

Sabbatical Leave Proposal

A. Applicant

Name: Nora Wheeler

Department: Mathematics

Type of Leave: Research and Project

Leave Dates: Spring 2018

B. Purpose of Leave

The purpose of my leave is to create mathematics-based puzzle-solving activities, both in the form of puzzle hunts and room escapes, for use in SRJC mathematics classes and for attendees of Day Under the Oaks, and to create a presentation about these activities to give at a mathematics conference. It will show our students and community that mathematics problem-solving can be fun, and it is the first step towards bringing an atmosphere of puzzle solving to SRJC which could potentially attract some excellent students and brilliant mathematics faculty. (See narrative for a description of these puzzle activities.)

C. Leave Objectives

My sabbatical will bring puzzling to SRJC in the following ways:

1. I will create three mathematics-based room-escape activities with different difficulty levels to be used at Day Under the Oaks. These activities could also be used to raise money for SRJC Mathematics Scholarships at other times of the year.
2. I will create at least five mini-“puzzle hunts” to be used in SRJC Mathematics classes (150A/B, 151, 155, 25, 58, and 27) that will reinforce topics taught in our classes. These would be available for use to all interested SRJC Mathematics instructors.
3. I will develop a presentation to give at a mathematics conference on the fun and interesting mathematics involved in puzzle hunts and room escapes. My hope is to inspire other mathematics instructors to consider using puzzle-solving to make learning more fun and productive in their classrooms. My talk will, of course, include a puzzle for attendees to solve.

D. Narrative

My sabbatical is based upon puzzle hunts and room escape activities. Puzzle hunts are comprised of a series of puzzles, leading teams from each puzzle to the next. The hunts can be in a physical location where teams travel, by foot or by car, to each subsequent puzzle, or they can be conducted online in which teams don't even have to be in the same city to work together. The puzzles vary greatly in form and difficulty, the solution of which is usually a word or phrase. While puzzles such as jigsaw puzzles and crosswords might be involved in a given hunt, the majority of the puzzles are much more abstract and can involve codes, word play, riddles, geometry, pattern recognition, numerical calculations, and manipulations of physical items. Room-escapes also involve solving puzzles of varying types, but all of the puzzles are in one room in which the team is "locked". The team must find clues and solve puzzles to "escape". Room escape puzzles are generally more manipulative in nature and include finding keys or discovering codes to open locked cabinets and boxes to find more clues, and ultimately to open the door.

MIT, UC Berkeley, and the University of Sydney all have puzzle hunts that they host each year. They are primarily for the students, but they attract a much larger population of puzzle enthusiasts. The MIT Mystery Hunt is the largest and longest-running puzzle hunt attracting thousands each year and lasting several days in January. The UC Berkeley Mystery Hunt lasts only 12 hours and is run twice each year, once for the students and once for the public. The University of Sydney week-long puzzle hunt, offered by their Math Club SUMS, is conducted online and recently had 200 teams participate, with only 72 of those in Australia. There are a vast number of other hunts that are run in a variety of formats all over the world, but the three I mentioned are offered by educational institutions and attract positive attention from it. That is the vision I have for SRJC.

I do not know of any educational institutions that host room-escapes, but it is currently a booming business worldwide. The concept of solving puzzles to escape a room began as a computer text adventure in 1988, and was first translated into a physical activity in Japan in 2008. At escaperoomdirectory.com, over 6000 rooms in 92 different countries are currently listed.

In order to achieve the outcomes listed above, I must first learn more about puzzle hunts, escape rooms, and most importantly, puzzle writing. Puzzle-writing is very difficult because you have to find the perfect balance between difficulty and fun. A puzzle that is too easy doesn't give you the satisfaction of having accomplished anything. And obviously, a puzzle that is too hard can be frustrating and no fun at all. In order to learn what I need to know to accomplish my objectives, I will research puzzle hunts, room escapes, and puzzle development by doing the following:

- Participate in the MIT Mystery Hunt in Massachusetts in January, as well as other hunts that are hosted during my sabbatical.
- Research old puzzles that are provided online. DASH, the Berkeley Mystery Hunt, and University of Sydney SUM Puzzle Hunt all post the puzzles from prior years on the internet. I will review these old puzzles and others, searching for mathematics-based puzzles as well as learning about good puzzle-writing techniques.

