

A new break-out safety activity for educating educators safe laboratory practices

Rajesh Sunasee

Associate Professor
Department of Chemistry , SUNY Plattsburgh
Councilor of Northern New York
ACS Local Chapter

ACS National Meeting 2019
Orlando, Florida
31st March 2019



STATE UNIVERSITY OF NEW YORK
PLATTSBURGH

Outline



SUNY Plattsburgh

Safety
Culture/Structure/Education

Breakout Safety
Activity

Analysis/Conclusions

SUNY Plattsburgh

- ❖ **College Type:** 4-year, public comprehensive university
- ❖ **Undergraduate Enrollment:** 5,297
- ❖ **Graduate Enrollment:** 407
- ❖ **International Enrollment:** 344
- ❖ **Average Class Size:** 22
- ❖ **Student-to-Faculty Ratio:** 16:1
- ❖ **% of tenure-track faculty holding the highest degree in their field:** 91%

Safety Education/Training @ SUNY Plattsburgh

❖ **Mandatory annual safety training for all educators & teaching assistants**

❖ **Chemical Hygiene Safety & Radiation Committee**

❖ **Departments involved:**

- ✓ Chemistry
- ✓ Biological Sciences
- ✓ Centre of Environmental & Earth Science
- ✓ Physics
- ✓ Geology
- ✓ Lake Champlain Research Institute

Safety Education for Educators

3 h mandatory
safety education
(theory-lecture style)

2003

3 h mandatory
safety education
(theory + practical)

spill training

2016

3 h mandatory
safety education
(online + practical)

risk assessment

2017

3 h mandatory
safety education
(online + practical)
Breakout Edu

Goal: Make safety education
fun & engaging

Fall 2018

Online Safety Education Course

HazCom safety video + Quiz

The Resource Conservation and Recovery Act (RCRA):

4 videos + 4 quizzes

- ❖ Introduction to RCRA
- ❖ Hazardous Waste Determination
- ❖ Our Hazardous Waste Process
- ❖ Why RCRA?

Safety Training: Fun & Engaging



LinkedIn groups (June 2015):

“What do you do to make your safety training more fun and engaging for your employees?”

- 1) Games** (Jeopardy-style game, quizzes based on tv game show)
- 2) Competition**
- 3) Rewards** (Candy etc..)
- 4) Active participation**

Breakout Edu



- ❖ Learning games platform that is transforming teaching and learning in classrooms
- ❖ Bringing the 4Cs alive: **critical thinking, collaboration, creativity, communication**



Physical Games

Physical games are great for team building activities or to introduce a new unit of study.



Digital Games

Digital games are great for quick classroom activities to review content or a fun way to conclude a lesson.



Digital Game Builder

Students and teachers can build their own content-aligned games for classroom sharing.

