Active Learning in a Remote Environment

New Faculty Remote Workshop,
July 21 - 25, 2019
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ACS Chemistry for Life™

COTTRELL SCHOLARS COLLABORATIVE
Integrating Discovery and Education to Advance Science

"Tell me and I forget.
Show me and I may remember.
Involve me and I will learn."

Variously attributed to: Aristotle; Confucius; Benjamin Franklin; Native American proverb; Chinese proverb; Voltaire

Active Learning:

… is the lesson, not an “add on”

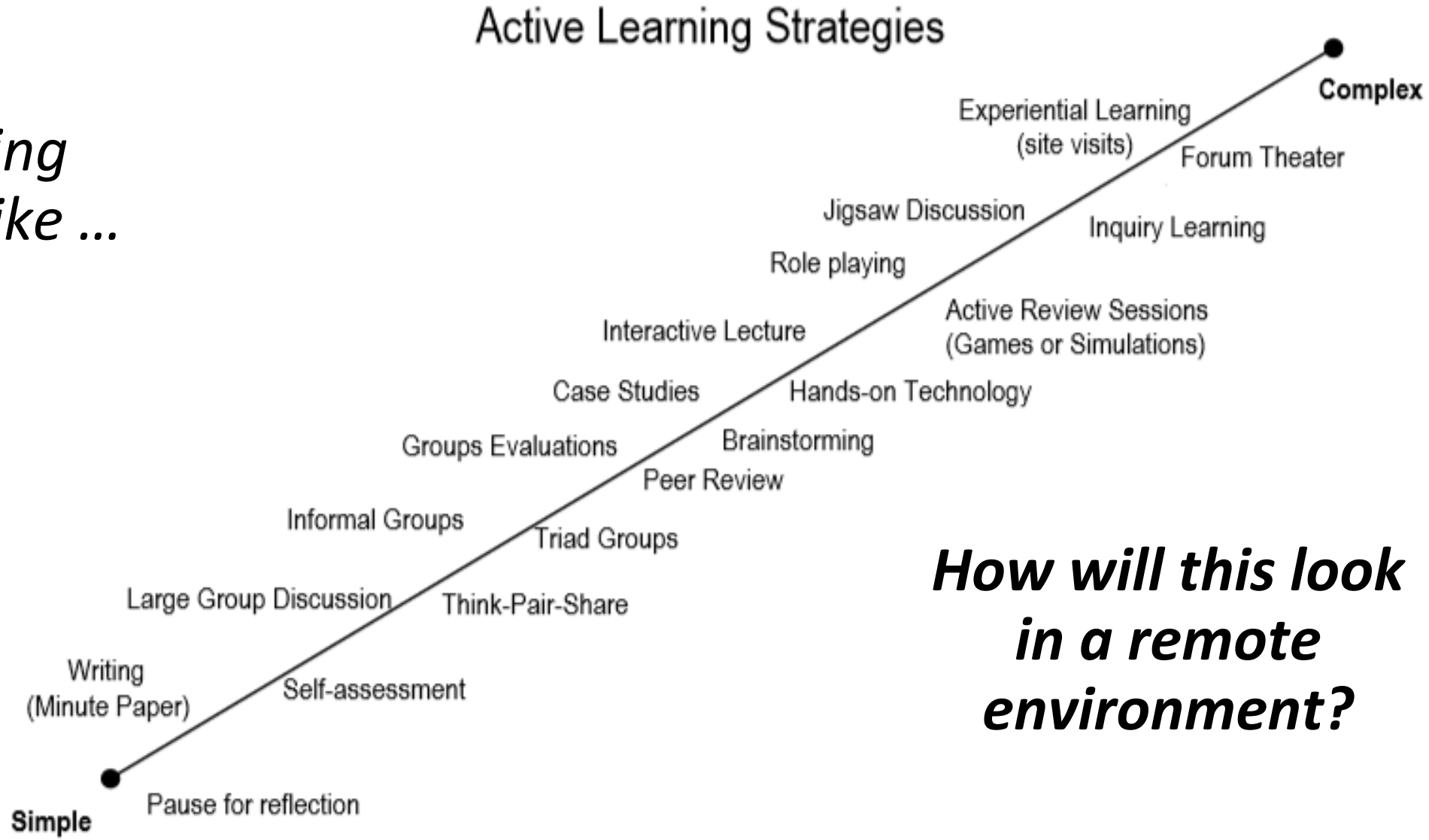
… requires the students’ presence and participation

… needs to happen every day

Litmus Test:

- “Did the students actually need to be present for this lesson?”
- i.e. Were the students required/invited to take an active part

Active Learning might look like …



How will this look in a remote environment?

http://crlt.umich.edu/sites/default/files/Active_Learning_Continuum_CRLT.pdf

Lesson – you are the student

“Analyzing titration data”

Purpose

Recognize difference in properties of acids, bases and salts through:

- Predicting pH values given volume data
- Creating a graph to support predictions

Observation: Changes in pH during a titration process are not linear or constant. Why?

