

Backward Design for Effective Lesson Planning

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Outcomes: By the end of this session, participants will be able to...

- ***Write or otherwise produce specific, student-centered, measurable learning objectives***
- ***Identify valuable sources of learning objectives***
- ***Describe criteria by which to select learning objectives for use in a lesson or course***
- ***Justify alignment of assessments and activities with chosen learning objectives***

Warm up: Brainstorming What is/are the goal(s) of good teaching?

Backward Design: an introduction

Backward Design is a method of designing educational curriculum by setting goals before designing assessments or choosing instructional methods.

Backward design of curriculum typically involves three stages:

- **Goal setting:** Identify the results desired, *learning objectives*
- **Assessment:** Determine acceptable levels of evidence that the desired results have occurred
- **Instructional Approach:** Design activities that will make desired results happen

A more detailed framework to apply backward design to any teaching setting:

Motivating Question:	Key Considerations:	Filters & Criteria:	Result:
Objectives: What is worthy of learning or necessary to understand?	Existing curricula, standards, instructor expertise, future coursework expectations, student population...	Enduring ideas, opportunities for authentic, discipline-based work, engagement...	Lesson framed around enduring understandings and essential questions, free of unnecessary or distracting information
Assessment: What will be the evidence of understanding?	Levels of understanding + a continuum of assessment types	Valid, reliable, sufficient, authentic work - feasible, student-friendly, non-punitive	lesson/unit anchored in credible evidence of the desired understandings
Teaching Approach: What learning experiences and teaching approaches promote understanding, interest and excellence?	Research-based repertoire of learning and teaching strategies. Match to instructor style and student engagement, knowledge and skill	Key purpose of a given approach: Are students realistically equipped? Is it feasible? Can it be evaluated? Revision based on observation and experience.	Coherent learning experience that will evoke and develop desired understandings, promote interest, make excellent performance more likely

from "Understanding by Design" from the Vanderbilt University Center for Teaching
<http://cft.vanderbilt.edu/guides-sub-pages/understanding-by-design>

What are the characteristics of a “good” learning objective?

Improving Learning Objectives: Examine the sample learning objectives from your field of study. (for those who could not attend the session, learning objectives from a wide variety of courses can be found online). With your neighbor, select one that you feel could be improved. Using the **Bloom’s Taxonomy** on the next page for inspiration, alter one of the sample learning objectives. Be prepared to discuss your changes and why you made them, based on the characteristics of “good” learning objectives.

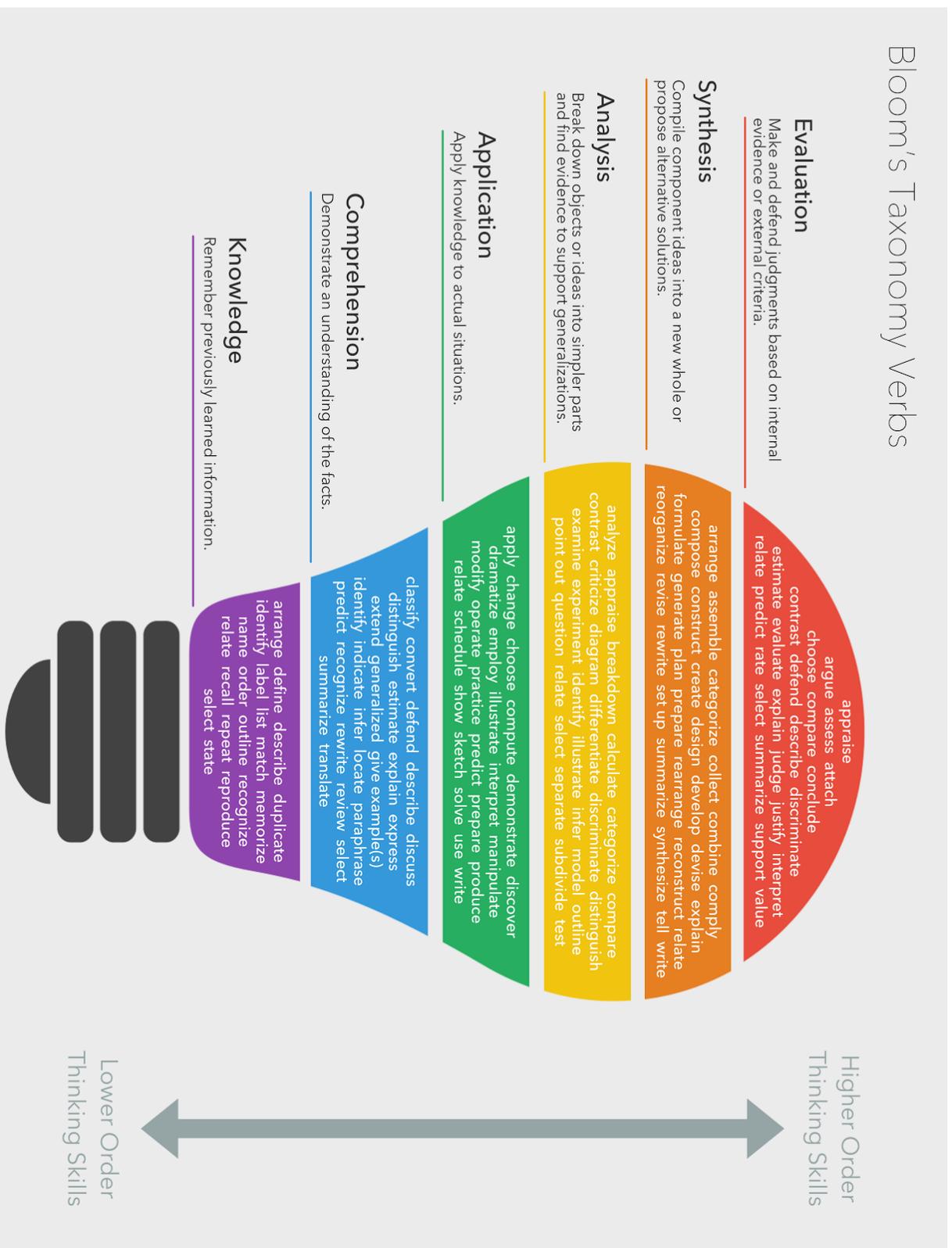
Original LO:

Improved LO:

Discussion: How are good learning objectives related to assessments and teaching approaches?

What are the dangers of planning teaching approaches and assessments without good learning objectives (i.e. *backward* backward design)?

Bloom's Taxonomy Verbs



One example of Bloom's Taxonomy:

Some tools you might find useful after today's session:

Checklist for refining topic-level objectives

- Is the goal expressed in terms of **what the student will achieve or be able to do?**
- Is the goal **well-defined**? Is it clear how you would **measure achievement**?
- Do chosen verbs have a **clear meaning**?
- Is terminology familiar or common? If not, is the **terminology itself a goal**?
- Does the goal **align** with your course-scale goals?
- Is the Bloom's level of the goal aligned with your **actual expectations**?
- Do your goals cover an appropriate **range of types of knowledge**?
- Is the goal **relevant and useful** to students?

Other resources:

“Understanding by Design” from the Vanderbilt University Center for Teaching
<http://cft.vanderbilt.edu/guides-sub-pages/understanding-by-design>

Iowa State University Center for Excellence in Learning & Teaching 3D Bloom's Taxonomy
<http://www.celt.iastate.edu/wp-content/uploads/2015/09/RevisedBloomsHandout-1.pdf>

A Private Universe (documentary: Harvard-Smithsonian Center for Astrophysics, 1987) <https://www.learner.org/resources/series28.html>



Exit Ticket: Below are the learning objectives I set for today's session. Please

1. Rate on a scale of 1-4 how well you feel you have achieved each goal based on our work today (4 = very well, 1= not well at all)
2. Please, improve or alter one or more of the objectives to make them
 1. more manageable for you
 2. more measurable by me
 3. more appropriate for what you want to learn
 4. Anything else! I appreciate your feedback

After this session, participants will be able to...

- 1 2 3 4** *Write or otherwise produce specific, student-centered, measurable learning objectives*
- 1 2 3 4** *Identify valuable sources of learning objectives*
- 1 2 3 4** *Describe criteria by which to select learning objectives for use in a lesson or course*
- 1 2 3 4** *Justify alignment of assessments and activities with chosen learning objectives*

Session Plan:

Activity:	Description	Material(s)	Time:
Do Now	<p><i>Projected Instructions as participants enter:</i> “Please come in and find a seat with/near your discipline.</p> <p>Write or brainstorm about the following question in the space provided on your session handout: What is/are the goal(s) of good teaching? Can you recall a time when you experienced great teaching in a science or math course? What made it so effective for you?”</p>	Projected slides, session handouts, cards/sticky notes designating options	5 min
Intro, motivation	<p>Quick share-out of brainstorming while I record on the board</p> <p><i>Have you ever had a bad vacation? If so, why was it bad? Why is it (hopefully) unusual to have a bad vacation?</i></p> <ul style="list-style-type: none"> • Backward design (to me) doesn’t really seem backward now that I understand how to apply it, because it turns out that we use this process to plan lots of things in our lives, albeit unconsciously. Here’s an example, and I’ll try to apply the stages of backward design a little formally so that we can identify the steps in the planning process. If you’ve learned about this approach before, please, no spoilers! • Walk through vacation goal setting, assessment & activities. What does it look like to explicitly apply backward design to something like a vacation? A bit weird, seems unnecessary? • What does it look like when we apply faulty lesson/curriculum design to something like a vacation? Absurd. <p>CTQ: So, why is it unconscious/implicit how to plan an “effective” vacation but planning an effective lesson is often elusive? We don’t automatically tend toward a goal-oriented planning process</p> <ul style="list-style-type: none"> • Facilitator solicits responses to this question and attempts to guide participants 	Projected slides, session handouts	8 min

	<p>to the idea that setting goals for the needs of others is challenging. We must employ empathy for learners who differ from us and we must acknowledge and avoid our expert bias</p>		
<p>Direct Instruction & modeling</p>	<p><u>Transition:</u> justification for today’s focus on learning objectives</p> <ul style="list-style-type: none"> • Often invisible to students (as opposed to assessment and teaching approaches/activities) • Can be difficult and daunting to write/produce good ones • Strong, well-written learning objectives set you up to produce aligned activities and assessments... Why is this?: <p>Project some sample learning objectives from STEM courses</p> <ul style="list-style-type: none"> • Components of good learning objectives: <ul style="list-style-type: none"> • Action oriented, participant-centered, measureable • Examples of sub-optimal learning objectives (discipline specific, distributed in folders around room) <ul style="list-style-type: none"> • Why are these not as useful as the previous set? • How can they be improved? Specifically, what’s wrong with “understand”? <p>Task: Use Bloom’s Taxonomy (on handout) to improve one or more of these learning objectives. Why did you choose the verb you did? How would choice of a different verb impact your assessment? Your instructional approach ? The students’ experiences?</p> <p>CTQ: How does alignment of objectives, assessment and activities affect instruction and student outcomes?</p>	<p>Slide: good LOs</p> <p>Folders containing sub-par LOs from various courses</p>	<p>10 min</p>
<p>Task: guided practice</p>	<p>CTQ: How can we design good learning objectives from scratch? What are some good sources? What are the criteria we should use to</p>	<p>Scrap paper</p>	<p>15 min</p>

	<p>decide what our objectives should be in the first place?</p> <ul style="list-style-type: none"> Facilitator will solicit suggestions and attempt to guide participants to misconceptions as a potential source for designing useful learning objectives. This is also a good source for TAs because they can observe confused students in class and then actively design office hours, recitations or review sessions to bring out and correct these misconceptions or other gaps in understanding. <p>Intro: individually and privately, please draw a diagram on your scrap paper that you feel represents why we experience seasons on the planet Earth.</p> <p>Content: Harvard seasons misconceptions video: https://www.youtube.com/watch?v=p0wk4qG2mlg</p> <p>Think, Pair, Share: Imagine you have just been hired to teach a planetary science/astronomy course at Harvard and you've seen this video.</p> <ul style="list-style-type: none"> Take 1 minute and consider what students would need to understand to overcome this common misconception. Turn to your neighbor and share your thoughts. Together, write a learning objective that meets the criteria we identified earlier We will hear some examples from volunteer pairs after 5 minutes <p>Extension: How can we make assessments and activities that are aligned to this objective? Ex: Imagine a pre-assessment like the one I just gave you.</p> <ul style="list-style-type: none"> What would a good assessment be? (individual question, task; formal or informal). What activities could you design to introduce, reinforce or provide practice tied to the objective you just wrote? 	<p>Packet</p> <p>Packet</p>	
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	<p>Keep in mind the verb -> the type and level of understanding you expect from your students based on your stated learning objective?</p> <p>CTQ: Based on your discussion of the assessments and activities, did any of you want to revise your learning objective? If so, why?</p>		
Summary	<p>Consider this list of learning goals I set for this session. On a scale of 1-4, rate how well you feel you achieved each goal <i>based on this session</i>. If warranted, please improve one or more of the goals i.e. to make them more manageable for you, more measureable by me, or more appropriate for what you want to learn</p>		3-5 min