Breakout Safety Activity



**Engaging & Fun
Safety Activity**



**Safety Education/
Training for
Educators**

Components of Breakout Safety Activity

❖ Spill Education



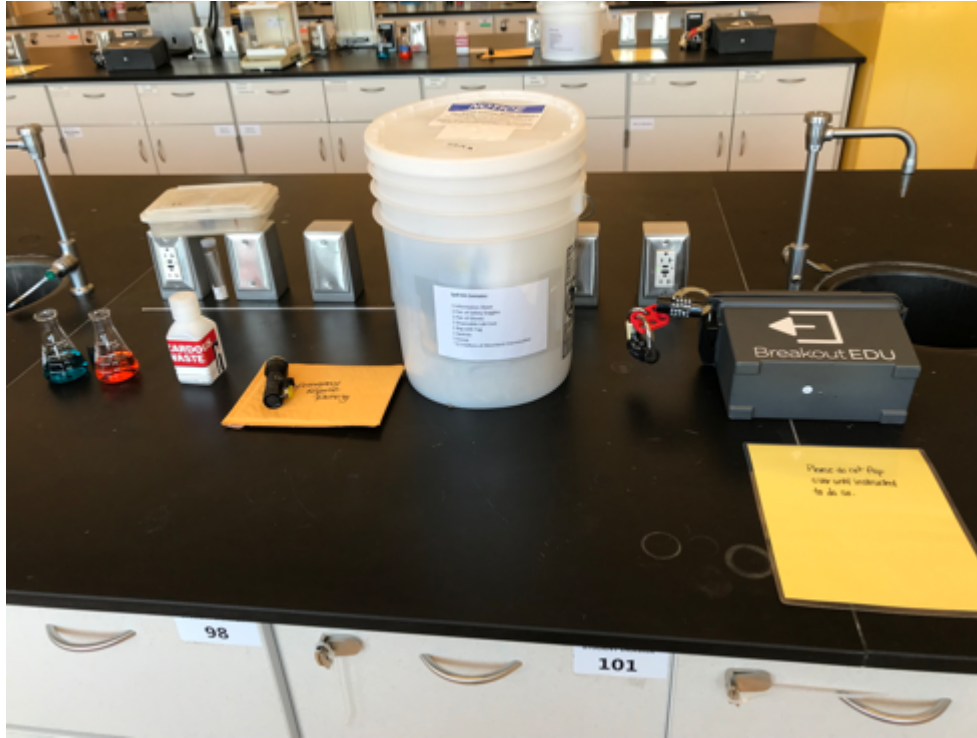
❖ Emergency Response Education



❖ Chemical Labeling/Hazardous Waste



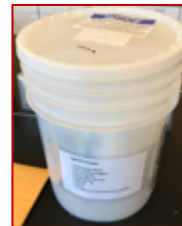
Breakout Activity Set-up



Cost ~ 1 kit = \$150

Clues to Breakout

❖ **Spill Activity:** 5 digit letter lock (O, N, B, R, O)



❖ **Emergency Response Activity:** 5 digit number lock

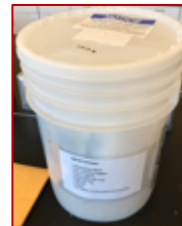


❖ **Chemical Labeling/Hazardous Waste:** one keyed Master lock



Spill Activity

❖ **Spill Activity: 5 digit letter lock (O, N, B, R, O)**



Instructions:

You are working with Bradford Reagent (1-1, 400g/ml protein Sigma B6916-500ml). You should have read the SDS (available to you through ChemWatch) prior to use. Pull the SDS up now. Oops! You have spilled about 200 mls of Bradford Reagent on the floor. There is a spill kit at your station. Using the spill kit and your knowledge of spill cleanup, determine the order in which you would use the spill kit contents. There are clues in the kit, which will help you unlock your first lock.

Emergency Response Activity

❖ Emergency Response Activity: 5 digit number lock

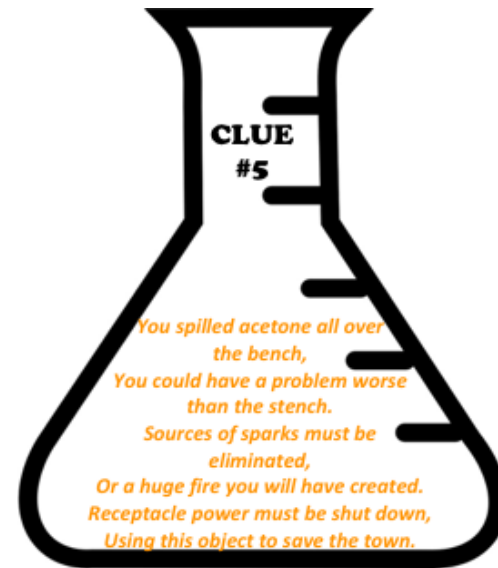
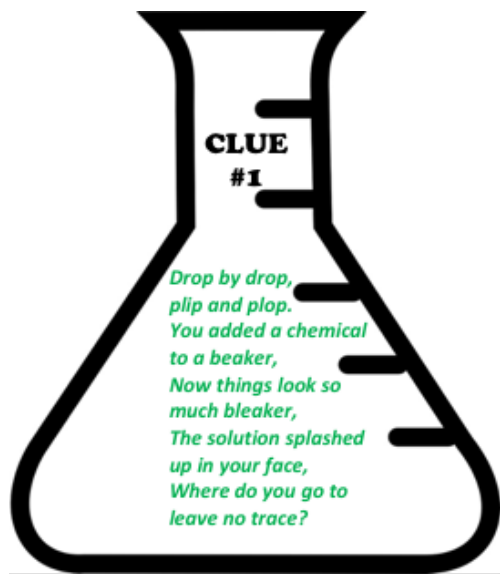


Instructions:

This one is a bit more of a scavenger hunt. The clues are in an envelope on your desk. Each “flask” will lead you to a different site within this laboratory. Each site will contain a clue, helping you unlock your second lock. (Hint: You may need a ***special tool*** to read your clue).