Your task is to follow and mimic the titration process of the substance given to you.

You are given 25.00 mL of 0. 247 M benzoic acid, C_6H_5COOH, to be titrated with a solution of 0.110 M NaOH Ka = 6.50 x 10^{-5}

Critical Thinking

a. Identify the substance being titrated as acid or base, strong or weak. What evidence do you have to support your claim?

b. Based on your claim above, predict a value of pH when your substance is by itself in water, in other words, before the titrant is added. No calculations needed. Explain how you chose the value.

c. As the titrant is added predict what would happen to the above pH? Explain.

Collaboration:

Part II: For the next section, your group is assigned four different volumes of titrant to calculate the pH at each stage. Be specific, show reactions that occur and all steps in your calculations.

a. After _____ mL of NaOH is added:

b. After _____ mL of NaOH is added:

c. at the equivalence point: (you need to determine the volume of NaOH at the equivalence point)

d. After _____ mL of NaOH is added:

Instructions for small group discussion:

- Your group is going to work collaboratively in a single document in a folder you will have access to soon (Google doc).
  - Write your group members' full names at the top of the Google doc
- For Part I of the activity, assign a person who will be the recorder.
- For Part II of the activity, each person will work in a different section of the question.
  - Assign the order based on month bday, from earliest to latest
  - Assign one person to be the time keeper to return in 10 minutes

Instructions (cont’d):

- Your group will be in a breakout room. Pay attention to your group number before you accept the invitation to join the group.
- The link to a google folder will be added to the chat.
- Open the link or copy the url.
- Open the folder that belongs to your group number.

Part II - calculations

- Bring group back together in the middle of the work
  - Address whole class questions
  - encouragement
- Branch point – the instructor could choose to:
  - Go back to break out rooms to put it all together for Part II, or
  - Finish asynchronously (Part II) – using discussion feature

How will the activity look in an asynchronous class?

