T3 Flipping Math/Science

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T3 Flipping Math/Science

Please Read and watch Video below:

**Flipping Math/Science** gives LCISD teachers an introduction to the ins and outs of teaching with a flipped or hybrid classroom. At the end of the T3 you should have:

- Knowledge of the basics of flipped or modified flip classes.
- Learned how to develop the online (video lecture) content, as well as in class active learning activities for the flipped classroom
- Reflected on and thought about how to organize your course for a flipped environment, and
- Accumulated a toolbox of strategies for designing and assessing both the students' learning experience as well as your teaching.

This class is taught Flipped to give you experience with the tools and learning methods that can help your students succeed in this type of learning environment.
• Start Here - Course Information & Orientation
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Discussion

Please introduce yourself and let us know about your interest in flipping.

Use this introductory discussion to post an introduction about yourself. Please include in your introduction:

- A little bit about yourself and where you are from
- Why you are interested in the flipped classroom
- What you hope you will learn in this course
About You Survey

Due No due date   Points 0   Questions 9
Time Limit None

Instructions
Please take 5 minutes to tell us more about you and why you are taking T3 Flipping Math/Science.

This is optional. However, all results will be kept confidential.

Take the Survey

Previous
Next
Concerns about Flipping - and How to handle them.

TRACEY JENSEN

Post any concerns you have about flipping.

Please give feedback to other posts.
FLIPPED CLASSROOMS

Scenario
For the past two weeks, Kyle has been taking a flipped course in designing food gardens. Before he attends each class, he watches videos of short lectures recorded or recommended by his instructor. Each lecture comes with a brief online quiz that offers him immediate feedback on whether he missed any essential points. Today as he enters class, he glances at the schedule on the whiteboard. For the first hour, teams will discuss how the content of the video lectures on microclimates, insect predation, and disease control will inform their team projects. Professor Dalton circulates among the tables to see if anyone has questions.

Kyle’s team will be repurposing an area the size of an urban backyard into a visually appealing garden that it also a functional food source. It’s part of the larger class project to reclaim a strip of city land by building a demonstration food garden. “I think we should bring in disease-resistant blueberries, grapes, and some fruits,” says Colin, looking at the rough drawings they have made so far. Dalton stops to look over their design. “Check the nursery catalogs on the front table,” he suggests. “Disease-resistant strains are clearly marked in their listings.” As they search the catalogs and discuss which diseases might be a problem in dwarf apples, pears, blueberries, and grapes, Kyle enters their cultivar choices in their Google Docs space. They are turning to a discussion of microclimates and plant placement when a chime signals discussion is over.

In the second half of the class, the team monitors each retrieve two flat boxes from the front of the class. One box contains a stack of pins and various leaves preserved in plastic. The second box has a foam insert topped by a paper grid; each square is labeled with a nutritional deficiency or a disease common to food plants. During the next half hour, each team is to identify the disease or nutritional deficiency and pin the correct leaf in the right spot on the grid. Dalton is on hand, directing attention to clues and sometimes challenging their choices.

As he leaves, Kyle reflects that the hands-on activities have given him a far better grasp of the information and more confidence in what he has learned than he could have gotten from an in-class lecture.

What is it?
The flipped classroom is a pedagogical model in which the typical lecture and homework elements of a course are reversed. Short video lectures are viewed by students at home before the class session, while in-class time is devoted to exercises, projects, or discussions. The video lecture is often seen as the key ingredient in the flipped approach; such lectures being either created by the instructor and posted online or selected from an online repository. While a prerecorded lecture could certainly be a podcast or other audio format, the ease with which video can be accessed and viewed today has made it so ubiquitous that the flipped model has come to be identified with it.

The notion of a flipped classroom draws on such concepts as active learning, student engagement, hybrid course design, and course pedagogical. The value of a flipped class is in the repurposing of class time into a workshop, where students can inquire about lecture content, test their skills in applying knowledge, and interact with another in hands-on activities. During class sessions, instructors function as coaches or advisors, encouraging students in individual inquiry and collaborative effort.

