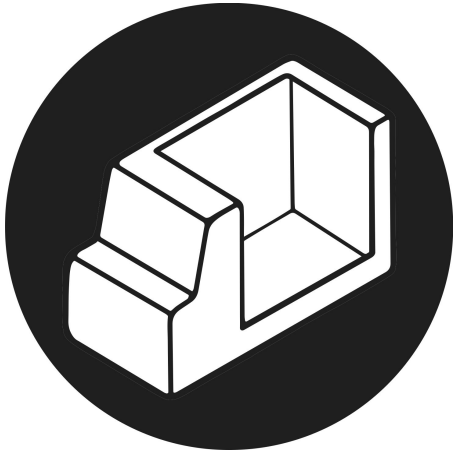
Deeper Learning Puzzles

education escape room toolkit



PART 1

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Institute of Design at Stanford

An escape room… what's that?

An escape room is a room or series of rooms which participants are "locked inside." In order to escape, participants must collaboratively solve a series of interesting puzzles.

Puzzle rooms are a fairly new concept, but have sprouted up all over in the past few years. You might be surprised to find them in your own neighborhood !

Adapted from Stanford d.School by Stanford Center for Assessment, Learning, and Equity (SCALE).

Sounds cool...but how is it educational?

Puzzle rooms require many of the deeper learning skills we are trying to support our students in developing! In order to solve puzzles and escape the room, a team must use effective communication, collaboration, critical thinking, creativity, and a growth mindset! We feel like puzzle rooms are a great way to teach these skills in an engaging way.

We've seen teachers build their own escape rooms in creative ways back at their own schools! Here's an example of a teacher at an international school helping her students review for a test: https://citizen-c.me/literary-life/breakout

Purposes

- Communication
- Collaboration
- Perseverance (it's okay to fail)
- Preview and review material
- Student engagement
- Learning about your own and other people's strengths
- Creativity--involving the student in the creation creates big opportunities for this
- Entrepreneurial--students could actually build a business around this

Adapted from Stanford d.School by Stanford Center for Assessment, Learning, and Equity (SCALE).

Purposes

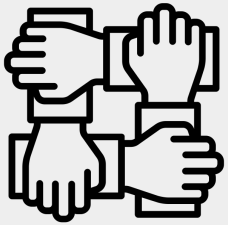
Besides being **fun**, puzzle rooms can support...

Intrapersonal Skills

- Perseverance--it's okay to fail
- Creativity--especially when students are solving AND designing puzzles

Interpersonal skills

- Communication
- Collaboration
- Community Building--learning about your own and other people's strengths



Academic skills

- Local history and current events
- Entrepreneurship--students could actually build a business around this
- Preview and review material

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FAQ

How can I make an escape room?

Although some escape rooms have high production quality, others leverage creativity and ingenuity to “hack” the escape room activities. Escape rooms can be created with a zero-to-low budget, and be built out easily in a classroom. You don’t need many funds nor space to make this experience a reality!

How long will this take?

There is a lot of flexibility in terms of time. Although some educators have built escape rooms over the course of a semester, it is possible to create an escape room experience in less than a week (especially if you have students help!)

How can I use this in my classroom?

Escape rooms can be used to build up and measure deeper learning competencies. They can also be used as a project launch, community building challenge, learning activity, study tool, or even as a replacement for a test!

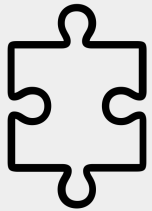
Adapted from Stanford d.School by Stanford Center for Assessment, Learning, and Equity (SCALE).

In this toolkit we will lead you through each section or major component of an escape room. We'll use the **Deeper Learning Puzzle Bus** as a model example for each section. If you've been through the bus, this will look familiar!

The Deeper Learning Puzzle Bus is a mobile educational escape room designed by the d.school K12lab as an experimental alternative to assessment. We featured the bus at SXSWedu and many other conferences in 2018-19.

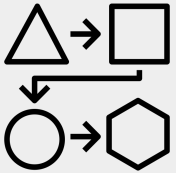
Escape Room Components

Puzzles



Narrative

Structure



Materials

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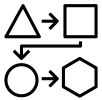
NOTE THAT FOR PERFORMANCE ASSESSMENT PURPOSES, YOU'LL NEED TO FIGURE OUT WHAT LEARNING OBJECTIVES OR PERFORMANCE OUTCOMES YOU WANT TO MEASURE WITHIN YOUR CONTENT AREA, THROUGH A SEQUENCE OF PUZZLES + PROBLEMS THAT STUDENTS WILL WORK TOGETHER TO SOLVE.

Breakdown of Escape Room Components

Puzzles are the main component of escape rooms. Series of connected puzzles make up an escape room. The more clever and interesting the puzzles, the more engaging the experience! Good puzzles engage different types of thinking and require multiple people to engage. Puzzles can focus on a subject area (math, history, etc) or based on a required skill (collaboration, communication). There are an infinite amount of different puzzles you can make for escape rooms.

A **narrative** is what ties the puzzles in an escape room together thematically, and creates the objective for the experience. Narratives set the tone and atmosphere for an escape room, and create a precedent for solving puzzles. Rich narratives can help participants be more energetic and imaginative.



The **structure** of an escape room dictates the flow of the experience. Structure links the puzzles together sequentially so that participants can ultimately win the game, or “escape”. There are different approaches to structures that help enable participants to stay engaged, and ensure that there is enough things to do inside for each individual.

Every escape rooms needs props, locks, and decorations to work effectively. Many of these **materials** can be repurposed from a classroom. Other essential materials such as combination locks and lockboxes can be purchased or even created with cheap materials such as cardboard.

