STAGE 5 GEOGRAPHY PROGRAM
AIR QUALITY AND URBAN GROWTH AND DECLINE

Sydney Tower Education Program provides syllabus specific work for Year 10 Geography students studying Air quality with Urban growth and decline for the focus areas of Issues in Australian Environments (5A3).

Offering a new standard in fieldwork study, the teacher’s kit consists of a Teacher’s program for the issues which employs research based learning and problem solving techniques in a group environment and on an individual basis.

The Teacher’s kit includes:
Teacher’s program for the issues of Air quality and Urban growth and decline
Student handouts (including factual information and activities to support program)
1. The air we breathe in Sydney
2. Sydney grows as transport changes
3. Map of the Sydney region
4. Research action plan (including the construction of a survey for the fieldwork)
5. Worksheets for fieldwork activity at Sydney Tower and in Sydney’s CBD
6. Assessment task with marking criteria
7. Sydney Tower Guidebook: 360˚ of Sydney, Your Sydney Tower Guide
# Program for Issues in Australian Environments

<table>
<thead>
<tr>
<th>Topic/focus area</th>
<th>5A3 Issues in Australian Environments</th>
<th>Time:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong></td>
<td>Ways in which geographical understanding contributes to the sustainable management of issues affecting the Australian environment</td>
<td></td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1</td>
<td>identifies, gathers and evaluates geographical information</td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>analyses, organises and synthesises geographical information</td>
<td></td>
</tr>
<tr>
<td>5.3</td>
<td>selects and uses appropriate written, oral and graphic forms to communicate geographical information</td>
<td></td>
</tr>
<tr>
<td>5.4</td>
<td>selects and applies appropriate geographical tools</td>
<td></td>
</tr>
<tr>
<td>5.5</td>
<td>demonstrates a sense of place about Australian environments</td>
<td></td>
</tr>
<tr>
<td>5.6</td>
<td>explains the geographical processes that form and transform Australian environments</td>
<td></td>
</tr>
<tr>
<td>5.7</td>
<td>analyses the impacts of different perspectives on geographical issues at local, national and global scales</td>
<td></td>
</tr>
<tr>
<td>5.10</td>
<td>applies geographical knowledge, understanding and skills with knowledge of civics to demonstrate informed and active citizenship.</td>
<td></td>
</tr>
</tbody>
</table>

**Suggested ICT**

Design and create a multimedia presentation or web page to communicate geographical information to a particular audience, including maps and diagrams as appropriate.

**Resources** (Include resources available within your school and community.)

There are a variety of commercial textbooks that can support the tasks outlined in this topic to provide background for students and that have skills based activities incorporating mandatory tools.

The use of the Internet is assumed as a source of information.

**Websites:**

Sydney Morning Herald

Environmental Protection Authority

Department of Environment, Water, Heritage and the Arts

Nova: Science in the news

NSW Government: Metropolitan strategy

Planning NSW: 2002 Metropolitan Development Plan, Managing Sydney’s Urban Growth
### Geographical Issues
- geographical issues affecting Australian environments including:
  - air quality
  - coastal management
  - land and water management
  - spatial inequality
  - urban growth and decline
  - waste management

- *describe each geographical issue in relation to:*
  - its nature
  - its impacts
  - the responses by individuals, groups and governments to the issue

- *outline how a range of geographical issues are affecting Australian environments*

### FIRST geographical issue affecting Australian environments
- the geographical processes relevant to the issue
- the perceptions of different groups about the issue
- individual, group and government responses to the issue
- decision-making processes involved in the management of the issue
- management of the issue and implications for sustainability, social justice and equity

- *explain the interaction of the physical and human elements of the environment*

- *recognise the responsibility of the levels of government to the issue*

- *propose actions that promote:*
  - sustainability

### Task 1
- Insert own activity

### Task 2  Air Quality - Sydney

**Scenario**
You are a politician fielding questions from a public meeting held in a local school, with regards to air quality. The public is concerned about the implications of air quality for the community, the school and the environment. Your preparation for the meeting includes the creation of a multimedia presentation.

To prepare for your meeting you do some background research on air quality in Sydney, in order to better understand local issues.

Read **Handout 1: The air we breathe in Sydney**
List the ways in which air pollution in Sydney has been improved.

