

Elementary Trades and ADST Projects at Home

Project: Marble maze

Time required: 1-2 hours

Theme: ADST, STEM. This activity can be used to introduce Greek mythology and has many educational benefits beyond play. According to Linda Drummond's article at <https://kidspot.co.nz/school-age/improve-handwriting-with-printable-mazes/>, mazes help children develop problem solving skills, hand-eye coordination, cognition, memory and patience. This lesson is a modification of many ideas found online including <https://www.instructables.com/id/DIY-Marble-Maze/> and can be used as a fun cross curricular challenge which includes mathematics, humanities and ADST.

Grades: 4-7

Tools and Materials:

- Safety glasses (recommended when using any makerspace tools)
- 1-cardboard box
- 1-marble or other small ball
- Hot glue gun
- Pencil
- Ruler
- Scissors

Procedure:

1. Start by introducing mazes and labyrinths by researching their origins on the internet with an adult. Try to find answers to some of the questions in the assessment portion of this lesson.
2. Now build your own maze by gathering tools and preparing your cardboard materials by carefully cutting the sides off your box off.



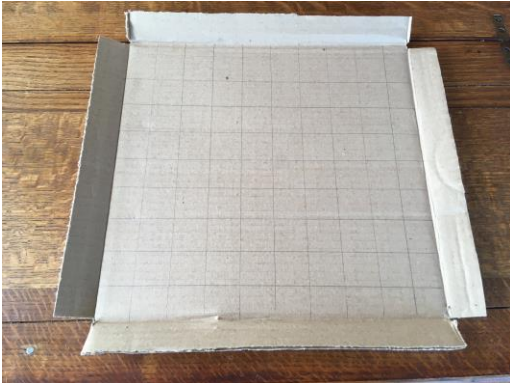
Remember to cut away from yourself and keep fingers clear to avoid injury. Set one of these pieces aside to act as the bottom of your maze. We left a 1" wall

attached to the bottom that will be folded up and glued to act as our perimeter wall.

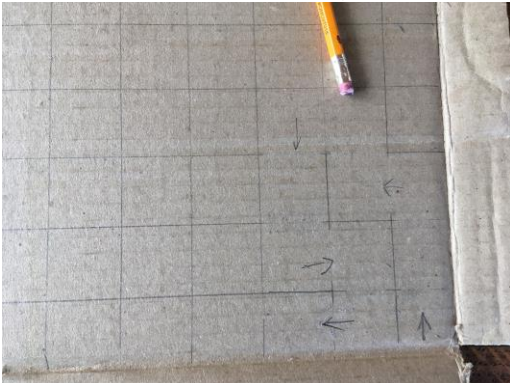
Next, cut wall materials by drawing lines at 1" intervals on the remaining cardboard. Carefully cut along lines with scissors to make multiple 1" strips of cardboard.



3. Design your maze by drawing the position of each wall with your ruler on your maze bottom. Start by using your ruler and pencil to draw a grid.

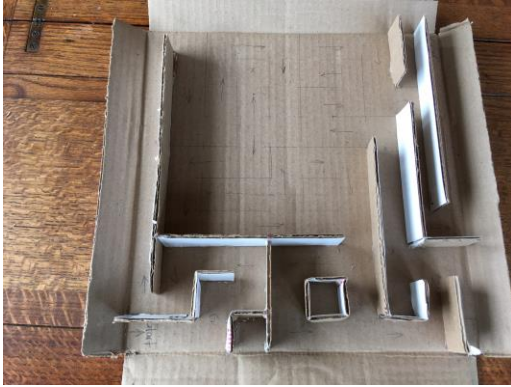


Decide where you want to start and erase lines as you create a path. We left arrows to remind us of path options and even included dead ends! The lines should be evenly spaced and include many direction changes and you should try to use as much of your grid as you can.



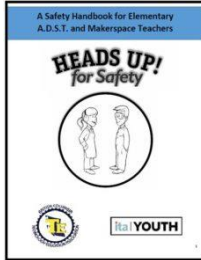
Visit <http://www.gwydir.demon.co.uk/jo/maze/design/index.htm> for many great maze design ideas.

