

NEXT-LEVEL MATH COREQUISITES DISTANCE LEARNING & HYBRIDS

Carolynn Reed, Department Chair
Colleen Hosking, Associate Professor

ACC PROFILE

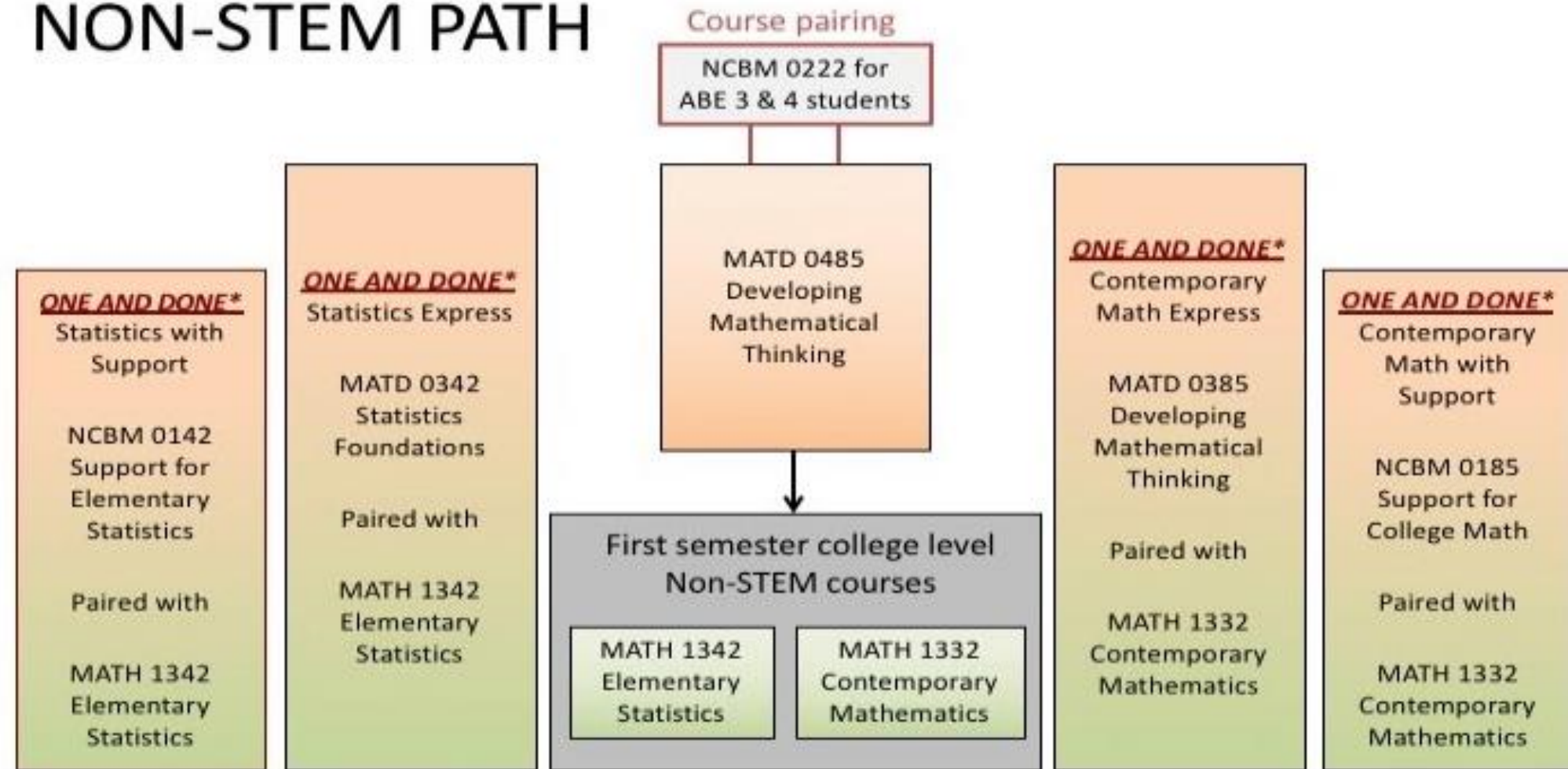
- Multi-campus, single college district with 11 campuses
- 7,000-square-mile service area
- Enroll 70,000+ students annually (credit/CE/AE)
- ~80% Part-Time, 20% Full-Time

WHAT IS A COREQUISITE?

