Green Cities

Resources:

- Student Activity Sheet; PowerPoint Slide; Teacher Notes
- Green Cities interactive resource: Air Quality airqualitygame.co.uk

Introduction

This simulation represents a city. The challenge for the player(s) is to manage the air quality within the city. The idea is that the air quality in the city is monitored using sensors which detect the build up of particulates and gaseous pollutants.

Players have to trade off the need to protect people from pollution with allowing people to move around freely, which is not only more enjoyable but promotes economic activity. Retail businesses won't survive if people aren't allowed to go shopping.

Learning Objectives	Learning Outcomes
• To manipulate a model to explore the relationship between air quality and restrictions on types of activity.	• Explanations in response to the interactive that show students understand how decisions are made to control air quality.

Teaching materials can be used in a variety of ways, a suitable method is suggested below:

1. Use the PowerPoint slide to introduce the interactive resource and explain the context. Get students to understand that they need to make decisions about how to set up the system they will be trialling, using the information provided and ensure their understanding of the value of different options.
2. Get students to use the interactive resource, setting up a system and seeing how it works. Ideally, provide them with enough time to modify their design and see if they can address any shortcomings indicated in the simulation feedback.
3. Follow up with the activity sheet, this presents students with feedback from a hypothetical system and asks them to interpret the data.

Why this technology is important:

Air pollution is a critical factor in many cities. It affects the health of a wide range of people but especially the young and the elderly. It affects the health of a wide range of people, particularly the young and the elderly, who are more vulnerable to its effects. This not only causes immediate health problems but also contributes to long-term health issues for these groups. Air quality sensors can detect a range of pollutants and warn city managers if there is a problem. Having the evidence to base decisions on makes it easier to protect people without imposing unnecessary restrictions. It is also important to appreciate that cities depend upon economic activity as well as healthy conditions.

Answers to Pupil Activity Sheet

Activity Sheet

Q1:

The air quality is likely to be good because there are restrictions on the use of diesel cars and vehicles and the use of electric vehicles is increasing.

Q2:

Happiness and satisfaction ratings are very low as restrictions are in place and some vehicle movements limited. Businesses are finding it difficult to get goods transported.

Q3:

There needs to be a balance between allowing actions that people want and limiting the factors that affect air quality.

Q4:

Longer term developments might include extending the use of electric vehicles, increasing the amount of public transport and restricting the use of petrol and diesel vehicles.

Q5:

Advantages of a model such as this include showing how data can be used to inform decisions, practising responses to data changes and understanding why excessive restrictions can cause problems. Disadvantages include there being some factors that the model doesn't show, such as the effect of temperature and how in the longer term vehicle ownership patterns may change.

Answers to Powerpoint Slides

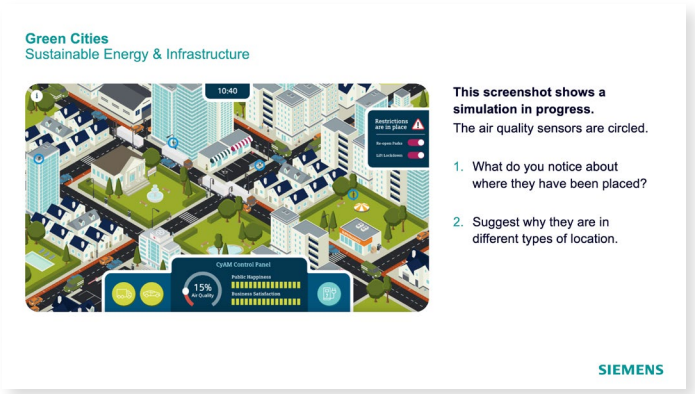
Powerpoint

Q1:

The air quality sensors have been placed in different types of location, such as some being low down, others high up some in parks and some by busy streets.

Q2:

This is so they can detect different types of pollution and also how pollution levels vary in different places, such as whether it is reaching open areas in parks.

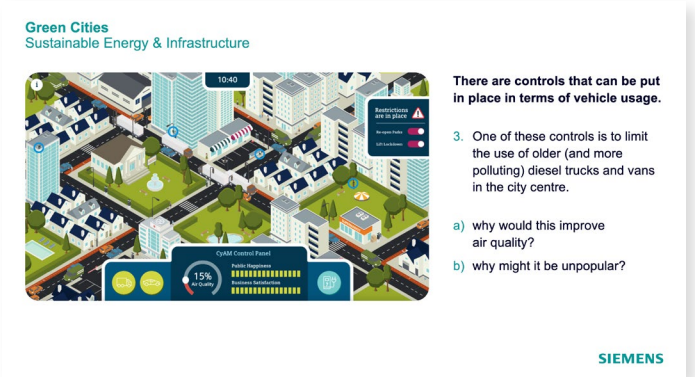


Q3:

Restricting the use of older diesel trucks and vans in the city centre.

a. would improve air quality as it would reduce the quantity of particulate and gaseous pollution in the air

b. would be unpopular as such vehicles are often used to supply shops with goods



Q4:

Restricting the use of older diesel cars in the city centre.

a. would reduce pollution

b. but would limit the mobility of some members of the population.

Q5:

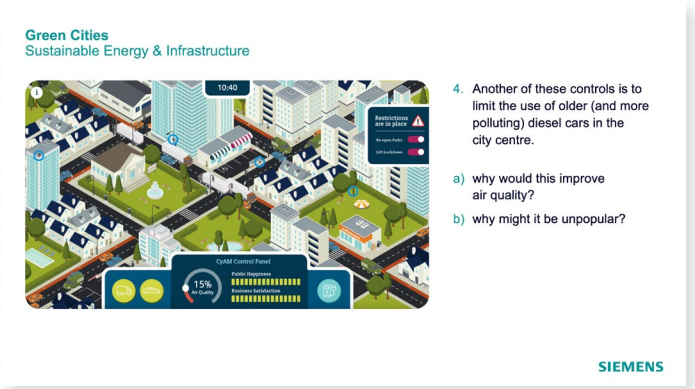
Increasing the number of electric vehicle charging points in the city would improve air quality because it would encourage people to switch from petrol and diesel to electric vehicles.

Q6:

Restrictions the city authorities can place on the movement of people are to reduce certain types of vehicle being used, close parks or impose a lockdown.

Q7:

Restricting the use of older diesel trucks and vans in the 7. The indicators include the quality of air, public happiness and business satisfaction.



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Virtual tour, discover quizzes, hear from Siemens apprentices and young graduates about the path they have followed to their career at the Wonder Wall and experience the SeeMe science and engineering show in the Auditorium.

Energy Farm Game

Design and implement a system that meets the energy needs of a farm while lowering both costs and environmental impact. Your choices determine the success of the farm. Can you create the most efficient energy solution?

Energy Island

Find the balance between cost, pollution and efficiency to keep Energy Island from grinding to a halt!