

Meet the Finger Gripper:

Name: _____

Lesson 7

Date: _____

Vocabulary

Pneumatic- operated by air.

Coordinate- a specific location defined by X, Y, and Z measurements.

Actuator- a mechanical device for moving or controlling something.

Move to Coordinate Block- code block that allows precise X, Y, and Z, movements.

Number Block- code block in the Math tab that allows the user to enter in a number.

Engage

Your instructor will run a program on the ORA. Using your current understanding of the ORA, write down how you believe this new end tool functions.

Answers may vary, but students may deduce that a vacuum motor is used since the ORA is making a sound that was used when the vacuum gripper was used.

After watching the video, was your prediction correct?

Answers may vary

Explore

When pressing the handguide button, find the X, Y, and Z coordinates needed to pick up the three objects. Answers may vary based on specific placement of objects, but here is an approximate solution

	X Coordinate	Y Coordinate	Z Coordinate
Object A	282 mm	166 mm	60 mm
Object B	-225 mm	135 mm	30 mm
Object C	225 mm	-135 mm	30 mm

You are also given a variety of objects; rank them from least to most compatible for the finger gripper

Least Compatible

Most Compatible

Answers may vary based on the objects available

Why did you rank these items in the order you did?

Answers may vary but could include size, texture, mass, etc

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Elaborate

You have been given a task by your instructor to program a cobot to precisely pick and place components on top of each other. In the space below, write the pseudocode and draw the code blocks needed to complete the challenge.

Task Requirements:

1. You may investigate the Quadrant map and task setup before coding. You may handguide the ORA and take measurements but **MAY NOT** move the cylinders.
2. ORA must start in the Initial Position.
3. ORA must use precise movements to pick up the cylinder in D2 and place it on top of the cylinder in B1/C1 without knocking over either cylinder.
4. The Evo must also use lights to signal that the stacking has occurred.
5. ORA must return to the Initial Position after stacking.

Pseudocode	Code Blocks
Move ORA to initial position Set tool to Finger Gripper Set Finger Grippers Open Move to coordinates for object in D2 but with high Z value Wait 1 second Move to coordinates with exact Z value Close finger grippers Wait one second Move to coordinates for second object but well above the second cylinder. Wait one second Lower to coordinates to stack first cylinder atop second Open finger grippers Wait 1 second Move to High position Evo flashes red, white, blue Move ORA to initial position	

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

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Evaluate

Please answer the following prompts.

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

1. Circle the objects that would be suitable for a finger gripper end tool to pick up.

Playing card

Dice

Marble

Butter knife

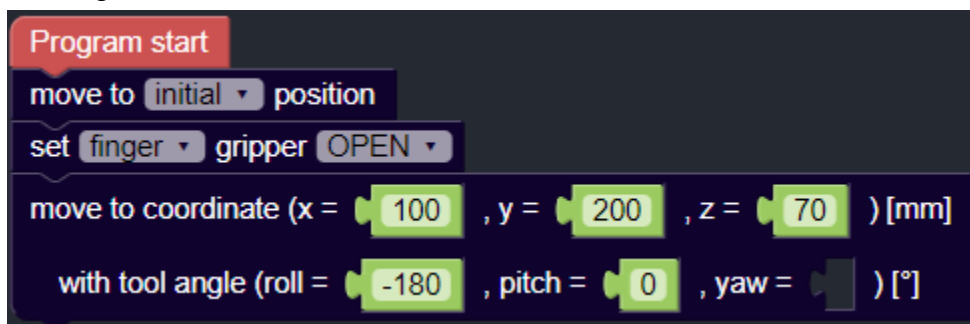
Building Block

Eraser

2. In this lesson, we primarily used handguiding and the ORA Editor to determine X, Y, and Z coordinates. How could we find X, Y, and Z coordinates with just a measuring device such as a ruler?

Answers may include using the base of the ORA as a starting point (Zero) for the X, Y, and Z planes. Students could use a ruler to measure the object's location in the X, Y, and Z directions. Students may also answer that they could move the ORA around and mark key landmarks by their X and Y coordinates and then measure from those locations to the objects.

3. If a person wanted to use the finger grippers to pick up a block at the coordinates listed in the 'Move to Coordinates' block, what commands/blocks might be missing?



Answers should include that the 'Set Tool' block must be used before the finger gripper open command is given. Then, as shown in the Explain section, the finger gripper should move to a location with a higher Z value than the object so the finger grippers do not knock over the object, so a second 'Move to Coordinate' block needs to be used with X=100, Y=200, and Z= >70.