How does it work?
There is no single model for the flipped classroom—the term is widely used to describe almost any class structure that provides prerecorded lectures followed by in-class exercises. In one common model, students might view multiple lectures of five to seven minutes each. Online quizzes or activities can be interspersed to test what students have learned. Immediate feedback and the ability to revise lecture segments may help clarify points of confusion. Instructors might lead in-class discussions or turn the classroom into a studio where students create, collaborate, and put into practice what they learned from the lectures they view outside class. As on-site experts, instructors suggest various approaches, clarify content, and monitor progress. They might organize students into an ad hoc workgroup to solve a problem that several are struggling to understand. Because this approach represents a comprehensive change in class dynamic, some instructors have chosen to implement only a few elements of the flipped model or to flip only a few selected class sessions during a term.

Who’s doing it?
A growing number of higher education individual faculty have begun using the flipped model in their courses. At Algonquin College, a video production class has been using this model to explain the workings of editing software, a procedure that is notoriously difficult to explain in a standard lecture. Short tutorial videos lectures let students move at their own pace, rewind to review portions, and skip through sections they already understand.
meaning students come to class able to use the software and prepare to do creative projects with their peers. A particularly successful example of a blended and flipped class in accounting at Penn State accommodates 1,300 students. In-class time is used for open discussion, a featured guest speaker, or hands-on problem solving where instructor support is supplemented by student assistants. At Harvard University, one physics professor not only employs the flipped model but has also developed a correlating site, Learning Catalytics, that provides instructors with a free interactive software enabling students to discuss, assess, and get feedback from what they hear in lecture.

**4** Why is it significant?

In a traditional lecture, students often try to capture what is being said at the instant the speaker says it. They cannot stop to reflect upon what is being said, and they may miss significant points because they are trying to transcribe the instructor’s words. By contrast, the use of video and other prerecorded media puts lectures under the control of the students; they can watch, rewind, and fast-forward as needed. This ability may be of particular value to students with accessibility concerns, especially where captions are provided for those with hearing impairments. Lectures that can be viewed more than once may also help those for whom English is not their first language. Devoting class time to application of concepts might give instructors a better opportunity to detect errors in thinking, particularly those that are widespread in a class. At the same time, collaborative projects can encourage social interaction among students, making it easier for them to learn from one another and for those of varying skill levels to support their peers.

**5** What are the downsides?

The flipped classroom is an easy model to get wrong. Although the idea is straightforward, an effective flip requires careful preparation. Recording lectures requires effort and time on the part of faculty, and out-of-class and in-class elements must be carefully integrated for students to understand the model and be motivated to prepare for class. As a result, introducing a flip can mean additional work and may require new skills for the instructor, although the learning curve could be mitigated by entering the model slowly.

Students, for their part, have been known to complain about the loss of face-to-face lectures, particularly if they feel the assigned video lectures are available to anyone online. Students with this perspective may not immediately appreciate the value of the hands-on portion of the model, wondering what their tuition brings them that they could not have gotten by surfing the web. Those who see themselves as attending class to hear lectures may feel it is safe to skip a class that focuses on activities and might miss the real value of the flip. Finally, even where students embrace the model, their equipment and access might not always support rapid delivery of video.

**6** Where is it going?

As the flipped class becomes more popular, new tools may emerge to support the out-of-class portion of the curriculum. In particular, the ongoing development of powerful mobile devices will put a wider range of rich, educational resources in the hands of students, at times and places that are most convenient for them. Greater numbers of courses will likely employ elements of the flipped classroom, supplementing traditional out-of-class work with video presentations and supporting project-based and lab-style efforts during regular class times. At a certain level of adoption, colleges and universities may need to take a hard look at class spaces to ensure they support the kinds of active and collaborative work common in flipped classes.

