>
<thead>
<tr>
<th>Solve this problem. What was easy about it? Not so easy?</th>
<th>Create and solve a problem similar to this problem.</th>
<th>What’s one question someone should ask themselves when they first look at this problem?</th>
</tr>
</thead>
<tbody>
<tr>
<td>What’s a mistake that someone might make in trying to solve this problem? Why might they make that mistake?</td>
<td>What mathematical concepts or terms/vocabulary does this problem show? Be specific!</td>
<td>Write a step-by-step set of directions that tells someone who was absent today how to solve this problem.</td>
</tr>
</tbody>
</table>

Portions Adapted from Carol Tomlinson