Create or assign groups using your LMS

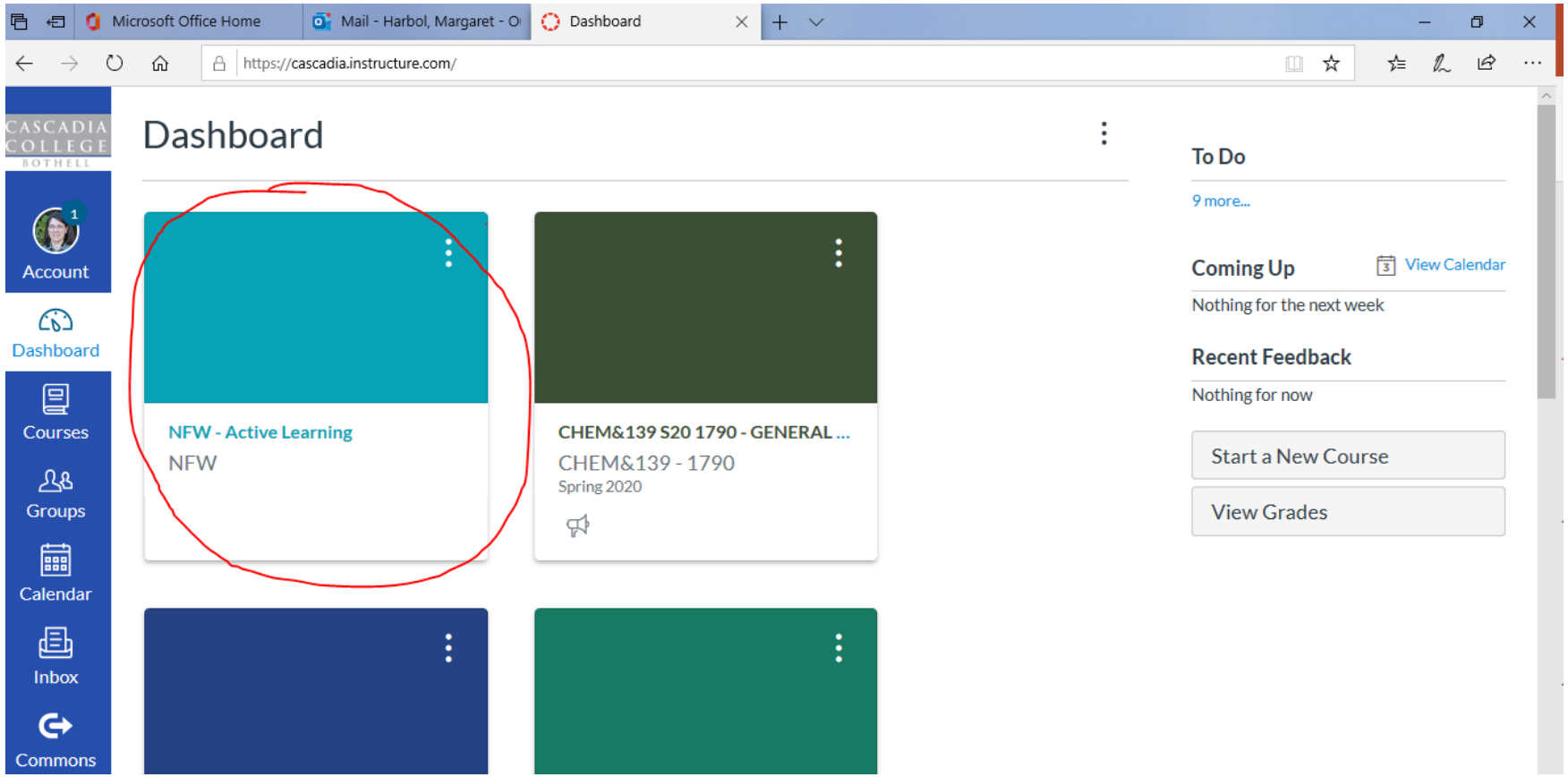
Deliver clear instructions on how the work should be divided

Use google docs or other collaborative platform for record keeping and submission

Use discussion boards for questions, clarifications and follow up

Canvas Course: “NFW – Active Learning”

- You will receive an invitation to the Canvas Course (hosted by Cascadia College) with login information.



https://cascadia.instructure.com/courses/1993790

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▾ Welcome New Faculty Workshop Participants!