Emergency Response Activity

❖ Emergency Response Training: 5 digit number lock (scavenger hunt)



Each “flask” will lead you to a different site within this laboratory and each site will contain a clue

Chemical Labeling/Hazardous Waste Activity

❖ Chemical Labeling/Hazardous Waste: **one keyed Master lock**

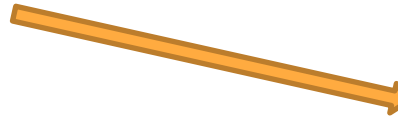
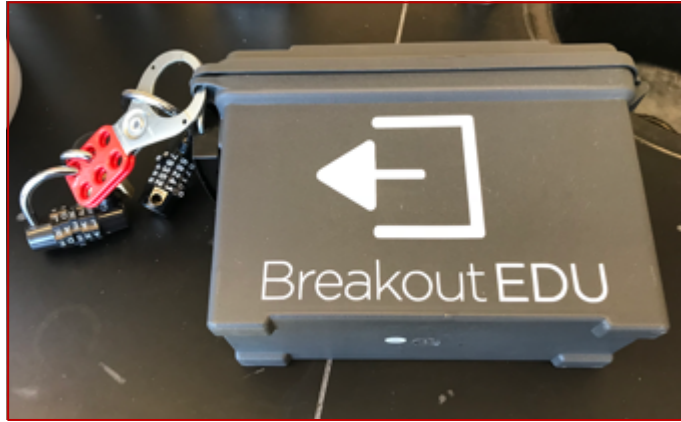


Instructions:

You have some used beakers at your bench. They contain the waste from one of your routine lab experiments. Please follow the appropriate steps for disposal, including consolidation, labeling and delivery to the proper location. You will find the clue to unlock your next lock, along the way.

Have fun and good luck!

Breakout EDU Box



A "pass" to escape

Reflection Cards Questions



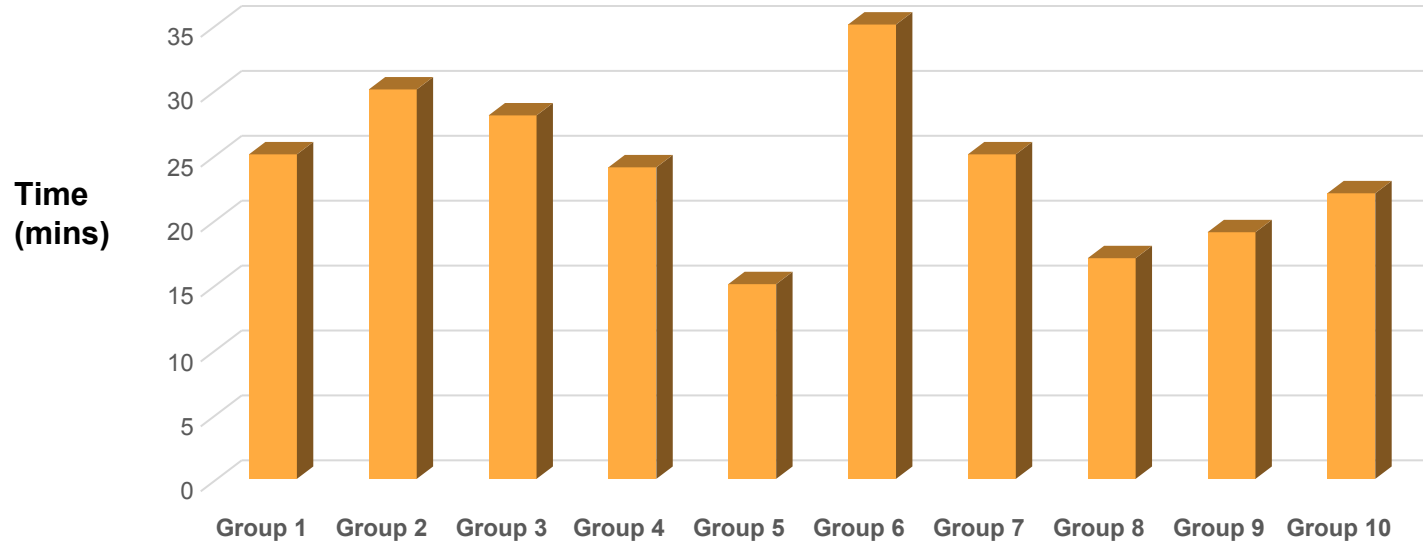
Describe how collaboration was exemplified?

