# STEM Lesson: Escape Code

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Overview: For this activity Kindergarten students will create a map of our school and use coding mice / bee bots to program exit routes in case of a fire or fire drill.

State of Georgia Standards:

SSKG2a Explain that a map is a drawing of a place

SSKG2b Explain that maps and globes show a view from above

NET6a Comprehends and applies kindergarten concepts and skills

Materials:

Coding Mice/ bee bots

Chart paper (Cut into the general shape of the school)

Colored stickers (one color for each exit / path out of the school)

Yard sticks

Colored paper squares (to represent your classroom)

Useful Vocabulary:

Coding: **Coding** is the method of giving instructions to a **computer** to perform a specific task. You may have also heard it referred to as "software **programming**" or "**computer programming**."

Map: A **map** is a drawing of all or part of Earth's surface. Its basic purpose is to show where things are. They show a view from above.

Prerequisite skills:

Students should have experiences with the coding mice / bee bots prior to the lesson if possible. The coding mice kits come with premade scaffolded challenges to help them learn how to code.

Students should have examined maps prior to the lesson to become familiar with the purpose of a map and how / when they are used.

Students should have been through one or more fire drills so they think of the activity more as a drill than worry about a possible emergency.

Lesson:

1. Open the lesson by showing students a map of their school using GOOGLE Earth but do not tell them what they are looking at. Discuss how this map shows a place they know from above in a smaller size than it is in real life. Have them guess what it is a map of to build anticipation for the project.
2. Next tell the students their principal needs them to know all the ways to get out of the building during a fire / fire drill in case one way is blocked or they need to change direction and it's too smoky to see. Explain that she wants them to know all the ways and to be able to teach others how to find them too.
3. Provide and overview of the project explaining that they will be making a map of the school and teaching the mice / bees all the ways to get out in case of an emergency. They will need to learn the codes the mice / bots need for each path.
4. Next go back to the GOOGLE Earth map and point out how the map helps them to see the shape of the school but they will need to imagine what the school would look like if the roof was missing in order to picture where the hallways, classroom and doors would be. (Show students your interior school map with classrooms and hallways shown if possible.)
5. Put the students into groups of 3-4.
6. Pass out one piece of chart paper (2' x 3') to each group. Set up the rule that all students must work on one side of the paper, so they are all seeing the map from the same direction.
7. Using the GOOGLE Earth map, help students figure out where their classroom would be in relation to the map even though they cannot see through the roof. (I used my overlay pen to mark it on the GOOGLE Map.)
8. Have students glue their colored square on the chart paper map they are working with in the appropriate spot.
9. Using the GOOGLE map help them figure out where the major exits would be and mark them on the projected map. Have students use the colored stickers to mark these exits on their map. (I chose to have them sticker only the closest exits at first to simplify and we added the other exits as we added hallways later.)
10. For the next parts I split my class into two groups as I only had 3 mice / bots and more groups. One group worked in the hallway to make their map and the other worked in the classroom to become proficient at coding the mice / bees. Then we switched for our second lesson.
11. For this next step it might be helpful to have your students work in the hallway outside the classroom to better visualize. From the classroom, have the students lay their yard sticks in the direction of the hallway they are in toward the nearest exit. (For example, we placed it outside the classroom connecting the playground door and the bus port door.) Then have them work together to trace both sides of the ruler to represent the hallway walls. The students not tracing can hold the stick in place to help. Have their students walk to the next adjoining hallway as if they were discovering it for the first time. Once they find it, have them go back to their maps, use their fingers to trace the path they walked to find the next hallway and then place their rulers on their maps to show its direction. Have them trace the ruler to add this hallway to their map and any new exits it leads to. Keep going until all hallways / exits are represented one-by-one or at least the major ones you wish them to know.
12. As an extension, you can have students walk each hallway and count their steps then label their maps with the distance for each hallway.

13. Once their paper maps are completed, have the students begin to program the coding mice / bee bots, beginning from the classroom door to get out of the building using each colored exit. They can work as a team, using trial and error to design a programming sequence that gets the mouse out of the building, and represent this sequence using the coding cards provided in the kit. (I had one programmer, one student working on matching the programming cards to the programmer's commands and one student writing the sequence on the data sheet. In groups where I had an extra student, I had them draw the path of the mouse on a separate paper or white board using a lines and turns.

14. Have students add their data sheet or map key to their maps once there are completed, present and display them.

15. Have students finish their recording sheets and reflect on the project.


Possible Miscues:

Robots must go through hallways to exit not "walk through walls" to get to exit.

Right turn versus left turn and how they relate to buttons on the robot.

Student Data Recording Sheet: _____

Emergency Exit Code Key

| Exit #1 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Exit #2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Exit #3 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Exit #4 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Exit #5 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Exit #6 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

Name: _____

## ESCAPE CODE STEM ACTIVITY

1. **Make A Plan**

What does a map show?_____

A map shows things from _____ as if we were

looking _____.

What does coding mean?_____

First Map                    Improved Map

[ ]                          [ ]

What is your team role?

| Map Maker | Code Maker | Peace Maker |
|-----------|------------|-------------|
| Programmer | Code Writer | Great Idea Giver |
| Steady Hand | Sketch Artist | Photographer |

## 2. Build

Check off the supplies as you collect them?



## 3. Try

See Data Recording Sheet

## 4. Reflect

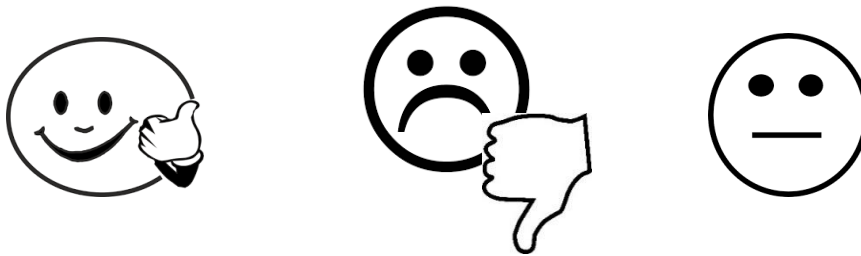Which route is the best for us to use if we need to get out from a

fire? _____

Why?_____

When might we use the _____ route?

_____

Predict the code you might need to use to program the mouse to get from your classroom to the learning commons.

|  |  |  |  |  |  |
|---|---|---|---|---|---|
|  |  |  |  |  |  |

How do you feel about the job you did?



Why? _____

Is there anything you could have done better?

_____