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Self-Reflections – Insights Into Students' Performance, Habits of Learning, and Thinking

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Phys 203
(General Physics for Non-Engineers I)

- **Phys 203**
  - Introductory Algebra-Based Physics Course
  - No Prerequisite Physics Courses
  - Weekly: Lecture (150 min), Discussion (50min), Laboratory (160min)
  - Focused on Newtonian Mechanics
  - 4 semester hours

- **Students**
  - Non-Science Majors
  - Class Size: 24 Students
  - Two sections (Fall 2018) have been involved in this study

- **Course Structure**
  - 200 problems, conceptual questions, hands-on activities and laboratories carefully structured according to taxonomies of thinking

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Phys 203
(General Physics for Non-Engineers I)

Spring 2016 – Spring 2018

- **DFW rates**
  - low
- **Performance**
  - good

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Self-Reflections Have Been Implemented in Phys 203

- **Anonymous**
  - Some Completed in Class
  - Some Completed at Home
- **Followed by Classroom Discussions**
  - Clarifying Misunderstandings
  - Reinforcing Learning Strategies
  - Adjusting the Course Content or Format
- **No Incentives Offered**

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How to Get an A in Phys 203

Before Class:
Read the assigned textbook chapter and annotate your formula sheet.

During Class:
1. Solve all the questions, problems, and hands-on activities and explain your solutions to one colleague.
2. Make sure you finalize all the tasks and check your results.

After Class:
1. Read the Chapter Summary.
2. Redo all the tasks we completed in class.
3. Do the homework.
4. Give yourself a timed exam that includes the tasks we covered.

Learning cycle based on student-related data. It is discussed in the first week of classes.

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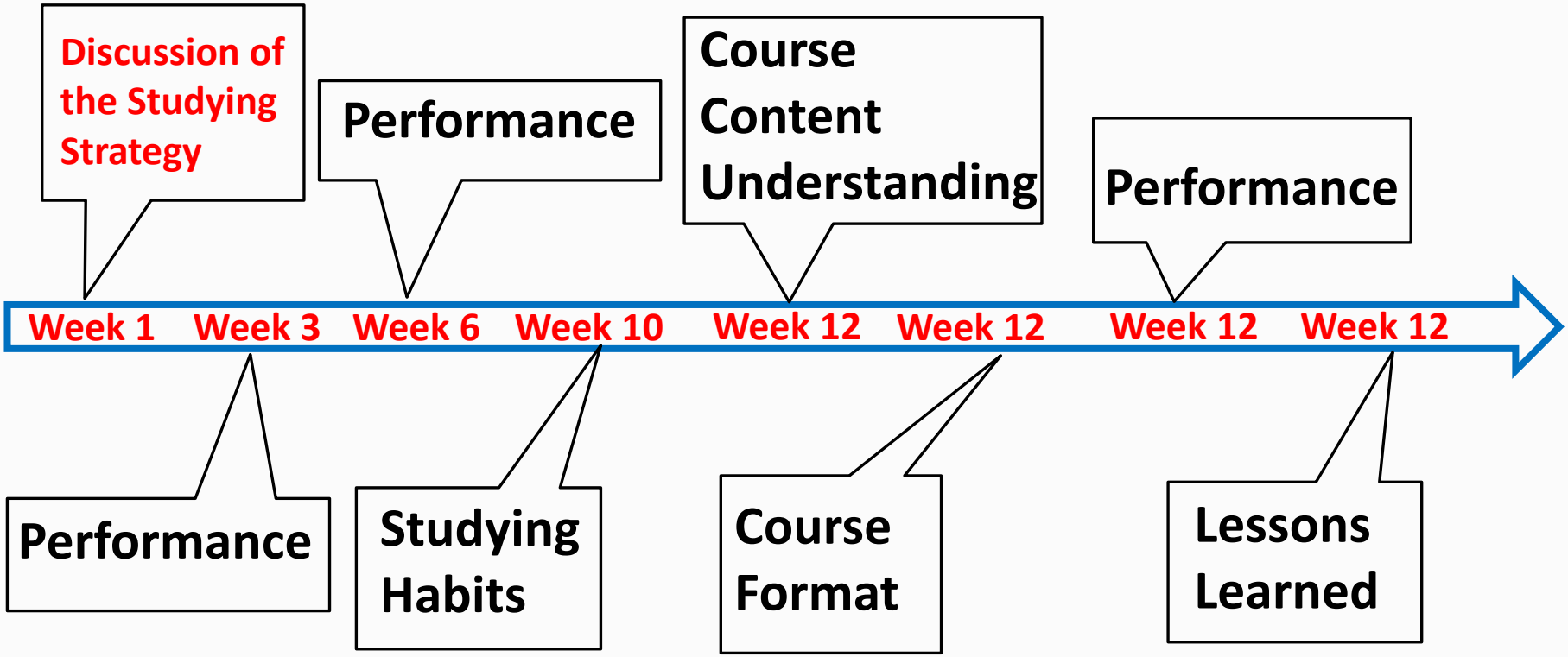
Self-Reflections Focus



Self-reflections implemented in two sections of Phys 203 Fa 2018.