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Puzzles

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Types of puzzles

- Code/logic based puzzles (critical thinking, academic knowledge)
  - Chronology
  - Math equations
  - Ordering
  - Code/language deciphering
- Experimentation/tool-based/cause and effect (creativity, perseverance)
  - Mazes
  - Hidden clues
  - Secret passages
  - Specialized tools
- Physics & engineering puzzles (critical thinking, content knowledge)
  - Light
  - Magnets
  - Mirrors
  - Rube Goldberg type of contraption
  - Construction

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What makes a good puzzle?

Sensory puzzles

Puzzles that engaged multiple senses can be very interesting. Could you make a puzzle based on musical notes? What about smell? Even logic puzzles can incorporate other senses!

Requiring multiple minds/bodies

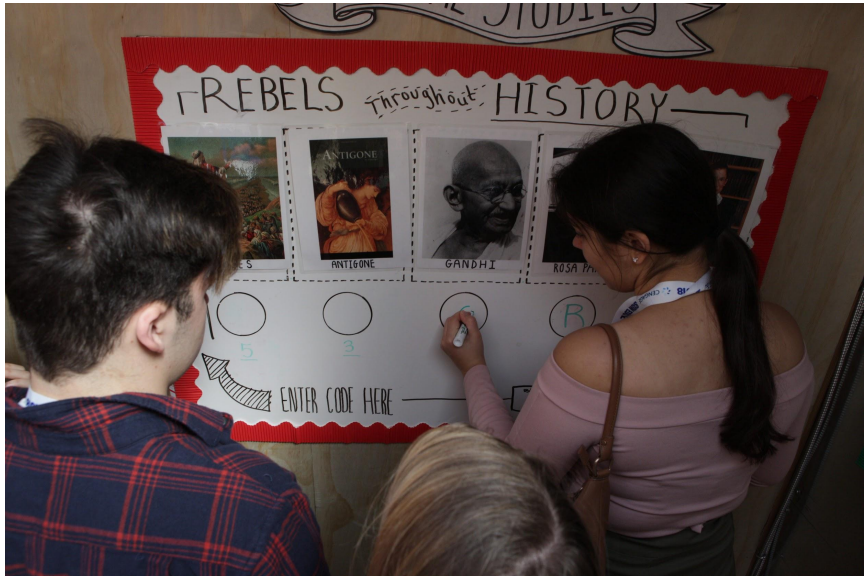
Puzzles that require multiple people to take part are often the most memorable. Puzzles that can be solved with one person leave little space for interaction-- and are often boring.

Content specific

Puzzles that require specific content are unique, and great opportunities to test knowledge. Wrapping in academic content into puzzles makes the content, and the puzzle more exciting.

THE NEXT SECTION OF THIS GUIDE PROVIDES SEVERAL DIFFERENT EXAMPLES OF DIFFERENT TYPES OF PUZZLES YOU COULD CREATE, TIED TO SPECIFIC CONTENT AREAS.

The **Rebels Throughout History** puzzle was designed on the puzzle bus as a way to tie in content while requiring good communication. It were was designed to be easily recreated in a classroom.



In this puzzle, students must find photos of historical figures around the room and put them in chronological order. Once they get this order right, they must decode the puzzle to find a code to unlock a word combination lock.

Rebels Throughout History

Puzzle Type: Code/logic

Skills required: Critical thinking, mastery of content, experimentation, problem solving

Content: Good for all subject matter (images can be of anything requiring ordering)

Difficulty to create: Easy--can be done in less than 15 minutes

Materials Needed

Puzzle Example

Rebels Throughout History

Whiteboard markers

Five letter combination lock

Standard printer

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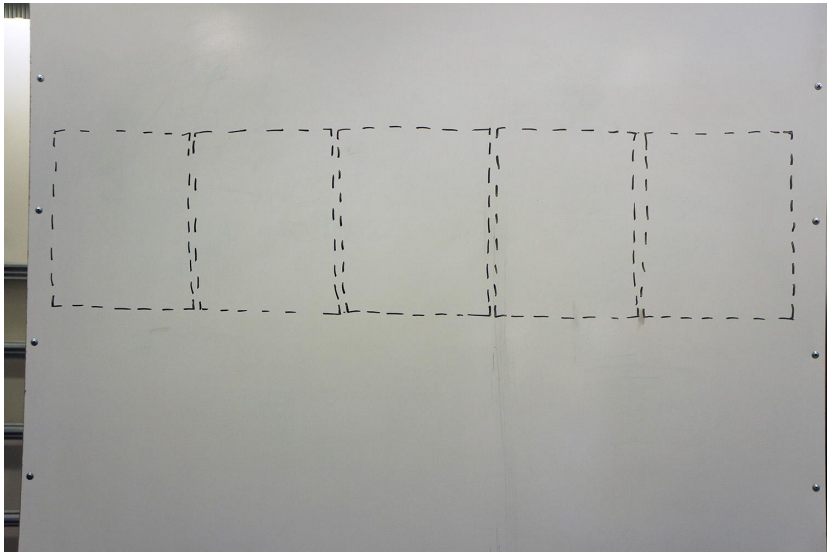
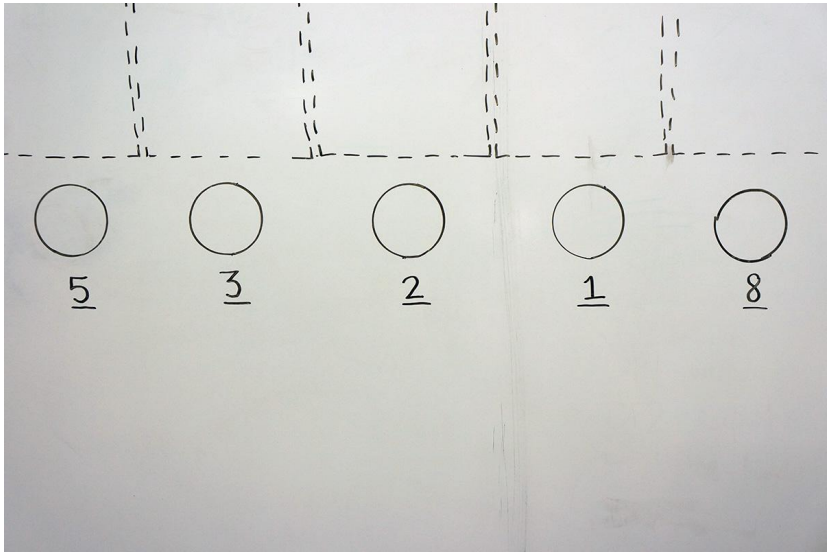


