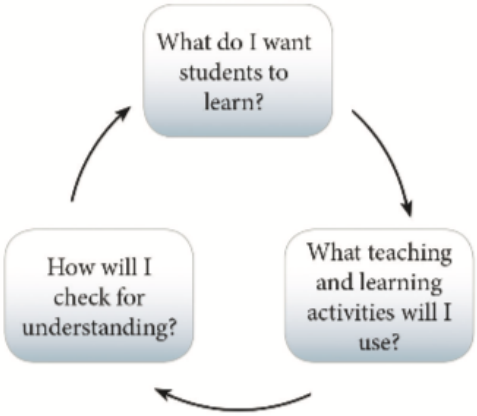
Effective Lesson Planning[1]

A lesson plan is the instructor's road map of what students need to learn and how it will be done effectively during the class time. Before you plan your lesson, you will first need to identify the learning objectives for the class meeting. Then, you can design appropriate learning activities and develop strategies to obtain feedback on student learning. A successful lesson plan addresses and integrates these **three key components**:

- Objectives for student learning
- Strategies to check student understanding
- Teaching/learning activities



Steps for Preparing a Lesson Plan *(Refer to the template on P.2)*

- Outline **learning objectives** (see below)
- Plan to **check for understanding** (questions and/or CATs – *P. 4)*
- Develop the **introduction with connections**
- Plan the specific **learning activities** (the main body of the lesson)
- Develop a **conclusion and a preview (summary)**
- Create a realistic timeline:
    - Estimate how much time each of the activities will take, then plan some extra time for each
    - Plan a few minutes at the end of class to answer any remaining questions and to sum up key points
    - Plan an extra activity or discussion question in case you have time left
    - Be flexible – be ready to adjust your lesson plan to students' needs and focus on what seems to be more productive rather than sticking to your original plan

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Learning Objectives

Objectives lay the foundation for the assessment of learning and the planning of learning activities. They also help students in the course understand what they are expected to learn. To write good objectives follow these steps:

1. Answer: *What are the most important concepts, ideas, practices or skills you want students to be able to grasp and apply? Why are these goals important?*
2. Select an action verb from Bloom's Taxonomy *(P. 2)* that best describes the kind and level of thinking in the learning objective. This ensures that the objective is ACTIVE.
3. Write the objective with respect to the student (LEARNER-CENTERED). For example, "*By the end of this lessons students will be able to (verb chosen in step #2) …"* (See the orientation objectives on *P.* ***Error! Bookmark not defined.*** for specific examples.)
4. Check that the objective follows the rest of the ALARMS acronym:
    - Can students ATTAIN it in the given time?
    - Is it RELEVANT to the course and what the students consider important?
    - Can you MEASURE (assess) it?
    - Is it SPECIFIC?
5. Revise the objective if necessary.

Active
Learner-centered
Attainable
Relevant
Measurable
Specific

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[1]*Excerpts from* Strategies for Effective Lesson Planning by S. Milkova, CRLT. Downloaded 7/26/18 from http://crlt.umich.edu/sites/default/files/instructor_resources/strategies_for_effective_lesson_planning.pdf
Center for Research on Learning and Teaching in Engineering, University of Michigan, 2020

Lesson Planning Template (LOCA-CLAS)

What do I want students to learn? → How will I check for understanding? → What teaching and learning activities will I use?

LO - Learning Objectives *(Direct the lesson and practice)*	**CA - Classroom Assessment** *(Are students getting it?)*
At the end of the lesson students will be able to … *1.* *2.* *3.*	*Questions to check for student attainment of the LO* *1.* *2.* *3.*
C - Connections *(How does the lesson connect to prior knowledge, to the big picture, to student interests and values?)*	
LA - Learning Activities *(What are you teaching? How will the students engage with the content as you teach?)*	
S - Summary *(Recap the objectives in different words, preview what's to come)*	

Revised Bloom's Taxonomy[2]

This model classifies thinking into six levels of cognitive complexity. While all cognitive levels are important for learning, instructors strive to move students towards higher order thinking (the top of the table). You can use the verbs in the second column of the table to **construct learning objectives** and **checking questions** at the given cognitive level.

