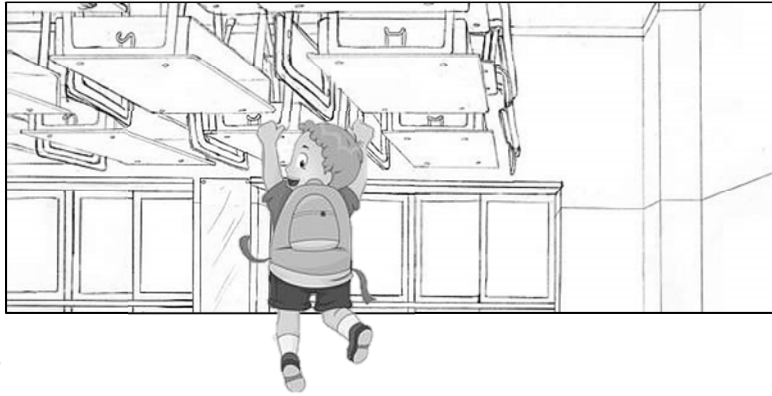


Flipped Classrooms

Don't Leave Them Hanging



What flipped classrooms are

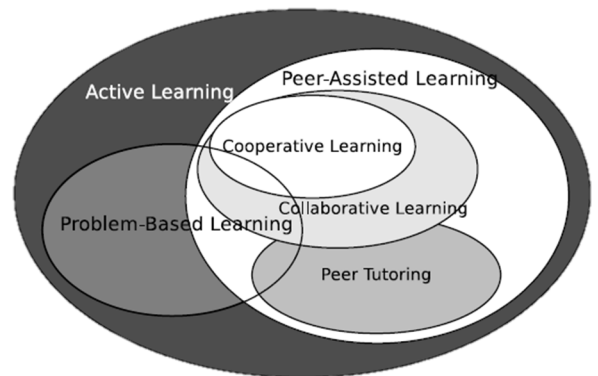
- Flipped classrooms are opportunities to reallocate valuable and limited in-class time to focus on contact between learners and between learners and instructors.
- They allow for better personalization of learning by granting learners direct access to lecture materials in the out-of-class environment. These materials may be paced and reviewed according to individual preference.
- Flipped classrooms utilize active learning strategies to apply, evaluate, and synthesize knowledge within the classroom space in conjunction with peers and under the guidance of instructors.

What flipped classrooms are not

- Flipped classrooms are not merely online courses. Learning materials are not just ported to an out-of-class platform.
- They do not lead to a technological replacement of teachers.
- They are not best served by design based solely on instructor intuition and experience.

Theories at play behind flipped classrooms

- Many roots in the theories of Piaget (Constructivism) and Vygotsky (Zone of Proximal Development)
- Relies heavily on active learning
 - Without the student-centered problem-based and peer-assisted learning theories, flipped classrooms do not exist (Bishop & Verleger, 2013).
- Also involves
 - Cognitive load theory
 - Motivation theory (intrinsic & extrinsic)
 - Self-efficacy theory
- ID Theories/Models (could be several)
 - ADDIE (<https://ohiostate.pressbooks.pub/flippeddesign/chapter/using-instructional-design-to-flip-the-classroom/>)
 - First Principles of Instruction (Lo & Hew, 2017)
 - Custom models (Lee, Lim, & Kim, 2017)



(Bishop & Verleger, 2013)

Implementing a flipped classroom *(see also tips that follow)*

- Out-of-class activities
 - Provide concise, targeted learning materials that learners may access at home to acquire the knowledge necessary to interact effectively during the in-class portion of class.
 - Evaluate and order (e.g., Bloom's taxonomy) your learning objectives for a single lesson
 - Include lower level cognitive material (e.g., remember, understand) in the out-of-class materials.
 - Presentation format is typically video instruction (see tips below).
 - Each video should cover a single topic and not exceed 10 to 15 minutes.
 - Interactive formats may include some closed-response quiz questions that can pre-inform the instructor about potentially troublesome topic areas, identify students that may need increased instructor attention during class time, and verify learner review of out-of-class materials.
- In-class activities
 - Provide opportunities for engaged, interactive learning that build upon and require application of the topics learned from the out-of-class materials.
 - May include some direct instruction of more technical or complicated material, but lectures must not be a primary component of the in-class sessions.
 - Usually involves some form of active learning (examples).
 - Audience response quizzes
 - Clicker questions.
 - Troublesome questions prompt discussion with neighbors and further attempts.
 - Pair and share activities
 - Rapid- Work in small groups to consider and answer in-class questions.
 - Reflective- Work in group across days to create presentation to answer a question.
 - Proactive- Alternate preparing discussion questions and hosting class discussions.
 - Student presentations
 - Groups prepare summary of reading to present to class.
 - Groups lead in-class discussion and answer student questions.