Describe how another member of your team exemplified critical thinking?

Describe how your group could have been more effective?

Describe how this game relates to what you are learning about?

Time of Completion: Unlocking Keys



Faculty Evaluations

“The escape room boxes were super fun”

“More of the break-out box in regards to safety”

“The game was the most fun safety training”

“The breakout room was fun”

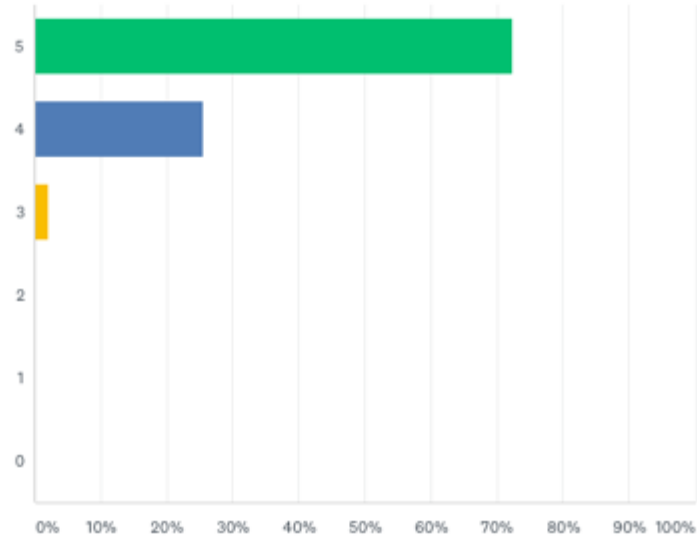
“Really liked the breakout-nice job”

“Thanks for the goodies and door prizes”

Faculty Evaluation

How effective was this hybrid method of delivery for the course content?
(5=most effective, 0=not effective)

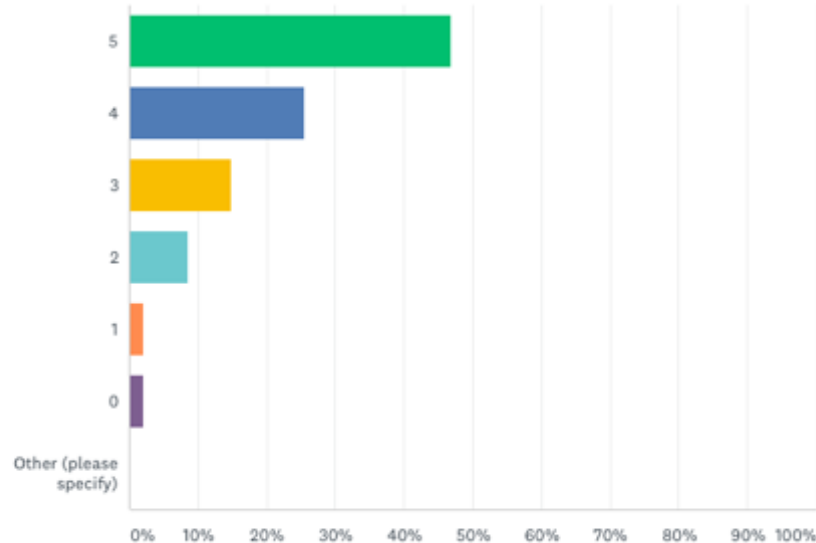
Answered: 47 Skipped: 0

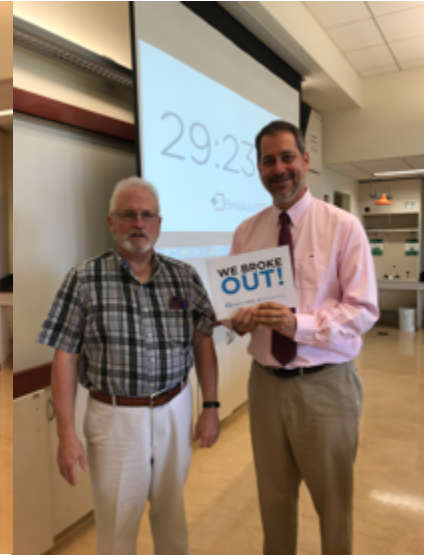


Faculty Evaluations

How relevant was this training for your role at SUNY Plattsburgh? (5=most relevant, 0=not relevant)