Access all content from within the module itself

▸ Titration Curve Activity: July 21 - 23

View Course Stream

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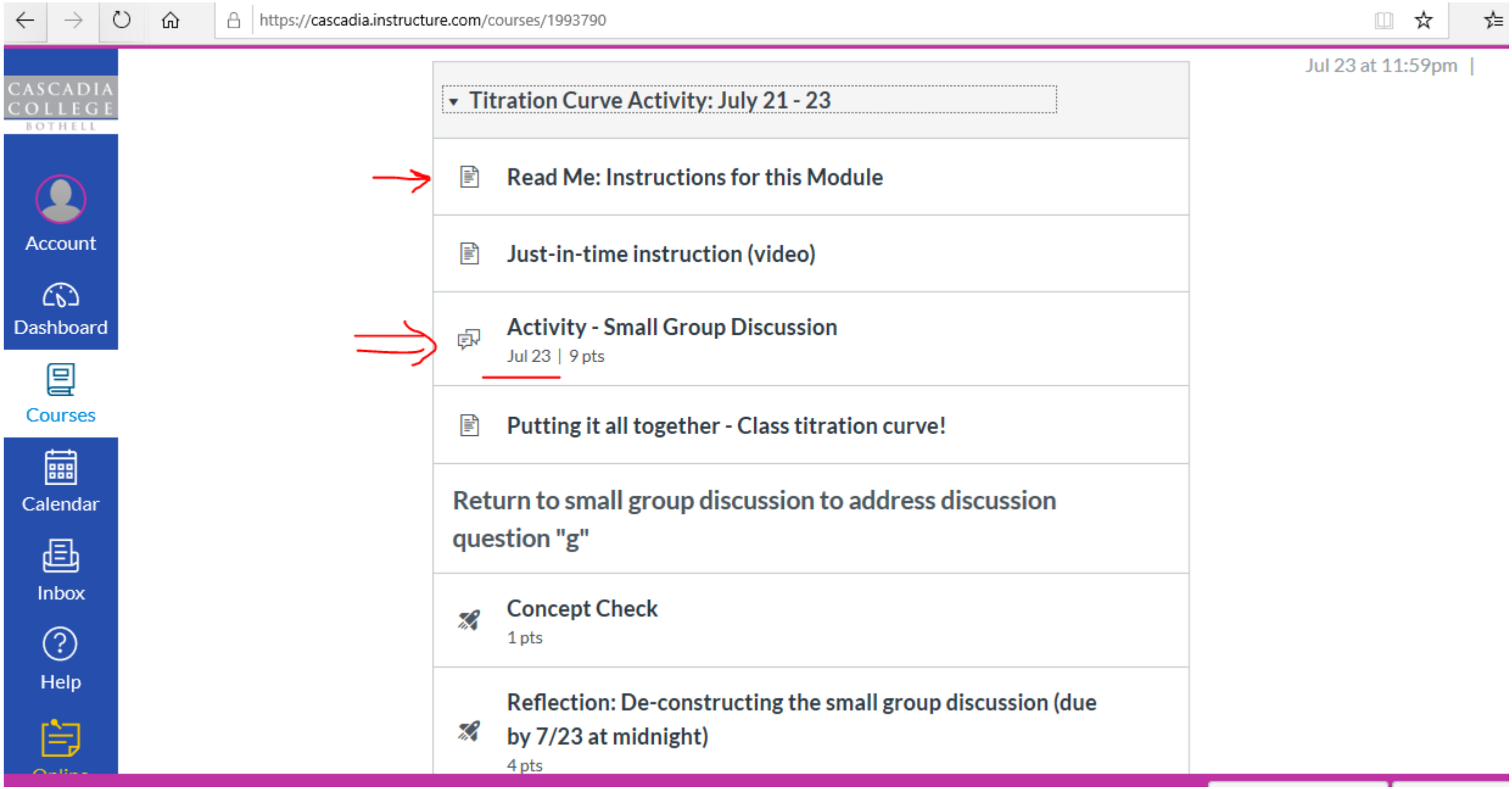
To Do

Activity - Small Group Disc...

9 points |
Jul 23 at 11:59pm |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Inbox
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Jul 23 at 11:59pm |
Titration Curve Activity: July 21 - 23
Read Me: Instructions for this Module
Just-in-time instruction (video)
Activity - Small Group Discussion
Jul 23 | 9 pts
Putting it all together - Class titration curve!
Return to small group discussion to address discussion question "g"
Concept Check
1 pts
Reflection: De-constructing the small group discussion (due by 7/23 at midnight)
4 pts

You will only see your group's discussion:

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Inbox

Help

Modules

Grades

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This is a graded discussion: 9 points possible due Jul 23

Since this is a group discussion, each group has its own conversation for this topic. Here are the ones you have access to:

Activity - Small Group Discussion

Margaret Harbol

This is a small group discussion. You have been assigned to a discussion group - with any luck, this is the same group you worked with during the live Zoom "Active Learning Strategies" session! As a student, you will only see the discussion you have been assigned to.

General Instructions for posting:

1. HOW TO SUBMIT A POST: Click the Reply link immediately below these instructions and type a very short title on the first line (please use ALL CAPS when doing this). Typing the topic in all caps