Step 1

Draw 5 squares that are roughly the size of an 8.5X11” piece of paper. This is where students will put up the pictures

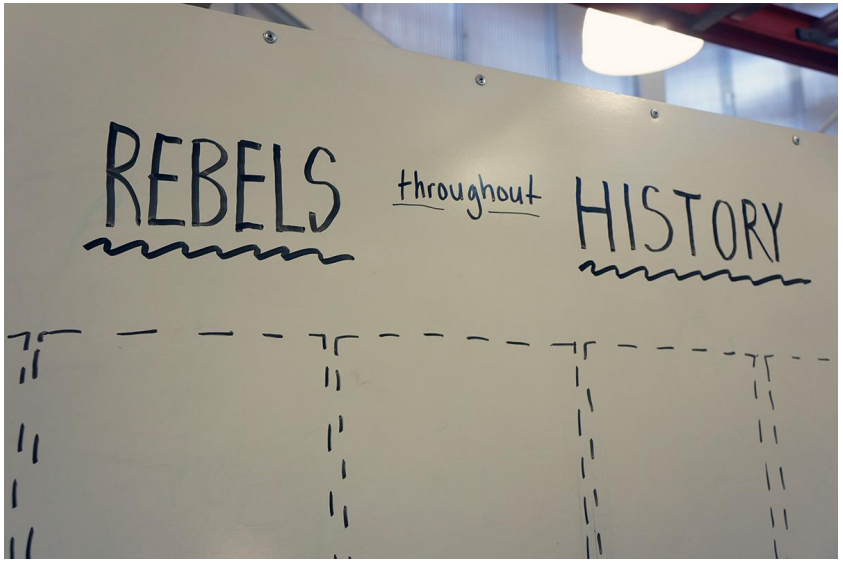
Step 2

Use a cup to draw circles under each of the squares.



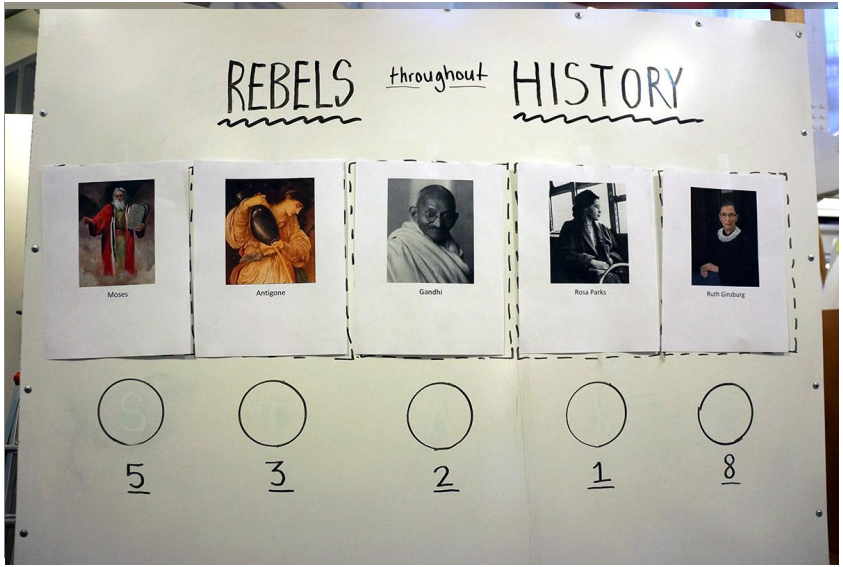
Step 3

Under each of the circles, write the following numbers. This will be the code that students need to figure out once they put up the pictures.



Step 4

Don't forget to name your puzzle! This will also help identify what puzzles students need to work on.

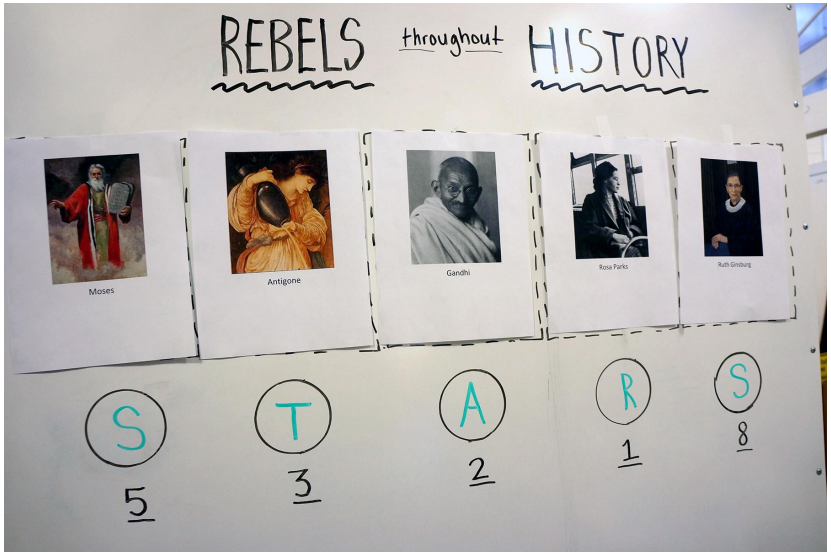


Step 5

Print out five pictures of historical figures. The figures (or rebels) we chose were Moses, Antigone, Gandhi, Rosa Parks, and Ruth Ginsburg. Label the images with the figures' respective names. These pictures should be hidden in the escape room.

