

Unit plan

Unit structure	Three classroom based lessons and one full day field trip.
Unit description	Students begin by investigating the characteristics of cities and what makes them sustainable. A fieldwork trip enables them to gather data which is used to form judgements about the sustainability of current urban areas. They conclude by proposing ways in which these areas can be made more sustainable in the future.
Foci of lessons	Lesson 1: Characteristics of cities and their sustainability Lesson 2: Field work—data collection in the real world Lesson 3: Bringing it together —data interpretation, presentation and analysis Lesson 4: Reporting and communication with a proposal for action

Plan and implement logically-sequenced teaching programs to develop higher order thinking skills, general capabilities and understanding of core concepts

Lesson 1: Characteristics of cities and their sustainability

Students discuss focus questions in small groups, recording their ideas and then share them with whole class. Students develop an understanding of key ideas and elements that derive from a consideration of the focus questions.

Focus questions

- What are the characteristics of cities?
- What are the characteristics of a sustainable city?
- What features make one city more sustainable than others?
- Why is it important for cities to become more sustainable?
- How should cities change to become more sustainable?
- What can individuals, governments and businesses do to make their city more sustainable?

Select and use teaching strategies that engage students in hypothesising and justifying decisions, opinions or courses of action

Introduce appropriate vocabulary including concepts such as sustainability, change, urban environments, central business district.

Activities

1. Arrange for small groups of students to brainstorm and record their ideas.
2. Suggest other questions related to the topic of sustainability of cities or questions that assist students to clarify their thinking.
3. To gain a greater appreciation of the nature of sustainable cities view the following resources <http://sustainablecities.net/>.

Lesson 2: Field work—data collection in the real world

Students undertake a full day field trip to different localities representative of the central business district, inner, middle and outer suburbs to observe, record and react to the characteristics of these areas of the city.

Focus questions

- What are appropriate ways of recording observations?
- What types of audio-visual equipment (eg digital camera), ICT (eg GPS and tablet computer) and paper-based media can be used to capture data in the field?

Introduce the use and application of GPS to record locations of features observed.

Activities

1. Identify different land uses and record their location (eg using a GPS) and characteristics (e.g. using digital camera).
2. Identify and record features that represent attempts at making the city more sustainable e.g. water recycling, low energy building construction, green open space, aspects of light and shade, bicycle paths, access and availability of public transport.
3. Record your reaction to aspects of each area of the city such as level of noise, cleanliness, congestion, visual attractiveness, perceived safety, level of maintenance of public amenity, access to open space, heritage value, availability of public bicycle hire, clarity and positioning of signage.
4. Take measurements using a suitable device to support visual observations e.g. measurements of access ramp width and slope to determine their suitability for disabled people.
5. Record the provision of appropriate sustainable services to meet the recreational and social needs of local residents in each area visited e.g. children's play grounds, separation of active and passive areas of parkland, BBQ facilities.
6. Examples of features that make a city sustainable see
<http://www.urbanecology.org.au/projects/sustainablecities.html>
<http://archive.rec.org/REC/Programs/SustainableCities/Characteristics.html>
<http://www.urbanecology.org.au/eco-cities/christie-walk/>

Use digital resources and tools to support teaching of concepts that are difficult to learn or give experience of source material that would not otherwise be accessible

Considerations

How can ICT be used to support student learning in the field?

What are the benefits of students recording their perceptions of places being studied?

Lesson 3: Bringing it together —data interpretation, presentation and analysis

Students collate, organise, present and analyse the data collected in the area investigated.

Focus questions

- How might the data collected be organised for inclusion in an ICT format such as a spreadsheet?
- What are the key features and issues that affect sustainability in the area investigated?
- How can the fieldwork data be presented in maps and graphical forms that use spatial technologies?
- What patterns can be identified from the data presented through the use of spatial technologies?
- To what extent does the data collected and displayed through the use of spatial technologies support or challenge your earlier views on the nature of a sustainable city?

Introduce the use of Geographic Information Systems (GIS) to enhance students' recognition of spatial patterns, relationships and interconnections between features in the urban environment.

Activities

1. Collaborate with a small group of students to share and collate data collected from different localities.
2. Discuss ways in which the data collected can be organised e.g. listing in a spreadsheet suitable for use in a computer-based mapping system.
3. Arrange and organise the data in preparation for its use in a computer-based mapping system.
4. Present the data in maps created using a computer-based mapping system.
Examine the presented data and identify patterns and issues that arise.
5. To obtain support for the use of GIS view the following
<http://sites.google.com/site/malcolmmcinerney/gisinaustralia>,
<http://spatialworlds.blogspot.com.au/>,
<http://www.spatialgenie.edu.au/spatialgenie/>

Considerations

How can students relate their newly acquired knowledge to prior understandings about sustainable cities?

How can spatial technologies be used to assist students to interpret, analyse and present their data?

Lesson 4: Reporting and communication with a proposal for action

Students synthesise their findings and develop strategies that could lead to action and participation in programs to make their city more sustainable.

Focus questions

- How can our city become more sustainable?
- How can individuals, governments and businesses take action and participate in programs that improve the sustainability of our city?
- What types of action and participation are appropriate for individuals, governments and businesses?
- What things might present barriers to the actions and changes proposed for creating a more sustainable city?
- What are the consequences of the proposals for making the city more sustainable?

Engage students in an evaluation of the proposals for making the city more sustainable. This should require reflection and the use of a perspective that considers the future sustainability of cities.

Facilitate students' small group presentations within the class group and then to a wider audience. Express opinions, present an argument, use evidence and refine one's views.

Considerations

Ensure that students' learning fosters opportunities for them to propose action that is based on their findings and new understandings.

Reflect on and evaluate the types of action proposed and the ways in which students may participate in programs to make the city more sustainable.

Identify different ways students can relate their new understandings to positive participation in community programs.

Activities

1. After discussion in small groups, propose different ways in which the data collected could be presented.
2. Discuss in small groups different ways of reporting the findings to different audiences such as a school year level, local council chambers or appropriate community group.
3. Create an individual report using ICT in an imaginative manner to present findings and proposals that reflect their vision for a more sustainable city.
4. Class discussion in which all students have an opportunity to present and justify a proposal for the improvement of the sustainability of one aspect of the city.
5. As a class, use individual findings and proposals to formulate a set of recommendations for making the city more sustainable.
6. Examples of cities planning for a sustainable future see

<http://www.csiro.au/Outcomes/ICT-and-Services/People-and-businesses/ReshapingCities.aspx>

<http://www.sustainable-city.org/>

<http://www.mnn.com/lifestyle/responsible-living/stories/sustainable-cities-of-the-future>

<http://www.guardian.co.uk/sustainable-business/cities-self-sufficient-new-urban-energy-centres>

Plan and implement teaching programs that engage students in actively applying the key skills of the learning area to its content