- Generation of novel material connecting class concepts and incorporating external material to “teach” to students in class.
- May combine multiple active learning methods for improved benefit.

Some flipping tips

- Use educational theory and evidence-based techniques as a foundation for your flipped classroom
 - Flipping is not just about using technology. Consider the essential elements of your course design.
- Ensure that both in and out-of-class activities use compatible instructional approaches
 - Mismatched approaches between settings may increase learning difficulties and learner dissatisfaction.
- Make the most of the positive aspects of the flipped classroom
 - Additional in-class time available to individualize education, integrate new topics, incorporate innovative methods.
- Predetermine the organization of your course material
 - Organize by cognitive complexity; Present lower level material in online format
 - Avoid just presenting all lecture material to learners online (cognitive overload)
 - Total time should not exceed total for traditional lecture (e.g., 150 min/wk. for 3 credits)
 - Out-of-class video length suggested as 1 to 1.5 minutes per grade level (10-15 min. max).
- “Buy-in” to your preferred pre-class activities
 - Video is not the only option
 - May include narrated PowerPoints, screencasts, interactive e-lectures, external web or video resources, Dropbox, social networking platforms, or even printed reading material.
 - Consider issues of accessibility, usability, and learner interest.
 - Multiple format choices may improve learner engagement through personalization.
- Use in-class time effectively
 - Interact with learners to receive real time feedback on performance and topic difficulties.
 - Learners may receive individualized attention as indicated by either pre-class questions or in-class performance.
- Prepare students for the experience
 - Do not just drop learner into a flipped environment.
 - Flipped classrooms are often perceived as lacking structure and guidance.
 - Use partial flipping (blending traditional and flipped) to ease learner discomfort.
 - Individual topics or modules may be flipped independent of others.

Things to be aware of

- Students tend to resist change and the unfamiliar structure and expectations of pre-class learning but once established, students tend to prefer the flipped classroom over traditional lecture formats (McNally et al., 2017).
- Highly motivated students tend to perform better in the flipped environment. Low achievers may be less engaged by and find pre-class videos more difficult (McNally et al., 2017).
- No significant performance differences have been found among pre-class lecture formats or delivery (e.g., video vs. narrated PowerPoint, televised vs. in person, virtual vs. interactive eLearning) which is “consistent with the theory that the medium is a carrier of content and unlikely to affect learning itself” (Clark as cited in DeLozier & Rhodes, 2017).
- Benefits of flipped classrooms may stem from the incorporation of active learning into otherwise traditional settings rather than the intrinsic act of flipping the content (Jensen, Kummer, & Godoy, 2015).

References

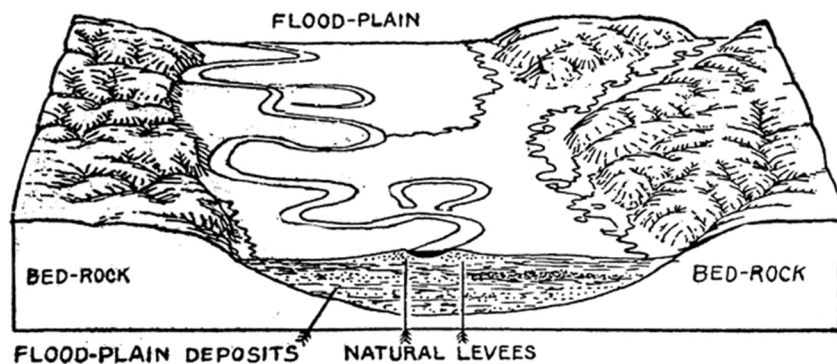
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Stream Restoration Worksheet

Prior to class, please watch all of the short videos found at the following link: <https://bit.ly/2OG5y1y>

Please watch the videos in order and as you do, **briefly** complete the following questions.

Video #	Questions
0 Introduction	No questions, just watch.
5 Stream Shape	What makes streams move?
	Why does it matter?
10 Floodplains	What is a floodplain?
	Why does it matter?
15 Erosion	What is erosion?
	Why does it matter?
	What can you do?
20 In-Stream Structures: Toe wood	What is toe wood?
	How is it beneficial?



https://newvitruvian.com/explore/stream-clipart-river-flooding/#gal_post_1260_flood-clipart-river-flood-6.gif

25 Bank Stabilization	What is bank stabilization?
	Why does it matter?
	What can you do?
30 and 35 Nutrients and Runoff	What is nutrient pollution?
	Why does it matter?
	What can you do?