Step 6

Leave tape or magnets for students to place historical figures on the board. They will need to put them in chronological order to complete the code.



Step 7

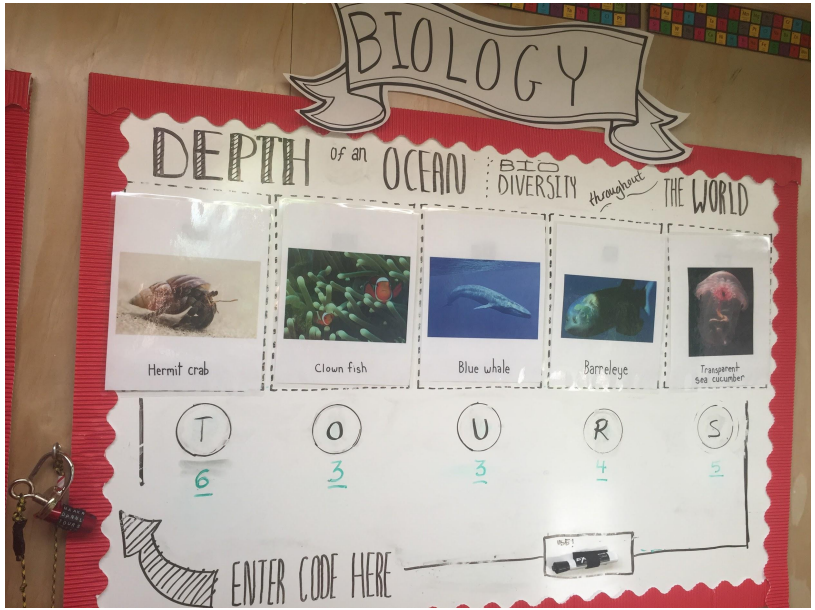
The number below the circles correspond the the correct letter in the figure's name. The 5th word of Moses is S, the third letter of Antigone is T, and so on. The code spells out a 5 letter word which is the code for the lock!

Step 8

Program your combination lock to STARS, and use it to lock a box, or tool. When students get the code, they will be granted access to the next puzzle.

Switch it up!

Although the subject matter of this particular example is history (requiring knowledge of the historic figures) you can easily wrap in your own content. For example, maybe you are a science teacher giving a lesson on ocean life. Print out pictures of animal life that live in various depts of the ocean.



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The **X Marks the Spot** puzzle requires collaboration, and participation from multiple group members. It can be scaled to require anywhere from 3-6 people, and is the most popular of our puzzles.

To solve this puzzle, students must find colored yarn that correspond with matching colored dots hidden around board with different numbers or words. They must connect the dots with the yarn and see where the strings intersect.

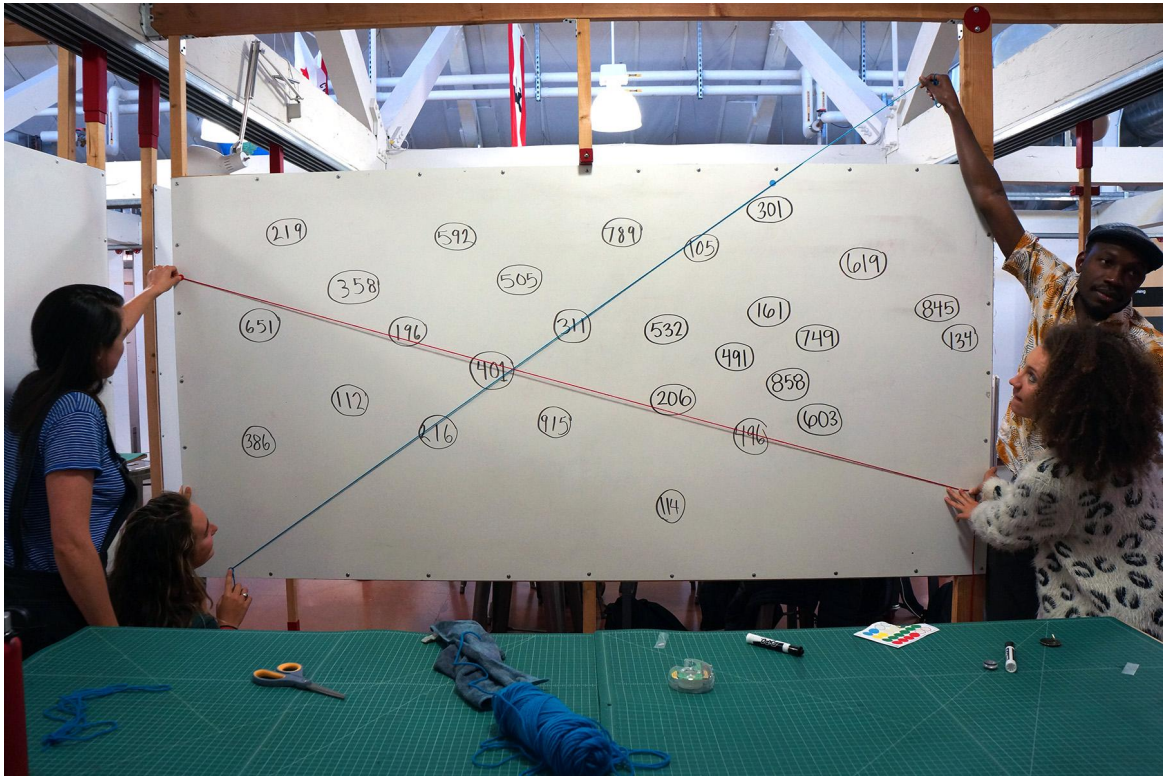
X Marks the Spot

Puzzle Type: Tool-based

Skills required: Collaboration, experimentation, problem solving

Content: Good for all subject matter, can put up vocab words, mathematical equations, etc.

