PBEA
PLANT BREEDING E-LEARNING IN AFRICA

Professional Learning Communities

Introduction to Lesson Plans & Improving Lectures

Your name:
Position:
Background:

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Basic Information on Plant Breeding in Africa E-Learning Modules

The goals of this project are to provide you up-to-date cutting edge content curriculum materials to you.

Reminders:

PBEA website: https://pbea.agron.iastate.edu/

PBEA Course Instructor Guide: https://pbea.agron.iastate.edu/plc/plant-breeding-e-learning-module-discussion/course-guide-pbea-molecular-plant-breeding

Professional Learning Communities Goals:

- To assist African professors with integrating the PBEA e-learning modules into their classroom curriculum
- To assist African professors with improving overall instruction

PBEA- PLC webpages to assist your instruction:

https://pbea.agron.iastate.edu/

Get signed in by following the login prompts: If you need assistance contact Walter Suza at wpsuza@iastate.edu

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Teaching & Learning Mini-Symposium

Welcome to the teaching and learning mini-symposium.

You play a significant role in determining student success in plant breeding. This workshop will help you learn some practices and skills that will aid you in becoming a better instructor.

This module has two parts. Part 1 will cover lesson planning and Part 2 will cover how to improve your lectures.

Ice-breaker

Describe your most effective teacher?

What did he/she do in the classroom that made them effective teachers?

Ice Breaker follow-up:

Effective instructors:

- Plan (goals & objectives)

- Understand content and how students learn

- Focus on student learning

- Create opportunities for students to transfer the material

- Are: Enthusiastic, Approachable & Helpful

Hildebrand, M., Wilson, R.C. & Dienst, E.R. (1971). *Evaluating University Teaching*. Berkeley, CA: UC Berkeley, Center for Research and Development in Higher Education.

AGENDA

- Overview of the PBEA website

- **Part 1: Lesson Planning**

    – The Basics

    – The ABCD of Lesson planning

    – Bloom's Taxonomy

    – Assessments

    – Teaching Strategies

    – Domains of Learning

– Maslow's Hierarchy of Needs

– Practice

Part 2: Improving Lectures

– The Basics

– Breaking up Lectures

– Writing good questions

– How to ask and respond to questions

– Putting it together

Part 1: Lesson Planning

Participants will:

- review information on the importance of planning lesson

- practice developing a learning objective

- practice identifying an assessment strategy for the objective

- practice identifying teaching strategies that align with the objective and assessment.

What is lesson planning?

Would you start a trip across country without a roadmap?

Planning lessons and units help you to ensure students are learning the right things in a way they can remember and synthesize the material. What you do as an instructor matters.

If you fail to plan you plan to fail.

Lesson Planning Part 1: Components of a Lesson Plan & Objectives

- Objectives

- Teaching/Learning Activities (Procedures)

- Evidence (Assessments)

It also includes an:

- Interest approach-

- Supporting materials/information-materials, references

Lesson Planning Steps (using Backward Design)

The order in which you create the lesson plan is, well backward.

You identify what you want students to learn by creating the objective first.

Identify Results and Learning Objectives

Then you figure out how you know that they learned the concept or skill or objective by assessing or evaluating student learning.

Determine Acceptable Evidence and Assessments

Then you plan what content, activities, or strategies will help you help students learn.

Plan Learning Experience and Instructional Methods

Wiggins, G. & McTighe, J. (2006). *Understanding by Design*. Alexandria Virginia: Association for Supervision and Curriculum Development.

Learning Objectives

Components of Learning Objectives

Audience – the intended learner (i.e. MSc Plant Breeding Students or it could by local farmers)

Behavior- what is the student supposed to be able to do as a result of the lesson? (i.e. students should be able to label the lesson plan components, or students should be able to develop a breeding plan)

Condition- what are the resources, equipment or tools you need for students to learn this. (i.e. plant samples, spectrophotometer)

What environment do you need to place them in? (i.e. a lab on genetic diversity)

Degree- what is the acceptable level of performance? (i.e. 9 out of 10 times, without error, within 60 seconds, using information from past lectures)

Learning Objectives

Activity: Can you identify the 4 components of a learning objective in the objective below?

