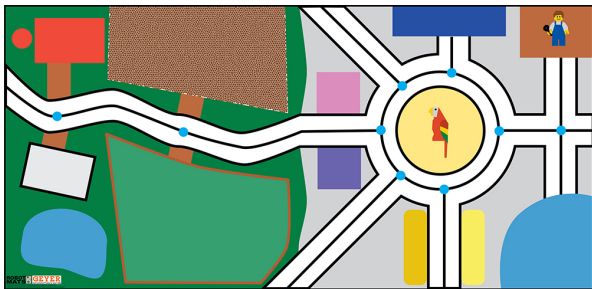# COUNTRY CITY

QUESTIONS?

Where do you live? Do you live in a city? Or are you living a country area? Are there high-rise buildings surrounding you or do you drive by miles and miles of countryside before you see a roadside gas station? Your robotics consulting firm has been hired to highlight the importance of the connections of these two different regions of our country.

THE PROBLEM

There has been an increase in the divide between these two regions in your state over the past few years. Why is there such a disconnect between these two areas? How much do the people of one area rely on the people of the other area? What resources do they share? How many people are commuting between one area and the other for work? Does one area enjoy higher wages than the other? Why? Graphic Organizer included on page 6 to guide your research.

MATERIALS

Option 1 (For FLL Practice) Materials Needed:
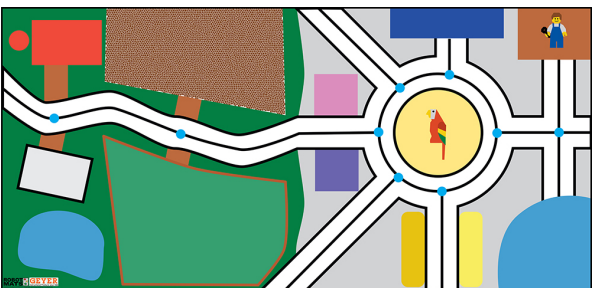1 - Geyer #199010 Country & City FLL Size Mat
1 - EV3 Robot
Lego® pieces to be used for attachments on your robot
Lego® figurine to be used as Farmer Brown
Lego® pieces to be used for "food" tokens
Lego® pieces to be used as fish in extra challenges

Option 2 (For other robotics systems) Materials Needed:
1 - Geyer #199010 Country & City FLL Size Mat
1 - Robot
Pieces to be used for attachments on your robot
Figurines to be used as Farmer Brown
Pieces to be used as food
Pieces to be used as fish in extra challenges

CHALLENGES

This is an aerial view of your region. Your goal is to program your robot to effectively show the interdependence of these two regions.

Level A Challenge

1. Place your robot on the "BARN" (red rectangle in top left corner of mat)

2. Place minifigure on "POWER PLANT" (brown rectangle in top right corner of mat)

3. Program your robot to follow the roads (white tracks on mat) from the "BARN" to "POWER PLANT", pick up Farmer Brown, and return him to the "BARN".