Higher Order Thinking ↑

Cognitive Level	*Sample Verbs*	*Sample Questions or Prompts*
CREATE Combine elements to form a coherent whole; reorganize elements into a new pattern or structure; propose alternative solutions.	• Design • Develop • Plan • Formulate • Construct • Compose	• Develop a way to minimize (maximize) ____ • Improve the design for ____ • Formulate alternatives for ____ • Design an experiment to test ____
EVALUATE Make and support evidence-based judgments based on criteria and standards.	• Choose • Prioritize • Rate • Critique • Assess • Select	• Rate the solutions to ____ • What changes to ____ would you prioritize? • Critique the effectiveness of ____ • How would you choose between ____ and ____?
ANALYZE Solve complex problems, interpret data, figure out system behavior and malfunctions. Break into constituent parts and determine how parts relate to one another or to an overall whole.	• Solve • Derive • Explain • Predict • Model • Interpret	• Can you model the ____ changes that occurred? • Can you predict the behavior of ____ (a system)? • Can you explain the problem with ____? • How does ____ relate to ____.?
APPLY **Carry out a procedure or solve simpler problems in new situations.**	• **Solve** • **Calculate** • **Determine** • **Implement** • **Demonstrate** • **Practice**	• **How would you use ____?** • **What examples can you give for____?** • **Determine what factors to change if ____?** • **What actions would you take to implement ____?**
UNDERSTAND Demonstrate comprehension of concepts and ideas (construct meaning).	• Restate • Paraphrase • Discuss • Describe • Recognize • Explain	• Can you describe ____ in your own words? • How would you summarize ____? • Compare and contrast ____? • How would you classify____? • How would you define ____?
REMEMBER Memorize and repeat facts, replicate known procedures.	• Define • Repeat • Record • List • Identify • Plug and chug	• Can you repeat ____? • Can you recall ____? • What is the definition of ____? • Can you list ____? • What ____? • Where____? When____?

Lower Order Thinking ↓

[2] Anderson and Krathwohl (2001)

Classroom Assessment Techniques (CATs)[3]

"Classroom assessment helps college teachers obtain useful feedback on what, how much, and how well their students are learning. Faculty [and student instructors] can then use this information to refocus their teaching to help students make their learning more efficient and effective" (Angelo & Cross, p. 3). An added benefit of CATs is that they engage students with the content, and are therefore a form of active learning. The simplest CAT is to **ask students questions orally** but there are other more structures formats as shown in the table below. The table describes selected techniques, along with the amount of instructor preparation required and the amount of in-class time needed for each assessment.

Name of CAT	Description	Time
1. Prior knowledge probe **2. Concept questions** **3. Misconception check**	Ask ungraded, quick-answer questions (e.g. multiple-choice, True/False, short answer) to students in order to: 1. check their existing knowledge of that concept 2. test students' understanding of key concepts. 3. elicits information about students' ideas and beliefs that may hinder or block further learning. Students may answer on paper, on-line, voting with hands, or using personal response systems (clickers).	Prep: Medium In-class: Low
Concept maps	Students produce diagrams or drawings that show and name the connections between major concepts and other concepts, facts, or principles that they have learned. These are very useful in courses requiring conceptual learning	Prep: Medium In-class: Medium
Exit ticket **(Minute paper)** **(Muddiest point)**	During the last few minutes of the class period, ask students to answer on a half-sheet of paper: "What is the most important point you learned today?"; and/or "What point remains muddiest or confusing to you?". The purpose is to elicit data about students' comprehension of a particular class session.	Prep: Low In-class: Low
Student-generated test questions	Allow students to write test questions and model answers for specified topics, in a format consistent with course exams. This will give students the opportunity to evaluate the course topics, reflect on what they understand, and consider what good test questions might be.	Prep: Medium In-class: High
Directed paraphrasing	Ask students to write a layman's "translation" of something they have just learned —geared to a specified individual or audience— to assess their ability to comprehend and transfer concepts.	Prep: Low In-class: Low
Application cards	After teaching about an important theory, principle, or procedure, ask students to write down at least one real-world application for what they have just learned to determine how well they can transfer their learning.	Prep: Low In-class: Low
Focused listing **(Brainstorming)**	In a given time period, students write down as many ideas as they can that are closely related to a single important term, name, or concept. Works well in classes of any size and is useful in courses in which a large amount of new information is regularly introduced.	Prep: Low In-class: Medium

Consider **using technology** to assess student understanding. Tools like the ones listed below can be used to **collect student feedback** and quickly identify concepts that need clarification.

a. Canvas quizzes - documentation.its.umich.edu/node/384
b. iClickers (audience response system) - lsa.umich.edu/iss/knowledge-base/classroom-tools/iclicker.html
c. Socrative - socrative.com
d. Piazza - piazza.com

[3] Adapted from Angelo & Cross (1993). More CATs at crlt.umich.edu/sites/default/files/resource_files/GSI_Guidebook/GSI_Guidebook_88.pdf