4. Add your maze walls by first measuring each wall with your ruler and then carefully cutting each from your 1" wall strips. Don't forget to add a wall around the entire perimeter of your maze if you didn't leave the fold down walls. We started at one side and then worked across to the other. There were times when we folded our strips to create squares and other features before gluing.



Carefully add hot glue along each layout line before holding each wall in place as the glue hardens. Be very careful when using the hot glue gun as the glue and the hot tip of the gun can easily burn you. Hot glue gun and other makerspace tool safety can be reviewed by visiting "Heads up for safety" at

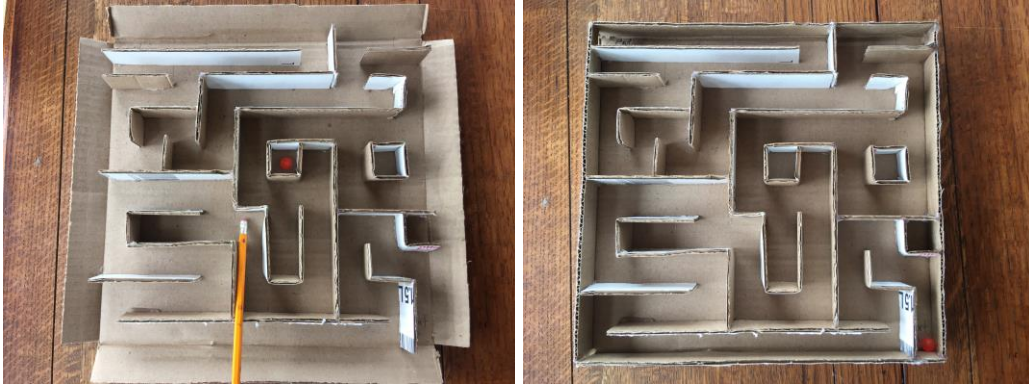
<https://docs.google.com/file/d/1InRrgLKELT4Zqe0hfXtxGBXRvtjemPx7/view?rm=minimal>



5. Finally, label the start and finish of your maze with your pencil or cut a start and finish point out of the perimeter wall.



Cleanup any loose glue and erase arrows before folding up the perimeter walls and gluing.



Now play and challenge your family members to see who can finish your maze fastest.

Extensions:

- Add holes to act as pit falls. Using scissors or a drill, with a drill bit that is larger than your marble carefully create a more challenging maze. Refer to “Heads up for Safety” at <https://docs.google.com/file/d/1InRrgLKELT4Zqe0hfXtxGBXRvtjemPx7/view?rm=minimal> for tips on drill safety.
- Create a different style and complexity of maze by visiting <http://www.gwydir.demon.co.uk/jo/maze/design/index.htm> or <http://www.cgl.uwaterloo.ca/csk/projects/mazes/> and create a maze that is more difficult to solve.
- Research labyrinths at <https://en.wikipedia.org/wiki/Labyrinth> or <https://labyrinthos.net/layout.html> to gain a deeper understanding of the mythology and design of labyrinths.
- Create a maze with wood for a product that will stand the test of time. Research building a wood maze on the internet and work with an adult to create a wood maze to be proud of.

Assessment:

Discussion questions:

1. Who developed maze/labyrinth building and why were mazes/labyrinths created?
2. What do people use mazes and labyrinths for now?
3. What was the most challenging part of designing your maze? How did you solve the issue?
4. What was the most challenging part of building your maze? How did you overcome this challenge?

Review these discussion questions and visit

<https://curriculum.gov.bc.ca/curriculum/adst> to make connections to ADST curriculum.

Resources and Links:

<https://www.instructables.com/id/DIY-Marble-Maze/> (Marble maze lesson)

<http://www.gwydir.demon.co.uk/jo/maze/design/index.htm> (Maze design)

<http://www.cgl.uwaterloo.ca/csk/projects/mazes/> (Maze design)

<https://docs.google.com/file/d/1InRrgLKELT4Zqe0hfXtxGBXRvtjemPx7/view?rm=minimal> (Heads up for Safety)

<https://en.wikipedia.org/wiki/Labyrinth> (Labyrinth mythology)

<https://labyrinthos.net/layout.html> (Labyrinth design)

<https://kidspot.co.nz/school-age/improve-handwriting-with-printable-mazes/> (benefits of mazes)

<https://curriculum.gov.bc.ca/curriculum/adst> (ADST curriculum)