- Play at least three room-escape games in at least three different cities. I will try to seek out the most successful rooms at the time based upon reviews, but I may also go to one with bad reviews to learn what not to do.

As I learn from these activities, I will embark on the creation of the puzzles/activities to be used in the in-class mini puzzle hunts and the room escapes for Day Under the Oaks. This process will require countless hours of creating and revising, as well as using my family and friends to test the puzzles and give me feedback on the difficulty and fun of each one. In order to be successful, these puzzles must include mathematics at an appropriate level, be challenging at the right level, require collaboration, and most importantly, be fun. In solving these puzzles, I want the participants to have to brainstorm for ideas on how to solve it. I want them to try ideas and I want some of those ideas to fail. Failure is an integral part of learning how to solve problems, and I want to teach our students not to be afraid of that.

During the whole process, I will be amassing content for the presentation on the mathematics of puzzle-solving to be presented at a mathematics conference. I will compile the most interesting and inspiring aspects of the puzzles I encounter and develop a presentation that I hope will be fun, interesting, and inspiring for other mathematics instructors. I will also create a puzzle to use in that presentation that would be appropriate for those with degrees in mathematics.

E. Evaluation Summary

1. How will the objectives of this sabbatical leave enhance my work performance at the college?

This sabbatical will be hard work and will require vast amounts of time and energy, but to be honest, it is also going to be amazingly fun and engrossing. While I love the mathematics I teach, the repetition of teaching the same material semester after semester diminishes my ability to be excited about it. By fusing mathematics and puzzle-solving, both of which I love, and being able to share that with my students and colleagues, my enthusiasm for teaching will be renewed.

2. How will the objectives of this sabbatical leave benefit students in my discipline?

The “aha moment”, when you finally figure something out after struggling with it, is a feeling that everyone understands and enjoys. The in-class puzzle hunts and the Day under the Oaks escape rooms will incorporate mathematics content with fun puzzle-solving activities, giving students the opportunity to have that moment and connect mathematical problem solving with that positive feeling.

3. How will the objectives of this sabbatical leave benefit my department?

The in-class activities will be available for use in all SRJC Mathematics classrooms, allowing all instructors to motivate their classes using fun and relevant puzzle hunt activities.

4. How does your proposed project address the SRJC Strategic Plan and/or your department’s educational plan?

One of the Goals and Objectives of SRJC is “Engage students and spark intellectual curiosity in learner-centered environments”. The activities I propose will help students use problem-solving skills in a collaborative way. Rather than sitting in a seat listening to a lecture or quietly trying problems by themselves, they will be talking and moving around and brainstorming and trying and failing and trying and succeeding... Totally engaged!

F. Abstract for Board Proposal Summary

Nora Wheeler will learn the mathematics and problem-solving techniques involved in puzzle hunts and room escapes by participation both as a player and as a planner. Based upon her experience, she will create mathematical puzzles and activities. These puzzles and activities will be used to create three room-escape activities to be used during Day Under the Oaks, as well as five short puzzle hunts that can be used in SRJC Mathematics classes. She will prepare a presentation based upon her experiences and discoveries about mathematics in puzzle-solving to be given at a mathematics conference. Nora hopes to make problem-solving a fun and interactive experience that will demonstrate the beauty and pleasure of mathematics to SRJC students and the public.

G. Approval

Applicant Name Nora Wheeler
Department/Program Mathematics
Review and Signature

Department Review

Signature of Department Chair

Date

Sabbatical Leave Committee Review

Signature of Committee Chair

Date

Board of Trustees Review

Action Taken

Date