Answered: 47 Skipped: 0





“If you can get people to laugh you will be able to get them to learn”

Breakout Safety Activity: Undergraduate Students



A “pass” to escape

Monthly Safety Challenge

Class: Organic Chemistry I (Fall 2018)

Class size: 61 students

Monthly Safety Challenge

Safety Training SUNY Plattsburgh

October Safety Challenge:

To be safe in the laboratory (or anywhere really), you only need to do four things. The four principles of safety are RAMP:

- ☛ *Recognize hazards* of chemicals, equipment and procedures.
- ☛ *Assess risks* of hazards associated with exposures and procedures.
- ☛ *Minimize risks* in design and execution of experiments.
- ☛ *Prepare for emergencies* with knowledge of safety equipment and protocols.

Using one of your own lab experiments (past or present) as an example, describe how the Four Principles of Safety can be applied. You must break it down into the four separate components to be considered a correct submission. Use the back of this sheet if you like, or submit on a separate sheet of paper.

Have a Lab Safety Plan.



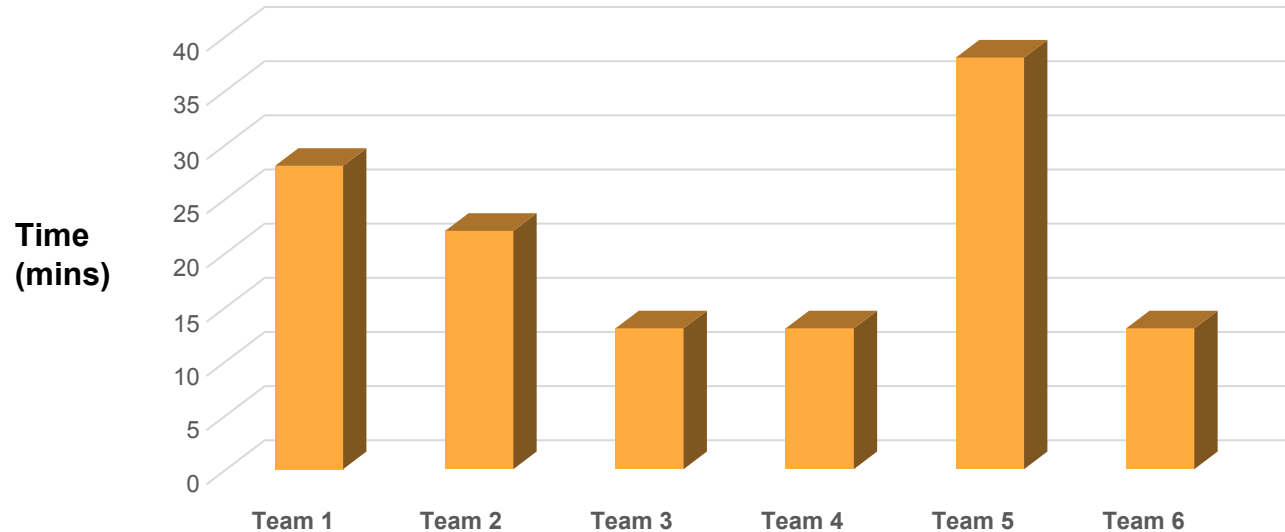
Send your answers to millerse@plattsburgh.edu or drop your entry off at Hudson 317. If completing for a class, please put the course name/instructor on your entry.

One winner will be selected randomly from all correct entries and will receive \$25 Cardinal Cash! Winner will be selected October 31st 2018.

Time of Completion-Unlocking keys

SAFETY

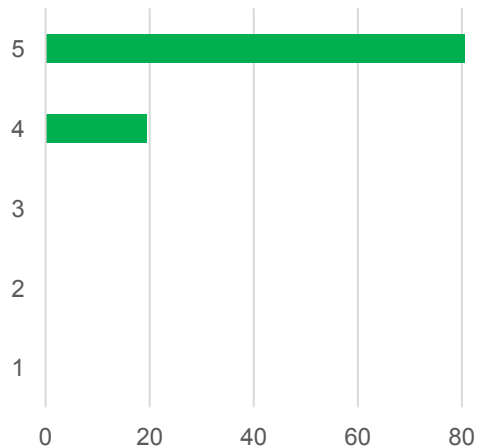
Team 1:	28:26min
Team 2:	22:32min
Team 3:	13:34 min
Team 4:	13:07min
Team 5:	38:06 min
Team 6:	13:01min



