

COURSE DESIGN WORKSHOP
EARTH EDUCATORS RENDEZVOUS - 2020
JULY 16-17, 2020

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LEARNING OBJECTIVES

1. Describe strategies to promote an inclusive college-level classroom
2. Explain the principal components of the backward design process
3. Analyze sample learning objectives and assessments.
4. Write learning objectives and design assessments for new lessons

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WELCOME BACK! - Schedule

8:00-8:10 Quick content review of Day 1

8:10-8:30 Objective Homework Review
Objective Q&A, deep-dive in chat

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WELCOME BACK! - Schedule

8:30-8:55 Objective Homework Review

You will be randomly assigned to a breakout room.
Discuss your experience writing objectives and steps
you took to make them detailed and measurable
along with any challenges



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ASSESS LEARNING OBJECTIVES WITH A CHECKLIST

1. Is it a clear statement that describes what students should know or be able to do at the conclusion of one lesson?
2. Is it measurable and describe how that measurement is achieved (i.e., Blooms/Fink verbs)?
3. Does it represent specific competencies, skills and/or knowledge that students are to master or demonstrate?
4. Does it avoid jargon and technical language unless specific vocabulary terms are required?



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Learning Objectives ... Check.

What Next?



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FEEDBACK & ASSESSMENT

Assessment - activities that are undertaken to provide information to be used as feedback to modify teaching and learning practices

- **Formative assessment** – low stakes/no stakes, evidence used to measure how well students are learning and to help the teacher to improve ongoing instruction – happens in class (or online).
- **Summative assessment** - the use of data, assembled at the end of a sequence of activities, to provide an overview of learning – happens on exams, homework or graded projects.

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STRATEGIES TO SUPPORT STUDENT LEARNING

Provide assessment and feedback opportunities during class

Active Learning:

1. Students participate in classroom activities (either "Doing" or "Observing") in addition to/instead of listening to direct instruction
2. Activities provide opportunities for student reflection on learning and/or facilitate student/instructor interaction and assessment of learning

Think – Pair – Share

ConceptTests

Minute Papers

Concept Maps

Bornwell & Eison (1991), ASHE-ERIC Higher Education Report No. 1
For more examples of active learning strategies, see McConnell et al., (2017) Instructional Utility and Learning Efficacy of Common Active Learning Strategies, Journal of Geoscience Education, 65, #4

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FEEDBACK & ASSESSMENT

"FIDElity" Feedback

- **Frequent** - where possible give (formative) feedback daily or weekly
- **Immediate** - provide feedback soon after related student work is completed
- **Discriminating** - clearly explain differences between high/low scoring work
- **Empathy** - show understanding for the students when delivering feedback

Adapted from Fink, 2003

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MATCHING ASSESSMENTS W/ LEARNING OBJECTIVES

Match each learning objective with separate defined assessment task Keep small tasks relatively brief – **ConceptTest**, fill-in concept map, Venn diagram

What are the 2 most common gases in Earth's atmosphere?

- A. Carbon dioxide and oxygen
- B. Nitrogen and carbon dioxide
- C. Oxygen and nitrogen

When would the sun be most likely to be overhead somewhere between the equator and the Tropic of Cancer in the Northern Hemisphere?

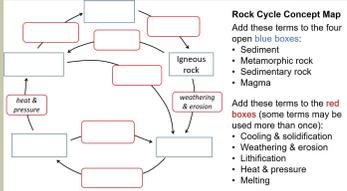
- A. Between the spring equinox and summer solstice only
- B. Between the spring and fall equinox
- C. Between the fall equinox and the winter solstice only
- D. Between the fall and spring equinox

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MATCHING ASSESSMENTS W/ LEARNING OBJECTIVES

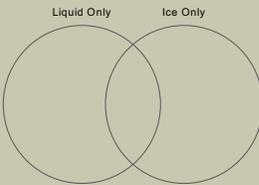
Match each learning objective with separate defined assessment task Keep small tasks relatively brief – **concepttest**, fill-in concept map, Venn diagram



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MATCHING ASSESSMENTS W/ LEARNING OBJECTIVES

Match each learning objective with separate defined assessment task Keep small tasks relatively brief – **concepttest**, fill-in concept map, Venn diagram



- A. Riming
 - B. Aggregation
 - C. Collision-coalescence
 - D. Vapor deposition
 - E. Evaporation
 - F. Sublimation
 - G. Condensation
 - H. Freezing
 - I. Melting
 - J. Hail
 - K. Graupel
 - L. Sleet
- Place the terms in the appropriate places in the Venn diagram.

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MATCHING ASSESSMENTS W/ LEARNING OBJECTIVES

Include at least one learning objective that focuses on higher order thinking skills and/or authentic tasks

- For example: Verbs associated with Bloom's Taxonomy that reflect tasks involving higher order thinking skills objectives include *derive, predict, analyze, design, interpret, synthesize, formulate, plan, correlate, evaluate, create, critique* and *adapt*.

Assessments should be appropriate for both students and instructors.

- Account for student preparation and experience and instructor work-load.

<http://www.cde.tyu.edu/NAECT/objshome.htm#assessment/objectives.html>

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POTENTIAL LEARNING OBJECTIVES

Would you make any changes to the potential learning objectives you wrote for homework?

What is the nature of the changes?

What assessment would you create that matches the revised learning objectives?

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Schedule

9:20- 9:35 BREAK

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OBJECTIVES AND ASSESSMENT

Whip around: In your own words, what connects learning objectives and assessment in the student experience?

