

## Incorporating Study Skills Into Developmental Math Classes – AMATYC 2010

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## Why Teach Study Skills?

- Are your developmental math students struggling solely because of poor math skills?

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## Why Teach Study Skills?

- Could part of the problem be that they do not know **how** to learn mathematics?

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## Student Success Courses at COS

- At our college, many (first year) students take a general study skills course.
- These “Student Success” courses focus on the college’s resources and programs designed to help students.
- The courses also offer general guidelines as to how to be a successful student.
- The courses are typically taught by the Counseling division.

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## The Two Pitfalls of our General Student Success Courses

- The set of study skills required to be successful in a math class are in many ways **different** than the skills needed in a history class.
- The study skills are taught **out of context**.

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## Study Skills That I Cover

- Note Taking
- Doing Homework Effectively
- Reading a Math Text
- Creating Note Cards
- Test Preparation
- Practice Quizzes
- Test Taking
- Test Analysis
- Time Management
- Study Groups
- Math Anxiety
- Learning Styles

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“How do I cover study skills and all the material in the course outline?”

- Incorporate study skills into your mathematics lecture.
- Design short in-class activities.
- Develop assignments that can be completed outside of class.

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Three Essential Elements Of Every Study Skill

- Explain how do we do it.
- Explain why do we do it.
- Encourage them to do it.

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## Study Skills Activities & Assignments

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- During the remainder of this session I will share (and model) a series of study skills activities and assignments.
- I may not be able to discuss each one, but they are all available on my web site – <http://georgewoodbury.com>
- Click on the “Presentations” tab, they are at the top of the page.

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## Study Skills Activities & Assignments

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- We will also be creating some activities or assignments in groups.

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## Note Taking

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- On the first day of class I tell my students what type of binder they need to have, and how the notebook should be structured.

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## My Binder Setup

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- Use a 1-1/2” or 2” 3-ring binder.
- Keep your syllabus at the front of the binder.
- Use dividers to create sections:
  - Notes
  - Homework
  - Exams & Quizzes
  - Key Problems
  - Handouts
  - Glossary

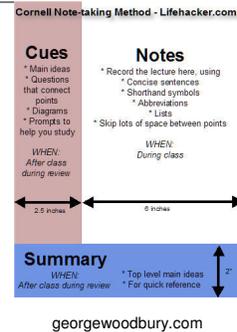
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## Note Taking

- On the first day that I lecture I explain the Cornell note taking system, and why it's helpful.

## Cornell Notes - Format



## Note Taking

- I also explain why we take notes in class, and how we use them afterward.

## Note Taking

- After I cover enough material for roughly one page of notes, I stop and talk to my students about their notes.
- Are they neat? Are they easy to follow?
- What questions or comments could have been written in the left-hand column?
- How would you summarize the first page of notes at the bottom of the page?

## Note Taking

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- This takes a total of 5 minutes of class time on top of the math lecture.
- On day 2, I walk into class and see my students preparing their pages.
- I start each class by asking students to read me their summaries from the previous day. Essentially, this is my “What did we cover yesterday?” moment.

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## Next Activity ...

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- Have any of your students run into a homework problem that they could not solve?

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## Doing Homework – Coping Strategies

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- Form groups of 2-4 students.
- Have each group of students make a list of 5 coping strategies when stuck on a homework exercise.
- Collect the strategies on the board, 1 from a group at a time until all strategies are exhausted.
- Comment/discuss the effectiveness/practicality of each.
- Add any other strategies you can think of.

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## Doing Homework – Note Cards

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- Assign homework as usual.
- For any problem missed, the student should write the problem, and what went wrong, on the front of the card and work out the problem correctly on the back.
- Collect the note cards to look them over. This will give you a snapshot of where your students are having trouble.
- Briefly discuss how to use these note cards as part of an overall test preparation strategy, as well as the potential benefits of using these cards.

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## Reading The Textbook – Main Features

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- Have students flip through 1 chapter in the textbook and make a listing of the different features in the book. This can be done individually, or in groups.
- For each feature, discuss how it can be used to help the student learn and understand mathematics.

## Note Cards & Memorization

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- Note cards are an effective tool for memorization. Here is a list of possible topics for which note cards would help students to memorize.
  - Sign rules for integers
  - Rules for arithmetic with fractions
  - Formulas for factoring
  - Set up for word problems
  - First step for solving absolute value equations and inequalities
  - Steps for graphing different types of functions/equations

## Note Cards & Memorization (p. 2)

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- Choose one topic early in the course, and make a set of note cards on the board. For example, in a prealgebra class covering multiplication and division of integers, list the different scenarios.
- As the course progresses, you can point out opportunities to create note cards.

## Test Preparation

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- Many developmental students do not know what or how to study.
- Two or three days before the exam, walk the students through a summary of the topics you've covered and what to expect on the test.
- Talk to them about your recommended preparation.

## Practice Quizzes

- As we all learned in grad school, being able to anticipate what you'll be asked is half the battle to be successful on an exam.
- Assign your students to create a practice quiz for the most recent section for homework.
- Give them an idea about the types of problems, as well as how many, to include.
- Collect the quizzes and give your feedback.

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## Practice Quizzes - Options

- Have students trade practice quizzes and give their own feedback.
- Have students trade practice quizzes and actually take the practice quiz. Return the quiz and have the other student grade it.
- Collect the quizzes and use them to make your exam.