Using **Table A: Percentage contributions to air pollution in Sydney**, construct two pie graphs for the three major sources of pollution in Sydney. Label the sectors.

(Formula for pie graph: Source x 3.6 = number of degrees of pie graph)

For a week gather data on Sydney's air quality from the Sydney Morning Herald or with more detail from EPA.
- social justice
- equity
- evaluate the success of individuals, groups and the levels of government in managing the issue

SECOND geographical issue affecting Australian environments (including fieldwork)

- the geographical processes relevant to the issue
- the perceptions of different groups about the issue
- individual, group and government responses to the issue
- decision-making processes involved in the management of the issue
- management of the issue and implications for sustainability, social justice and equity
- investigate a geographical issue through fieldwork by developing and implementing a research action plan (as outlined on page 17 of Syllabus)

Use a table as below.

<table>
<thead>
<tr>
<th>Date</th>
<th>Pollution index</th>
<th>Wind direction and speed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EPA standards for pollution based on the Regional Pollution Index (RPI):
- Low – pollution index 1 to 24
- Medium – pollution index from 25 to 49
- High – pollution index 50 or higher

Graph your results and analyse the patterns over the week. Suggest reasons for this pattern, in relation to other climatic factors, such as wind direction and speed.

Your presentation to the public meeting should include:
- the range of air quality issues in the community
- the geographical processes involved
- the perceptions of different groups to some of the local air quality issues
- individual, group and government responses to some of these issues (include statistical data to account for changes over time)
- management of these issues and any implications for sustainability, social justice and equity.

Task 3 Urban Growth and Decline – local area

Scenario
The local primary school needs to teach their students about the importance of sustainability (Stage 3). They have asked your group to develop a lesson that will teach the students about the development of the local area and how it can be managed in a sustainable way.

Your presentation will include the following information:
- the location of the suburb/town in relation to Sydney, using maps and digital images
- the history of this suburb/town and its main features (human and physical)
- an explanation of the processes involved with the changes over time (is it growing or declining?) in this suburb/town
- how individuals, groups and governments have responded to issues of development in your suburb/town
- some strategies that will promote sustainability in your suburb/town as it changes.

Present the lesson to the class.
- explain the interaction of the physical and human elements of the environment
- recognise the responsibility of the levels of government to the issue
- propose actions that promote:
  - sustainability
  - social justice
  - equity
- evaluate the success of individuals, groups and the levels of government in managing the issue
- develop a research action plan
- apply fieldwork techniques
- present geographical information in an appropriate format
- demonstrate active citizenship by proposing individual/group action to address the issue

### Task 4 Urban Growth and Decline – Sydney

**Scenario**
You have been employed by Sydney City Council to research the urban growth and development of Sydney. You will present your report to the Council.

To understand modern day Sydney it is first necessary to understand how Sydney grew in the early days.

**Read Handout 2: Sydney grows as transport changes**

Complete Table B: Sydney’s population growth 1788-2006 by finding out the population of Sydney in 2001 and 2006. Explain why the population is only given for particular years.

Suggest why the Aboriginal population is not included in this table.

Construct a line graph of the growth of Sydney using the information in Table B.

Identify the period of fastest growth for Sydney and provide an explanation.

Using both Table B: Sydney’s population growth 1788-2006 and Table C: Number of motor vehicles in NSW, compare the population of Sydney with the population of NSW. In the early 60s (1960/1961), what percentage of the population of NSW lived in Sydney? Suggest a reason for this trend.

**Use Handout 3: Map of Sydney region**

On the map of Sydney, mark on all the places referred to in the information. Choose a method of shading to distinguish the areas of development in time order.

Construct a timeline of the changes in Sydney’s growth. Label the periods of growth to indicate the factors causing growth in that period.

On Table C, complete the last column to indicate the number of persons per vehicle. Research the current situation and fill in the details for 2008. Comment on the increase in vehicles from 1950 – 1965 and from 1965 – 2008.

Write a paragraph outlining the role of the motor vehicle in the growth of modern day Sydney.

**Pre-fieldwork activity**
Now that you have some understanding of Sydney’s growth you will undertake your research to investigate a specific issue relating to urban growth and decline.