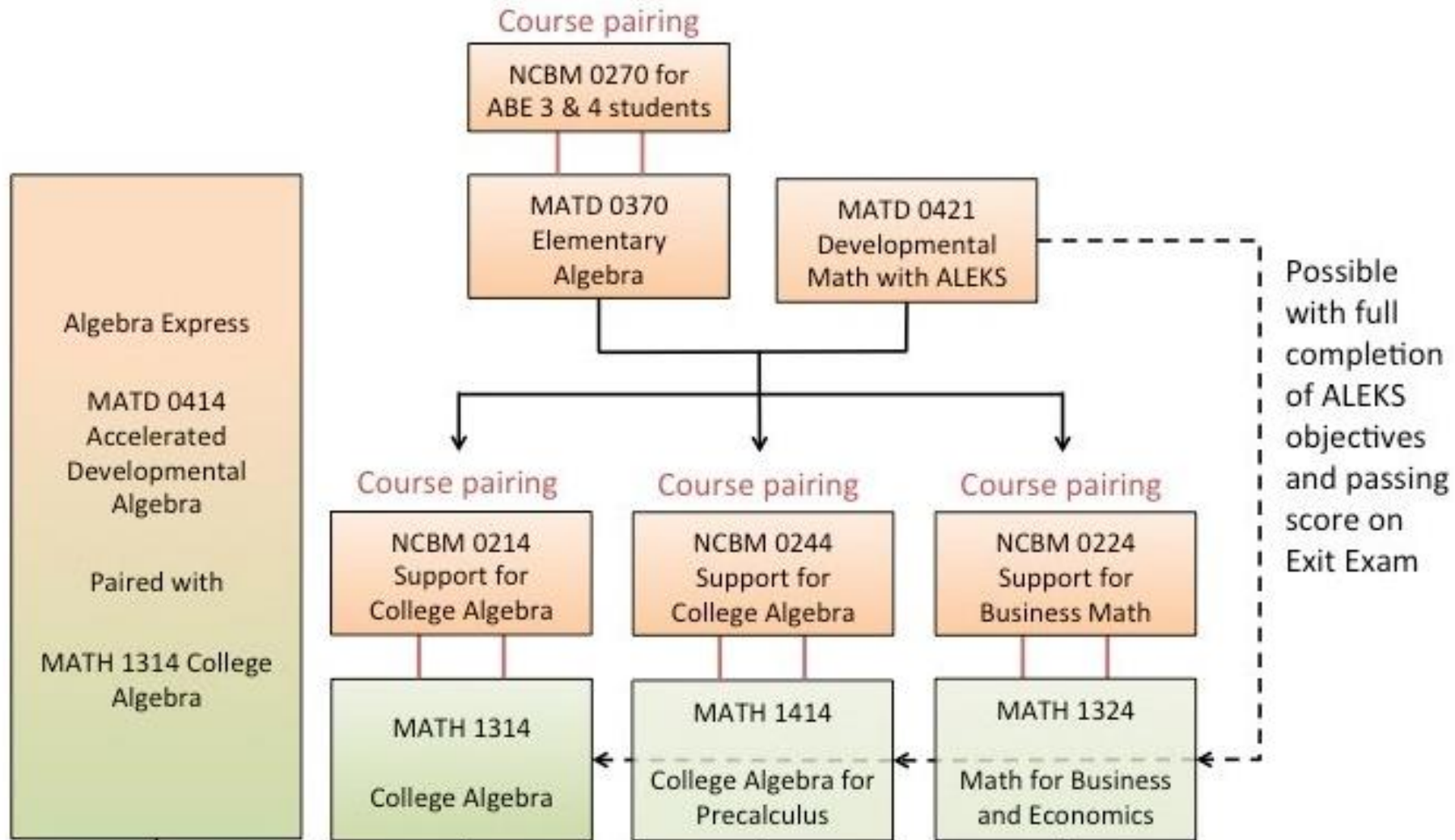
- Developmental and College-level math courses taken concurrently
- Students are given just-in-time instruction on the prerequisite math that is needed in college-level course

NON-STEM FLOWCHART

NON-STEM PATH



STEM FLOWCHART



TWO LEVELS of STUDENT PREPARATION

- Higher preparation:

One level below
gateway course
- Lower preparation:

Two (STEM) or more
(non-STEM) levels
below gateway course

LOWER PREPARATION LEVEL

- Developmental content fully integrated into gateway curriculum
- Non-STEM 6 credit hours (3 hour support + 3 hour gateway course)
- STEM 7 credit hours (4 support + 3 gateway)
- Two instructors co-teaching

LOWER PREPARATION

- Collaborative & Active Learning
- Full integration of prerequisite material
 - Backwards map college-level topic
 - Start where they start
 - Careful scaffolding