Bonus: Add a touch sensor and write a program that returns the robot to the "BARN" using the dirt road. This program must be started by pressing the touch sensor.
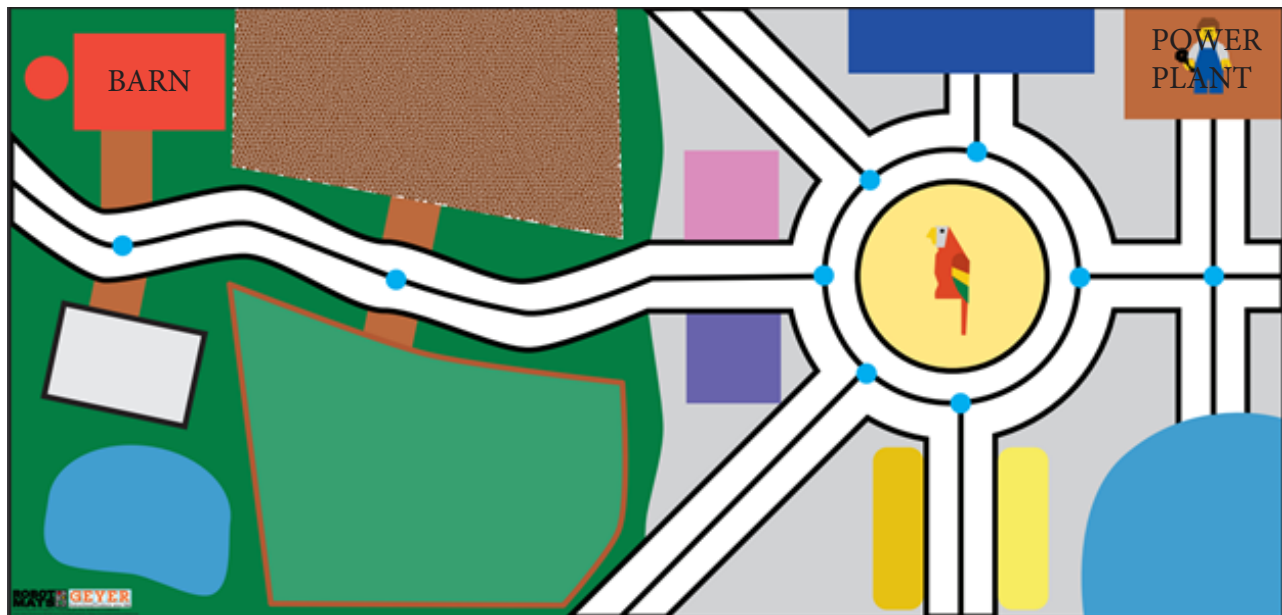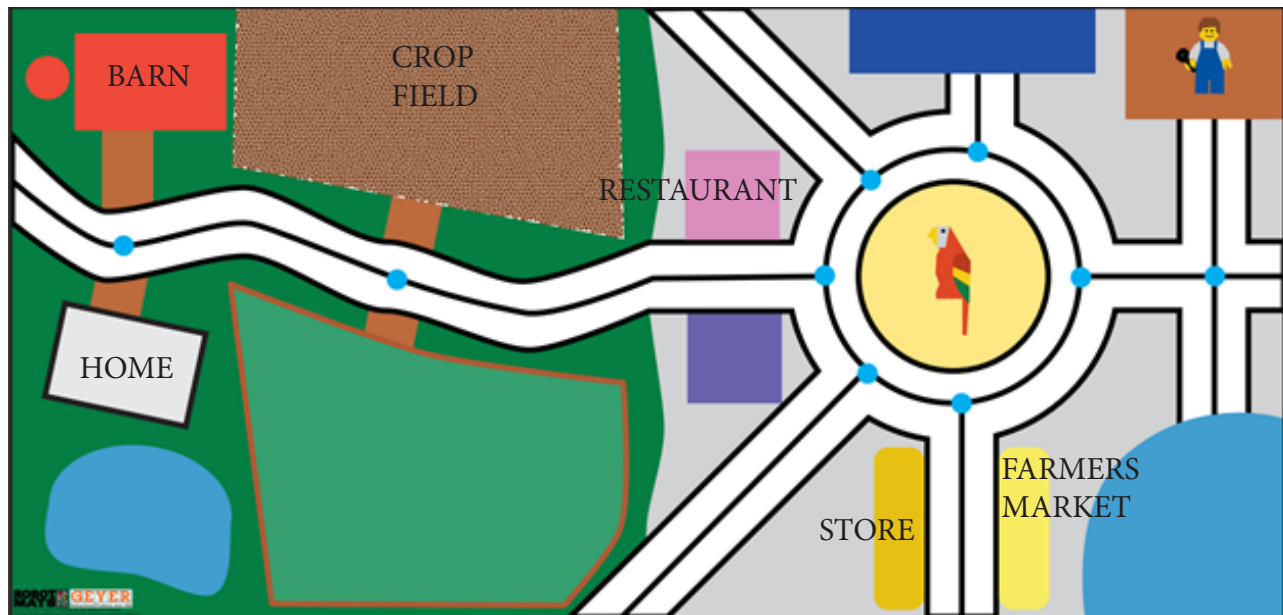

*Markings on this mat for "BARN" and "POWER PLANT" do not appear on your mat

Level B Challenge

1. Place your robot on the "BARN".

2. Design and build an attachment that allows you to move the "FOOD" tokens from the "CROP FIELDS" to the "STORE (A)". "RESTAURANT (B)", and "FARMERS MARKET (C)" on the mat. You may need to write three different programs where each program returns to "BARN" so you can load the next item to be placed.