Your research will require a research action plan incorporating a fieldwork activity collecting primary data from Sydney’s CBD and Sydney Tower (Observation Deck).
Refer to **Handout 4: Research Action Plan** for assistance with this.

Follow the steps through the plan, recording your answers on **Handout 4**, in the spaces provided.

**Fieldwork activity**
When you go to Sydney’s CBD and Sydney Tower (Observation Deck), you will use **Handout 5: Worksheets for fieldwork activity** and the survey developed in **Handout 4** as part of your Research Action Plan.

**Post-fieldwork activity**
Collate, summarise and analyse the survey results. Present the results in tables and graphs. Write a paragraph interpreting the results.

Use all your research both secondary and primary to prepare your report for the Sydney City Council meeting investigating plans for Sydney’s future growth.

Your report should include:
- Facts
- Images
- Data in graphic form
- Reference to perceptions on the issue by individuals, groups and governments (local, State and Federal)
- Recommendations for future action by Sydney City Council

See **Handout 6: Assessment task**

This task will give you the opportunity to demonstrate what you know and can do as a result of your research.
The air we breathe in Sydney

When Sydney is represented by images in brochures we see a city of blue skies surrounded by clear waters and bushland that extends all the way to the Blue Mountains. The view from the top of Sydney Tower allows you to see all of this on a clear day, but the environment in which we live is not always like this. Air pollution is a major concern in Sydney with smog warnings being issued throughout the year.

Whilst the air quality in Sydney is improving with new environmental regulations banning backyard incinerators, new regulations on emissions from industry, better public transport, newer more efficient motor vehicles and better roads, we still have the nation's worst air pollution.

As discussed in Fact Sheet 1, Sydney is situated on the Cumberland Plain and is bounded by higher land in the north, south and west. This makes Sydney a basin or a bowl that can trap air pollution for many days. These biophysical factors affect the accumulation and severity of air pollution in Sydney.

The cost of air pollution is not often considered, but it is estimated that $350 million is spent on health cost alone and $13 million on building cleaning. Other costs may be impossible to calculate such as the loss of visual amenity (the attractiveness). Consider this when you view Sydney from the top of Sydney Tower and consider the impact this might have on visitors to Sydney.

There are many causes of air pollution in Sydney and many different types of air pollutants. By far the major cause of air pollution is the motor vehicle which contributes about 90% of Sydney's carbon monoxide, 80% of oxides of nitrogen and 90% of lead levels. Table 3 below shows the percentage of pollutants contributed by different sources in Sydney.

<table>
<thead>
<tr>
<th>Source</th>
<th>Oxides of Nitrogen (nox)</th>
<th>Total suspended particulates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor vehicle</td>
<td>82</td>
<td>31</td>
</tr>
<tr>
<td>Major industry</td>
<td>13</td>
<td>36</td>
</tr>
<tr>
<td>Domestic/commercial</td>
<td>5</td>
<td>33</td>
</tr>
</tbody>
</table>

Table A – Percentage Contributions to Air Pollution in Sydney

Photochemical smog causes haze in the Sydney region and is made up of a number of different chemicals. This type of pollution can have serious health implications in Sydney causing a number of effects on human health. This is also the case for ground level ozone, which is toxic to human health.

This fact sheet is a very brief overview of some of the factors affecting Sydney's air quality. You may have many questions about what the different types of pollution are, how topography and weather affects Sydney's air quality and how we can control air pollution. The next section will allow you to investigate all these questions as you are guided through your research action plan to investigate air quality in and growth of the Sydney region.
Handout 2

Sydney grows as transport changes

With the arrival of the British in 1788 the growth of Sydney began. A small population of Aboriginal people lived in what is now known as the Greater Metropolitan area of Sydney. It is difficult to assess how many Aboriginal people populated this area when the First Fleet arrived into Sydney, however the estimate is between 4,000 and 8,000 people. There were many clans in this region all belonging to the Darug tribe.

The First Fleet arrived with about 1,200 people to establish a convict settlement. From this point the growth of Sydney began slowly, with numbers being added by the subsequent arrival of more convicts, sailors and free settlers and the loss of population due to illness, disease. At the same time the Aboriginal population was reduced to about 400 as a result of diseases and murder of the local Aboriginal populations. Aboriginal numbers built back up to 10,000 by 1961.