**7** What are the implications for teaching and learning?

The flipped classroom constitutes a role change for instructors, who give up their front-of-the-class position in favor of a more collaborative and cooperative contribution to the teaching process. There is a concurrent change in the role of students, many of whom are used to being cast as passive participants in the education process, where instruction is served to them. The flipped model puts more of the responsibility for learning on the shoulders of students while giving them greater impetus to experiment. Activities can be student-led, and communication among students can become the determining dynamic of a session devoted to learning through hands-on work. What the flip does particularly well is to bring about a distinctive shift in priorities—from merely covering material to working toward mastery of it.
Discussion

7 Things You Should Know About Flipping: Questions about the flipped classroom

Use this forum to discuss questions and share insights you have about the flipped classroom based on the introductory materials provided.
Bottlenecks

Think about where you have observed students "get stuck" or have learning "bottlenecks" in the class(es) you teach, or where you have experienced bottlenecks in your own learning if you are not currently teaching.

Talk to your partner about one of the following:

- Reflect on your course and think about the bottlenecks or other problem topics as you think about what to flip.
- Where would you like to improve what you currently do?
- Where do your students get stuck in your course, could you focus improvement on that area?
- Could flipping help student learning in particular areas or topics in your course?
Flipping Brainstorm

For 10 minutes, start brainstorming ideas for how your "flip" might look in your class or school.

- What should be face-to-face?
- What should be online?
  - What printed resources should you make available?
- What can you do to increase engagement of your students?
- Are you finding any resources that would benefit your class?

Do not worry about specific lessons just yet.

Talk with your partner. Remember, in brainstorming - there are no bad ideas!

Here is an open Diigo list of flipping the classroom resources many of which are open resources

Articles you may read
- Teachers Use Flipped Classroom Tech to Make the Most of Student-Teacher Time - EdTech Magazine.pdf
- eCampus News 20 NEW facts about Flipped Learning in higher ed - eCampus News.pdf

Post at least one idea on Discussion Board: Brainstorming Ideas for How to Flip Your Course
Brainstorming Ideas for How to Flip Your Course

Use this forum to brainstorm and share ideas for flipping your own course. In your post include some basic information about your course such as your discipline, a very brief description of your course, the level of your course, and number of estimated students in your course so that your peers have some context for when they provide feedback to your ideas.
Where do I get videos?

Prepared Videos
- Prepared Videos - List of resources
- Khan Academy Courses: Khan Academy
- Canvas Commons

Making your own videos:
- How I make Videos
- Planning/Creating Videos - Tools
- Ideas on Ways to Make Your Own Videos - Examples of different methods

After researching resources on this page, share your thoughts: Video Discussion
Prepared Videos

*Don't reinvent the wheel. Redesign it to fit your needs!*

What are others in your discipline doing? Look for videos and resources you can use in your own course so that you do not have to recreate the wheel!

Flipping takes planning and time! Don't just 'plop' flipping on top of what you already do. Be strategic in your decision-making as you decide what to flip and why!
Especially the first year, time is a real challenge. Browse through some the major video resource websites and search for videos in your discipline or topic that you can use for your course. Sources of already created materials:

- **Vimeo**
  - **Example: Blood Cells and Bacteria**
  
- **Google Videos** (which mostly finds YouTube videos but through a Google interface)
  - **Example:**
    - **Stoichiometry**

- **Youtube**
  - **Teacher Youtube**

- **itunesU** - download the itune U app to watch video lectures etc.

- **PBS media**

- **Annenberg Learner** (short overview videos that might be useful but mostly these are videos that need to be purchased)

- **TED talks** and **Ted Ed**

- **Khan Academy** - The next page has links to the Khan courses.

- **Canvas Commons** - Must be the teacher to view Canvas Commons.
  - You can limit your search by
    - Grade Level (K-12, Undergraduate, Graduate) or
    - Type of Resource: Courses, Modules, Assignments, Quizzes, Discussions, Pages, Documents, Videos, Audio, Images.

