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STEM Project

Chapter 5 – Global Systems

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City planning

Many cities around the world have not been designed to be particularly efficient in how they consume energy. Often this is due to history. If not planned carefully, cities can grow organically over time as successive governments change their planning and land-use policies.

In Australia, many of our cities grew rapidly during a period when oil and other fossil fuels were cheap and plentiful. At this time, there was not yet a good understanding of the urgency of climate change and the need to reduce emissions of carbon into the atmosphere. Consequently, many Australian cities have a central business district surrounded by many kilometres of suburbs spread out in all directions. While these cities usually do have public transport options, they largely rely on carbon-emitting cars and trucks to move goods and people around.

In this activity, you will explore the idea that the design of cities determines how much energy is consumed by residents and the amount of greenhouse gas produced and therefore contributes to climate change.

The place where you live

Think about the city or town you live in. Discuss the following questions with a partner and note down your thoughts.

How old is your town or city? Which parts do you think are the oldest?

Are houses and other buildings spread out or densely packed together?

How do people move around? Do they mainly walk? Cycle? Drive? Use public transport (train/bus/tram)?

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Transport

When fuel is burnt in a car engine it reacts with oxygen to form carbon dioxide and water. The carbon dioxide is released into the atmosphere, contributing to the greenhouse effect and climate change. This means that planning transportation systems that minimise the use of fuel is extremely important for the future of the Earth.

Good planning can reduce the carbon emissions that a city or town produces. One of the most effective planning mechanisms to reduce emissions is good public transport. One train can replace up to 800 carbon-emitting cars on the road. However, the more spread out a city, the harder and more expensive it is to create an accessible and affordable public transport system.

Encouraging people to walk or ride a bicycle instead of driving a car is another way to reduce carbon emissions, but this requires safe and well-maintained cycling and walking paths. Again, the spread of a city will affect the possibilities for cycling and walking, and so will the weather!

New low-emission technologies, such as hybrid and electric cars, can also help to reduce carbon emissions. Cities can promote these in lots of ways such as providing free charging stations or free parking for low-emission transport.

Think about the city or town in which you live. With your partner, discuss answers to the following questions.

What public transport exists? Is it fast/affordable/easily accessed?

Are there options for other low-emission transportation (cycling and walking paths)?

Think of three things that could be done in your city/town/suburb to encourage lower transport carbon emissions. Make these three things specific: Where would they be implemented? How would they help? Would they be expensive?

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One interesting transportation idea that has been suggested to reduce energy consumption in cities is to replace trains with a system of travelators (flat escalators) that would move people around at speeds of up to 20 km/h.

What would be the advantages of this system?

What would be the disadvantages of this system?

Do you think it is an idea that might work? Why / why not?

Housing

Many Australian homes are large single houses on individual blocks of land. The floor space of an Australian home is often bigger than homes in other countries. The average Australian home is more than twice the size of an average home in the United Kingdom.

What are the advantages of this type of housing?

What are the disadvantages of this type of housing?

How do you think the size of houses in your suburb and their density (how spread out they are) effects the amount of energy used in your suburb?

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Starting from scratch

What if you could build a city from scratch? China is doing exactly this in an attempt to plan for the future of its population. These cities have been nicknamed ‘ghost cities’, as they often start out almost empty before people slowly begin to move in.

Imagine you have been employed by the Chinese government town-planning department to help them to design their housing and transportation systems in a brand new city. They want to know how to make sure these aspects of the city are as energy efficient as possible.

You are to provide at least five recommendations regarding the housing and transportation options for this new city.

Think about all the factors that you have discussed in this activity to help you make recommendations. You may also like to do some further research on energy efficient innovations in housing and transportation around the world.

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Discussion and reflection

What have you learnt through the process of discussing and exploring this topic?

Do you have any advice for your local council regarding how your own city or town is planned?

Write down any questions you have about this topic that are unanswered and how you could go about answering them.

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