NON-STEM LEARNING ACTIVITY

Distributions: Shape & Center

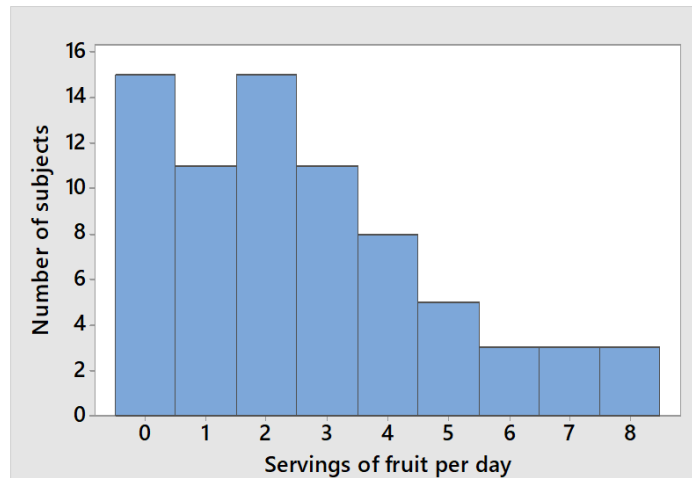
Start where they start

Students are introduced to the concept of histograms

2.2 (Part 1): Introduction to Histograms

Reading Histograms

A **histogram** is a graph that organizes quantitative data, like counts and measurements, so we can see the **distribution** of these data values (i.e. how they vary). The horizontal axis shows the range of values we might see, and the vertical axis shows the frequency, or how many times those values appear in our data set. *(Histograms in statistics rarely include “break lines” when the graphs do not start at 0. Likewise, histograms are sometimes offset, i.e. moved over, to help us better read the graph.)*



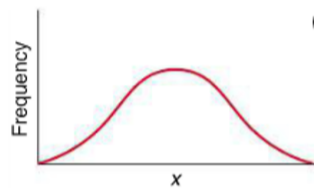
← Easy, relatable context

Careful Scaffolding

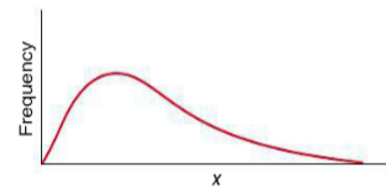
Concept of shape is built step-by-step

The Shape of the Distribution

First, let's consider the general shape of the graph – is it symmetric or skewed? The following is called a symmetric distribution or a bell-shaped distribution.



The next graph is described as "skewed."

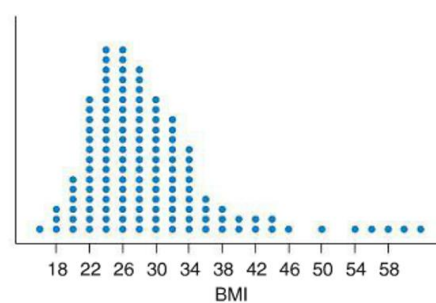


1.
2.
3. How
4. How

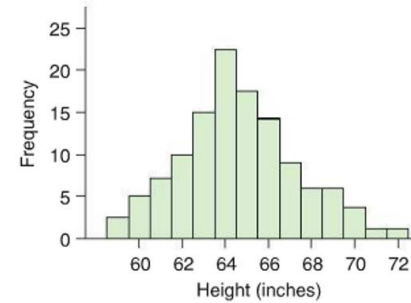
5. We use the terms "skewed right" or "skewed left" to describe graphs. The graph above is skewed right. How do you think you could define skewed right?

Describe each of the following graphs as symmetric, skewed right or skewed left.

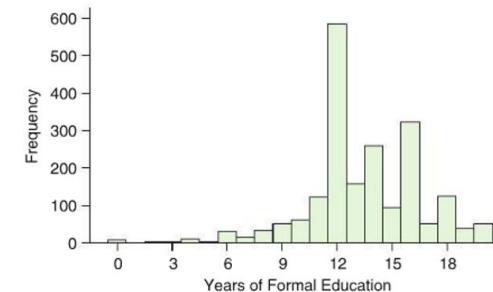
6.



7.



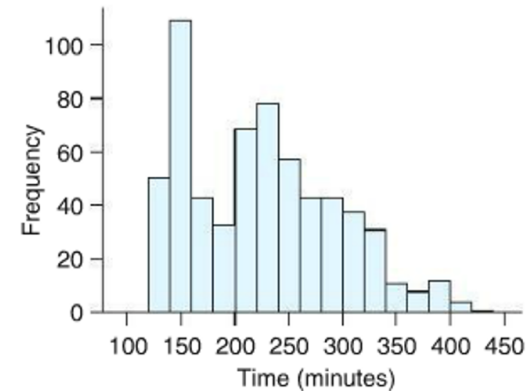
8.



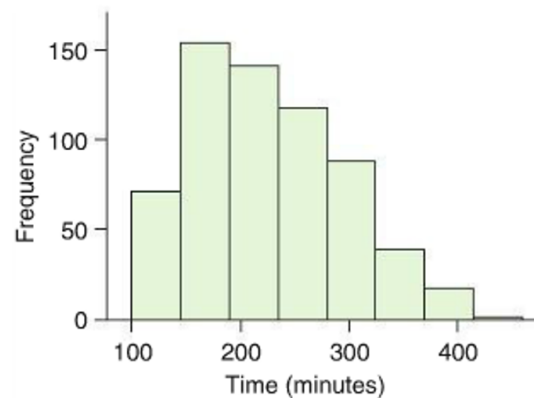
Opportunities for Discussion

Students work together in groups while instructors circulate

12. When we look at real data, it may be more difficult to identify the number of mounds.
How would you describe the graph to the right – unimodal, bimodal, or multimodal?