9:35 - 9:40

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OBJECTIVES AND ASSESSMENT

Group Discussion:
How do educators traditionally plan these course elements during course design?

How have you planned learning goals, in-class activities and assessment in your past courses?

9:40 - 9:45

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Schedule

9:45 - 10:00 Backwards Design

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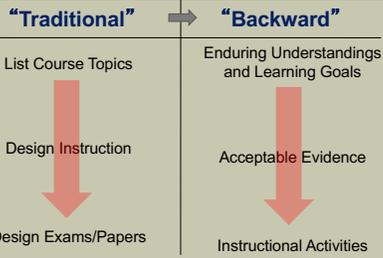
FIVE YEARS OUT...

What Do You Want Your Students to Remember?

- enduring concepts (e.g., democracy, equilibrium)
- how to **transfer knowledge** to novel circumstances
- how to **engage in critical inquiry** and analysis
- **know how** to get and evaluate information
- be able to communicate competently using a wide variety of media
- habitually seek, respect and use **diverse perspectives** in problem-solving
- see **ethical problems** and make ethical choices

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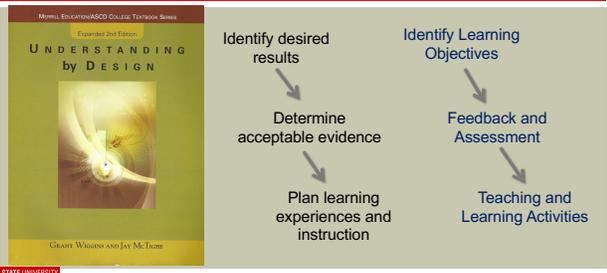
START WITH THE END IN MIND



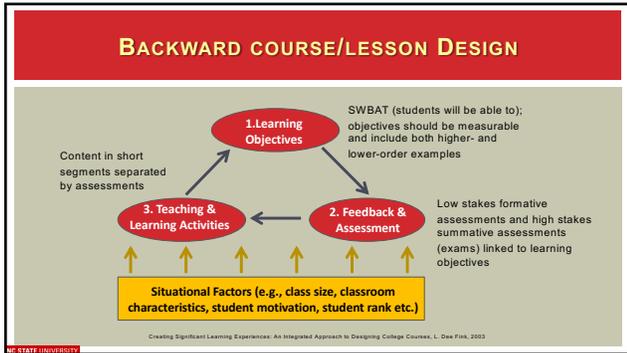
Wiggins and McTighe (1998)

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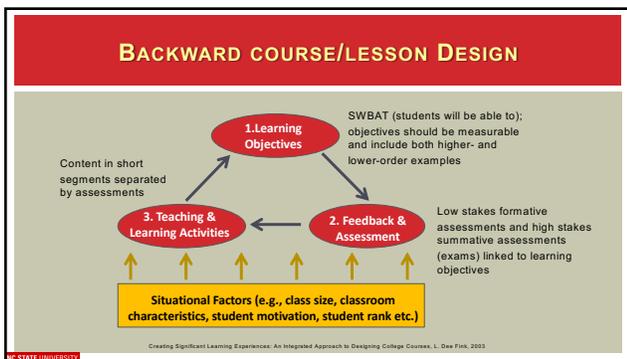
BACKWARD DESIGN IS OUTCOME BASED RATHER THAN COURSE TOPICS



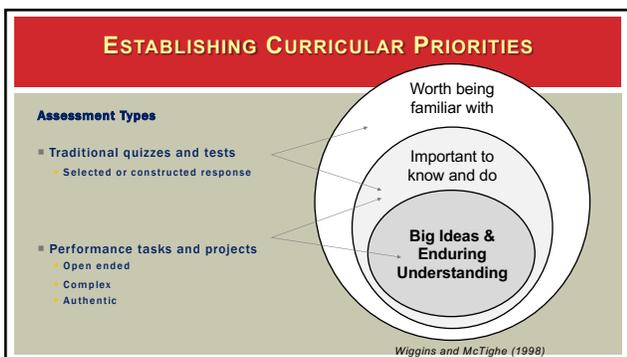
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HELPFUL LINKS

- Understanding By Design
 - <https://cft.vanderbilt.edu/guides-sub-pages/understanding-by-design/>
- What is backward Design?
 - <https://educationaltechnology.net/backward-design-understanding-by-design/>
- Backwards Design Tool: One Teacher's Journey and Process in NGSS
 - <http://www.mtscienceducation.org/toolkit-home/from-1d-to-3d/backwards-design-tool/>

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OBJECTIVES AND ASSESSMENT

Group Discussion:
How do you think can we put backwards design into practice during our course design?

10:00 - 10:10

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HOW TO APPLY BACKWARDS DESIGN

Reginald General Discussion:
How I put backwards design into practice?

10:10 - 10:15

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HOW TO APPLY BACKWARDS DESIGN

Jason's NCSU Example:
Separate PowerPoint

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LESSON DESIGN RUBRIC

Five categories, 10 items to consider:

- Learning objectives
- Assessment and Feedback
- Resources and Materials
- Instructional Strategies
- Alignment

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High Structure Course Template

Multiple features to support student learning via Backward Design

- Identify clear learning objectives
- Create tasks (assessments) associated with learning objectives.
- Provide students opportunity to practice tasks or task components during class (formative assessment, active learning).
- Match measurable summative assessments to learning goals as directly as possible.
- Be explicit with how these actions help support learning

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Schedule

10:30 - 10:50 Brainstorm goals for your upcoming course and generate a plan for revision via lesson design rubric

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Schedule

10:50 Workshop Evaluation

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END OF DAY 2

THANK YOU!!!

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