<table>
<thead>
<tr>
<th>DATE</th>
<th>POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1788</td>
<td>1,500</td>
</tr>
<tr>
<td>1822</td>
<td>7,000</td>
</tr>
<tr>
<td>1828</td>
<td>10,815</td>
</tr>
<tr>
<td>1833</td>
<td>16,200</td>
</tr>
<tr>
<td>1836</td>
<td>19,800</td>
</tr>
<tr>
<td>1841</td>
<td>30,000</td>
</tr>
<tr>
<td>1846</td>
<td>45,100</td>
</tr>
<tr>
<td>1851</td>
<td>53,900</td>
</tr>
<tr>
<td>1861</td>
<td>95,800</td>
</tr>
<tr>
<td>1871</td>
<td>137,500</td>
</tr>
<tr>
<td>1881</td>
<td>225,000</td>
</tr>
<tr>
<td>1891</td>
<td>383,000</td>
</tr>
<tr>
<td>1901</td>
<td>481,830</td>
</tr>
<tr>
<td>1911</td>
<td>636,350</td>
</tr>
<tr>
<td>1921</td>
<td>960,000</td>
</tr>
<tr>
<td>1933</td>
<td>1,235,000</td>
</tr>
<tr>
<td>1947</td>
<td>1,480,000</td>
</tr>
<tr>
<td>1954</td>
<td>1,863,160</td>
</tr>
<tr>
<td>1961</td>
<td>2,183,100</td>
</tr>
<tr>
<td>1971</td>
<td>2,725,000</td>
</tr>
<tr>
<td>1976</td>
<td>2,765,000</td>
</tr>
<tr>
<td>1981</td>
<td>2,874,823</td>
</tr>
<tr>
<td>1986</td>
<td>2,989,070</td>
</tr>
<tr>
<td>1991</td>
<td>3,097,956</td>
</tr>
<tr>
<td>1996</td>
<td>3,276,207</td>
</tr>
<tr>
<td>2001</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
</tr>
</tbody>
</table>

Table B: Sydney's Population Growth 1788 – 2006
(excluding Aboriginal population)
Sydney’s growth during the establishment of the convict settlement was slow. With a limited population there was little need for large amounts of housing. As a result, the only area that was built up by 1822 was in the Tank stream valley, where the northern section of today’s Central Business District is located. In fact, Sydney Tower marks the most southerly point of the “urban” area of Sydney at this time. With the continued growth of Sydney there was the need for more space. Individual homes required their own gardens to grow vegetables in the fledgling colony and this meant the need for an expanded urban area. Also, an increase in shipping and trade required a larger port area than Circular Quay. Wharves were constructed around Darling Harbour, which also promoted the growth of housing in this area. By the 1850s, the entire area covered by today’s CBD was taken up by both housing and commercial buildings. Also the first of Sydney’s suburbs began to appear. These included Woolloomooloo and Darlinghurst, Redfern and Chippendale and Surry Hills. The type of housing in the CBD area and the surrounding suburbs was mainly terrace and row housing. These small houses on narrow blocks of land meant a high density of people could live in the one area. This was essential for all of those who lived and worked in Sydney. At this point in time the only means of transport to work in and around Sydney was walking. Only the rich could afford a horse and buggy, so it was important to be located close to work.

Transport has had a major impact on the growth and decline of urban areas in Sydney. The wealthy merchants could afford horse drawn transport and moved to the edge of the growing city. Suburbs such as Potts Point attracted these wealthy people in the early 1840s. Balmain and Glebe were also populated in this decade, although there was a mix of middle and working class residents as there was employment close by these suburbs.

The rapid growth of Sydney began with the introduction of trams. Both steam trams and electric trams were cheap enough for all people to use in the Sydney region and this led people to move from the crowded inner city locations to areas served by trams. However, people still needed to be able to walk to the tram line so the development of residential housing occurred along the tram lines. The first trams were steam powered and began operating in Sydney in 1879. Steam trams operated in Sydney until 1902 and connected the city to the eastern suburbs all the way to Bondi, Clovelly and Maroubra. The inner west suburbs of Sydney were also connected at this time. From 1890 electric trams allowed Sydney to expand further with trams servicing the NorthShore as far as Chatswood and Northbridge in the North and all the way to Narrabeen via Mosman and Manly in the Northern Beaches region. Further growth was achieved in the western suburbs with trams extending to Ryde and Strathfield and Canterbury and Earlwood in the south west.