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Course DFW Rates

- **DFW rates (Spring 2016 – Spring 2018)**
  - one or two students dropped, failed or withdrew

- **DFW rates Fa 2018 Section 1**
  - one student dropped because he wanted to take a math class
- **DFW rates Fa 2018 Section 2**
  - one student withdrew because medical reasons

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Performance on Exams

Exams	Four previous semesters (N = 160 students)		Section 1 Fa 2018 (N = 23 students)		Section 2 Fa 2018 (N = 23 students)	
	Class Average	Standard Deviation	Class Average	Standard Deviation	Class Average	Standard Deviation
Exam I	89	19	91	15	82	23
Exam II	99	19	87	17	88	15
Final Exam	89	25	99	6	98	11

Good performance on exams.

Caveats: different exams, slightly different coverage, some exams contain extra credit while others do not.

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Performance and Guessing on Exams

Exams	Section 1 Fa 2018 (N = 23 students)		Section 2 Fa 2018 (N = 23 students)	
	Class Average	Percent of students who guessed (90% of students answered)	Class Average	Percent of students who guessed (67% of students answered)
Exam II	87	90 %	88	75%

Good performance does not always mean good understanding.

On average, students guessed on two problems on Exam II.

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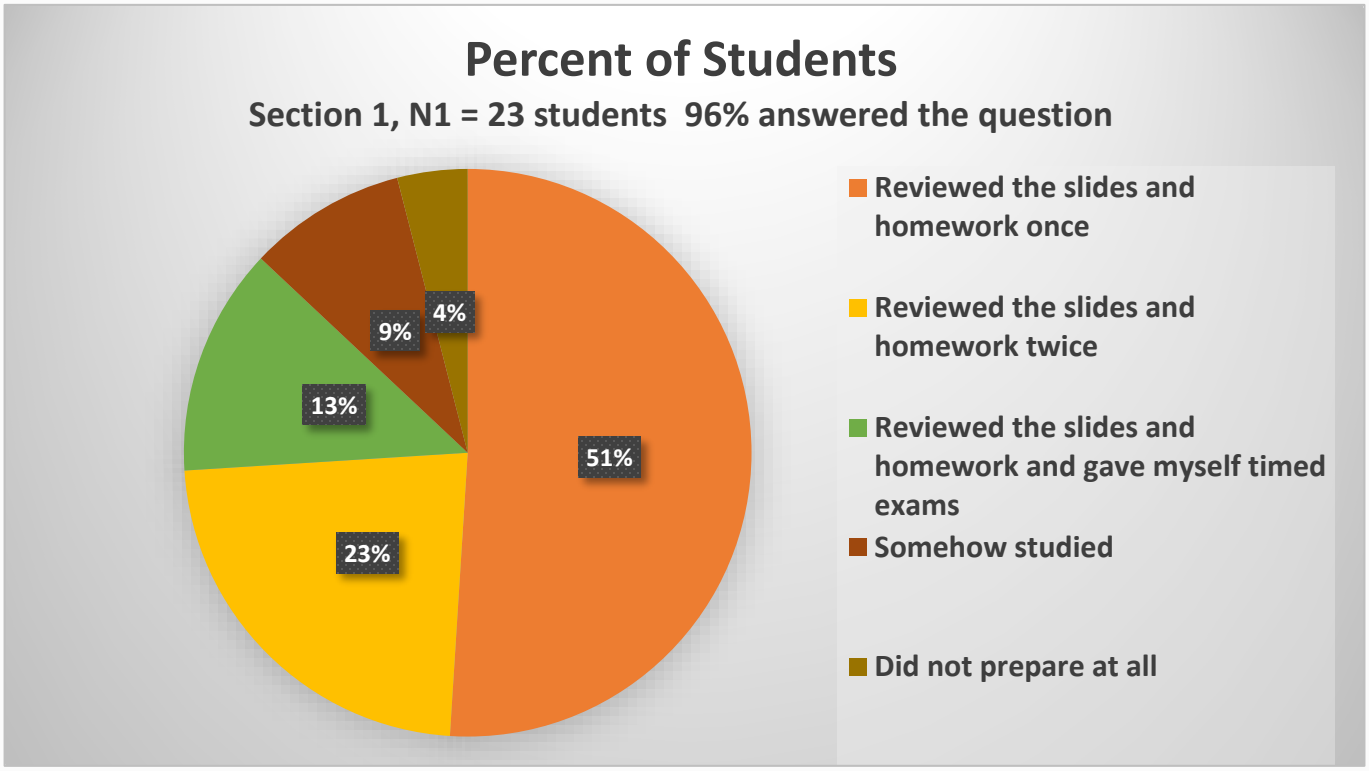
How Do Students Prepare?

