

Facilitation Notes

Engage ⌚ 5 min.

Introduce the context of a busy city and the many resources required to make it function.

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I can explain how resource use affects the environment.

I can describe how an increase in population impacts a city's resources.

I can model solutions that minimize use of Earth's resources.

Population Pressure

Students will construct an argument that explains how increases in human

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Population Pressure

How does a growing city impact Earth's resources?

What activities are happening in a city at any given moment? People, businesses and factories are all making life work in a busy system. Their activities all require **resources**. Do they have enough for everyone?

0 | Goals and Objectives

You can introduce the students to the objective and learning targets of this lesson.

1 | Introduction

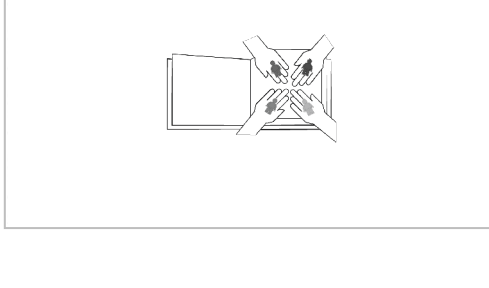
Ask students what they know about the growth of cities. Depending on your local context, you can reference a nearby town or city and discuss how it has grown in recent years. If more suitable, ask students about a major city in your region or name a well-known city such as New York, Miami or New Orleans. These cities have small areas of land, but have grown in population rapidly. Students can consider why cities grow and the possible impacts of such growth.

2 | Context

Ask students to brainstorm activities that could be happening in a city at any given moment. Emphasize that these could be personal activities such as taking a shower or eating, as well as larger systems of activities such as transportation lines running and factories, businesses and offices working. Introduce the key vocabulary *resources* and ask: *What resources do you use each day to live, work and play?*

Explore ⌚ 15 min.

In groups of 4, students will build a city that represents different ways resources can be used.



Build:

- City

Name all the activities happening in the city. What resources are being used?

3 | Groups and Roles

Divide the students into groups of 4. Use the blue, red, green and yellow LEGO® minifigures to assign student roles and help each student find which part of the collaborative model they will build. They can find the corresponding blue, red, green and yellow LEGO minifigure icons in the building instructions.

4 | Build and Explore

This is a miniature scale model of a city. If students need support, you can help them identify these elements:

- Factory
- Shop
- Cars
- Truck delivering goods from the factory to other parts of the city
- Three houses
- Water tower

Building Instruction for use during Explore

C107

Explain ⌚ 5 min.

Students will discuss what is happening in the city and the resources required for each activity.

What are all the different activities happening in this city? What resources are needed to keep these activities working for the busy city? How does this impact the environment?

5 | Share

You can prompt students' thinking with questions and brainstorming:

- *What are all the components included in the model? What are some that might be unseen?* (For example, people living in the houses are using water, heating and cooling their home and using electricity.)
- List or display some ideas. *What resources are being used for these activities?* (for example, fuel, electricity and water)
- *How can we group resource use together?* (For example, trucks and cars are both using fuel.) Encourage students to identify patterns in resources.

Elaborate ⌚ 15 min.

Students will consider how population growth will impact resource use in the city and then build solutions that conserve those resources. Afterwards, students will share their solutions and relate this experience to real-life examples of cities with Earth-friendly features.

The population of this city is booming! What will this do to the city's use of resources? Redesign the city so that it conserves Earth's resources and continues to function for the growing number of people.

6 | Build

Guide students in connecting an increase in population to an increase in resources consumed and therefore to impacts on the greater environment. If students need support, you can lead brainstorming before groups start to build. For example, groups can try to solve specific resource problems, such as needing more fuel for trucks and cars. You can also suggest some solution ideas:

- A public transportation system
- Solar cells or panels on the factory and homes
- Wind turbines to create sustainable energy
- Urban or rooftop gardens
- Rainwater collection systems

7 | Share Your Build

To check student understanding, you can look for the following:

- Students can connect an increase in population to an increase in resources consumed.
- Students can describe how an increase in population impacts use of Earth's resources and the environment.
- Students can model solutions to minimize resource use as a population increases.
- Students can explain how their solutions conserve Earth's resources, even as the population increases.

8 | In Real Life

Discuss how the two photographs show resource conservation in city settings. The electric bike rental system enables people to avoid or minimize using cars and fuel-dependent vehicles to get around. The parking garage shows how space can be used efficiently for businesses as well as the parking needs of a growing population. The outside of the building supports plant life, which cleans the air and supports biodiversity in the area.

Evaluate ⌚ 5 min.

An optional evaluative prompt asks students to explain what happens to the use of resources as populations increase.

Explain what happens to resource use as populations increase. What impact can this have on Earth's resources?

9 | Show What You Know

You can ask students to write answers in their notebooks or use other methods established in your classroom.

10 | Clean Up

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Clean Up