40 Riffles and Pools	What are riffle and pools?
	How are they beneficial?
45 In-Stream Structures: Cross Vanes	What are cross vanes?
	How are they beneficial?
50 Trees	Why do trees matter?
	What do they contribute to healthy streams?
100 Restoration	What is the stream restoration process?



Stream Restoration- In-Class Worksheet

Problem Statement

North Beaumont is a small town (1200 residents) in rural Indiana. The town boasts a city park with a recreational lake that supports boating, fishing, and swimming. This lake is fed by Turtle creek, a small stream that runs north to south, adjacent to the main highway. The stream is flanked by pastureland to the west and cropland to the east. The family that owns this farmland has donated the pastureland to the town council for use in expanding the local park. They have also agreed to allow any necessary improvements to the adjacent cropland.

Turtle creek has a number of issues as illustrated in the provided images. The stream itself is shallow, with a heavy bed of sand and sediment, low overall biodiversity (as determined by an expert from the local university), and evidence of excess nutrient loading. The stream also floods extensively during heavy rains due to runoff from the roadway and the adjacent fields.

The town council would like to provide a stable, aesthetically pleasing waterway as part of the park expansion. Ideally this would include increased biodiversity and water quality as well as improved habitat for aquatic and terrestrial wildlife. They have consulted with you as young environmental scientists for suggestions on what might be done to improve the overall quality of Turtle Creek as part of the park expansion. They have not provided any budgetary information and are primarily looking for ideas that could address the existing problems with the stream.

Working together as a group use what you have learned from the video series to assess the current situation and suggest a possible restoration approach for this stream. You may illustrate your improvement plans on the attached Aerial View Worksheets.

Not sure how to get started? Consider the overall Stream Restoration Process:

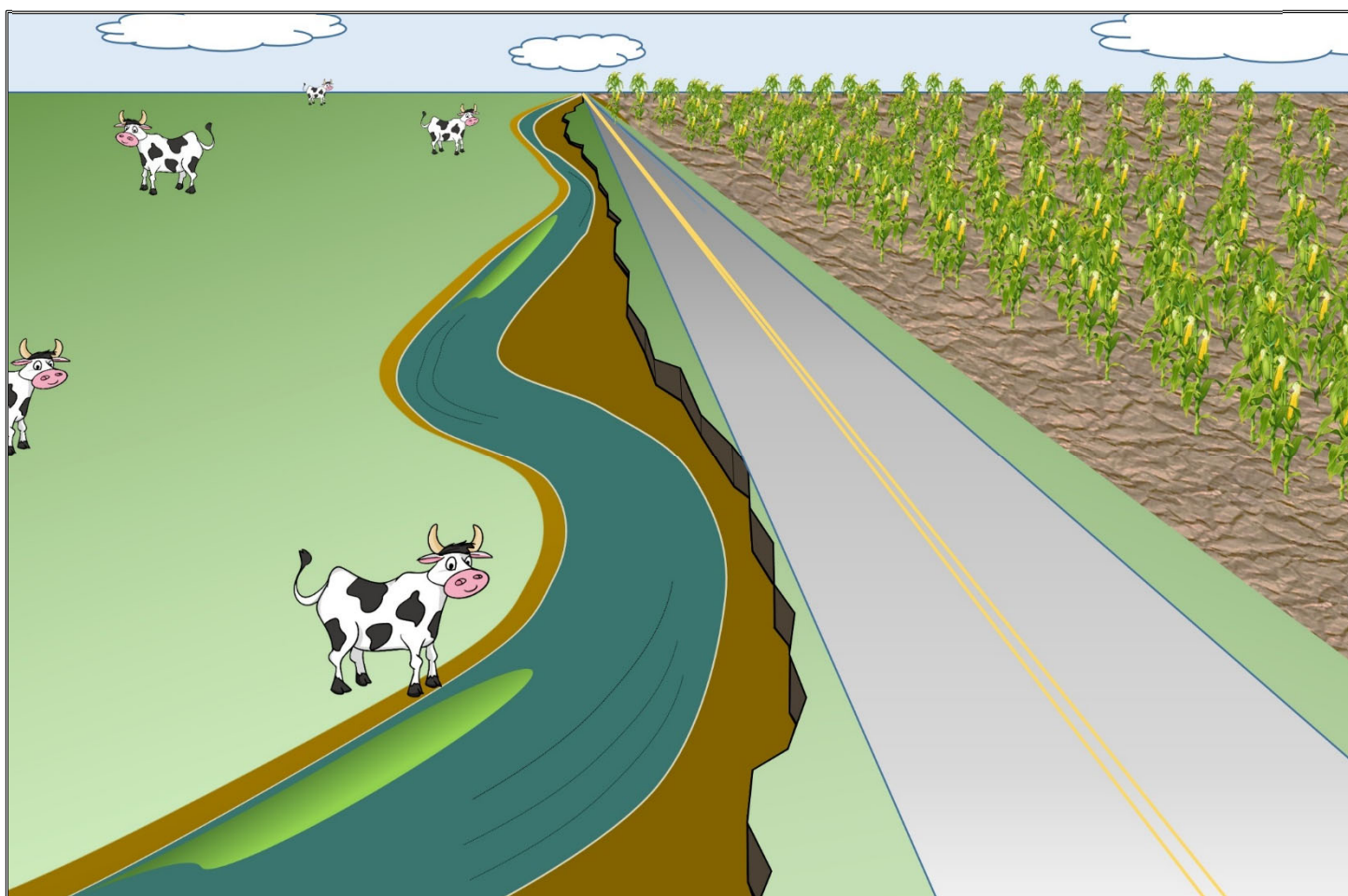
- You need to
 - Define your _____
 - _____ the stream
 - Determine the best _____ of _____