Difficulty to create: Easy--can be done in less than 15 minutes



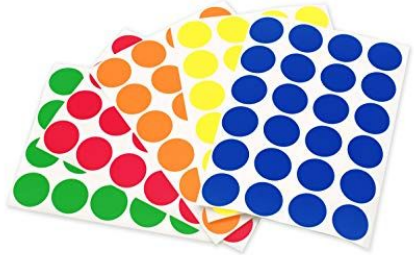
Materials Needed

Puzzle Example

Rebels Throughout History

Whiteboard marker

Any type of combination lock



Sticker dots

Colored yarn (red and blue)

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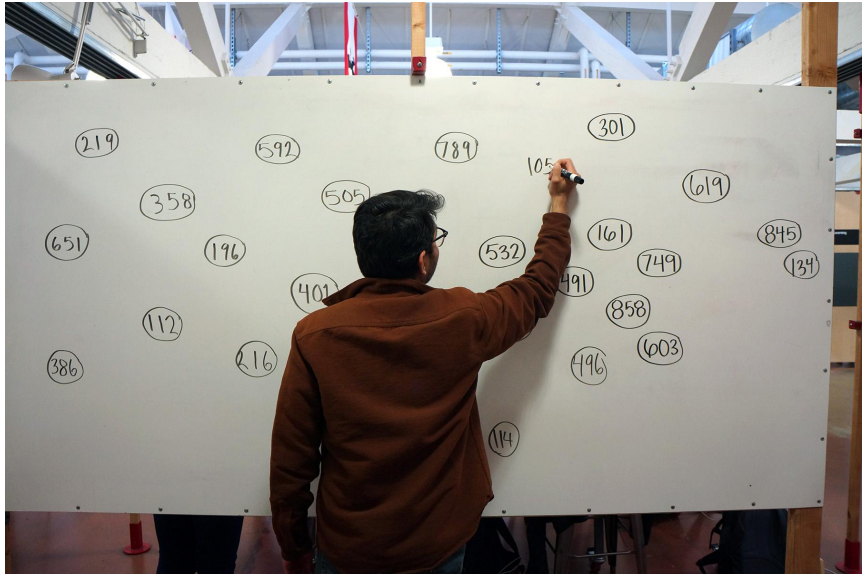
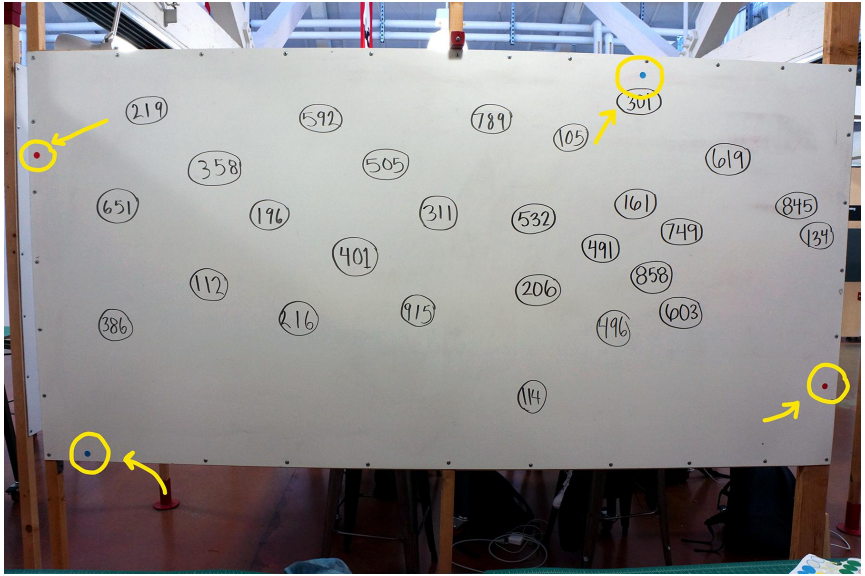


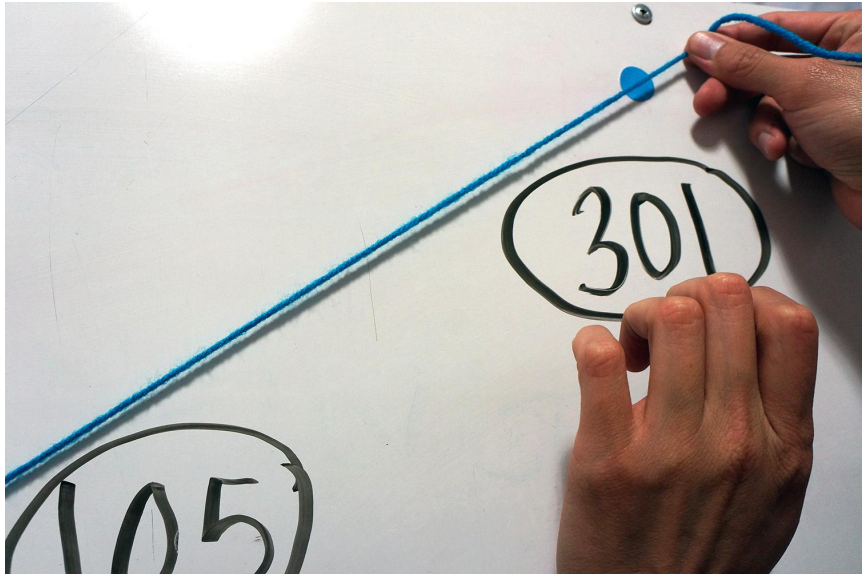
Step 1

Write down words or numbers across a whiteboard or chalkboard.