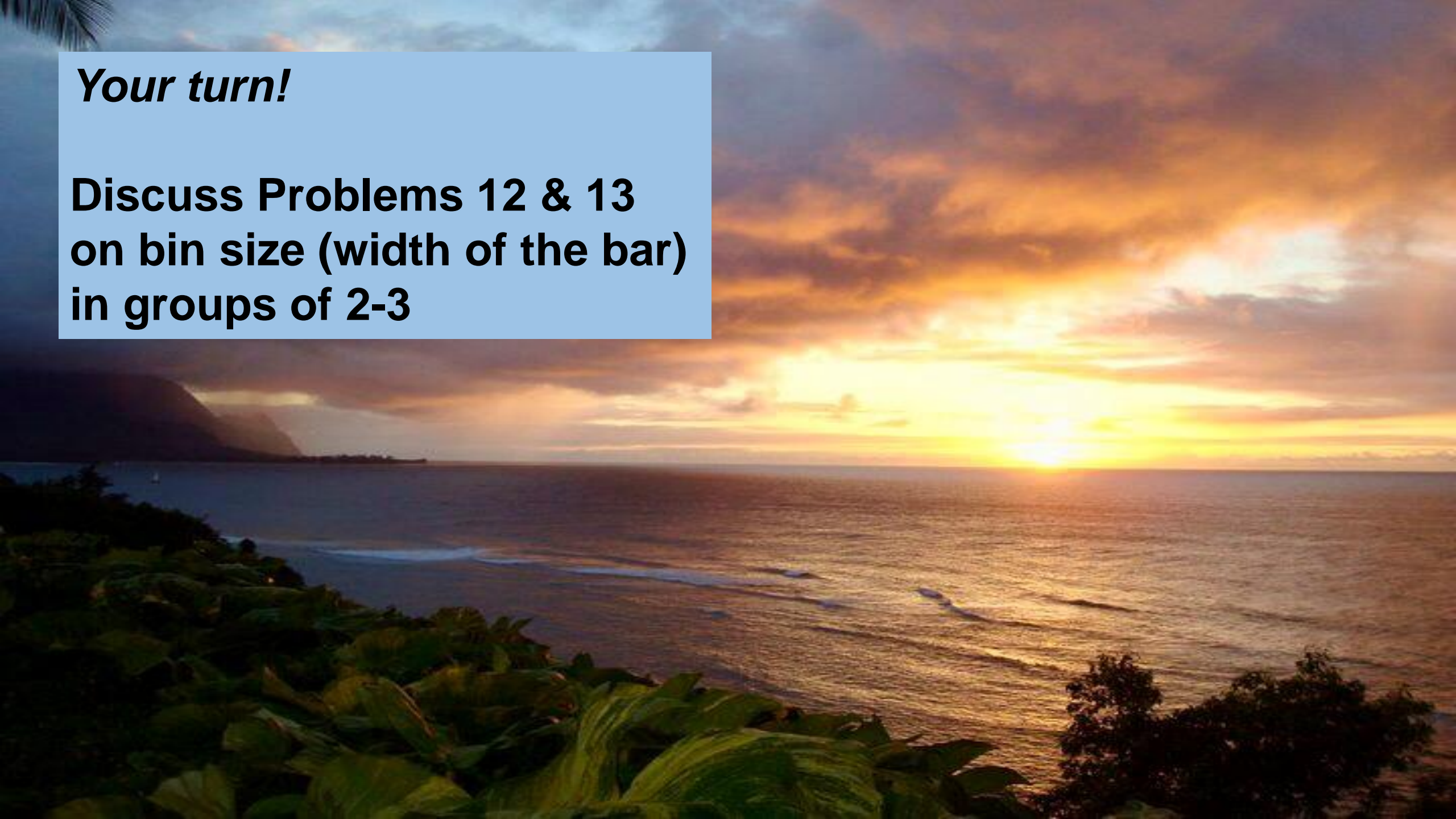
13. The following graph is made from the same data set as in the #12.



- a) Estimate the bin size in each graph.
first graph: _____ second graph: _____
- b) Why does the maximum value for the frequency change from the first graph to the second?
- c) How would you describe the second graph – unimodal, bimodal, or multimodal?

Your turn!