> **Given a learning objective, faculty will identify learning objective components without error.**

- What is the:

- **A:**

- **B:**

- **C:**

- **D:**

Is this objective observable and measurable? Why is this important?

Bloom's Taxonomy: A tool that can help you create good objectives

Bloom's Taxonomy is a framework that can assist you with creating good learning objectives and developing good questions to ask student's during class or on assessments. It is based on 6 categories that represent lower to higher levels of cognition.

- **Remember** – retrieve knowledge from long term memory
- **Understand** – construct meaning
- **Apply** – perform a task using knowledge
- **Analyze** – differentiate, organize, and attribute knowledge
- **Evaluate** – Judge and critique knowledge
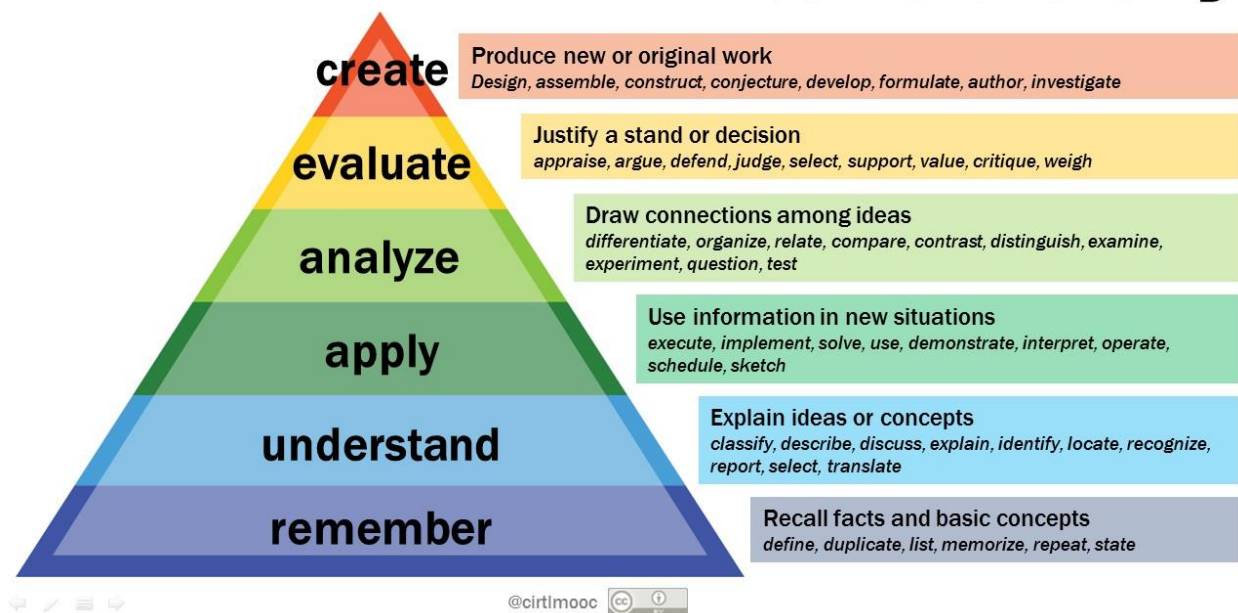- **Create** – generate and produce new knowledge (Bloom's Taxonomy)

Look at the Bloom's Taxonomy graphic. Some of your objectives will be designed to help students remember facts or basic concepts, and some will require students to apply or to analyze information. Many instructors concentrate on the lower cognition levels (remember or understand levels) in their objectives, questions or assessments.

Is this a good or bad thing?

You can assist students in understanding the materials more robustly by also creating objectives using higher cognition levels (apply, analyze, evaluate, & create).

Bloom's Taxonomy

create — Produce new or original work
Design, assemble, construct, conjecture, develop, formulate, author, investigate

evaluate — Justify a stand or decision
appraise, argue, defend, judge, select, support, value, critique, weigh

analyze — Draw connections among ideas
differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test

apply — Use information in new situations
execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch

understand — Explain ideas or concepts
classify, describe, discuss, explain, identify, locate, recognize, report, select, translate

remember — Recall facts and basic concepts
define, duplicate, list, memorize, repeat, state

@cirtlmooc

Creative Commons Bloom's Taxonomy Graphic. Credits to Vanderbilt University.

