

First Year Seminar 1314: The Mathematical Gardner
Fall Term 2016
Course Description

Instructor: John Schmitt

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Office Hours: Monday 1:30–2:45pm, Wednesday 10am—11am, Friday 1:30pm—2:45pm,
and by arrangement

Meeting Times:

Section A, Tuesday and Thursday, 1:30 pm — 2:45 pm, Warner Hall 507

Course Description:

In this course we will have an “orgy of right-brain tomfoolery” as inspired by the writings of Martin Gardner. For several decades Gardner’s contributions to *Scientific American* in the form of his column on mathematical games bridged the divide between professional mathematicians and the general public. He shared with us like no other, introducing or popularizing topics such as paper-folding, Hex, polyominoes, four-dimensional ticktacktoe — the list goes on seemingly forever. We will examine these mathematical curiosities for pure pleasure.

Textbook: *Martin Gardner’s Mathematical Games* (on CD) by Martin Gardner, Mathematical Association of America (MAA), 2005. (Current sale price of \$51 from the MAA; or from the college bookstore.) A copy of the CD is held on reserve in the Davis Family Library.

All the texts written by Martin Gardner that are owned by Davis Family Library, many of which are contained within the above CD, are held on reserve in the Davis Family Library. These include his autobiography, the titles that follow, and many others.

- *Martin Gardner’s Mathematical Games*

- *Martin Gardner's Sixth Book of Mathematical Games from Scientific American*
- *aha! Gotcha: Paradoxes to puzzle and delight*
- *aha! Insight*
- *A Gardner's workout: training the mind and entertaining the spirit*
- *Hexaflexagons, Probability, Paradoxes, and the Tower of Hanoi*
- *Knotted Doughnuts and Other Mathematical Entertainments*
- *The Last Recreations: Hydras, Eggs and Other Mathematical Mystifications*
- *Mathematical Magic Show*
- *Mathematical Puzzles and Diversions*
- *New Mathematical Diversions*, original version and revised version
- *Origami, Eleusis, and the Soma Cube*
- *Penrose Tiles to Trapdoor Ciphers*
- *Time Travel and Other Mathematical Bewilderments*
- *The Universe in a Handkerchief: Lewis Carroll's Mathematical Recreations, Games, Puzzles, and Word Plays*
- *Wheels, Life and Other Mathematical Amusements*

Other texts in the style of and inspired by Martin Gardner, available in Davis Family Library

- *The Mathematical Gardner*. Edited by David. A. Klarner. Wadsworth International, Belmont, CA, PWS Publishers, Boston, MA, 1981.
- *A lifetime of puzzles*. A collection of puzzles in honor of Martin Gardner's 90th birthday. Edited by Erik D. Demaine, Martin L. Demaine and Tom Rodgers. A K Peters, Ltd., Wellesley, MA 2008.
- *Tribute to a mathematician*. Edited by Barry Cipra, Erik D. Demaine, Martin L. Demaine and Tom Rodgers. A K Peters, Ltd., Wellesley, MA 2005.
- *Homage to a Pied Puzzler*. Edited by Ed Pegg Jr., Alan Schoen, Tom Rodgers. A K Peters, Ltd., Wellesley, MA 2009.

All of the above listed works fall into the topic known as “recreational mathematics”. The Davis Family Library also has a subscription to *The Journal of Recreational Mathematics*.

A requirement:

As a result of your readings you will create many mathematical objects, puzzles, and curiosities. This is a required part of your reading, and so reading ten pages of text might take a couple of hours as a result of creating and puzzling. You are **REQUIRED** to bring these creations to class following the assigned reading and to save these creations in an organized portfolio. These creations will also be brought to the oral examinations.

Seminar Philosophy:

This course is a seminar-style course, not a lecture-style course. Thus, your active participation will drive our class meeting time. Each day we meet you will be prepared — you will have done the reading, puzzled the puzzles, and generated answers and **questions** for us all to consider.

Goals of the Course:

- Think deeply about simple ideas.
- Discover the breadth of mathematics.
- Write about mathematics and mathematical ideas.
- Have fun.

Special Needs: If you require special arrangements for class or during tests/exams please talk to me as soon as possible to make such arrangements. (For instance, it will be important to let me know if you are color-blind.)

Grading Percentages:

| | |
|---------------------|----|
| Participation | 20 |
| Oral examination 1 | 20 |
| Oral Examination 2 | 20 |
| Writing Assignments | 40 |

The Participation portion of your grade will derive from your active participation in class — the intelligent observations you make, the good questions you ask, the solutions you provide, your preparedness, etc. It is a somewhat subjective component – I will do my best to give you feedback on a regular basis.

Assignment of Grades:

The assignment of grades will follow the scheme below.

| | |
|--------------|---|
| 90 and above | A |
| 80 - 89 | B |
| 70 - 79 | C |
| 60 -69 | D |
| below 60 | F |

The values for plus and minus will be determined at the end of the semester.

Course supplies:

You will find it useful to have the following supplies: scissors, glue, a ruler and compass, colored pens/pencils, various shades and thicknesses of paper, a large quantity of counters (e.g. buttons, coins, beads), deck of playing cards, checkerboard, cardboard, . . . This list is not exhaustive. You are expected to bring to life the objects that we read about. Some of these supplies will help do that, at other times you will need to be creative in how best to bring some object to life. You need not spend much money, or any at all (visit the college’s “re-use trailer”), in obtaining some of these — be creative!

Absences:

Please see me in advance for absences. More than one unexcused absence will negatively impact your participation grade.

Social Gatherings:

One evening we will dine as a class in the Ross Commons House at 26 Blinn Lane – the date will be announced later. There will also be a Friday evening barbeque at my home, 1 South Gorham Lane, some time in September — details forthcoming. Other social

gatherings will be announced during the semester. These are not a required part of the course. When everyone's schedules become clear, I hope we can lunch together once a week.

Honor Code:

The Honor Code will be observed throughout this class and for all examinations. If you have a question about how the Honor Code applies to this class, please ask. In particular, failure to comply with the homework policy (see above) will be considered a violation of the honor code. As most evaluations will be term papers and writing assignments, plagiarism will not be tolerated. Proper citation will be a topic of conversation during the seminar. Questions concerning proper citation may be addressed to me, our Peer Mentor, our Course Librarian (Bryan Carson) or the Center for Teaching, Learning and Research.

Writing expectations:

Over the course of the semester you will be asked to write many times. These writing assignments will vary in length, but each should possess clarity, conciseness, and an exuberance for mathematics, puzzles, and curiosities.

To support you in your writing, **Josh Nislick ('17)** will serve as our seminar's Peer Mentor. Josh is a successful mathematics major who will be able to advise you on writing, as well as time management, course selection and other topics. Please make sure you take advantage of Josh's talents and time. Josh can be contacted at jnislick@middlebury.edu.