**Discuss Problems 12 & 13
on bin size (width of the bar)
in groups of 2-3**



**HYBRID:
LOW PREP
COREQS**

Qualitative Data:

*Students and
instructors felt the
3-hour class period
was too long to focus*

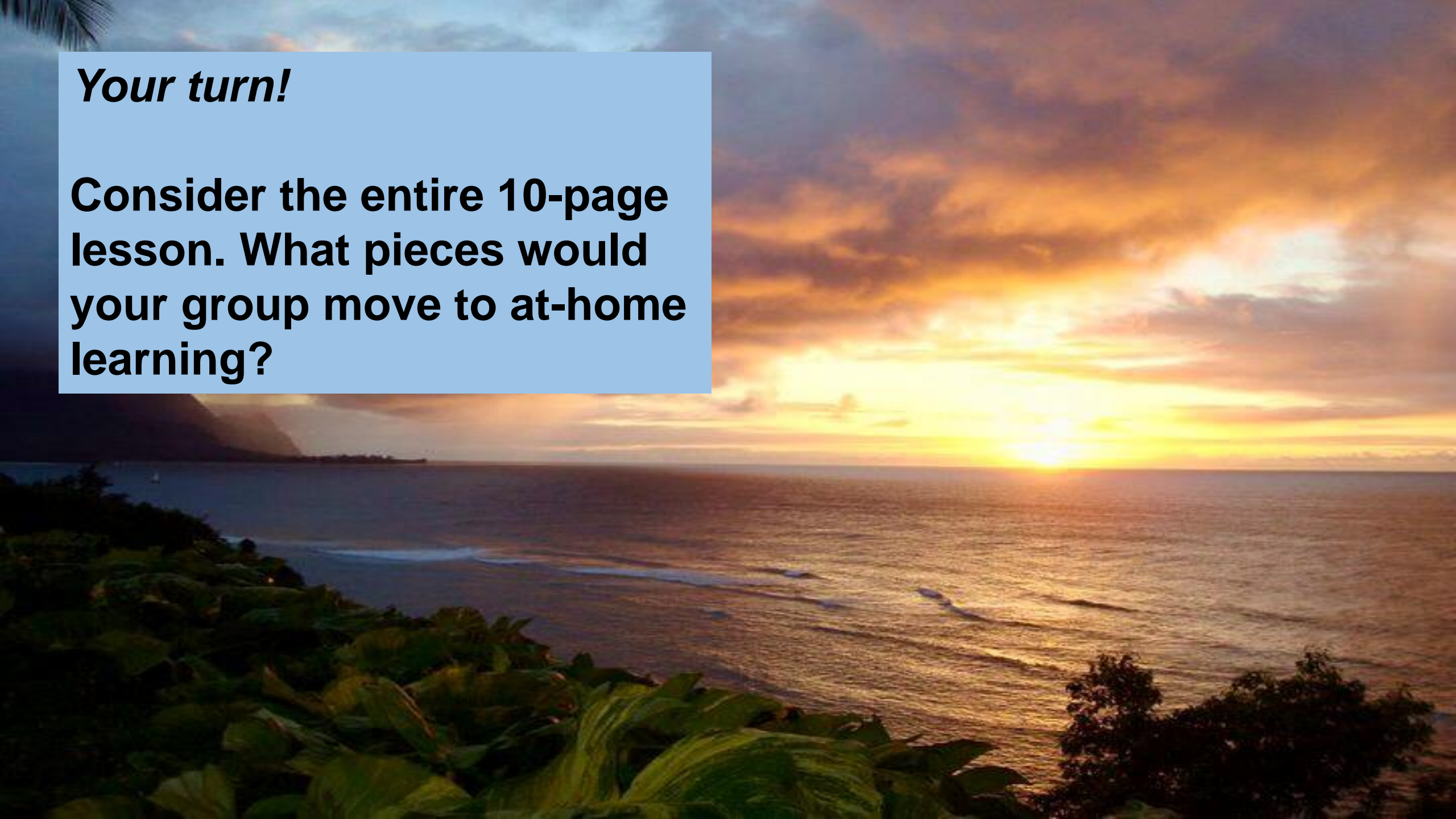
Scheduling:

- Keep 3 LEH College-Level
- Hybrid 3 LEH Developmental
 - 40% Outside of class = 35 minutes
 - Total time in class now ~2.5 hours

What learning is shifted
outside of class???

Your turn!

Consider the entire 10-page lesson. What pieces would your group move to at-home learning?



2.2 (Part 1): Introduction to Histograms

Reading Histograms

A **histogram** is a graph that organizes **distribution** of these data values (i.e. see in the data. The vertical axis shows *(Note: The axes on graphs in statistics the location of 0 is sometimes offset,*

Scaffolded enough to do at home prior to class

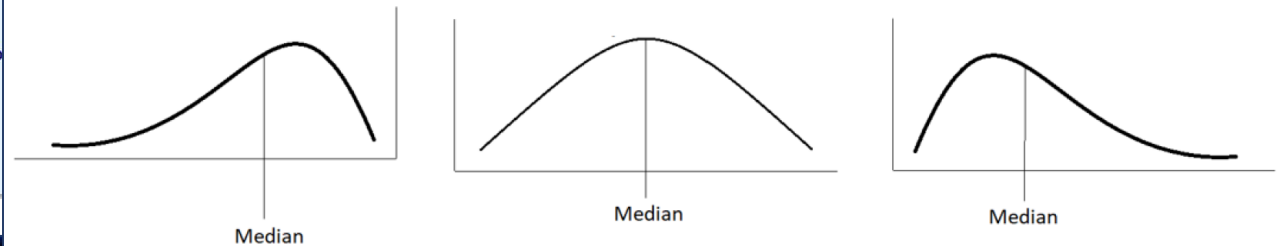
Time to explore individually, also carefully scaffolded

Histograms and Dotplots in Statkey

Open Statkey. Under Descriptive Statistics and Graphs data set Traffic flow (Timed) from the list of pre-loaded

Descriptive Statistics and Graphs
One Quantitative Variable
One Categorical Variable
One Quantitative and One Categorical Variable
Two Categorical Variables
Two Quantitative Variables

Section 2.2. First, label the graphs as symmetric, skewed left or skewed right. Then, estimate the location and label the mean on each distribution. The median has been labeled in each of the following distributions.