Look at the REVISED Bloom's Taxonomy Action Verbs in the back of the booklet. This should be your **GO to TOOL** when creating meaningful objectives.

Learning Objectives

Activity: Identify the ABCD of lesson planning using this objective.

- Crop Improvement students will demonstrate pedigree writing with 100% accuracy when given the Pedigree Naming Systems and Symbols PBEA Module. Name the ABCD

- A

- B

- C

- D

Let's Practice

Write learning objectives for your lesson. Include the ABCD components and use your GO to TOOL (Bloom's Taxonomy verb sheet).

_____

- A_____
- B_____
- C_____
- D_____

Lesson Planning Template

Now that you have an objective you can enter it in the lesson plan template. The template is available hard copy at the end of this module. Also a fill-in-able online form is available on the PBEA-PLC website:
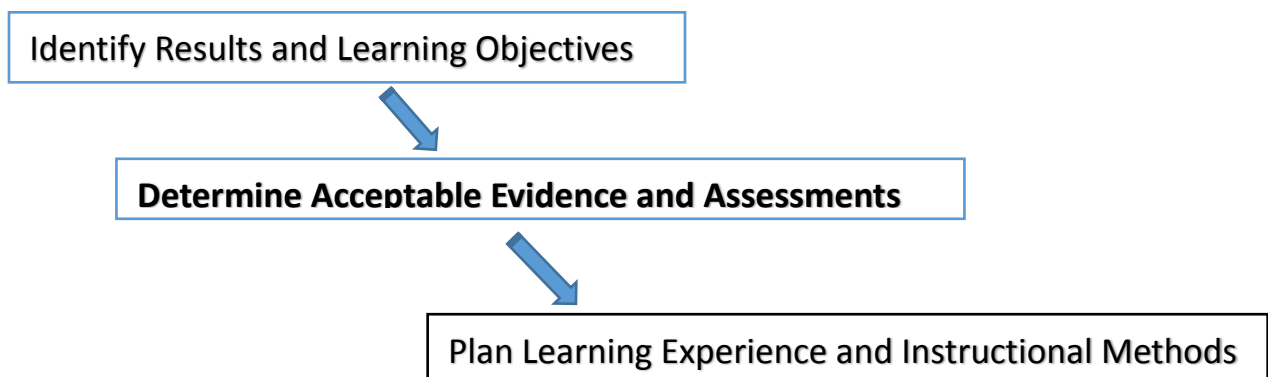
https://pbea.agron.iastate.edu/plc/Lesson%20Development%20&%20Delivery

LESSON PLANNING TEMPLATE

Lesson Title:

Course: Module: Unit:
Core Competency: Author: Time:
Materials:

Objectives	Procedures	Assessments

Lesson Planning: Evidence & Assessment
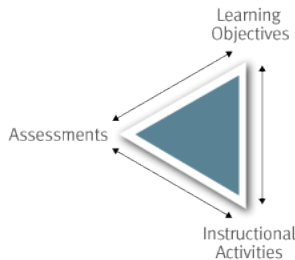
You just identified your results and learned about learning objectives. Now let's take a look at that assessment piece.

Identify Results and Learning Objectives

↓

Determine Acceptable Evidence and Assessments

↓

Plan Learning Experience and Instructional Methods

Wiggins, G. & McTighe, J. (2006). *Understanding by Design*. Alexandria Virginia: Association for Supervision and Curriculum Development.

Basic Principles

Align objectives with instruction and assessment. "Assessments should reveal how well students have learned what we want them to learn while instruction ensures that they learn it. For this to occur, assessments, learning objectives, and instructional strategies need to be closely aligned so that they reinforce one another. To ensure that these three components of your course are aligned, ask yourself the following questions:

2. **Assessments:** What kinds of tasks will reveal whether students have achieved the learning objectives I have identified?

3. **Instructional strategies:** What kinds of activities in and out of class will reinforce my learning objectives and prepare students for assessments?

1. **Learning objectives:** What do I want students to know how to do when they leave this course?