Now sum it up in the Discussion:  **Video Discussion**
Khan Academy

Khan Academy Online Class Resources

Find a course you are interested in and investigate

- Math by subject
  - Early math
  - Arithmetic
  - Pre-algebra
  - Algebra 1
  - Geometry
  - Algebra 2
  - Trigonometry
  - Precalculus
  - Statistics & probability
  - AP Calculus AB
  - AP Calculus BC
  - AP Statistics
  - Multivariable calculus
  - Differential equations
  - Linear algebra

- Math by grade
  - Kindergarten
  - 1st
  - 2nd
  - 3rd
  - 4th
  - 5th
  - 6th
  - 7th
  - 8th
  - Eureka Math/EngageNY
  - High school

- Science & engineering
  - Physics
  - AP Physics 1
  - AP Physics 2
  - Cosmology & astronomy
  - Chemistry
  - AP Chemistry
  - Organic chemistry
  - Biology
  - AP Biology
  - Health & medicine
  - Electrical engineering

- Computing
  - Computer programming
  - Computer science
  - Hour of Code
  - Computer animation

AP teachers can use free AP videos, articles, and practice exercises for daily classroom activities or homework, and students can use them anytime for extra help.

- AP Calculus AB
- AP Calculus BC
- AP Statistics
- AP US History
- AP World History
- AP Art History
- AP Physics 1
- AP Physics 2
- AP Chemistry
- AP Biology
- AP Macroeconomics
- AP Microeconomics
How I make Videos

Hardware:
- Computer: Mac (home)
- Wacom tablet with stylus
- Microphone

Program:
- Notebook (Usually - because of Mac)
- Power Point
- To get pictures, formulas, etc: Use capture feature of Notebook or Screen Shot in Preview

Online Resources
- Demos
- GeoGebra
- Colorado PhET
- Online textbook
- Actually, any online source not copyrighted.

Screen Capture
- Camtasia (paid)
- Screen-Cast-O-Matic

Video Storage
- YouTube
- Dropbox
- Arc (Canvas)

Planning/Creating Videos

Ideas on Ways to Make Your Own Videos

Discussion: Video Discussion
Planning/Creating Videos

Remember: Flipping the class puts what used to be 'in' the classroom (typically the lecture) 'out' of it and what used to be 'out' of the class (typically examples, peer learning, homework) 'into' it.

1. Plan Your Video

- First, decide what content you want to create. Start with a simple example, not a full lecture. Let me reiterate - do NOT do a full 50-minute lecture! They will not pay any more attention to you on video than in class.
- Break your 50-minute lecture into chunks.
- Make each its own video explained without interruption in 3-10 minutes. Students really would rather watch 3 videos that are 10 minutes each than one 30-minute video.
- Next, imagine what kind of video will help you express that information best.
- Don't overprepare your video but do know key points
- It doesn't have to be perfect. (You don't have time to be perfect.) As a matter of fact - I have my students point out my glitches. The first one who finds a mistake gets a sticker. Before you scoff - NEVER underestimate the power of a sticker in high school!

2. Select Your Video Creation and Recording Technology

- Canvas - (District account or you can get free account)
- Camtasia (paid)
- Screen-Cast-O-Matic (free or paid)
- Ink2Go (paid)
3. Writing Equipment

- Lots of Writing: Tablet PC to write on with a stylus.
- Little writing (such as underlining or pointing out details in pictures, a regular PC/mouse.
- Choose a microphone headset.

4. Program: Experiment with writing, erasing, changing pen colors, etc.

- You can use Power Point, Word, One Note, etc.
- I use Smartboard and prepare in advance any text or figures I want to be able to draw over/around, talk about, etc.
- The Khan Academy uses SmoothDraw
- You can also use the whiteboards provided in some screen capture software programs such as Ink2Go.

5. Upload and Link your Video

There are several places you could upload your video now that it is finished!

- YouTube
- Canvas Arc
- Dropbox
- Google Docs
- Office 365

Discussion: Video Discussion
Ideas on Ways to Make Your Own Videos

First, most teachers teach on teams - so teams can undertake the video making process.