then (if needed)

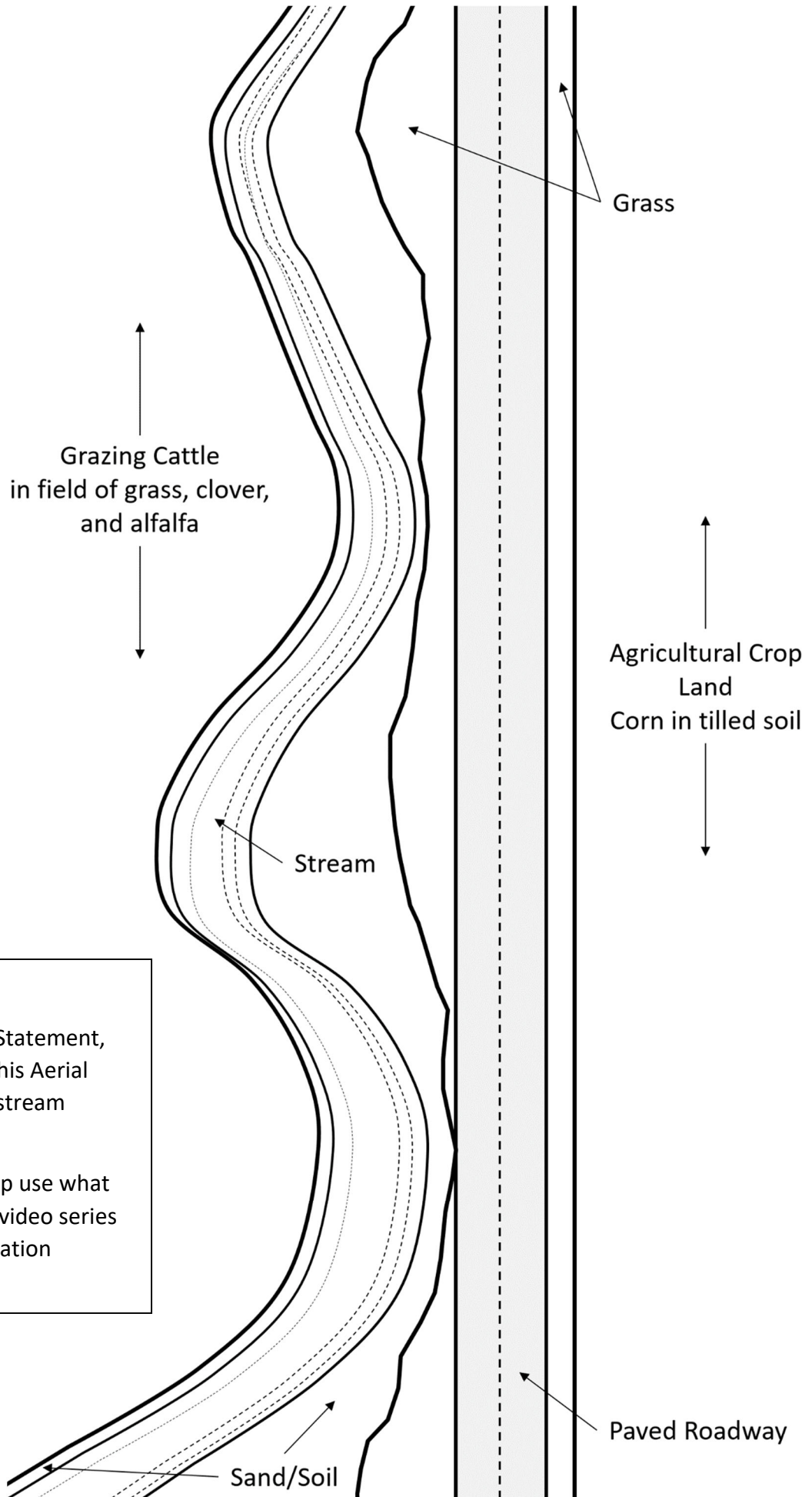
- _____ the _____ and floodplain
- Build _____ structures
- Protect the _____

This should set the stage for what to do next. Also, refer to the worksheet you completed before class.