From: Carnegie Mellon. (2018). Why should assessment, learning, objectives and instructional strategies by aligned. Retrieved from https://www.cmu.edu/teaching/assessment/basics/alignment.html

Types of Student Assessments

Formative Assessments – are designed to monitor student learning by providing on-going feedback. This feedback can be used to improve your teaching and to help students improve their learning. On-going and continuous assessment is key to the learning process.

- Written reflections
- Polls/Surveys
- Quizzes
- ALA/Case Studies

Summative assessments - are designed to evaluate student learning at the end of a unit against some standard or benchmark.

- Final Exam
- Final project, paper, presentation
- Portfolio
- Standardized tests
- ALA/CASE Studies

Activity – Alignment

Outline an "aligned/coherent example" from a lesson that you have or will teach in your plant breeding program. Write a sentence or two for each the following aspects:

Objective	
Instruction/Procedure	
Assessment	

On your Lesson Plan Template make any changes to how you will assess students based on the objective you created and this new information.

Review a Tutorial on Writing Good Multiple Choice Questions

At: https://cft.vanderbilt.edu//cft/guides-sub-pages/writing-good-multiple-choice-test-questions/

Brame, C. (2013). Writing good multiple choice test questions. Vanderbilt University.

Lesson Planning: Teaching Strategies (Procedures)

How do we get from…..

Objectives   to   *Assessment*

Teaching Strategies!

Teaching strategies are a conduit between the learning objective and the assessment. They are also a mechanism for facilitating learning, presenting information and helping students learn concepts.

*A golden rule of teaching is: Variety is the Spice of Life.*

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Domains of Learning

To assist you in developing a variety of teaching strategies is the three domains of learning. These include: Cognitive, Psychomotor and Affective. Read through the definitions and the types of methods some instructors use to reach students through the three domains. Under the "Your Ideas" column write down the methods you would use in your class.

Domain	Definition	Methods	Your Ideas
Cognitive	Knowledge- the mental skills	Lecture Discussion Case Studies Demos and Labs ALA's	
Psychomotor	Manual or physical skills (requiring practice- measured in precision, speed, procedures, techniques)	Data recording in Excel Pipetting Practice Labs Exercises	
Affective	Growth in emotions, feelings or values	Opportunities to: Question Communicate Lead Gain trust Be professional	

A bit more on the Affective Domain. Professors that attend to helping students feel comfortable in class can actually improve student motivation.
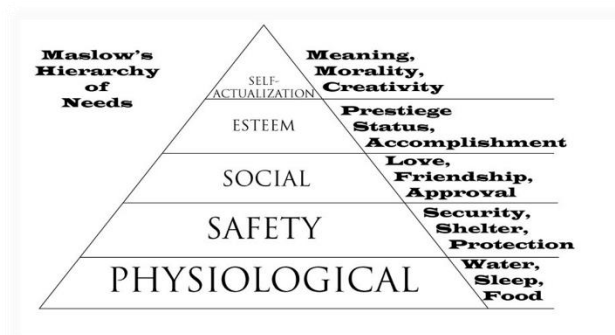
What does this graphic say about how well students will learn if their needs are not met?

What do you believe are the best methods?

Some things to think about when choosing methods:

☐ Are they practical? How does the method apply to my students and their course, degree program, career?

☐ Do they improve motivation or reduce barriers to motivation? : How will this lecture or activity help motivate the students to learn the material and to seek out further learning? .

☐ Do they fit with the objectives you are trying to achieve?

☐ Do they help students bust previously held assumptions about the content?

☐ Do they help you assess student understanding of the concept or assess if they can apply the skill you taught them?

Part 2: Improving Your Lectures

Participants will:

- Review the benefits and downfalls of lectures
- Review how to improve effectiveness of lectures from the student's perspective
- Practice including a Lecture Break-up method in their lesson plan
- Practice asking good questions
- Review how to ask and respond to questions

Watch the Ferris Bueller Video at: https://www.youtube.com/watch?v=wZOy6w6UsMY

What is your reaction to the classroom video clip?

What key message did you take away?

How is this relevant to your role as a teacher?

As you go through this section. Jot down at least 10 ways anyone can improve lectures.