Bonus: Create an attachment and write a program that allows your robot to carry ALL of the tokens at once AND drops them in the correct positions around the mat. Start your program with a "Touch" sensor.
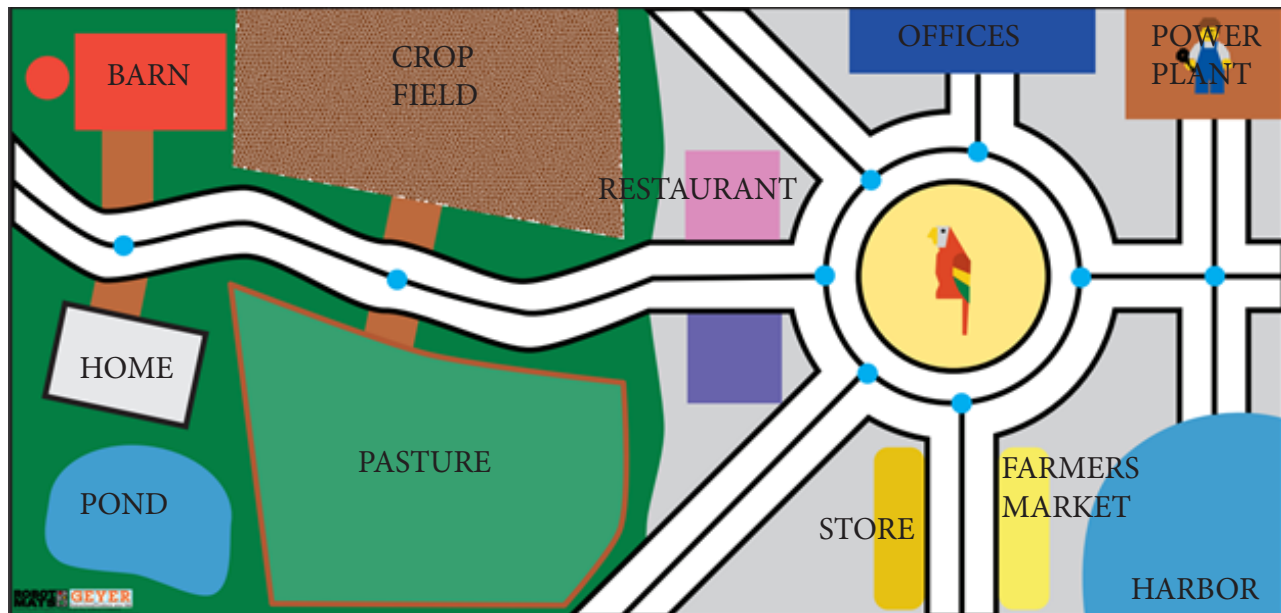

*Markings on this mat for "BARN", "HOME", "CROP FIELD", "STORE", "RESTAURANT", and "FARMERS MAR-

Level C Challenge

1. Place your robot on the blue dot between the "BARN" and the "HOME" positions on the mat.

2. Design and build a robot that uses sensors to manuever through the mat. There should be at least three instances in your program where a sensor is used to control your robot.
   - Color sensor line follower along the roads
   - Color sensor at the blue dots, the robot turns left or right and proceeds with line follower

3. Return "HOME" when all tasks have been completed.

Bonus: Closely examine your program...find a place within your program to replace some of your code by using a LOOP block.

*Markings on this mat for "BARN", "HOME", "CROP FIELD", "RESTAURANT", "OFFICES", and "POWER PLANT", "POND", "PASTURE", "GROCERIES", "STORE", and "HARBOR" do not appear on your mat.

Additional Challenge Ideas

There are many more options for challenges on this mat than Challeneges A-C.

Here are some more ideas:

Catch & Release – "Catch" fish that are too big for the Pond and "Release" them in the Harbor.

Bring Them In – Coral animals in the Pasture and bring them to the Barn.

Night on the Town – Farmer Brown and his wife need a night out. They want to go to the Restaurant to eat, go to the store to get Mrs. Brown a new dress and hit the Grocery store on their way home.

Pay the Bills – Mrs. Brown needs to go to the Offices and then to the Power Plant to pay some bills and then return home.

