

# Ozobot's Mad Dash!

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Grades: 6–12

Coding Methods: **OzoBlockly**

Subjects: **Math, Science, Computer Science**

Robots: **Evo, Bit**

## Brief Summary

During the sudden onslaught of grocery hoarding during a pandemic, Ozobot must travel to several stores to find some toilet paper!

Pre-Reader/ESL: **No**

## Required Materials

- 1 Evo or Bit per group
- 1 Computer or Tablet per group
- 1 Protractor per group
- 1 Ruler per group
- 1 Pencil per group
- 2 Ozobot's Mad Dash Map per group
- 1 Ozobot's Mad Dash WS per group

## Lesson Objectives

- measure distance in centimeters and convert to millimeters
- code Ozobot using OzoBlockly to travel a path using the measurements made by the students
- measure angles using a protractor
- calculate the angles needed to rotate Ozobot using knowledge of the degrees in a circle and straight line

## Preparation

### Background Knowledge

- Prior Lesson <https://portal.ozobot.com/lessons/detail/basic-training-1>
- Completed Lesson <https://portal.ozobot.com/lessons/detail/ozoblockly-training-k-1>
- Completed Lesson <https://portal.ozobot.com/lessons/detail/ozoblockly-training-2-5>
- Completed Lesson <https://portal.ozobot.com/lessons/detail/ozoblockly-training-6-up>

- Ability to measure angles with a protractor
- Ability to measure centimeters with a ruler
- Knowledge of degrees in a circle
- Knowledge of degrees in a straight line (straight angle)
- Ability to perform addition and subtraction up to 3 digits
- Ability to convert centimeters to millimeters
- Ability to perform multi-step addition and subtraction problems

## Lesson Tips

- Ozobot recognizes numbers between -127 to 127, but you can combine multiple blocks together for numbers higher than 127. For example, you could code a 180 degree turn with two "rotate 90 degrees" blocks. They may discover as working in Ozoblockly or you may tell them.
- degrees might need altering as they run the programs due to friction with the paper and individual bots
- Ozobot only rotates counter-clockwise on positive degrees. To turn clockwise, students would need to enter negative degrees. I have created a video and sample code for both ways.

## Direct Instruction (Teacher Facing Instructions):

- 1 Draw lines connecting locations in order and measure distance between them in centimeters.
- 2 Convert centimeters to millimeters.
- 3 Measure the angles needed to rotate with a protractor (decide if you want to tell them about Ozobots rotation limitation- changes the math significantly but also a great discovery activity and learning extension).
- 4 After first 3 steps, give Ozoblockly get started standard instructions.

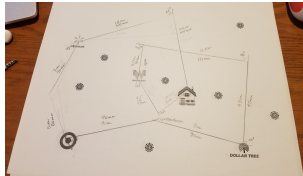
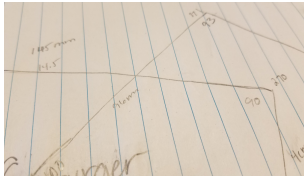
## Lesson Closure (Optional)

-Discuss why the degrees had to sometimes be modified in Ozoblockly (friction with paper or technological differences).