Why do we Lecture?

Past

Present

University classrooms haven't changed much since the days of Socrates. Lecturing is still the primary teaching technique used by many University faculty. For centuries professors had to lecture, because of the lack of books and resources. Even though there is much more access to information on all topics, lectures still predominate as the go-to teaching method at Universities.

Reasons:

- **Tradition:** we were taught by professors using lecturing as their primary teaching strategy and it worked for many of us. We are used to this method.
- **Efficiency** because it is assumed that creating a lecture is less time intensive than creating a lesson plan using a variety of other methods, and if more students are admitted into the class there are less time/resources needed to add them.
- **School infrastructure** because Universities throughout the decades have invested in creating classrooms that are best used to deliver lectures (unmovable seats all directed toward the front, etc.) and it is difficult for faculty to work around this.

Benefits & Downfall of Lectures

Lectures are Effective for: transmitting information. They are equal to reading, watching videos, etc.

Lectures are believed to be Ineffective for: promoting thought, changing attitudes, values and perspectives and teaching behavioral skills.

- Better for understanding concepts are: case studies, simulations- along with a lecture.
- Better for changing attitudes, values and perspectives are: interactive peer activities
- Better for behavioral skills are: hands-on, practice, exercises where you use the skill repetitively.

Lecture effectiveness increases if:

Faculty break-up lectures every 20-30 minutes by using active learning or interactive techniques.

Breaking up Lectures helps students:

- Focus

- Understand errors in thinking (misconceptions)

- Improve understanding by using the concepts or skills immediately

- Build brain neural connections for better recall and transfer to novel settings

- Build Trust

- Increase motivation

Freeman, S., Eddy, S., McDonough, M., Smith, M., Okorafor, N. Jordt, H. & Wenderoth, M. (2014). Active learning increases student performance in science, engineering, and mathematics. Washington D.C.: Proceedings of the National Academy of Sciences of the USA.

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How to Break-Up Lectures?

- Ask <u>good</u> questions

- Develop a memory device

- Solve a short problem or scenario

- Work a problem

- Do a note checks

- Playing a game

- _____

Every 20-30 minutes

Activity: Breaking up Lectures

Here are four easy interactive techniques that can help you **Break-up** your lectures. Pick one and decide how to include it in a Lesson Plan.

☐ **Method 1: EXAM QUESTIONS**

Alone or in pairs, or groups of three, students write an exam question about the material just covered in class. Write these on the board and ask other students to critique them (give specific criteria). You can collect all of the questions in writing; using the best ones on the exam!

☐ **Method 2: MINUTE PAPERS**

At the end of a class or section of material, ask your students to write for one or three minutes. Questions such as: "What was the most important point of today's class or "What questions do you still have about this material?" gives you important feedback about the student's comprehension and a useful starting point for the class discussion.

☐ **Method 3: THINK-PAIR-SHARE:**

Pose a question which requires analysis, evaluation, or create (See Bloom's taxonomy verb sheet).   Each student thinks or writes on this question for a minute, then turns to the person next to him to compare ideas. Then the pairs share their ideas with some larger group (pairs of pairs, table, or the whole group).

☐ **Method 4: PRESS CONFERENCE:**

Alone or in pairs, students generate press-conference style questions to as you or a panel of students who had been assigned to prepare on the topic. (Who, What, When, Where, Why and How are press conference style questions).

Which activity did you choose?

How do you plan to use it?

Trying one of these each week will help you gain skill in adding interactive components in your lecture. Remember if it doesn't work the first time- try it again, just like your students you will get better with practice.

Using Questions to Break-up Lectures

The most common way to Break-up Lectures is by asking questions.

What do Good Questions Do?

- ✓ Involve students in the lesson
- ✓ Increase motivation
- ✓ Evaluate student's preparation
- ✓ Assess achievement of goals and objectives
- ✓ Check on work completion
- ✓ Develop critical thinking skills
- ✓ Review previous lesson
- ✓ Nurture insights
- ✓ Stimulate independent learning

So, what is a good question?

Good questions help students think more deeply about the course concepts. Good questions stimulate memory or recall, understanding, application, analysis, evaluation or creativity with the content. Remember Bloom's Taxonomy?

