The Art of Thin Slicing
Getting students from point A to point B

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Warm up:

- Form Random groups
- In your group choose one topic that you will teach in a high school math class and one lesson within that topic
- Write on top of your board:
  - Class
  - Topic
  - Lesson

Introduction:

- I’ve taught math for 31 years at Coleville High School in Coleville CA.
- We’re a small rural school with around 50 students.
- I teach all levels from Algebra 1 to AP Calculus including Probability and Statistics and Computer Science

Coleville High School

My experience with BTC:

- 2015 (ish) Dan Meyer on Twitter
  - Liljedahl's web page
  - "Yeah, this is great for engagement, but…"
- 2016 (ish) Peter Liljedahl on Twitter
- 2020 November–the book comes out–everything changes
- 2020 November–Pandemic protocols and the fire
- Since 2020…

BTC “basics”:

- Visibly random groups
  - Promotes equity in the classroom
  - Why groups of 3?
- Students work standing at white boards
- Prime them with non-curricular problems
- Teach them to think so that they will be able to tackle any problems you give them–including curricular problems

Goals of thin slicing

- To present curriculum to students in a way that allows them to “discover” the mathematical concepts by working them out.
- By developing their own understanding of the concepts, students are able to take ownership of their processes.
- Create an “optimal experience” where students are so involved in the learning process that they will tackle any problem you put in front of them.

Types of curricular tasks

- Rich tasks
- Thin slicing–not all thin sliced tasks are equal
  - Moving from one level to another
  - “Discovering” a pattern
- Review tasks–mild, medium, spicy

Peter on tasks:

“It turns out that almost any curriculum tasks can be turned from a mimicking task to a thinking task by following this same formulation–begin by asking a question that is review of prior knowledge; then ask a question that is an extension of that prior knowledge.”

Building Thinking Classrooms pg 28

Step 1: Finding Point A

- Identify the prerequisite skills students should have and may need to review. You want to be sure to connect the new learning to these prerequisite skills.
- Identify the easiest possible problem in the prerequisite skills and that is probably your point A.
- If your students are struggling with your thin sliced tasks–no matter how “easy” you think they are–you haven’t found point A yet. Remember that students need to experience success in order to be willing to continue to try.

Step 2: Finding Point B

- What is the scope of the lesson? Is it a one day or multiday lesson?
- If it is a multiday lesson, are there stopping points along the way?
- What would a typical quiz question from this lesson or sequence of lessons look like?

In your groups:

- Write 3 problems
  - One should cover background knowledge and be your “intro” problem
  - One should follow from that problem and be one that every student should be able to understand and complete
  - One should be the ending problem or ultimate goal for the topic

But what about scaffolding?

- You build that in to the thin slices.
- Think about the things you would tell your students during a lecture on the subject.
- Write problems that do the scaffolding for you through the thin slices
- For your 5 minute introduction, what is the least you can do or show them to get them started?

Point A for the Unit Circle

Students should already know:

- Pythagorean Theorem
- Right triangle trig
- The equation of a circle

Unit Circle: What concepts are in the lesson?

- Radian measure of an angle
- What is the Unit Circle?
- Using the Unit Circle to evaluate trigonometric functions
- Reference angles

The Unit Circle: My Goals

- They recognize they are making a circle whose radius = 1 and equation is $x^2 + y^2 = 1$
- They see that the x coordinate is the cosine and the y coordinate is the sine
- They can find the sine and cosine of any angle, they are no longer restricted to a right triangle
- They can always draw a right triangle within the unit circle to connect it back to right triangle trigonometry

Step 3: Fill in the blanks

- Create a basic problem for your demo that they should know how to do
- Create the “ideal” or advanced problem you’d like them to end the lesson with
- Create intermediate problems that will “get them there”

In your groups:

- Create at least 3 problems that progress student knowledge from the “Point A” problem towards the “Point B” problem
- Try to change just one aspect of the problem each time
- Think about what you want students to notice as they progress through the problems

How do I introduce the topic?

- As a notice and wonder
- As a warm up
- As a mini lesson
- As all of the above
- Other ideas?

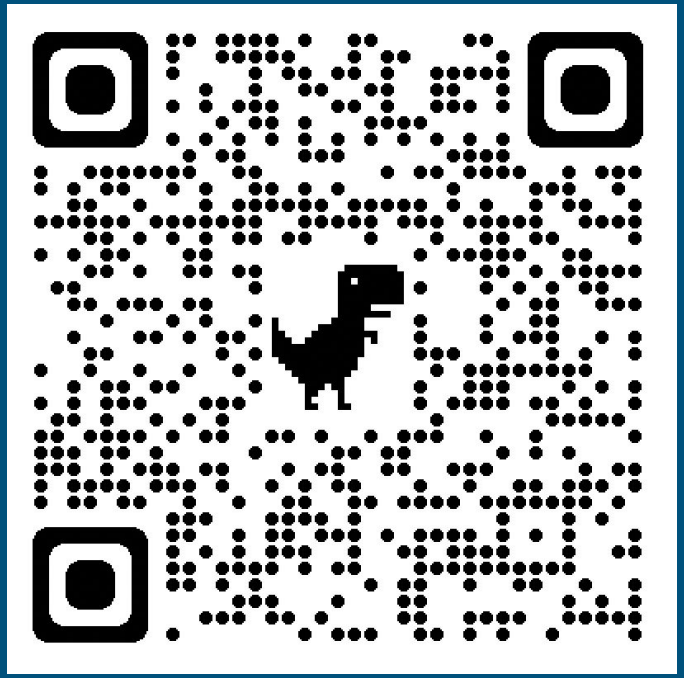
How do I give them the problems?

- The “Banner” method
- Write them on the board (should I number them?)
- Slide show
- Desmos activity
- Slips of paper
- Other ideas?

What ifs:

- What if one group finishes early?
- What if one group doesn’t get it?
- What if no one finishes?
- What if they all finish?
- Questions…

Thank you for your time!



Link to shared folder

Link to slides