# Student Practice (Student Facing Instructions):

- 1 Make a path between locations (AVOIDING VIRUS MOLECULES) for Ozobot to travel and measure all the distances needed to travel in centimeters and convert to millimeters.  
**Goals:** Measure the distances between objects and record data in mm.  
**Attachments:** [Mad Dash TP Map.pdf](#), [Mad Dash TP Student WS.pdf](#), [Mad Dash for TP Directions.pdf](#)
- 2 Measure the angles between lines created to see how Ozobot needs to turn (can differ based on how they measure and the fact that Ozobot only rotates counter-clockwise on positive degrees and clockwise on negative).  
**Goals:** Measure the angles created between 2 intersecting lines.
- 3 Create a program in Ozoblockly that has Ozobot travel to each object based on your measurements. This step will likely take different times for each group based on factors previously mentioned. Different limitations will create a personalized learning experience for each student/group as previously mentioned in different parts of this lesson.  
Limitations include: Ozobot number processing, rotation direction unless negative angles.  
Measurements will likely alter between groups based on precision of lines drawn, how they avoid molecules, etc. Do they need to account for a whole rotation, etc based on your expectations set forth at the beginning of the lesson.  
**Goals:** Create a program in Ozoblockly that has Ozobot travel to each object based on your measurements.  
**Attachments:** <https://youtu.be/Gp44-doputY>, <https://youtu.be/sqoKRlaFyg>, [Mad Dash Sample Code 2.pdf](#)

```
Go to distance 40 cm  
Go to angle 90 deg  
Go to distance 25 cm  
Go to distance 120 cm  
Go to angle 90 deg  
Go to distance 57 cm  
Go to angle 40 deg  
Go to distance 50 cm  
Go to angle 90 deg  
Go to distance 52 cm  
Go to angle 100 deg  
Go to angle 10 deg  
Go to distance 52 cm  
Go to angle 90 deg  
Go to distance 50 cm  
Go to angle 90 deg  
Go to distance 22 cm  
Go to angle 97 deg  
Go to distance 40 cm  
Go to angle 90 deg  
Go to distance 50 cm  
Go to angle 90 deg
```



## Lesson Extension (Optional)

- 1 Have templates of locations and have students glue them down in different places then traveling to gather them all. Time may vary.  
**Goals:** Gather all the items based on different location.
- 2 Create a larger scale poster to travel. Time may vary.  
**Goals:** Gather items based on different data measurements.
- 3 Create a path traveling to each location in a different order. Time may vary.  
**Goals:** Gather each item in a different order than the original.
- 4 Have them create a color code path including codes at each item. Time may vary.  
**Goals:** Create a color code path for Ozobot to gather all items.

# Supplements

## Additional Attachments

- [Mad Dash TP Student WS.pdf](#)

## Academic Standards

- ISTE.1.a
- ISTE.1.c
- ISTE.4.a
- ISTE.4.b
- CCSS.MATH.PRACTICE.MP1
- CCSS.MATH.PRACTICE.MP4
- CCSS.MATH.PRACTICE.MP5
- CCSS.MATH.PRACTICE.MP6
- CCSS.MATH.CONTENT.2.MD.A.1
- CCSS.MATH.CONTENT.2.MD.A.3
- CCSS.MATH.CONTENT.4.MD.A.1
- CCSS.MATH.CONTENT.4.MD.C.5.a
- CCSS.MATH.CONTENT.4.MD.C.5
- CCSS.MATH.CONTENT.4.MD.C.5.b
- CCSS.MATH.CONTENT.4.MD.C.7
- CCSS.MATH.CONTENT.4.MD.C.6
- CCSS.MATH.CONTENT.3.NBT.A.2
- CCSS.MATH.CONTENT.5.MD.A.1
- CCSS.MATH.CONTENT.7.G.B.5
- CCSS.MATH.CONTENT.8.G.A.5
- CSTA.1A-AP-12
- CSTA.1A-AP-13



Name(s) \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# Ozobot's Mad Dash!

## Student WS

1. Draw a plan to leave home and visit each location in the following order AVOIDING ALL VIRUS MOLECULES:

1. Wal-Mart
2. Target
3. Dollar Tree (Find TP HERE!!!!)
4. Whataburger
5. Home

2. Measure the distance between each item in centimeters then convert to mm. \_\_\_\_\_ mm = 1 cm

3. Measure the degrees of each angle needed to turn to travel to the next object with a protractor.

4. Go to Ozoblockly.com and begin programming. You will find the distance and rotation blocks under Level 4.

5. Code a section at a time.

What did you discover as you entered your lengths?

What did you have to do to adapt the lengths?

What did you discover about how Ozobot rotates?

What did you have to do to adapt the angles?

Did you have to change the angles any? Why do you think this is?

6. Gather all the items and take them Home and celebrate with a code of your choice!

# Ozobot's Mad Dash for TP!

-Your mission to leave home in search for the ever-useful toilet paper! Visit each location in the following order **AVOIDING ALL VIRUS MOLECULES:**

1. Wal-Mart
2. Target
3. Dollar Tree (Find TP HERE!!!!)
4. Whataburger (because it is the best)
5. Home

-Make paths to avoid the virus molecules totally- No tire can roll over and pickup the pesky things!