- If the shape of the distribution is symmetric, the mean is _____ than the median.
higher/lower/the same as
- If the shape of the distribution is skewed left, the mean is _____ than the median.
higher/lower/the same as
- If the shape of the distribution is skewed right, the mean is _____ than the median.
higher/lower/the same as

Concept connection with more scaffolding to help summarize concept

Hybrids may not be the way to go for us...

- Less collaboration time
- Less face-time with instructors
- New ideas for keeping non-Hybrid:
 - Can still shift work outside of class
 - Last ~30 minutes is not brand-new material
 - Implement a 10-minute break

**DISTANCE
LEARNING:
HIGH PREP
COREQS**

Quantitative Data:

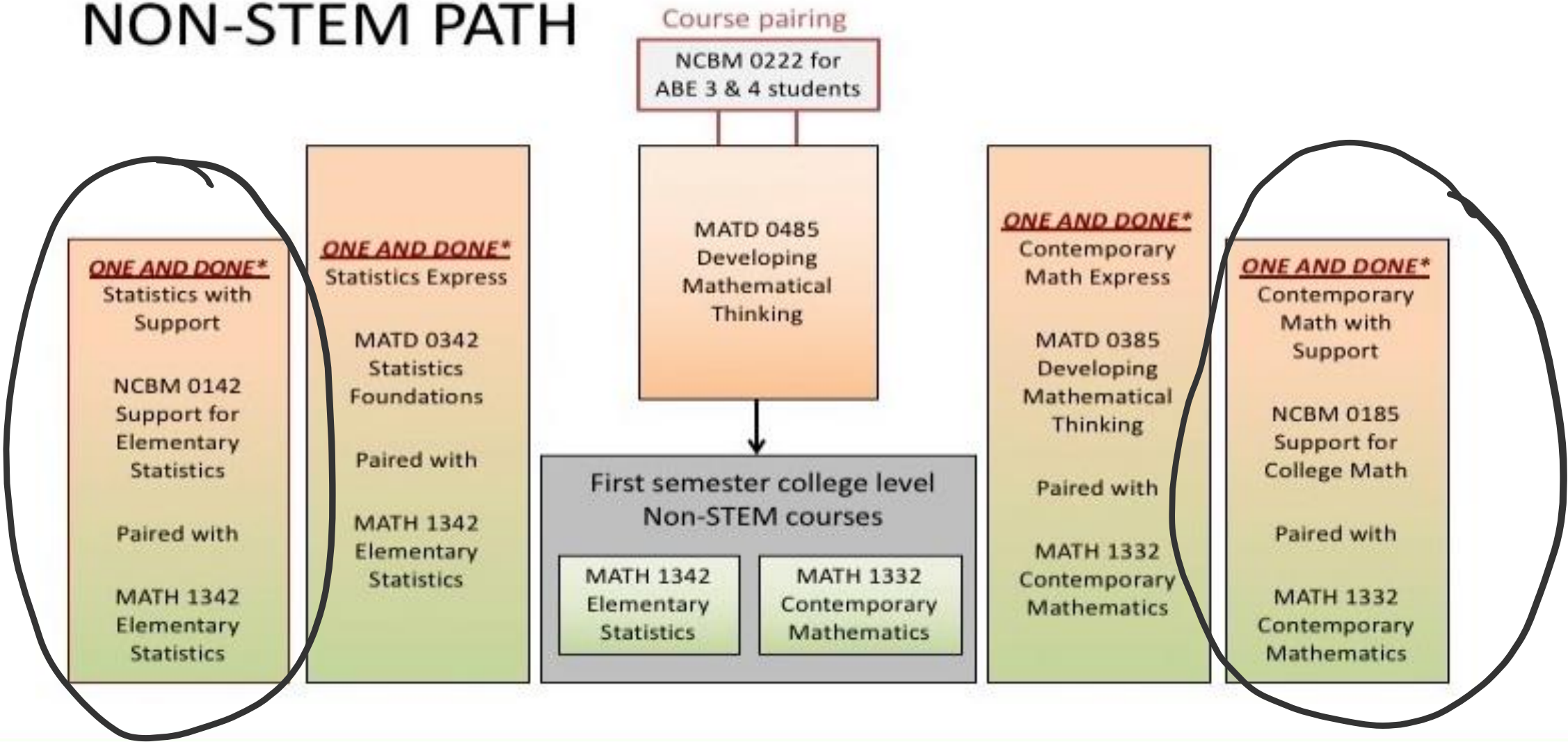
Student DL success rate consistently abysmal for lower-prepared students in stand-alone dev. math

