

Meet the Vacuum Gripper:

Name: _____

Lesson 5

Date: _____

Vocabulary

Vacuum- a space with negative pressure that has less pressure than the atmosphere.

Set Tool Block- code block in the ORA Editor that determines which end effector tool is attached to ORA.

Set Vacuum Gripper Block- code block in the ORA Editor that turns on and off the vacuum pump.

Vacuum Pump- a small pump in the end effector tool that controls the creation of the vacuum.

Atmospheric Pressure- the pressure exerted by the mass of the atmosphere

Engage

The ORA is running code that is moving Evo from Quadrant A1 to Quadrant A4. Describe in detail what is occurring to cause the Evo to be moved between the quadrants.

The ORA is lowering the vacuum gripper tool onto the Evo in A1 and turning on the vacuum. The Evo is lifted by the vacuum gripper and placed in A4. Then the gripper is turned off and ORA leaves the Evo in that quadrant.

Explore

Collect four candies and a straw from your instructor. Using the ORA Quadrant Map, place a candy in A1, A4, B1, and D1. The candy collection bowl is located in D4. Write the pseudocode and act out the commands necessary to move the candies with the “vacuum gripper” to the collection bowl.

1. Set tool to vacuum gripper (Students won't know this block yet, but it is good to add here)
2. Move ORA to A1, Low
3. Engage Straw Sucking Vacuum!
4. Move ORA to A1 High
5. Move ORA to D4 Low
6. Disengage Straw Vacuum
7. Move ORA to A4, Low
8. Engage Straw Sucking Vacuum!
9. Move ORA to A4 High
10. Move ORA to D4 Low
11. Disengage Straw Vacuum
12. Move ORA to B1, Low
13. Engage Straw Sucking Vacuum!
14. Move ORA to B1 High
15. Move ORA to D4 Low
16. Disengage Straw Vacuum
17. Move ORA to D1, Low
18. Engage Straw Sucking Vacuum!
19. Move ORA to D1 High
20. Move ORA to D4 Low
21. Disengage Straw Vacuum

Note: Students won't know about having to lift the ORA to a high position before moving, it is just good practice to add!

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Explain

Set Tool Block

What is its purpose?

The purpose of this block is to tell the ORA what end effector tool it has attached to the end of the arm.

When do you use it?

This needs to be run once but before any vacuum gripper blocks are used.

Set Vacuum Gripper Block

What is its purpose?

The block turns the vacuum motor on and off.

When do you use it?

It is used any time the student wants the ORA to turn on or turn off the vacuum gripper.

Elaborate

You have been given a task by your instructor to program a card-dealing cobot. Use the space below to plan and develop your code. Then recreate and test your code using the Ozobot Editor.

Pseudocode

1. Set tool to vacuum gripper
2. Move to Initial Position
3. Move to <Location_1>, Low
4. Turn on the Vacuum Gripper
5. Move to <Location_1>, High
6. Move to A1, Low
7. Turn off the Vacuum Gripper
8. Move to A1, High
9. Move to <Location_2>, Low
10. Turn on the Vacuum Gripper
11. Move to <Location_2>, High
12. Move to A1, Low
13. Turn off the Vacuum Gripper
14. Move to Initial Position
15. Evo Top Color sequence

After testing your code, was it successful? If not, what changes do you need to make to accomplish the task at hand?

Answer May Vary

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Evaluate

Please answer the following prompts.

Remember to include your **name** and **date** on this paper!

- Thinking back to the Elaborate M&M activity, why would the vacuum gripper be the proper tool to move M&Ms rather than a pair of chopsticks?

The M&Ms are a weird shape with a smooth surface. The vacuum gripper is able to accommodate weird shapes while the M&Ms might slip out of the chopsticks.

- Match the code block with its purpose

C Turns on the Vacuum Motor

A. set vacuum gripper OFF

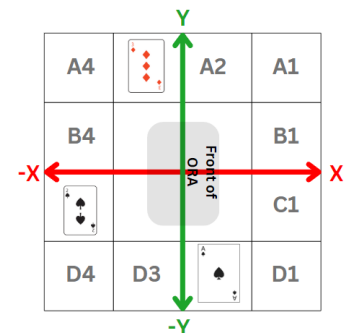
A Turns off the Vacuum Motor

B. set tool to Vacuum Gripper

B Sets the End Effector Tool to the Vacuum Gripper

C. set vacuum gripper ON

- To the right is a diagram of the ORA Quadrant map with an Ace, 2, and 3 card in Quadrant D2, C4, and A3, respectively. Use the ORA vacuum gripper to pick the cards up from their quadrants and place them in quadrant A1. Cards must be stacked by ascending value (Ace on the bottom, 2, then 3). Draw the code blocks and write the pseudocode to accomplish the task.



Pseudocode	Code Blocks
- Set tool to vacuum gripper - Move to Initial Position - Move to D2, Low - Turn on the Vacuum Gripper - Move to D2, High - Move to A1, Low - Turn off the Vacuum Gripper - Move to A1, High - Move to C4, Low - Turn on the Vacuum Gripper - Move to C4, High - Move to A1, Low - Turn off the Vacuum Gripper	(Code on following page)

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14. Move to A3, Low
15. Turn on the Vacuum Gripper
16. Move to A3, High
17. Move to A1, Low
18. Turn off the Vacuum Gripper
19. Move to Initial Position

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Program start
set tool to Vacuum Gripper
move to initial position
move to location D2 position LOW
set vacuum gripper ON
move to location D2 position HIGH
move to location A1 position LOW
set vacuum gripper OFF
move to location A1 position HIGH
move to location C4 position LOW
set vacuum gripper ON
move to location C4 position HIGH
move to location A1 position LOW
set vacuum gripper OFF
move to location A1 position HIGH
move to location A3 position LOW
set vacuum gripper ON
move to location A3 position HIGH
move to location A1 position LOW
set vacuum gripper OFF
move to initial position
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