

Planning Exercises and Sessions

Effective Lesson Planning

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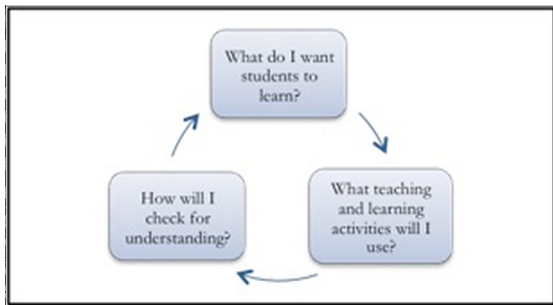
The Road Map

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- 2 Step 1: Outlining Learning Objectives
- 3 Step 2: Developing an Introduction
- 4 Step 3: Planning Specific Activities
- 5 Step 4: Checking Understanding
- 6 Step 5: Developing Conclusions and Previews
- 7 Step 6: Creating a Realistic Timeline
- 8 Conclusion

The ideal plan

A successful lesson plan addresses and integrates three key components

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



Here at MathCCES, you will most likely be responsible for designing exercises for homework and self-exercise, and for preparing and holding Exercise Sessions. This means your planning includes thinking about which exercises you will assign, and how many - so think ahead! Your choices will define your exercise sessions more than anything else.

Keep in mind that there are several resources available to you.

- Don't reinvent the wheel
- Reach out to colleagues who have taught before
- Make use of materials from previous semesters
- When in doubt, talk to the Professor

Step 1: Outlining Learning Objectives

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What do you want the students to learn?

Specify your goals by asking yourself the following:

- What are the main topics I want to address?
- What do I want students to learn?
- What do I want them to understand and be able to do once session is over?
- What do I want them to take away from this particular homework?

Rank your goals in terms of importance

Consider the following questions:

- What are the most important concepts, ideas, or skills I want students to be able to grasp and apply?
- Why are they important?
- If I run out of time during session, which exercises could not be omitted?
- And conversely, which ones could I skip if pressed for time?

Step 2: Developing an Introduction

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What was covered in lecture?

You might want to start your session by quickly refreshing the concepts covered by the homework. You will want to make sure students do not have big issues with specific theorems, formulas, and algorithms necessary for the exercises. When planning this intro, ask yourself:

- How will I check the students familiarity with necessary concepts?
- What are common pitfalls for students?
- How will I present the solutions?

Step 3: Planning Specific Activities

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Getting the solutions

This is the step where all comes together. If you planned your exercises well, you can play your session in different ways. It is always nice to have more than one approach to non-trivial exercises, and to assess how the students get to the answer. Some questions that may help you design activities:

- What will I do to explain the exercise?
- What will I do to illustrate the solution in a different way?
- How can I engage students in the topic?
- What are some relevant applications that can help students understand the topic?
- What will students need to do to help them understand the solution better?

Step 4: Checking Understanding

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How to find out if they are learning?

Think about specific questions you can ask to check for understanding, and try to predict the answers your questions will generate. Moreover, try to anticipate questions beforehand: which will be productive and which might sidetrack the class? Aim for a balance between covering content and ensuring understanding. Plan on the following:

- What questions will I ask students to check for understanding?
- What will I have students do to demonstrate that they are following?
- Going back to my list of learning objectives, how can I check whether each of those has been accomplished?

Step 5: Developing Conclusions and Previews

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At the end of the session

It is always good to summarize the main points of the homework:

- You can state the main points yourself
- You can ask a student to help you summarize them
- You can ask them to write down on a piece of paper what they think were the main points of the lesson

The last option allows you to gauge their understanding of the topic and then explain anything unclear the following class.

It is also nice to preview the next homework. What are the coming topics? This helps students to connect the different ideas within a larger context.

Step 6: Creating a Realistic Timeline

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Be prepared to adjust your plan as needed

A realistic timeline will reflect your flexibility and readiness to adapt to the specific classroom session. Some exercises can have their solutions sketched; other will need careful exposition. Here are some strategies for creating a realistic timeline:

- Estimate how much time each of the exercises will take, then plan some extra time for each
- When you prepare the homework, indicate how much time you expect to spend on each exercise during session
- Plan a few minutes at the end to answer any remaining questions and to sum up key points
- Plan an extra example or discussion question in case you have time left
- Be flexible! Adjust your lesson plan to students' needs
- Focus on what seems to be more productive rather than sticking to your original plan

Conclusion

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Presenting your plan

In a regular lecture, letting your students know what they will be learning and doing in class will help keep them more engaged and on track.

- You can write a brief agenda on the board
- You can tell students explicitly what they will be learning and doing in class
- You can outline on a handout the learning objectives for the class

Providing an overview of class time can help students remember better and follow the rationale behind your plan. Having a clearly visible agenda will also help you to avoid repeating the “We will get there” statement.

Reflecting on your plan

Sometimes, your plan does not work. And that is fine! The important thing is to understand WHY it didn't, and how you can avoid that in the future. After a each session, ask yourself:

- Which exercises were too easy/hard?
- What went right/wrong with the homework? Why?
- What went right/wrong with the session? Why?
- In hindsight, what would you do differently?

Remember: a productive lesson is not one in which everything goes exactly as planned, but one in which both students and instructor learn from each other.