HIGHER PREPARATION LEVEL

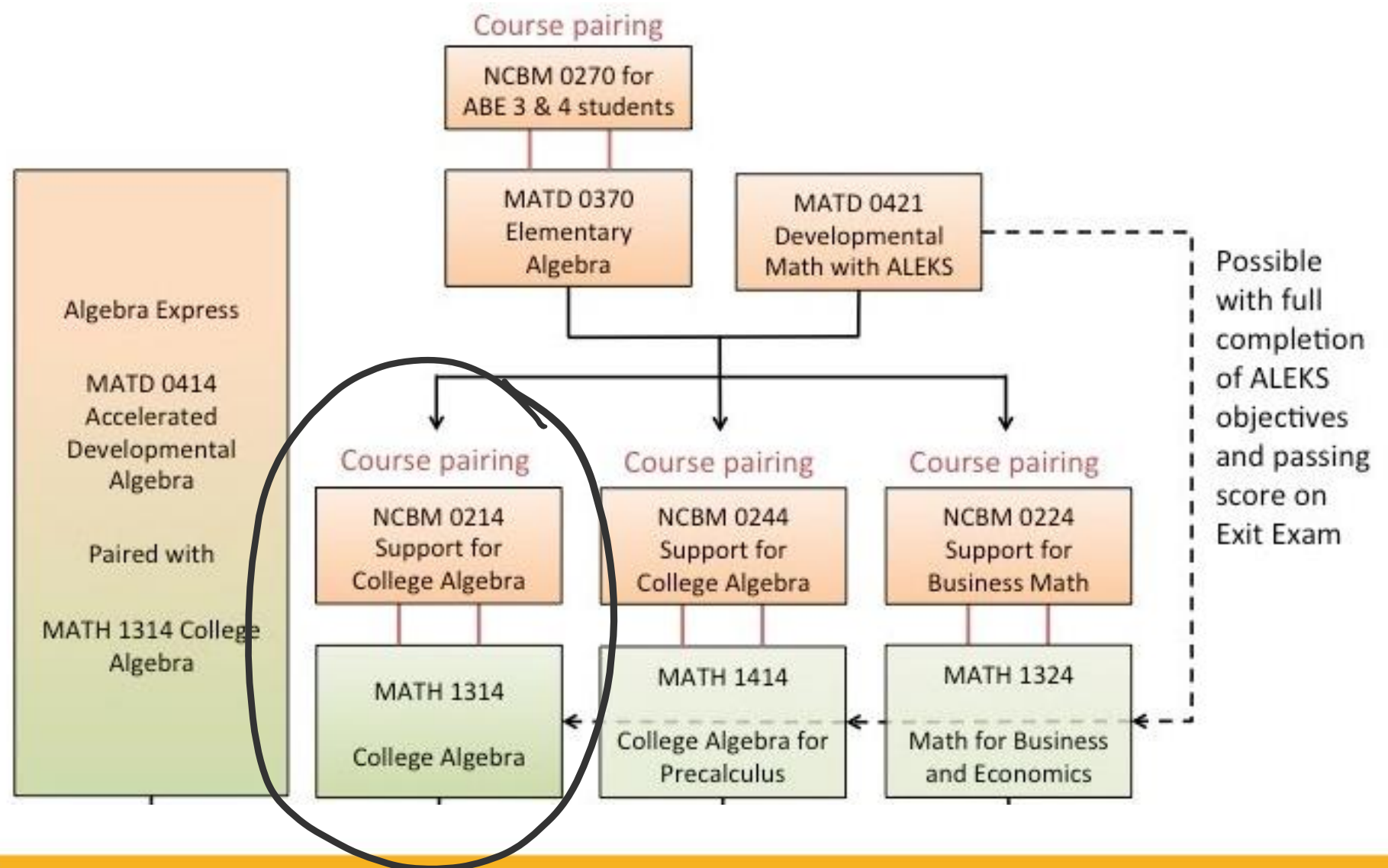
- Developmental content fully aligned with gateway curriculum
- Non-STEM 4 credit hours (1 hour support + 3 hour gateway course)
- STEM 5-6 credit hours (2 support + 3-4 gateway)
- Separate sections, single cohort

NON-STEM FLOWCHART

NON-STEM PATH



STEM FLOWCHART



ESSENTIAL ELEMENTS

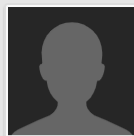
- Just-in-time prerequisite support
- Student success strategies
- Collaborative learning


Discussion Boards



Student success:

Opportunities to connect and share strategies with others



Colleen Hosking 

posted 6 months ago (last edited 1 month ago)

Test Anxiety Strategies

When students are about to take a math test, it is not uncommon to feel anxiety. Here are some techniques to help if you feel anxious right before or during an exam:

1. **Deep breathing** - breathe in deeply through your nose, then exhale slowly for a longer time than your inhale. Repeat a few times. This calms down your body which can translate to calming down your mind.
2. **Tense and relax** - Put your feet flat on the floor and hold the seat of your chair. Tense your body for a count of 5, then relax. Repeat a few times. This also helps calm down your body which can translate to calming down your mind.
3. **Positive Self-Talk** - If you tell yourself you won't do well, there is one kind of reaction in your brain. If you tell yourself you have prepared, you are capable, and you can do this - there is a different kind of reaction.