Color Illustration (view as you leave town (facing north), with the stream flowing toward you)



Aerial View

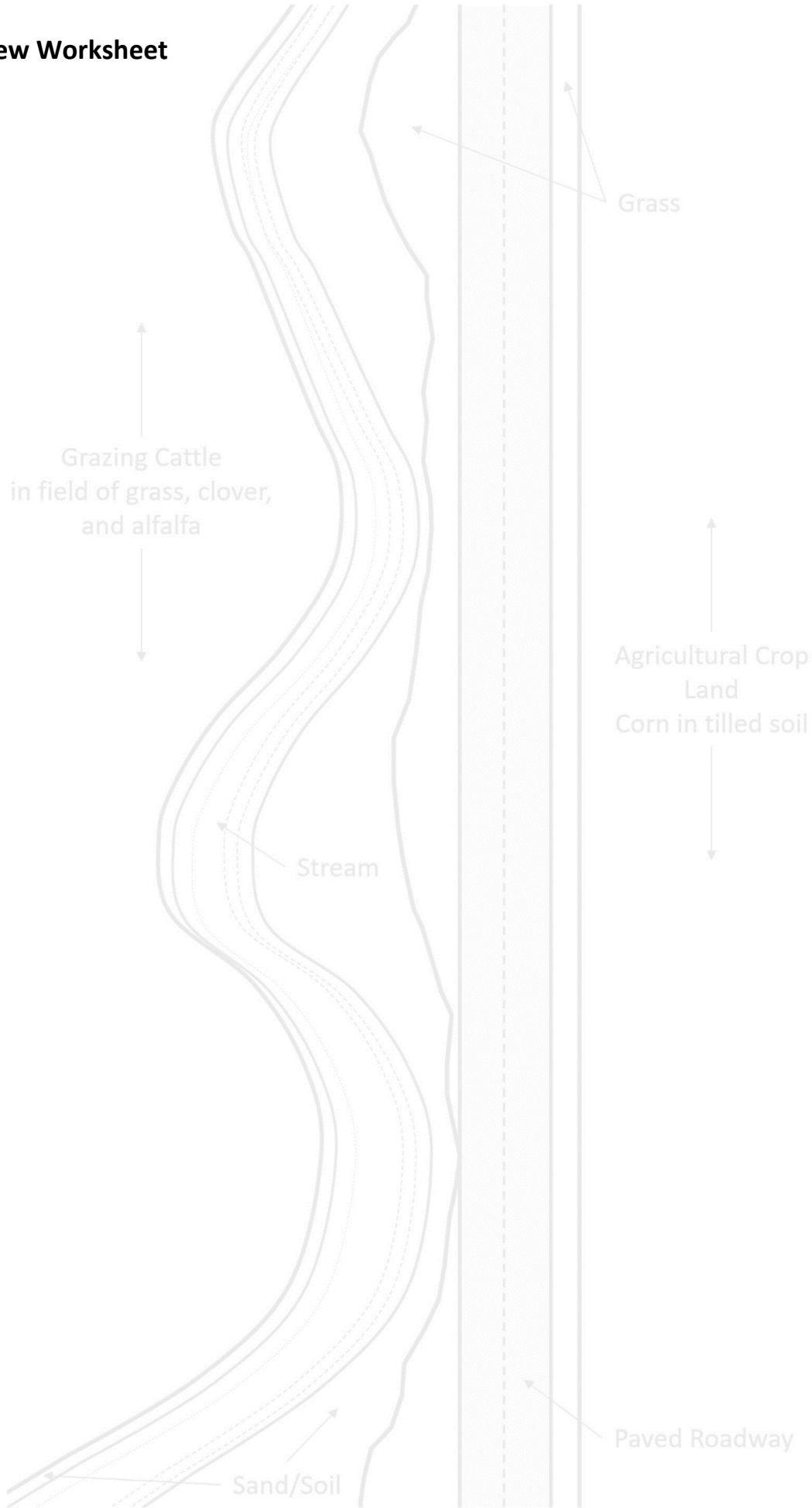


Instructions:

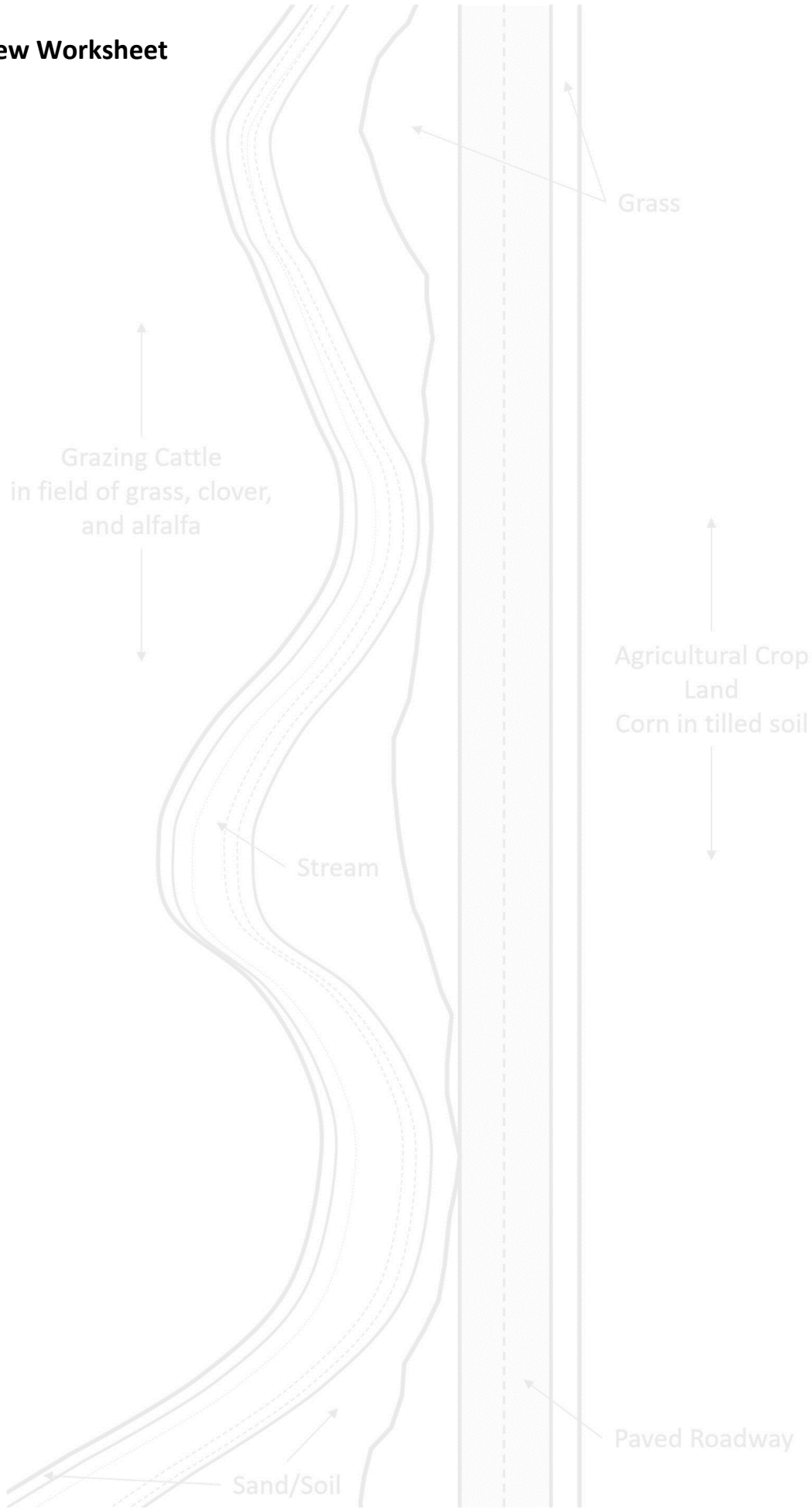
Use the provided Problem Statement, the Color Illustration, and this Aerial View to assess the current stream situation.

Working together as a group use what you have learned from the video series to suggest a possible restoration approach for this stream.