Student Evaluations

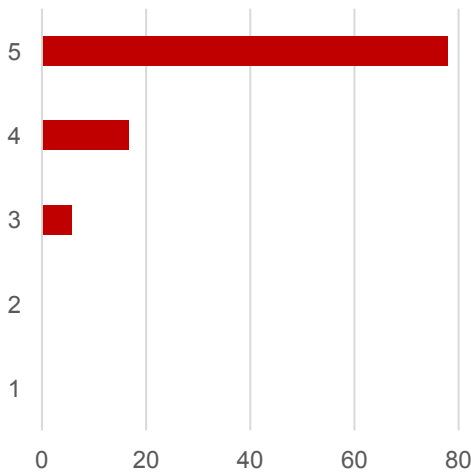
Organic Chem class, n = 36

Content of safety activity



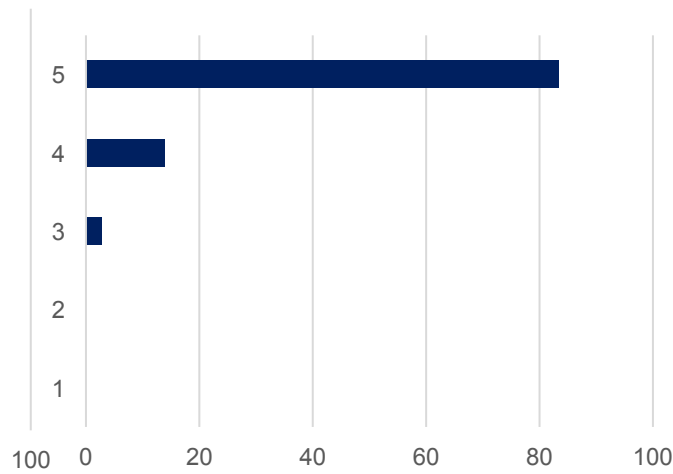
(%)

Learning about safety



(%)

Engaging Experience



(%)

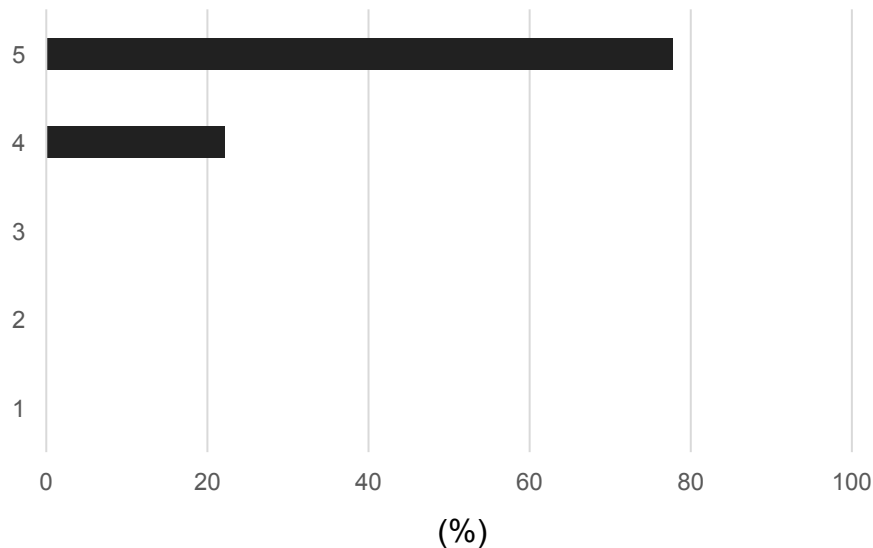
Scale: **5** (most effective); **0** (least effective)

Student Evaluations

Organic Chem class, n = 36

How likely would you recommend this breakout activity to other students?

(On a scale of 1-5, 5 = very likely 1 = unlikely)





Future Plans

- ✓ **Add more safety activities**
- ✓ **Try activity with High School students**
- ✓ **Increase the level of difficulty for faculty members**
- ✓ **Assessment of breakout safety activity**

Acknowledgements

- ✓ Mrs Shannon Nephew (key person in the design of Breakout Safety Activity)
- ✓ Faculty members
- ✓ Students
- ✓ Teaching Assistants