What is a strategy you have successfully used to help with test anxiety?

OR

Write a quick pep talk to yourself or an imaginary classmate. Use the Positive Self-Talk strategy.

Discussion Boards

Percentages in the News - Week 4

Find an example of a percentage quoted in a news article. Include the sentence with the quote in your post. Include the link.

Describe the use of the percentage (as a fraction, to describe change, or for comparison), and explain its context. Be sure to comment on someone else's post in addition to posting your own example.



**Opportunities
for practice**

Discussion Boards

Discuss: What is different?

1. You are asked to find an equation of a line and are given the slope and a point on the line instead of the slope and y-intercept. What would you do differently?
2. You are asked to find a linear function, instead of an equation of a line. What would you do differently?
3. You are asked to find an equation of a line perpendicular to a given line instead of parallel to a given line. What would you do differently?
4. You are asked to find an equation of the line passing through two given points, instead of being given a slope and a point. What would you do differently?



**Build
conceptual
understanding
by working
together**

Notebook assignments



Prerequisite review

Notebook: Unit 1 Week 2

2A: Unit Conversion (Preview)

1. **Units** describe what is being measured or counted.

(a) What units could you use if you were describing the distance from Austin to San Antonio? _____

(b) What units could you use if you are buying a house and you want to know how large it is? _____

2. We can describe units using words OR using an abbreviated form.

Example: When you are driving a car, your speed is read as miles per hour and written as mi/hr.
Words Abbreviated

(a) Based on the example, what math operation does the word “per” mean? _____

(b) Suppose you are buying some fabric. To calculate the unit price, you divide the price (in dollars) by the area (in square yards). The units are written: $\$/yd^2$. Write the units using words: _____

Note: “square” corresponds to a 2 exponent on the units. What exponent will you use for “cubic”? _____

Notebook assignments



Supporting
Student
Success

9. **Preparing for Exam 1** - Make this plan no later than Tuesday, 9/10, so you can be sure to fit in all your assignments while still leaving yourself plenty of time to study and get help before the exam.

Include the following on your calendar (can be on more than one date and is just a tentative plan):

- When you will work on Sections 2.2, 2.3, and 2.4 – including Online HW
- When you will work on Quiz 1C
- All deadlines for Unit 1C
- When you will work on the Exam 1 Review (plan at least 2-3 different days)
- When you will get help on the review if needed (can be posting on the boards or tutoring online/in-person)
- When you plan to take Exam 1
- A backup Exam 1 day in case something happens on the day you were planning

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9/8	9/9	9/10	9/11	9/12	9/13	9/14

Notebook assignments



Additional
practice on
isolated
skills

4. Since 1650, the average annual growth rate for world population was around 0.7%. However, the rate has varied significantly over the years. For example, it peaked at about 2.1% during the 1960s and was 1.1% in 2013.

Find the approximate doubling time for each these growth rates. Recall the doubling time formula: $T_{\text{double}} \approx \frac{70}{P}$, where p is the percent in percent form.

a. Doubling Time for 0.7% rate: $\frac{70}{P} = \frac{70}{0.7} = \underline{\hspace{2cm}}$ years

b. Doubling Time for 1.1% rate: $\underline{\hspace{10cm}}$

c. Doubling Time for 2.1% rate: $\underline{\hspace{10cm}}$

Notebook assignments



**Scaffolding
concept
connections**

Variable(s)	Graphical displays	Parameters and statistics	Example
One categorical			
One quantitative			
Two categorical			
One quantitative and one categorical			
Two quantitative			

FIRST SEMESTER DATA

Course	DL College-level course success rate (A, B, C)	Success rate for all sections of course (classroom and DL)
Contemporary Math Corequisite NCBM 0185/MATH 1332	63%	70%
	<i>n</i> = 27	<i>n</i> = 780
Elementary Statistics Corequisite NCBM 0142/MATH 1342	54%	56%
	<i>n</i> = 54	<i>n</i> = 515
College Algebra Corequisite NCBM 0214/MATH 1314	40%	46%
	<i>n</i> = 77	<i>n</i> = 1929

Thank you!

Carolynn Reed

Mathematics
Department Chair

creed@austincc.edu



Colleen Hosking

Associate Professor
of Mathematics

cneroda@austincc.edu