The use of trams and trains was limited to the ability to walk to the train station and so the development of housing in Sydney was linear i.e. the housing was clustered along the train or tram lines. Much of the land between the train lines was undeveloped as people could not walk the long distance to the train lines.

After World War II, the use and ownership of the car flourished. From 1955, when car ownership became more common, Sydney’s suburban area grew rapidly. The areas between railway lines were filled in by residential areas as commuters no longer needed to walk to the station. As seen in Table 2 the popularity of the motor vehicle as a means of transport in New South Wales grew rapidly and by 1965 85% of all trips made by people in Sydney were made by private car or public bus. This required a huge number of roads to be built to accommodate the needs of people in the Sydney region.
<table>
<thead>
<tr>
<th>DATE</th>
<th>No. OF MOTOR VEHICLES IN NSW</th>
<th>NSW POPULATION</th>
<th>PERSONS PER VEHICLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>478,000</td>
<td>3,193,000</td>
<td></td>
</tr>
<tr>
<td>1955</td>
<td>709,000</td>
<td>3,490,000</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>971,000</td>
<td>3,832,000</td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>1,313,000</td>
<td>4,169,000</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table C: Number of Motor Vehicles in New South Wales.

Such rapid growth in the use of private vehicles has allowed Sydney to grow to its physical boundaries of the Hornsby Plateau in the North to the Blue Mountains in the west and Woronora Plateau in the south. This area is known as the Cumberland Plain and is visible from the top of Sydney Tower. Virtually all of the plain is covered in suburban residential development and most people rely on the car for transport as public transport in the outer suburbs of Sydney is usually inadequate.

The automobile has had an enormous impact on the growth of Sydney and its environment.
Handout 3

Map: Sydney Region
Handout 4

Research Action Plan

**STEP 1: IDENTIFY THE AIM/PURPOSE OF THE INVESTIGATION**
In step 1 you will break the research topic into a number of parts. This will help you to understand all the parts of the topic.

Come up with ideas for the aim of the investigation.

_________________________  _________________________  _________________________

_________________________  _________________________  _________________________

_________________________  _________________________  _________________________

↑ ↑ ↑

Urban growth in Sydney

↓ ↓ ↓

**STEP 2: WHAT ARE THE KEY/FOCUS QUESTIONS**
In step 2 you need to think of as many questions as you can about your topic. To help, work in groups of four and list as many questions as you can in the box below.

Here are some common questions geographers ask:

- What is….? • What changes have occurred in ……. over time?
- Why is ……. there? • Where is …….?
- When did ……. start? • When will …….?
- How does …….? • Who has ….? 
- What are the effects….?. • What action ….?.
- Which groups are involved?
Now report on your focus questions to the class. Once each group has reported, select the focus questions that will be able to be researched through primary data collected from the fieldwork activity.

**My groups focus questions** - make the questions as specific as possible for each one of the aims you identified in Step 1.

**Focus questions** – selected for class research
When completing your research you can tick off the questions you have answered as you go. This will also help you plan your time.

**STEP 3: DECIDE WHICH PRIMARY AND SECONDARY DATA ARE NEEDED TO ANSWER THE FOCUS QUESTIONS.**

There are two types of data that geographers collect.

The first is **primary data/sources**, which is raw data or original text providing first hand information such as interviews, observations, diary entries, letters, original documents, photos, measurements and questionnaires.

The second is **secondary sources**, which interpret or assess original evidence and may contain someone’s opinion. These include maps, videos, textbooks, brochures, pamphlets, magazine and newspaper articles, web sites, government publications, radio programs and the fact sheets you have already used.

In the tables below select the types of data/sources you will use to answer the focus questions. To save time, number the focus questions in step 2 and use this number in the table below.