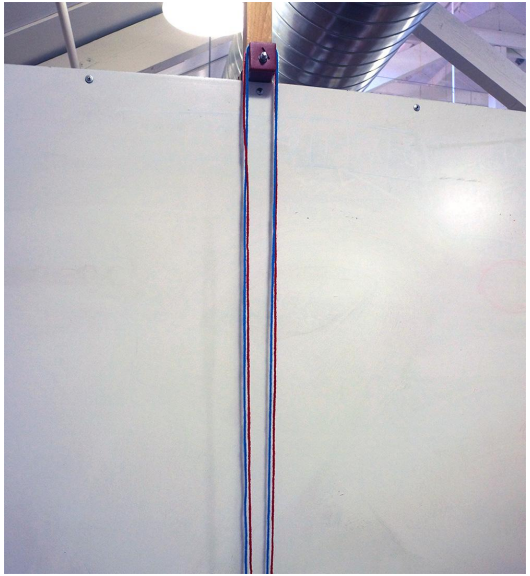
Step 2

Place colored voting dots in each corner of the board. Try not to place them directly in the corners, they should be slightly offset. Each color should have a corresponding color on the opposite corner.



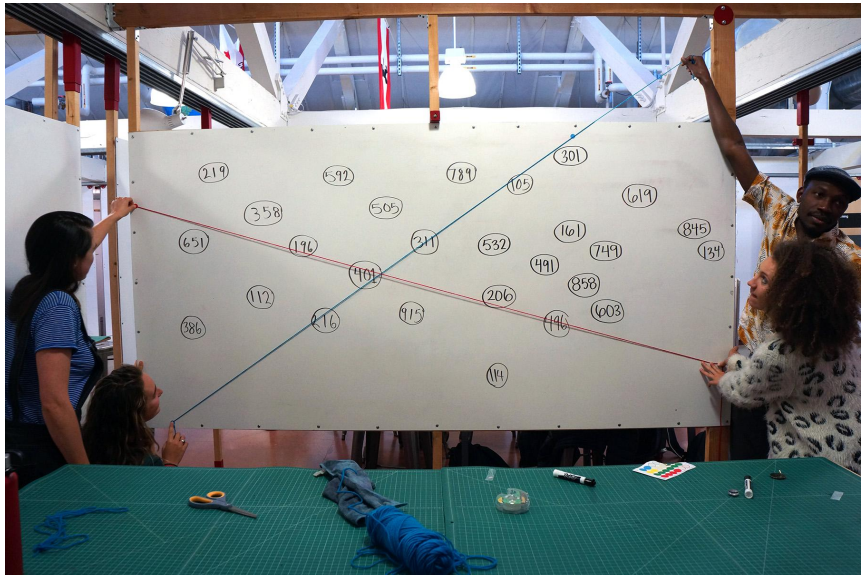
Step 3

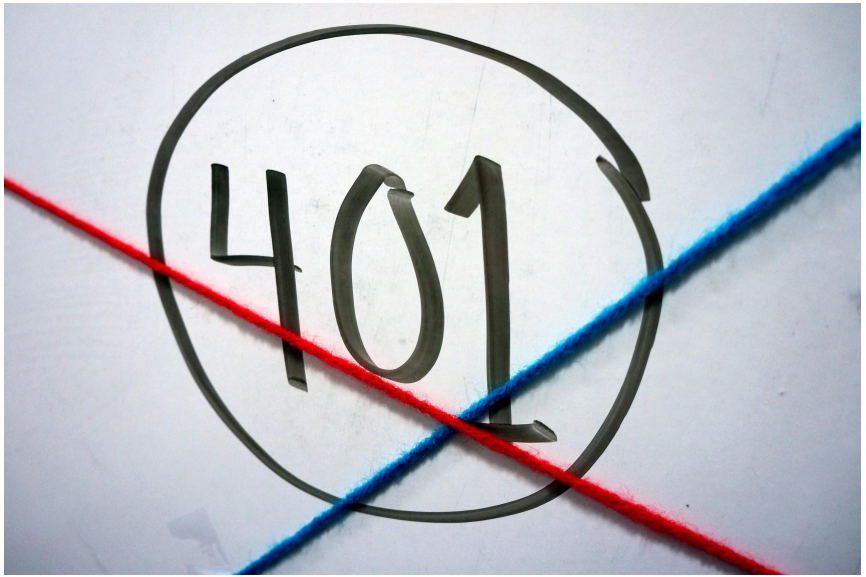
String will be used to connect the dots. This is why the placement of the dots shouldn’t be too obvious.



Step 4

Place colored string nearby, or hide it as a hidden clue.





