

# Junk Food Junction: What's Your Function?

## What is a Function?

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| **Grade Level** | 8th – 9th Grade | **Time Frame** | 2-3 class period(s) |
| **Subject** | Mathematics | **Duration** | 110 minutes |
| **Course** | Algebra 1, Pre-Algebra | | |

## Essential Question

How can you represent and describe functions?

## Summary

"Junk Food Junction: What's Your Function?" breaks down the components of a function and the relationship it has in real-world contexts. The goal is to identify different variables of the given function, either by equation or graph. Participants will identify domain, range, independent, and dependent variables of a function.

## Snapshot

**Engage**

Students brainstorm ideas for a vending machine.

**Explore**

Students discover patterns by playing the Function Machine game.

**Explain**

Students develop an understanding of the components of a function: domain, range, independent variables, and dependent variables.

**Extend**

Students create advertisements for their vending machines, incorporating the various function components.

**Evaluate**

Students engage in a Gallery Walk to view other students' advertisements and evaluate the functions for the various vending machines.

## Standards

*ACT College and Career Readiness Standards - Mathematics (6-12)*

**F506:** Understand the concept of domain and range in terms of valid input and output, and in terms of function graphs

*Oklahoma Academic Standards for Mathematics (Grade 8)*

**PA.A.1.1:** Recognize that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the value of the dependent variable.

*Oklahoma Academic Standards for Mathematics (Grade 8)*

**A1.F.1.2:** Identify the dependent and independent variables as well as the domain and range given a function, equation, or graph. Identify restrictions on the domain and range in real-world contexts.

## Attachments

- 3-2-1—Junk Food Junction - Spanish.docx
- 3-2-1—Junk Food Junction - Spanish.pdf
- 3-2-1—Junk Food Junction.docx
- 3-2-1—Junk Food Junction.pdf
- Function Machine Levels—Junk Food Junction - Spanish.docx
- Function Machine Levels—Junk Food Junction - Spanish.pdf
- Function Machine Levels—Junk Food Junction.docx
- Function Machine Levels—Junk Food Junction.pdf
- Function Machine Teacher's Guide—Junk Food Junction.docx
- Function Machine Teacher's Guide—Junk Food Junction.pdf
- Function Machine—Junk Food Junction - Spanish.docx
- Function Machine—Junk Food Junction - Spanish.pdf
- Function Machine—Junk Food Junction.docx
- Function Machine—Junk Food Junction.pdf
- Lesson Slides—Junk Food Junction.pptx
- Vending Machine Advertisement—Junk Food Junction - Spanish.docx
- Vending Machine Advertisement—Junk Food Junction - Spanish.pdf
- Vending Machine Advertisement—Junk Food Junction.docx
- Vending Machine Advertisement—Junk Food Junction.pdf
- Vending Machine Gallery Walk—Junk Food Junction - Spanish.docx
- Vending Machine Gallery Walk—Junk Food Junction - Spanish.pdf
- Vending Machine Gallery Walk—Junk Food Junction.docx
- Vending Machine Gallery Walk—Junk Food Junction.pdf

## Materials

- Lesson slides (attached)
- 3-2-1 handout (attached; one half sheet per student)
- Function Machine handout (attached; one per student)
- Function Machine Levels handout (optional; attached; one per student)
- Vending Machine Gallery Walk handout (attached; one per student)
- Copy paper, or copies of the Vending Machine Advertisement handout (attached; one sheet per student)
- Markers or colored pencils
- Sticky notes (one per student)
- Devices with Internet access

15 minutes

# Engage

**Teacher's Note: 3-2-1 Preparation**

Make sure to print copies and cut the attached 3-2-1 handout into half sheets before you begin the activity.

Using the attached **Lesson Slides,** display **slide 5** and discuss the following question with students: If you could create any vending machine, what three products would you include, and how much would they cost?

Move to **slide 6** and pass out a copy of the **3-2-1** handout to each student. Students will work individually to brainstorm ideas for their own vending machines, using the 3-2-1 instructional strategy prompts to help guide their thinking. Students should consider what products they want to sell and the cost of those products. Encourage students to also think about the more unique aspects of the machine, such as the colors, lighting features, and payment methods.

**Teacher's Note: Brainstorming Session**

Students should not actually build their vending machines right now. This is simply a time for them to brainstorm and think about what they want in their vending machine, and how they want it to operate.

25 minutes

# Explore

Display **slide 7** and assign each student a partner. Pass out the attached **Function Machine** handout to each student and explain to pairs that will also need to have a device to access the internet.

Have students access the Function Machine game from the Math Playground website. Walk students through how to set up the game and play a round or two with them until they feel comfortable navigating the game independently. Give the pairs time to play three or four more rounds on their own. As they play, have them write their input, output, and the function on the handout.