How did you prepare for Quiz 2?



Only 13% of the students follow the learning cycle.

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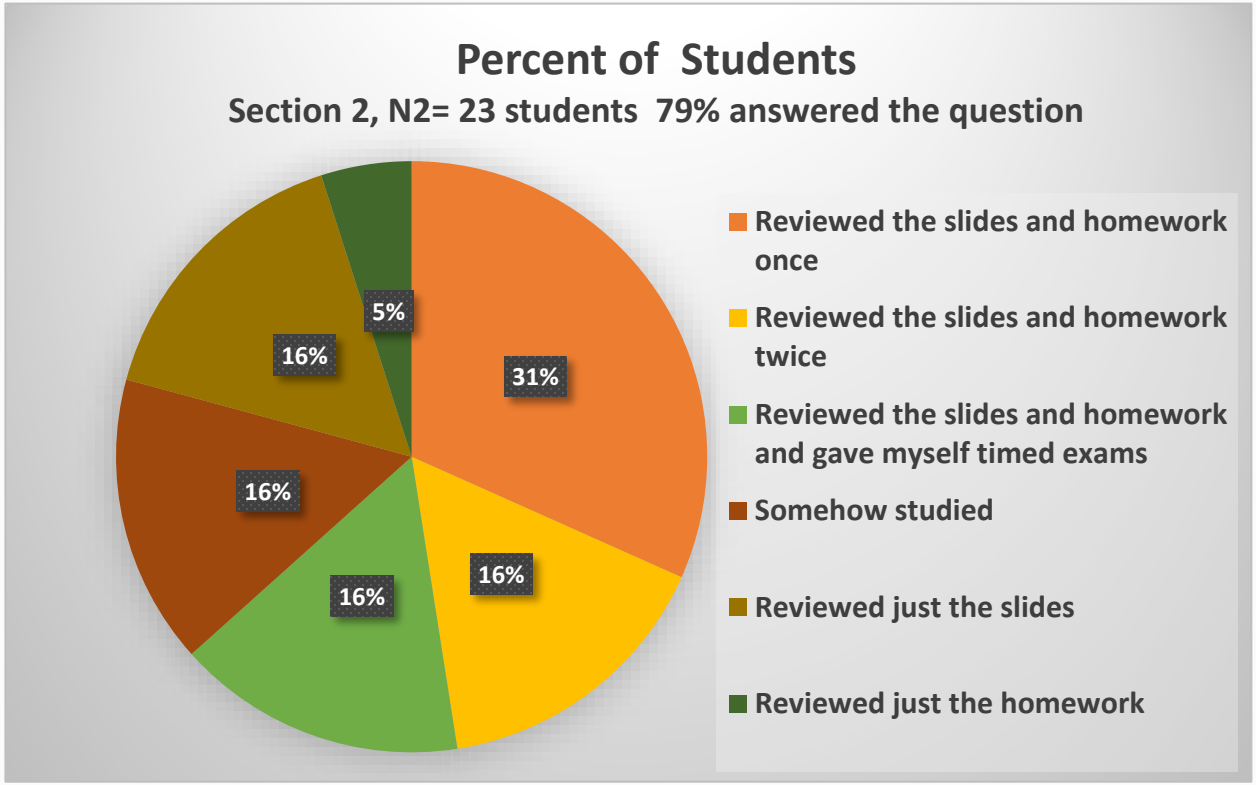
How Do Students Prepare?

How did you prepare for Quiz 2?



Only 16% of the students follow the learning cycle.

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Students about Themselves

List two things that you've learned about yourself while completing the self-reflections.

I learned that I have to…
go over the content multiple times.
spend more time studying.
pay more attention to my math.
ask for help/learning resources.

Section 1
N1 = 23 students
57% students answered

Students changed their studying habits.

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Students about Themselves

List two things that you've learned about yourself while completing the self-reflections.

I learned that I have to…
manage my time wisely.
extract the information carefully from the problems before I answer.
review constantly.
review the same content multiple times.
follow the learning cycle you provided.
take notes carefully.
not be afraid of exams.

Section 2
N2 = 23 students
90 % students answered

Students changed their studying habits.

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Lessons Learned

- Self-Reflections can provide useful information without use of significant class time
  - Good students' performance does not necessarily mean good understanding
  - Self-reflections are informative for both the instructor and the students

Future Steps

- Analyze the characteristics of the problems on which students guessed
  - Address in class potential difficulties

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Thank you