Step 5

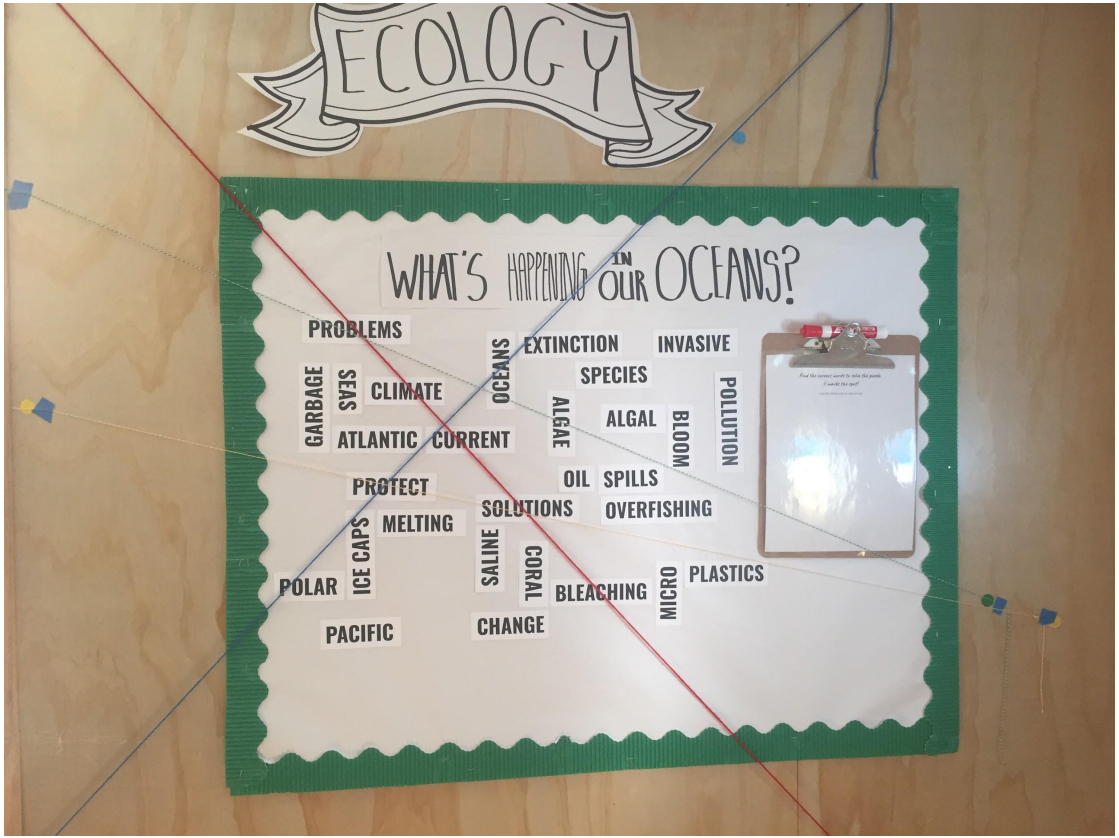
The string should intersect on one of your numbers or words. This will be the correct word! Multiple students will have to work together to hold the strings in the correct places. Try to spread out the dots as far as possible.

Step 6

To move the intersection of string, you can either move the voting dots, or just write in the correct code where they do intersect.

Switch it up!

This puzzle can be expanded on in many different ways. You can add more strings to have more intersection of lines which could produce multiple clues. In the example here, we added two more strings so there were 5 intersections which marked a word. These words were used for a madlib puzzle which would ultimately give a final clue to a word combination lock. You can find the madlib at https://bit.ly/2YTREw8



The **Worldly Traveler** is a great puzzle to tie critical thinking and geography together. It is very easy to remix, and the extremely simple to create.

Students will find scattered pieces of a letter which outlines a journey across the globe. They will have to find the locations on the map to determine which direction the traveler went. These directions correspond to a directional combination lock.

Worldly Traveler

Puzzle Type: Code/logic

Skills required: Critical thinking, mastery of content

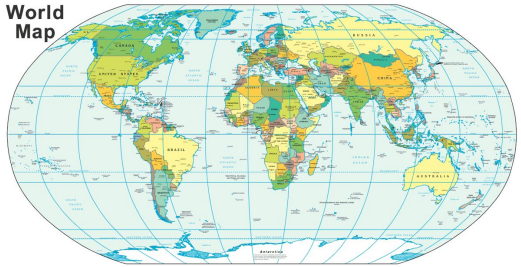
Content: Can be used with any content related to geography

Difficulty to create: Very easy-- can be done in less than 10 minutes

Materials Needed

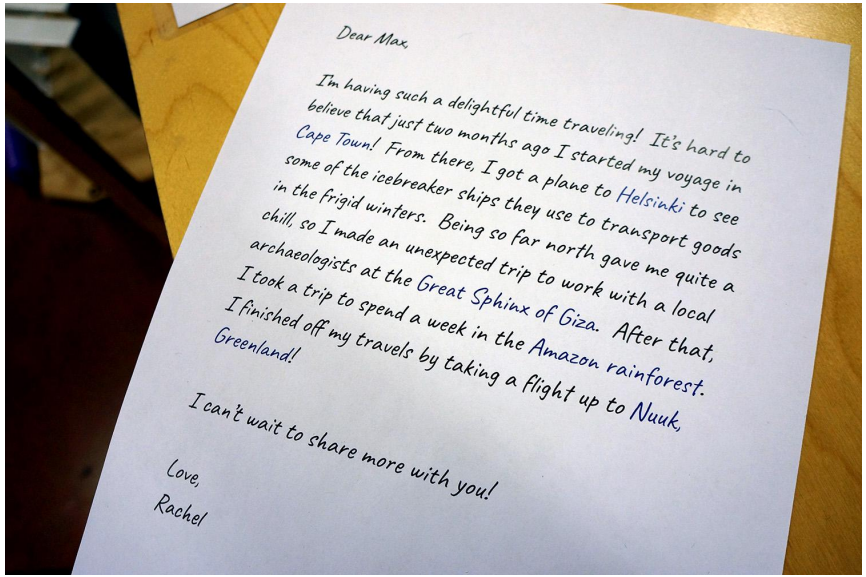
Whiteboard marker

Directional Lock



Laminated World map

A printer



Step 1

Write a letter from one student to another detailing her recent trip around the world. Instead of using named locations, used regional specific areas such as Amazon Rain Forest or the Nile river.

Step 2

Use a laminated world map and tape it up to a wall.

Step 3

Students will need to track the journey with a whiteboard marker.