-Code Ozobot with color code or Ozoblockly depending on your teacher's directions.

Students directions to print or display on page 3 of this document.

## **Ozoblockly Tips:**

-With Ozoblockly, remember, Ozobot only turns left.

-Move a specific Distance Block and Rotate Angle Block are in Level 4.

-Distance is measure in mm.

-Ozobot only recognizes whole numbers.

-Ozobot only processes up to number 127 so for larger numbers, you may need to duplicate one or more of the move blocks.



### **Ozoblockly Lesson:**

- Measure (in cm) from home to Wal-Mart to Target to Dollar Tree to Whataburger and back home!
- Measure the angles with a protractor. Ozo only turns left (counter-clockwise unless you program him to do negative angles).
  - Tip: degrees in a circle are 360.
  - Tip: degrees in a straight line are 180 (also called a straight angle).

Extension: Celebrate at the end!

Below is a sheet to display or print for students if you wish:

# Ozobot's Mad Dash for TP!

-Your mission to leave home in search for the ever-useful toilet paper! Visit each location in the following order **AVOIDING ALL VIRUS MOLECULES:**

1. Wal-Mart
2. Target
3. Dollar Tree (Find TP HERE!!!!)
4. Whataburger (because it is the best)
5. Home

**-Make paths to avoid the virus molecules totally- No tire can roll over any of it or it will pickup the pesky things!**

1. Draw a plan to visit each location in order.
2. Measure the distance between each item in centimeters then convert to mm. \_\_\_\_\_ mm = 1 cm
3. Measure the degrees of each angle needed to turn to travel to the next object with a protractor.
4. Go to Ozoblockly.com and begin programming. You will find the distance and rotation blocks under Level 4.
5. Code a section at a time.
6. Gather all the items and take them home celebrating with a code of your choice!

Everyone at home sincerely thanks you- you are Ozo-some!!

move distance: 105 mm speed: 50 mm/s

rotate angle: 105 deg speed: 50 mm/s

move distance: 120 mm speed: 50 mm/s

rotate angle: 43 deg speed: 50 mm/s

move distance: 70 mm speed: 50 mm/s

rotate angle: 50 deg speed: 50 mm/s

move distance: 50 mm speed: 50 mm/s

rotate angle: 75 deg speed: 50 mm/s

move distance: 90 mm speed: 50 mm/s

rotate angle: -20 deg speed: 50 mm/s

move distance: 90 mm speed: 50 mm/s

The image shows a Scratch script for a robot dance routine. The script is composed of several blocks:

- set top light color** (yellow)
- spin left** (yellow)
- spin right** (yellow)
- set top light color** (white) (yellow)
- rotate angle: 90 deg** (yellow)
- move distance: 95 mm** (yellow)
- rotate angle: 90 deg** (yellow)
- move distance: 121 mm** (yellow)
- rotate angle: 92 deg** (yellow)
- move distance: 45 mm** (yellow)
- rotate angle: 40 deg** (yellow)
- move distance: 45 mm speed: 50 mm/s** (yellow)
- rotate angle: 80 deg speed: 50 mm/s** (yellow)
- move distance: 30 mm speed: 50 mm/s** (yellow)
- disco** (pink)

The script is set against a background of a grey robot head. A circular arrow icon is visible in the top right corner of the workspace.

Name(s) \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# Ozobot's Mad Dash for TP!

## Student WS

1. Draw a plan to leave home and visit each location in the following order AVOIDING ALL VIRUS MOLECULES:

1. Wal-Mart
2. Target
3. Dollar Tree (Find TP HERE!!!!)
4. Whataburger
5. Home

2. Measure the distance between each item in centimeters then convert to mm. \_\_\_\_\_ mm = 1 cm

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What did you discover as you entered your lengths?

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What did you discover about how Ozobot rotates?

What did you have to do to adapt the angles?

Did you have to change the angles any? Why do you think this is?

6. Gather all the items and take them Home and celebrate with a code of your choice!