<table>
<thead>
<tr>
<th>PRIMARY SOURCES</th>
<th>FOCUS QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaire</td>
<td></td>
</tr>
<tr>
<td>Interviews</td>
<td></td>
</tr>
<tr>
<td>Photographs</td>
<td></td>
</tr>
<tr>
<td>Letters</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td></td>
</tr>
<tr>
<td>Measurements</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECONDARY SOURCES</th>
<th>FOCUS QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Websites</td>
<td></td>
</tr>
<tr>
<td>Textbooks</td>
<td></td>
</tr>
<tr>
<td>Government documents</td>
<td></td>
</tr>
<tr>
<td>Newspapers</td>
<td></td>
</tr>
<tr>
<td>Magazines</td>
<td></td>
</tr>
<tr>
<td>Pamphlets</td>
<td></td>
</tr>
<tr>
<td>Videos</td>
<td></td>
</tr>
</tbody>
</table>
STEP 4 – IDENTIFY THE TECHNIQUES THAT WILL BE USED TO COLLECT THE DATA.
There are many ways in which you can collect data. In this step we will look at how to construct a good questionnaire and collate the data from the questionnaire and how to collect and assess the usefulness of secondary data.

CONSTRUCTING A QUESTIONNAIRE
You will need to construct a questionnaire for this research activity. There are a number of factors which make a questionnaire good.

1. How many people will you survey? The more people you survey the more valid your data will be. But, you can’t survey hundreds of people in the limited time you have. In this task each member of the class will survey 5 people. This will give the class a large amount of data.

2. Your questionnaire needs to be clearly set out and neat.

3. No more than 10 questions should be included – this keeps the amount of time to a minimum.

4. Your questionnaire should identify who you are and why you are doing the survey.

5. No personal details should be collected from the person you are surveying.

6. The easiest questions to collate data from are close-ended questions – these questions give a limited number of choices or opinions. Open-ended questions can be used sparingly in a questionnaire, but remember there will be a very large range of responses.

A sample questionnaire has been created below to help you identify the important parts of the questionnaire.
SAMPLE QUESTIONNAIRE

I am a Geography student researching environmental issues in the Sydney region. All information I collect will be anonymous and treated confidentially. Would you mind answering a few questions?

1. What is the main environmental issue facing Sydney today?

2. From the list below, what do you think is the main environmental issue facing Sydney today?
   a. Air quality issues
   b. Water quality and supply issues
   c. Waste disposal issues
   d. Population growth and urban issues

3. On a scale of one to ten - ten being very severe, how serious do you believe Population growth and urban issues to be?
   1     2     3     4     5     6     7     8     9     10
   Not Very
   Severe Severe

4. Where do you live?
   a. Suburbs of Sydney
   b. NSW – Other than Sydney
   c. Other states of Australia
   d. Overseas

5. Do you believe the NSW government is doing enough to solve the problems of Population growth and urban issues? YES/NO

Thank you for your cooperation and time.

Office use ONLY
   o Male
   o Female
   o 20 – 30
   o 30 – 40
   o 40 – 50
   o 50 – 60
   o 60+

Anonymous and confidential collection of information.

Closed question. this is the same as question 1, but there is a limited number of responses which will make collecting and collating data easier.

Personal information that does not identify an individual is ok.

Complete this section after you have moved away from the person.

Identifies who you are.

Open ended question.

Scales of response can be used to gauge how important an issue is.

Don’t forget to thank the person you have surveyed.
CONSTRUCTING YOUR OWN QUESTIONNAIRE

In the same groups as in Step 2 decide on 7 questions that you would like to ask. Remember to ask closed questions for most with one or two open questions.

List your group’s questions in the box below.

<table>
<thead>
<tr>
<th>My group’s questions:</th>
</tr>
</thead>
</table>

With your teacher, list all the different group’s questions. As a class select the best 7 – 10 questions for a questionnaire on *Population growth and urban issues.*
Use the box below to record the questions for the class questionnaire.

*Population growth and urban issues Questionnaire*

Once the class has selected the questions, you can write or type up a neat copy of your questionnaire and survey at least 5 people. This means that the same data will be gathered by all members of the class which will make your sample larger. The larger the sample (number of people surveyed) the more valid your data.
COLLECTING SECONDARY SOURCE INFORMATION
You need to make sure that the information you are collecting for this research project is relevant to the topic and that the information is valid i.e. true and unbiased. To do this you need to consider the following:

1. Authority
The first thing to check and record is the Author. Is this person or organisation qualified to write about the topic? As a general rule, government and universities usually provide quality information about a topic. Home pages on the web may contain incomplete or incorrect information that is not based on valid research. Be careful of the information that is available on the internet.