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Inbox

Help

Jul 23 at 11:59pm |

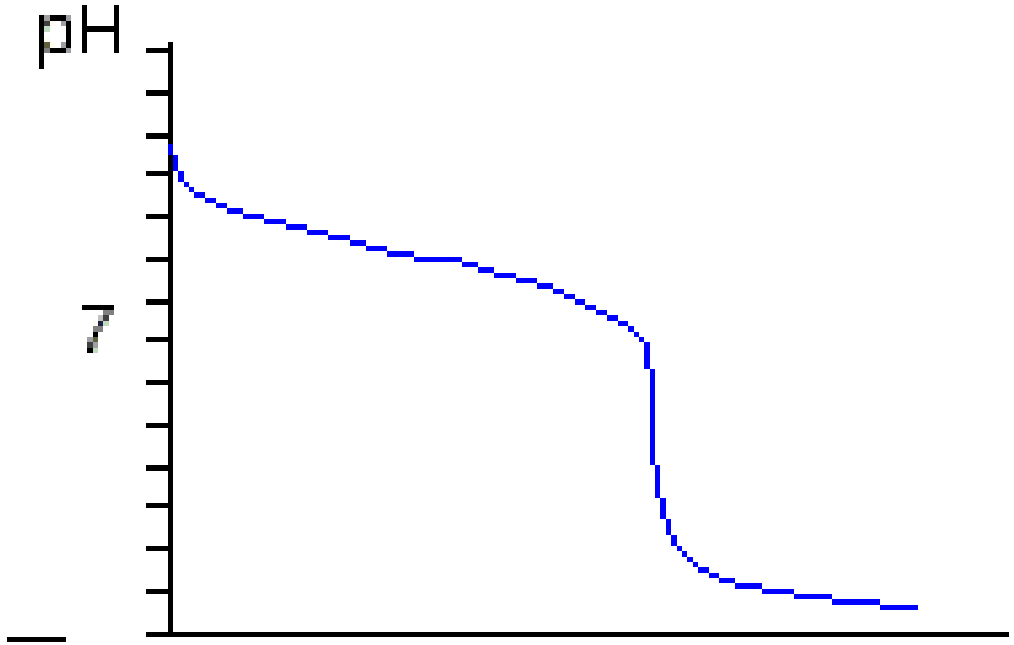
Titration Curve Activity: July 21 - 23

- Read Me: Instructions for this Module
- Just-in-time instruction (video)
- Activity - Small Group Discussion
  Jul 23 | 9 pts
- Putting it all together - Class titration curve!
- Return to small group discussion to address discussion question "g"
- Concept Check
  1 pts
- Reflection: De-constructing the small group discussion (due by 7/23 at midnight)
  4 pts

Assessment

What type of titration is represented by the graph shown?

a. Strong acid with strong base
b. Weak acid with strong base
c. Weak base with strong acid
d. Strong base with strong acid



Chat Storm:

- Consider your answer
- Type <u>but do not send</u> in “Chat”
- I will say “1-2-3 send!”

Debrief

- De-construct the assignment:
  - Order of the questions
  - Student involvement: need everyone’s input
  - Active Learning Strategies used?
  - Scientific Practices – inherently active

Scientific Practices

- Asking questions and Defining Problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations
- Engaging in argument from evidence
- Obtaining, evaluating and communicating information

Next Generation Science Standards taken from NSTA site [*https://ngss.nsta.org/PracticesFull.aspx*](https://ngss.nsta.org/PracticesFull.aspx)

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Engaging in argument from evidence

Critical Thinking

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b. Based on your claim above, predict a value of pH when your substance is by itself in water, in other words, before the titrant is added. No calculations needed. Explain how you chose the value.

Developing and using models to predict

c. As the titrant is added predict what would happen to the above pH? Explain.

Collaboration:

Collaboration

Part II: For the next section, your group is assigned four different volumes of titrant to calculate the pH at each stage. Be specific, show reactions that occur and all steps in your calculations.

a. After _____ mL of NaOH is added:

b. After _____ mL of NaOH is added:

c. at the equivalence point: (you need to determine the volume of NaOH at the equivalence point)

Based on an observation, use mathematical reasoning

d. After _____ mL of NaOH is added:

Reflection:

Self-reflection

e. Analyze the values obtained and relate to your answers in part I. do your values support your predictions, why or why not.

Class results:

Jig-saw (part of full data)

f. Your results will be input in the class excel sheet to create the full graph for the titration. Input your data before the next class.

Asynch. learning – Analyzing data (graphing)

g. Explain the pattern observed for the graph. Use the provided discussion board to input your reasoning.

Asynch. learning – Constructing explanations

Debrief (cont'd)

De-construct *instructor* actions

- Limit materials; Group size; Assigned role of a recorder;
- What is the instructor doing to facilitate learning?

Select content carefully:

- Active learning takes time
- May need to make choices of what content to support in-class:
  - What content requires most support for student understanding
  - What content can students use independent learning skills
  - “What’s the sticking point of this lesson?”

Planning a lesson activity

Consider:

- Your classroom environment (synchronous vs. asynchronous)
- Your style (stretch your comfort zone??)
- Your content/competency/skill/etc.
- Available technology (high tech/ low tech)

- Need Inspiration?

    Peers; workshops; Journals (Chem Ed); literature resources