Step 4

The completed journey will give students a set of directions which can be imputed into a directional lock.

Step 5

Students use the directions in the directional lock in order to get to the next area or find a clue for another puzzle.

Narratives

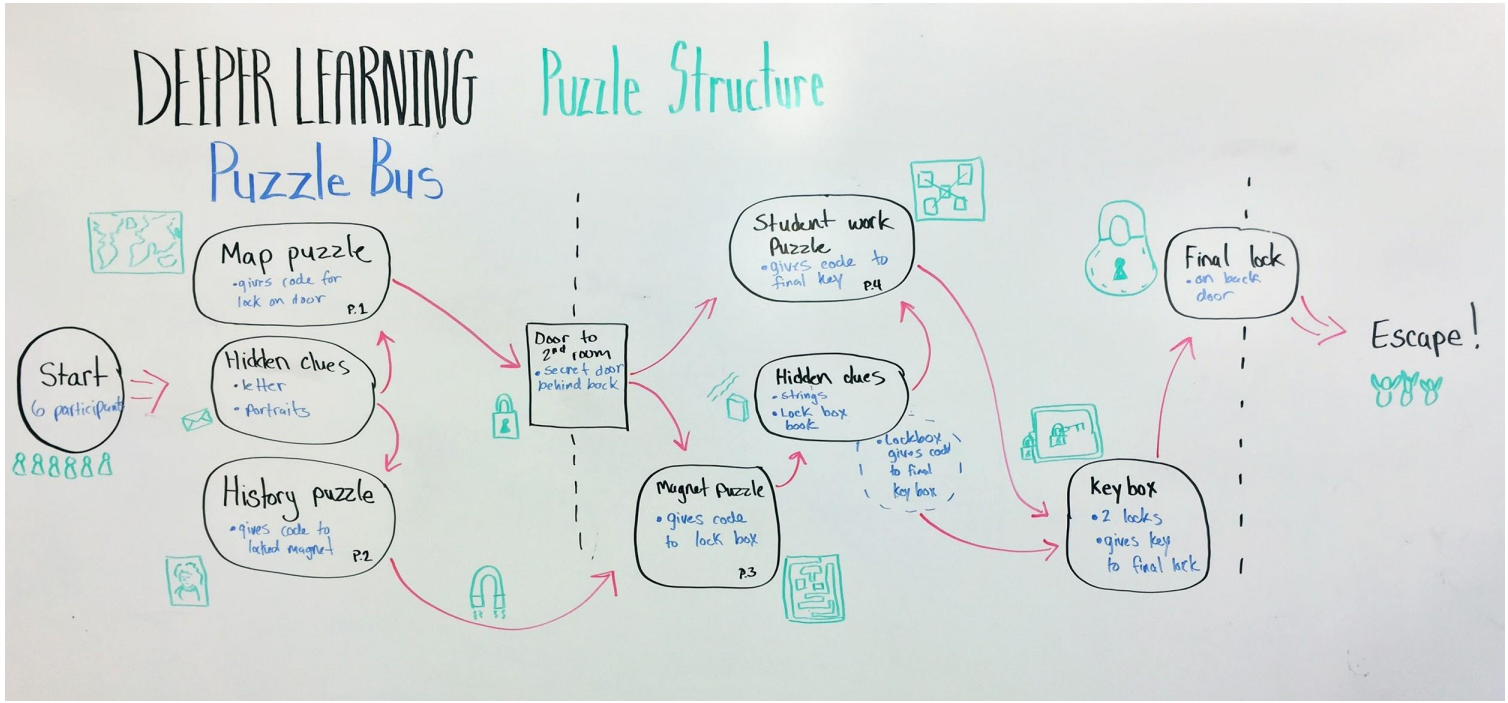
The narrative provides an opportunity to engage the participants. A narrative can link the puzzles together in a cohesive story line and provide an authentic reason for escape. Where am I? Who am I? Why am I here? How do I get out? The narrative can be drawn from content or constructed from your imagination! Some examples include:

Themes

- Present
  - Social issues
  - News events
  - Where's Waldo: find your missing school mascot or class pet
- Literary (books and movies)
  - Juliet saves Romeo
  - Phantom Tollbooth
- Science
  - Surviving in different biomes/ecosystems (rainforest, ocean)
  - Breaking out of a mad scientist's lab
  - Moon landing or astronaut challenge
- Historical
  - Inside a historical figure's home, office, or lab (ie. Albert Einstein, MLK, Marie Curie, JFK)
  - Events leading up to a major historical event
- Dystopian/Fantastical
  - Zombie apocalypse
  - Haunted school
- Mystery
  - Solving a cold case
  - Crime scene investigation

Structure

The structure of an escape room dictates the flow of the experience. Structure links the puzzles together sequentially so that participants can ultimately win the game, or “escape”. There are different approaches to structures that help enable participants to stay engaged, and ensure that there are enough things to do inside for each individual.



These are just examples of the types of low-tech materials that could be used – we encourage you to use basic household or classroom items that are easily accessible and very low or no cost.

Materials

Items

Materials used for the Puzzle Bus include:

- Dictionary Lockbox - $9.57
- Ultraviolet Marker - $3.24
- Ultraviolet Light 5 pack (best deal) - $11.99
- Plastic Vials with caps 12 pack - $5.99
- Combination Letter Locks - $8.56 ea
- Directional Lock - $7.98
- World Map - $14.36
- Color Yarn
- Expo markers
- Cardboard

The most expensive materials are typically locks, and lock boxes. Other materials can be substituted for low cost alternatives or even made out of cardboard. Second-hand stores like Goodwill and Savers are great places to acquire interested objects that can be manipulated to create puzzles. Old board games and decks of cards are invaluable for code puzzles. An old cookie jar might be a fun prop to hide a clue in.