You can make them in a live class (with students) or with no class.

With a live class, you are recording during one of your periods, so outside time is not required to record videos. However, you will have more post-production to take out student comments, sneezes, and other distractions.

With no class, you record during your off period, before or after school. You should have a block of uninterrupted time.

You can use a screen capture for:

- Online resources
- Whiteboard
- Smartboard
- Document Camera
  - Power Point
  - Word Documents
  - Smartboard, etc.

If you want a live video, you can hire a professional videographer or set up a camera in your room.

Discussion: Video Discussion
What are the pros and cons of making your own videos? Using prepared videos?

Feel free to make a short video (just say 'Hi') and post here. To make a video click Record/Upload Media above:
You are the Student:

With your team, do the M&M Lab

Upload your results

(10 minutes)
M&M Lab

What did you learn?

Home or Class activity?
You are the Student:

Pick one of the following:

• Instructional Video – Assignment
• Assignment 1 - Quiz
Feedback
Assignment
Quiz
Sandbox: Designing Your Flipped Course

Review examples of different tools available for flipping in Examples of Assessments.

Go to your LCISD canvas https://lcisd.instructure.com/ and log in with your school credentials.

Create a flipped module for your class.

Think about the Objective, Presentation, Practice, and Assessment:

When finished - complete the Exit Ticket.
Examples of Assessments

There is more to flipping than giving the students homework. Are students engaged at home?

Have students watch the video and upload.

Quizzes: Quiz 1: Quiz with Quizlet

Blank Quiz: You supply the problems on paper.

Discussions: Have students engage in a Discussion forum.

Have students bring in on paper the next day:
- Files: M&Ms Lab: Exp Growth and Decay
- Do a Lab F-4DIR.pdf or F-4GRAF

Instructional Video 1

Due: No Due Date
Points: 0
Submitting: a text entry box, a media recording, or a file upload

Watch the video and take notes. Upload your notes.

Sketch a PV diagram and find the work done by the gas during the following stages:

(a) A gas is expanded from a volume of 1.0 L to 3.0 L at constant pressure of 3.0 atm.

(b) The gas is then cooled at a constant volume until the pressure falls to 2.0 atm.
Quiz 1: Quiz with Quizlet

Due: No due date
Points: 2
Time Limit: None
Questions: 2

Instructions

\[ \frac{d}{dx} (c) = \text{derivative of a constant} \]

Take the Quiz
Ch 4 Day 1 Notes Quiz

Instructions

Submit your Day 1 Notes Quiz answers here. You will need your note guide (p. 9-10) to answer as the questions and answers are not provided in canvas!

Example 4C video help...

How to Find the Inverse of a Function (mathbff)

Take the Quiz
Lab (Exponential Growth and Decay)

DO NOT EAT the M&Ms until you are done collecting all the data!

Exponential Growth Procedures:

1. Place 2 M&Ms in a cup. This is trial number 0.
2. Shake the cup and dump the M&Ms on the plate/work surface. FOR EVERY M&M THAT HAS THE “M” SHOWING, ADD ANOTHER M&M TO YOUR CUP AND THEN RECORD THE NEW POPULATION. (IF 2 M&Ms land face up, add 2 more M&Ms to the cup)
3. Repeat Step 2 until you are done with 14 trials OR you run out of M&Ms.

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F-4 Home Lab

Due: No Due Date
Points: 100
Submitting: a media recording or a file upload

- Watch the 2 clips of an F-4 Crash.
- Study the graphs: F-4GRAPH.PDF
- Complete Problem 1: F-4DIR.pdf
- Save work as pdf. Upload completed work.

Feel free to make comments on Videos

add your two cents Comment at 0:00
Exit Ticket
TRACEY JENSEN

What is one idea, activity, concept, etc that you plan to implement in your course? If you are not a classroom teacher - what will you encourage your teachers to do?

Search entries or author  Unread  

Reply

Replies are only visible to those who have posted at least one reply.

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