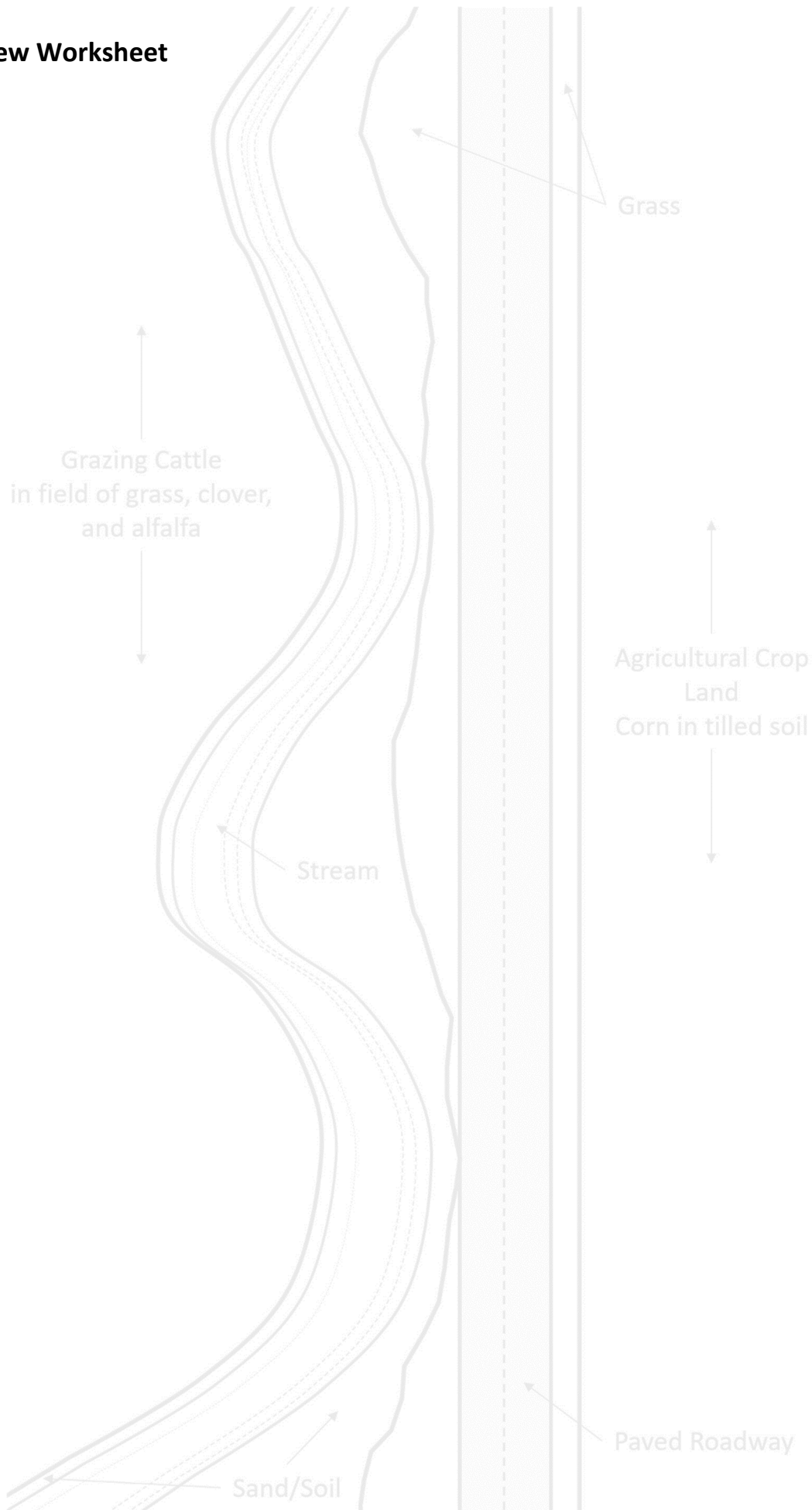
Aerial View Worksheet



Aerial View Worksheet



Aerial View Worksheet



The background of the slide features a light blue to white gradient. It is decorated with several realistic water droplets of various sizes, some with highlights and shadows, scattered across the top and bottom edges.

FLIPPED CLASSROOMS

AMY DUNFORD

NATHAN HILLIARD

ORGANIZATION

- CASE STUDY ACTIVITY (40 MINUTES)
- GROUP REFLECTION (5 MINUTES)
- PRESENTATION/DISCUSSION
- FLIPPED CLASSROOM INTRODUCTION
- HOW DOES THEORY FIT IN?
- PAIR DISCUSSION
- FINAL THOUGHTS

BUT FIRST

- LOCAL EFFECTS OF STREAM BANK EROSION
- THE LAUNCH APARTMENTS, WEST LAFAYETTE, IN



CASE STUDY

- 40 MINUTES
- TWO GROUPS
 - TADD, YISHI, SALLY, ZUI
 - MOHAN, DAMJI, HOLLY, ADRIE
- REVIEW THE IN-CLASS WORKSHEET
 - WORK TOGETHER TO PROPOSE A JUSTIFIABLE SOLUTION TO THE DESCRIBED PROBLEM
 - USE THE SUPPLIES PROVIDED TO MAKE YOUR CASE
- FEEL FREE TO ASK QUESTIONS


The background of the slide is a light blue gradient. It is decorated with several realistic water droplets of various sizes, some with highlights and shadows, giving them a 3D appearance. The droplets are scattered across the top and bottom edges of the slide.