2. Current information
Is the information up to date or has the situation changed? This is important and a date of publication can easily sort out the most current information.

3. Purpose
The audience the information was written for and how the information is presented is also an indication of the validity of a source. Some information is designed to entertain or persuade. If this is the case, important information may have been left out. If the source is designed for a particular audience, it may have been simplified.

4. Objectivity
Information is often used to persuade people of a problem that exists. This is bias. Most sources contain some bias which may influence the way you think. Bias can be difficult to spot, but thinking about the Author and their purpose may help you find bias.

In the boxes below, summarise the details of five pieces of information you have used to help you answer the focus questions in Step 2. You must find and use:

1. Two books, magazine, newspaper or pamphlets
2. Two websites
3. One graph/diagram

Make an assessment of the validity of each source based on the 4 criteria above.
### Source Three: Website One – Government Department

<table>
<thead>
<tr>
<th>Web address (URL):</th>
<th>__________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person/Group who prepared the site:</td>
<td>__________________________</td>
</tr>
<tr>
<td>Date last updated:</td>
<td>__________________________</td>
</tr>
<tr>
<td>Can you trust information from this site? Why/ Why not?</td>
<td>____________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
</tbody>
</table>

### Source Four: Website Two – Community or Environment Group

<table>
<thead>
<tr>
<th>Web address (URL):</th>
<th>__________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person/Group who prepared the site:</td>
<td>__________________________</td>
</tr>
<tr>
<td>Date last updated:</td>
<td>__________________________</td>
</tr>
<tr>
<td>Can you trust information from this site? Why/ Why not?</td>
<td>____________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
<tr>
<td></td>
<td>__________________________</td>
</tr>
</tbody>
</table>
STEP 5: COLLECT PRIMARY AND SECONDARY DATA

SURVEYING
When you visit Sydney Tower you will be required to survey visitors and collect information. Make 10 copies of the survey and have a clipboard to lean on.

There are some rules to follow in order to conduct your survey ethically and safely.

- Groups will survey in different locations – Sydney Tower, CBD, Shopping centre or mall
- Work in pairs for safety
- Always be polite, even if the person you approach is not polite
- Remember to smile It makes a huge difference with cooperation
- Never fill in the statistical data on sex and age while the person is still with you
- Select a cross-section of people to make the data valid.

OBSERVATIONS
When you visit Sydney Tower you will be required to make observations about the size and shape of Sydney and record your information using geographic tools such as: photographs, field sketch, notes. (Don’t forget to take the camera.)

This information will be primary source data that you will use in your final report.
SECONDARY DATA
Collect any brochures or other written information from Sydney Tower that will assist your investigation

Before departing on the fieldwork consider the types of information and observations you think you should make. List these in the box below.

Data I need to collect on the fieldwork:

STEP 6: PROCESS AND ANALYSE THE DATA COLLECTED

It is essential that you continually refer back to the focus questions you are trying to answer when completing this step.

Secondary Sources: Information relevant to the focus questions in Step 2 needs to be processed and analysed in this step.

Primary Sources: The best way to process this type of data, particularly the survey data and air quality data recorded in step 5 is to use a database or spreadsheet program. Create tables to store the data and use the graphing functions in the software to show the differences in the responses from the survey.

Example: The table below shows the responses from question 2 in the sample questionnaire from step 4.

<table>
<thead>
<tr>
<th>ENVIRONMENTAL ISSUE</th>
<th>NUMBER OF RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air quality issues</td>
<td>62</td>
</tr>
<tr>
<td>Water quality and supply issues</td>
<td>98</td>
</tr>
<tr>
<td>Waste disposal issues</td>
<td>63</td>
</tr>
<tr>
<td>Population growth and urban issues</td>
<td>77</td>
</tr>
</tbody>
</table>
Using the graph/chart function in Microsoft Excel, the pie graph below represents the information graphically.