Good questions are generally open-ended versus closed. An open ended question usually starts with "How", "Why", "For what reason.". Lower ended questions usually start with "do you" or "what are."

Good questions fit with the objectives you have created for that lesson. But remember to attended to asking higher order questions as instructors have a tendency to rarely ask them.
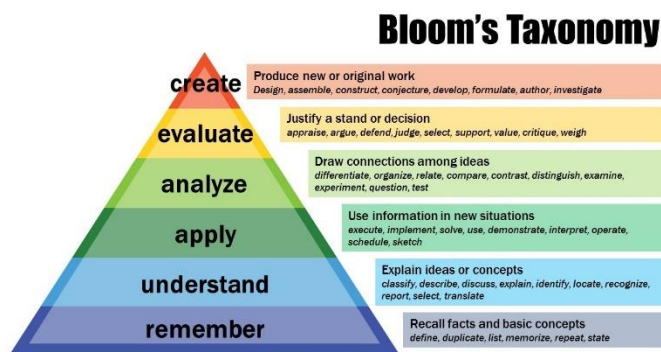
Creative Commons Bloom's Taxonomy Graphic. Credits to Vanderbilt University.

Planning Lecture Questions

At the beginning of your lecture ask an Advanced Organizer Question	to focus attention on lecture concepts, stimulate a reason to be engaged, to motivate.
In the middle: Ask Cognitive Rehearsal Questions	to summarize, elaborate, extend the concept or hint at the next class session
At the end: Ask Summary Questions	to summarize, elaborate, extend the concept or hint at the next class session

Activity- Asking Good Questions in your Lecture

In 5 minutes or less write three questions using your lesson plan objectives that:

Question 1: stimulates engagement	
Question 2: assesses student understanding	
Question 3: summarizes, elaborates, or extends the concept or hints at the next class session	

Putting it together: Lecture plan using questions

Although lesson plans can cover a week, a unit, or an entire course, planning what you are going to do in a lecture is a great place to start.

Below is an example of how you might write up your lecture procedure in a way that reminds you to think about and write out your questions before you get to class. Don't forget to use what you have already learned about Bloom's taxonomy, Domains of Learning and Asking & Responding to Questions.

Along with your procedure add the questions you would like to use and the specific method (s) you will use to attend to student's cognitive, psychomotor or affective needs.

Example	Your Lecture Procedure

Lecture Outcomes/Objectives
 Procedure (50 minute Lecture)
 1. Advanced Organizer Question (5 minutes)
 _____
  Use the Lecture Break-up method: Pair-Think-Share.
  It is okay if they can't answer the question because your lecture will help them understand what they just did.
 	
 2. Lecture (20 minutes)
 3. Ask a Cognitive Rehearsal (5 minutes) Question:_____
           (that elaborates on the content)
 4. Lecture (15 minutes)
 Ask students to practice using the concept by performing an exercise.
 5. Ask a Summary Question (5 minutes)
 _____using a
 Break-up method: Mini-paper
 Tomorrow
 Assessment- Next period ask students to fill out a 5 question quiz, based on information covered. Then go over the answers. Assess if the majority of students understand, if so move on, if not, go over what they don't understand.	

How to Ask & Respond to Questions

How a question is asked can help students understand what is being asked and can elicit better answers.

How you respond to student's questions can also impact the quality of answers.

Here are a few pointers:

Asking Questions

- One question at a time (don't nest).

- Wait-time (5 seconds)

- Don't interrupt

- Show interest (smile)

- Mix-up who responds

- Allow students to build on others knowledge

Responding to Questions

- If incorrect- follow-up with another question

- Check indiscriminate praise

- Be available to answer questions-email or after class, during office hours.

A good way to increase student respond to questions is to modify the class room arrangement. Just by asking students to fill in the chairs at the front or changing how you arrange the desks in your classroom can signal to students that they need to be more engaged.

How would you arrange your classroom to get the maximum response from students?

Lesson Title:

Course: **Module:**   **Unit:**   **Materials:**

Core Competency: **Author:**   **Time:**

Objectives	Teaching Strategies/Procedures	Assessments

REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon.

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