ACTIVITY REFLECTION

- DISCUSS AS A GROUP (5 MINUTES)
 - HOW DID THE ACTIVITY GO?
 - HOW APPROPRIATE WAS THE CONTENT PROVIDED FOR OUT-OF-CLASS LEARNING?
 - WAS THE OUT-OF-CLASS WORKSHEET HELPFUL?
 - HOW DOES THIS COMPARE TO AN EQUIVALENT 30 TO 40 MINUTE LECTURE?



PRESENT YOUR DESIGN SOLUTIONS

- WHAT PROBLEMS DID YOU IDENTIFY?
 - DESCRIBE YOUR PROPOSED SOLUTION
 - WHY DO YOU THINK YOUR SOLUTION IS APPROPRIATE?
- 

The background is a light blue gradient, darker at the bottom. It is decorated with several realistic water droplets of various sizes, some with highlights and shadows, scattered across the top and bottom edges.

REFLECTIONS

- SHARE YOUR EXPERIENCES

BRIEF INTRODUCTION TO FLIPPED CLASSROOMS



<https://www.youtube.com/watch?v=iQWvc6qhTds>

The background of the slide is a light blue gradient. It is decorated with several realistic water droplets of various sizes, some with highlights and shadows, giving them a 3D appearance. The droplets are scattered across the top and bottom edges of the slide.

HOW DOES THEORY FIT IN

- WHAT KINDS OF THEORY SUPPORT THE IDEA OF FLIPPED CLASSROOMS?
- WHAT ABOUT INSTRUCTIONAL DESIGN THEORY?
- ARE THERE ID THEORIES THAT WOULD NOT WORK FOR A FLIPPED CLASSROOM APPROACH?
 - WHY?

PAIR DISCUSSION

- PAIR UP WITH A NEIGHBOR (10 MINUTES)
 - HAVE EITHER OF YOU USED A FLIPPED APPROACH FOR YOUR OWN CLASSROOM?
 - IF SO, WHAT WAS YOUR EXPERIENCE? HOW WAS IT RECEIVED?
 - WHAT PROBLEMS DID YOU ENCOUNTER OR WOULD YOU EXPECT AS A RESULT?
 - HOW DID YOU OR WOULD YOU DEAL WITH THESE PROBLEMS?
 - IF YOU HAD TO SELL THE FLIPPED CLASSROOM TO YOUR STUDENTS, HOW WOULD YOU DO THAT?
 - IS THIS A TECHNIQUE YOU ARE LIKELY TO USE IN THE FUTURE? WHY?
- SHARING

TIMELINE

- 1:30 START/ANNOUNCEMENTS
- 1:35 INTRODUCTION/ADVANCED ORGANIZER
- 1:38 PRIOR TO START, EXAMPLE OF CURRENT RELEVANCE OF STREAM QUALITY
 - BANK EROSION AT WEST LAFAYETTE APARTMENT COMPLEX
- 1:40 DISTRIBUTE IN-CLASS WORKSHEETS AND MATERIALS
 - DIVIDE INTO GROUPS
- 1:45 START ACTIVITY
 - WORK ON DESIGN
 - ASK QUESTIONS
- 2:25 REFLECTION
 - HOW DID THE ACTIVITY GO?
 - HOW APPROPRIATE WAS THE CONTENT PROVIDED FOR OUT-OF-CLASS LEARNING?
 - WAS THE OUT-OF-CLASS WORKSHEET HELPFUL?
 - HOW DOES THIS COMPARE TO AN EQUIVALENT 30 TO 40 MINUTE LECTURE?
- 2:30 PRESENT DESIGN IDEAS
- 2:35 DISCUSS REFLECTIONS
- 2:45 SHORT VIDEO INTRO ON FLIPPED CLASSROOMS
 - [HTTPS://WWW.YOUTUBE.COM/WATCH?V=IQWVC6QHTDS](https://www.youtube.com/watch?v=IQWVC6QHTDS)
- 2:47 DISTRIBUTE FC HANDOUT, OVERVIEW
- 2:50 DISCUSSION ON THEORY
- 3:00 PAIR DISCUSSION
 - EXPERIENCES AND PROBLEMS WITH FLIPPED CLASSROOMS
 - HOW DO YOU SELL AND WOULD YOU USE?
- 3:10 SHARING
- 3:25 FINISH