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## Practice Quizzes → Practice Tests

- Build up from a series of practice quizzes to a practice exam.
- This helps students refine their vision, focusing on what an exam will look like compared to a section quiz.
- A practice test will help put your students in a "test situation" without "test consequences".
- Practice tests help students to identify areas where improvement is needed.

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## Practice Quizzes – MML Style

- Print out the online exercise listing for a certain chapter for your text from MML.
- Form groups of 4 students, and instruct them to make a 20 question practice test from this list. Tell them that the problems should be varied in level of difficulty and represent the entire chapter.
- Quickly create their practice tests on MML, and post them so they can take it.

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## Test Taking – The “Half Test”

- Write a varied test that will take half of a class period.
- After the students have finished, give out a sheet with solutions.
- Have students determine whether they are working quickly enough.
- Have students determine which subjects/problems will require further study.

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## Test Taking – The “Half Test”

- The main idea is to put students in a test-like situation prior to the test. This can be done before the first exam, and students can do this on their own prior to all subsequent exams.

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## Test Analysis

- When you turn back a test, assign your students a “Test Analysis” assignment.
- For any problem they lost points on, have them
  - Explain the error in their own words
  - Rework the problem correctly
  - Cite a page number and example number where this type of problem can be found in the book
  - Make up a similar problem of their own and solve it.

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## Time Management – Weekly Calendar

- Give a 1-week calendar and have students fill out commitments (classes, work, ...), travel time, sleep, meals, ...
- Then have students pencil in time for studying and homework for each class.
- Open discussion on whether this is enough time devoted to the course, is the plan realistic, etcetera.

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## Time Management – Weekly Calendar

- A couple of weeks later have students keep track of the time they spend working on your class. Have them compare their budgeted study time with their actual study time.

## Study Groups – Group Assignments

- Mathematicians in History – Create a poster documenting the life of a prominent mathematician.
- Newsletter – Create a newsletter explaining how to solve a certain type of problem.
- Group Activities to be completed outside of class.

## Mathematicians in History



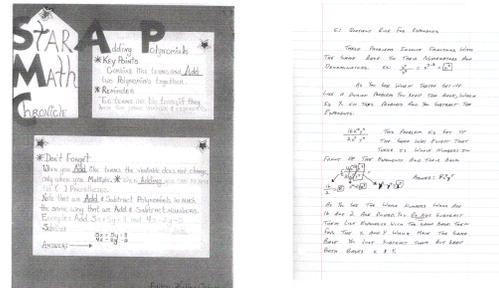
## Mathematicians in History



## Newsletter Assignments



## Newsletter Assignments



## Math Anxiety – Math Autobiography

- ❑ As a homework assignment, ask students to prepare a brief “Math Autobiography”. This should include items such as
  - ❑ Classes taken
  - ❑ Positive experiences
  - ❑ Negative experiences
  - ❑ Overall attitude about math
  - ❑ Strengths and weaknesses

## Math Anxiety – Math Autobiography

- ❑ Just getting these ideas on paper helps students to realize their situation, and gives you a quick snapshot into the mathematical background/baggage of your students.
- ❑ Commonalities can be discussed in class, showing students that they are not the “only one”.

## Math Anxiety – Strengths & Weaknesses

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- During the last 5 minutes of class, have students list 3 reasons why they will pass the class, as well as completing the sentence "If I fail the class, it will most likely be because ..."
- Collect all of the responses from students on their way out.

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## Math Anxiety – Strengths & Weaknesses

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- Prepare a summary list from both categories before the next class.
- Begin the next day with a discussion that will celebrate those strengths, and focus on how to overcome those potential shortcomings.
- Include your suggestions for overcoming math anxiety.

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## Learning Styles – Pass The Pen

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- Instructor puts a problem on the board. This works best at the end of class, when you have time to sneak in that one extra example to make sure students truly understand before they leave.
- A volunteer comes up to do 1 step, then passes the pen to another volunteer who does the next step, and so on.

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## Another Note Taking Activity

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- On a day early in the semester, reserve 5-10 minutes at the end of class.
- Pair students in groups of 2-4 students. Have the students compare their notes, questions, comments, and summaries. Have the students supplement their notes based upon their discussions.
- Assign the students to use the textbook to supplement their notes.
- On the next day, go over different ways that students supplemented their notes.

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## Reading The Textbook – Think/Pair/Share

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- For homework have students read through several objectives or an entire section in the book. The earlier in the semester the better, while the material is on the “easier” side.
- Students should summarize the main ideas and describe the types of examples covered.

## Reading The Textbook – Think/Pair/Share (page 2)

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- At the beginning of class, put students in groups of 2-4 students. The students should compare what they have written with the rest of their group, looking for items or ideas they are missing.
- Give the students a brief assignment, allowing them to use what they have written. This will allow the students to determine whether they got enough out of the reading.

## Study Groups

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- If you want to encourage your students to form groups outside of class, consider incorporating collaborative activities into your class as early in the semester as possible.
- For example, reserve the last 5-10 minutes for students to work on problems in groups. If the experience goes well, your students are more likely to work together outside of class.

## Learning Styles – Group Presentations

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- At the end of class, assign a particular problem to one group, based on the material covered that day. This can be selected from the homework exercises, or a problem of your own.
- At the beginning of the next class they make a 5-minute presentation of their solution. The presentation should include auditory/visual components. Encourage them to use as much of the board as they can to present their work, and to make their explanations as clear and thorough as possible.

## Questions or Comments

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