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

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ACS National Meeting 2019
Orlando, Florida
31st March 2019
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)

3 h mandatory safety education (online + practical)

Breakout Edu

3 h mandatory safety education (online + practical)

risk assessment

Goal: Make safety education fun & engaging

2003

2016

2017

Fall 2018

spill training
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?
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.

https://www.breakoutedu.com
Breakout Safety Activity

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

Engaging & Fun Safety Activity

Safety Education/Training for Educators
Components of Breakout Safety Activity

- Spill Education
- Emergency Response Education
- Chemical Labeling/Hazardous Waste

https://environmentthealthsafetyforbusinessdotcom.files.wordpress.com/2012/07/3d-guy-spill-frustration.jpg
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. Ooops! 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)

- **CLUE #1**
  - Drop by drop, plip and plop.
  - You added a chemical to a beaker.
  - Now things look so much bleaker.
  - The solution splashed up in your face.
  - Where do you go to leave no trace?

- **CLUE #3**
  - You cut your finger, there is a bit of blood,
  - Where do you go to nip it in the bud?

- **CLUE #5**
  - You spilled acetone all over the bench,
  - You could have a problem worse than the stench.
  - Sources of sparks must be eliminated,
  - Or a huge fire you will have created.
  - Receptacle power must be shut down,
  - Using this object to save the town.

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
Reflecting 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?
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

Class: Organic Chemistry I (Fall 2018)

Class size: 61 students

A “pass” to escape

Monthly Safety Challenge
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 millerce@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

Team 1: 28.26 min
Team 2: 22.32 min
Team 3: 13.34 min
Team 4: 13.07 min
Team 5: 38.06 min
Team 6: 13.01 min
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