Visit the Monument – Farmer Brown and his wife have never really seen the Monument in Town. Take them on a trip that goes around the Monument and then back home.
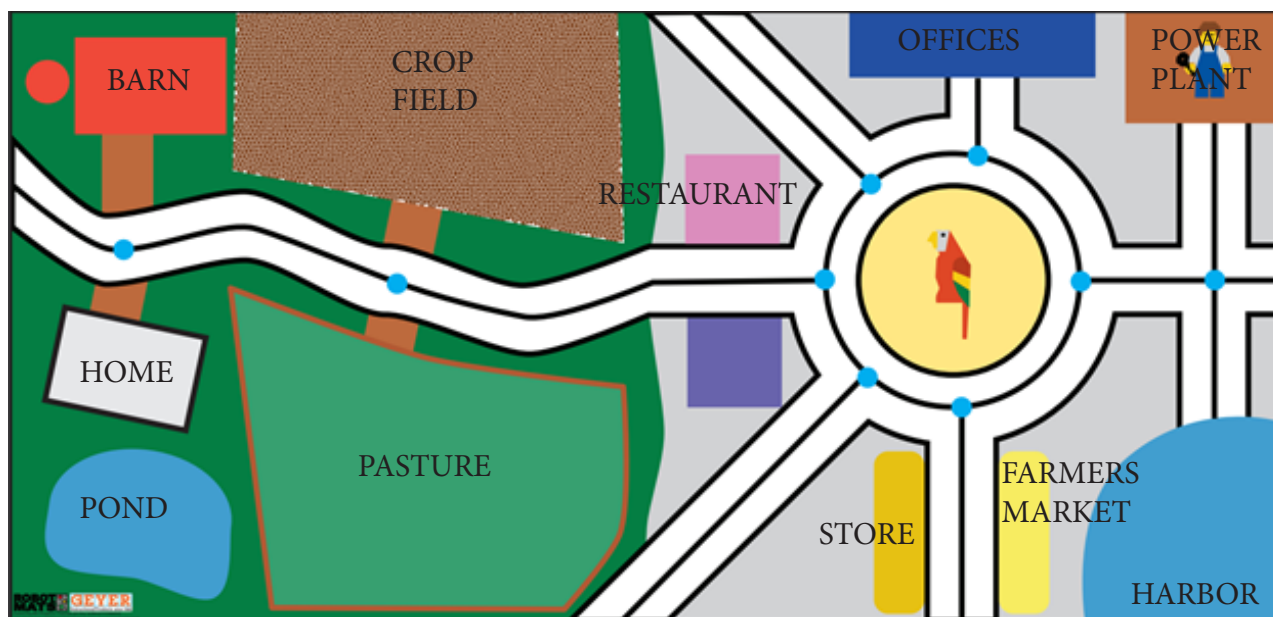
*Markings on this mat for "BARN", "HOME", "CROP FIELD", "RESTAURANT", "OFFICES", and "POWER PLANT", "POND", "PASTURE", "GROCERIES", "STORE", and "HARBOR" do not appear on your mat.

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THE PROBLEM GRAPHIC ORGANIZER

What resources would differ for someone living in the city versus someone living in the
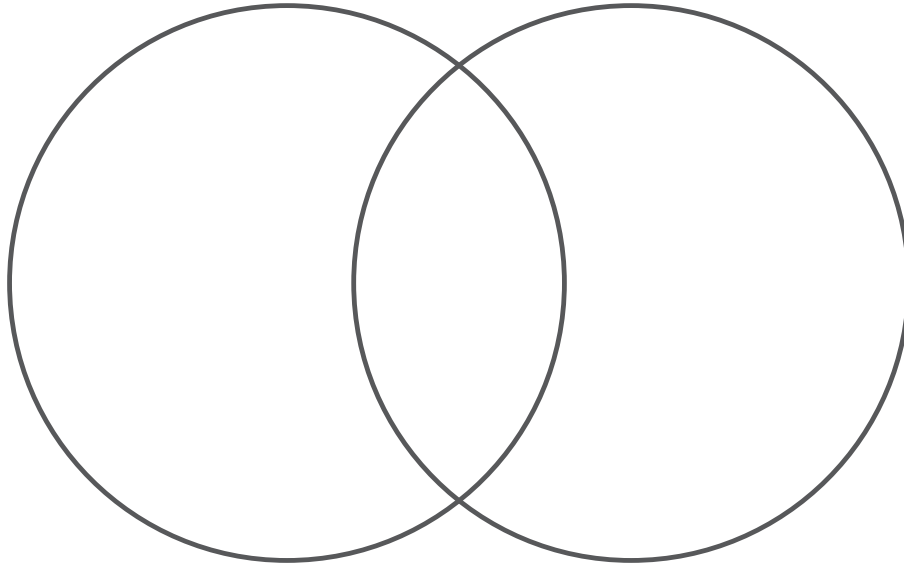
How would "City Living" look when compared to "Country Living"?

What type of jobs would you expect to find in the city compared to the country?

How would jobs from one area be dependent on jobs from another area?

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BRAINSTORM

In the spaces below develop/sketch two different robots to solve the problems presented on the mat. Label your materials and annotate any attachments and their function on your robot. Once both sketches are complete, indicate what you consider to be the strengths and weaknesses of each solution on the lines provided.

IDEA # 1

EVALUATE:

STRENGTHS

_____

_____

_____

_____

WEAKNESSES

_____

_____

_____

_____

IDEA #2

EVALUATE:

STRENGTHS

_____

_____

_____

_____

WEAKNESSES

_____

_____

_____

_____

DEVELOP A PROTOTYPE

Construct your robot. Remember to follow specifications and constraints. Neatly sketch your final solution below. Label dimensions and materials. Final sketch must be completed prior to testing.

TEST AND EVALUATE:

Did your robot successfully complete the robot challenge? _____

REDESIGN THE SOLUTION

What problems did you encounter? Did you change your original design concept? If so, why? If you had to redesign your model to solve the problem better, what changes would you recommend in your new design?

_____

_____

_____