### Teacher's Note: Function Machine

The Function Machine requires Adobe Flash Player, and you might need to unblock or download Adobe Flash Player before using the site. The game has two modes, beginner and advanced. The beginner mode uses simple patterns to create a function, while the advanced mode uses more complex patterns. Consider having students start with beginner mode and move up from there. After students select Beginner or Advanced, they can adjust different settings, such as the max number and the activity level. You can also decide whether you want students to create their own input or have the computer generate it for them. If the function becomes too complicated, students can reset the board.

### Optional Paper Function Machine

If you cannot access the Function Machine, consider using the attached **Function Machine Levels** packet to replace navigating to the website. In the Function Machine Levels packet you will find three different handouts that go from level one to level three difficulty with the difficulty increasing per level. Print out the appropriate level of difficulty handouts for your students. Additionally, you will find a **Function Machine Teacher's Guide** handout to help you assess these complete handouts.

25 minutes

# Explain

After students have had opportunities to play a few rounds of the Function Machine game, come back together for a whole-class discussion.

Move to **slide 8** and ask each pair to discuss the different functions they created. Then, have them respond to the following question: “Based on your experience with the Function Machine activity, how would you define ‘function?’”

Write student answers on the board, and then, as a whole class, narrow down the ideas into a few bullet points.

Once students have defined the word “function,” display **slide 9** and review the provided definition. Ask students to compare it with the definition they created. Now that you have a working definition of a function, it's time to dive into the components of a function.

Explain to students that since they now understand what the word function means, they will learn about the components of a function. Move to **slide 10** where there is a chart set up with one column being the domain and the other being the range. Begin by reviewing the provided definition for domain, then have students work together to create class definition for domain in their own words. Once they have created their own definition, have students share out their answers to the example question provided on the slide. Repeat this process with range.

Display **slide 11** and once again, repeat a similar process to define "independent variable" and "dependent variable."

### Teacher's Note: Additional Slides

How you go about completing the Explain activity is open for interpretation. The goal is for you to identify the gaps in understanding that you observed during the Explore activity and eliminate those gaps now. Add more slides if you need more room for examples or create definitions. Do what you need to do for your students to succeed!

30 minutes

# Extend

Display **slide 12** and pass out the attached **Vending Machine Advertisement** handout to each student. Have students  return to the vending machine ideas that they proposed on their 3-2-1 handout. Explain that they will be creating an advertisement for their vending machine. Advertisements should include all of the following:

- The name of the vending machine
- A picture of the vending machine
- A description of the product being sold
- The cost of the products
- A pitch explaining why someone would want to buy the products

Emphasize the importance of the product and cost in students' advertisement design. Let them know that they will be identifying the domain, range, independent variable, and dependent variable for their peers' (function) vending machines. So, they need to include enough information to enable other students to write a function based on their products. Provide the following example: "If I put one dollar in, I get two pieces of candy. If I put two dollars in, I get four pieces of candy."

### Teacher's Note: Number of Products

When instructing students how many products to include in their vending machines, have them stick with one product as the Gallery Walk handout they will use in the Evaluate does not have space for multiple functions.

### Optional Tech Integration

Canva and Piktochart are both great options if you would like to have students use technology to create their advertisements.

After students have had time to work on their advertisements, pass out a sticky note to each student. Ask students to write down the function for their own machines, and then put the sticky note away for use as an answer key later in the lesson.

15 minutes

# Evaluate

Display **slide 13** and pass out the attached **Vending Machine Gallery Walk** handout.

Have class members post their completed advertisements on the wall around the room or display them on their devices. Students will complete a Gallery Walk to evaluate other students' vending machine creations by identifying the domain, range, independent variable, and dependent variable. Students will also create a function based on the input and the output of each vending machine. Walk students through an example by filling out the top line of the handout as the following:

- Name: Chips, Chips, Chips!
- Domain: $2, $4, $6, $8
- Range: 1, 2, 3, 4 bags of chips
- Independent Variable: Dollars
- Dependent Variable: Bags of Chips
- Function: C = D/2

Review the examples with students and make sure to clarify and answer any questions for them. Then, have them participate in the Gallery Walk.

When students have finished filling in their handouts, conclude the lesson by having students get out their sticky notes and share the functions for their own vending machines in order for the other students to check their work.

## Resources


- K20 Center. (n.d.). 3-2-1. Strategies. https://learn.k20center.ou.edu/strategy/117
- K20 Center. (n.d.). Canva. Tech Tools. https://learn.k20center.ou.edu/tech-tool/612
- K20 Center. (n.d.). Gallery walk/carousel. Strategies. https://learn.k20center.ou.edu/strategy/118
- K20 Center. (n.d.). Piktochart. Tech Tools. https://learn.k20center.ou.edu/tech-tool/2394
- Math Playground, LLC. (2020). Function machine. https://www.mathplayground.com/functionmachine.html