![Pie chart showing major environmental issues]

In your final report, you can place the graphs and discuss their relevance to your own research and the environmental issues under investigation.

**STEP 7: SELECT A PRESENTATION METHOD TO COMMUNICATE YOUR RESEARCH FINDINGS**

Once you have completed your research you will need to decide with your teacher how you are going to present the findings of your research. Listed below are a couple of options for you to think about.

- **Report** – this is a written document that uses words to answer the questions.

- **Audio-visual** – slides, videos and audio tapes can be used for this type of report or a combination of the two. Software such as Microsoft Powerpoint can used to great effect in this type of presentation as it is easy to combine many different types of information.

- **Oral report** – a verbal presentation of your findings could be delivered to the class. You could combine your speech with an audio-visual display.

- **Pictorial essays** – instead of using text, a pictorial essay combines maps, graphs, photos, cartoons and drawings to present your information. Some text is required particularly in the conclusion to ensure that it is clear what your research has discovered.

Select one of the four options above by highlighting the presentation method you are going to use.
STEP 8: PROPOSE INDIVIDUAL OR GROUP ACTION IN RESPONSE TO THE RESEARCH FINDINGS AND, WHERE APPROPRIATE, TAKE SUCH ACTION

In your research you would have discovered how individuals, community groups and various levels of government react to the issue of urban growth in Sydney. Also, the final presentation of your work should include the actions that each of these groups in our community should take to improve the situation. Discuss with your class mates and teacher the actions you can take to contribute to the environment in which you live.

List the actions in the box below.

Actions I can take:
Handout 5

Worksheets for fieldwork activity at:
Sydney Tower (Observation Deck) and in Sydney’s CBD

A. Survey

Conduct survey of visitors about their views on environmental issues for Sydney.

Use survey created in Handout 4: Research Action Plan

Checklist for conducting survey:
Need a minimum of 30 responses from whole group to obtain a valid sample size for analysis.
Need a range of age groups.
Need a cross-section of people such as workers, local visitors, overseas visitors.
N.B. Each group to gather data from a different location eg only one group at Sydney Tower (Observation Deck), one group in the shopping centre, one group in the mall and other groups at other locations around the city depending on itinerary for the day.
Work in small groups at all times for safety– but take turns at being the interviewer.

These organisational arrangements will vary depending on the size of the fieldwork group ie. a single class or a whole cohort.

B. Observation

1. Locate and describe the physical boundaries to the growth of Sydney or sketch a diagram to show where these boundaries exist.

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Or sketch a diagram of the boundaries below:
2. Considering there is a limit of land in the Sydney basin, how will residents in the future be housed in Sydney? Look for the different types of housing in Sydney to help answer this question.

3. Construct a transect from the South Window (the one with an S on it). A transect shows where different types of land use exist. On this transect note down where these types of land use exist:

   1. Recreation       4. Low Density Residential
   2. Industrial       5. Medium Density Residential
   3. Transport       6. High Density Residential

Use the numbers above to locate land use on your transect.

---

SYDNEY TOWER

4. How has land use in this area changed in the last decade? Tick the following.

   A) Loss of residential land   E) Less industrial land
   B) Increase in low density housing   F) Increase in recreational land
   C) Increase in medium density housing   G) Changes in transport
   D) Increase in high density housing

5. Stand at the southern windows and locate Botany Bay. Describe and account (give reasons) for the land use around Botany Bay.

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
6. List a number of environmental impacts that may be caused by the land use you described in the question above.

______________________________________________________________________
______________________________________________________________________
______________________________________________________________________

7. Halfway between Botany Bay and Sydney Tower is a large residential high rise built on old industrial land. Give possible reasons for:

A) The decline of industry in this area
______________________________________________________________________
______________________________________________________________________

B) The growth of residential land
______________________________________________________________________
______________________________________________________________________

8. What impacts on the environment both positive and negative might be experienced by urban growth (new residential high rise) and urban decline (decline of industry) in this area.

<table>
<thead>
<tr>
<th>POSITIVE IMPACTS</th>
<th>NEGATIVE IMPACTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. On your map locate other areas of high density residential land you can see from all windows of the Tower. Keep coming back to this question.

10. Locate bearing 230° - 4 km from Sydney Tower is the suburb Glebe. You will notice many small houses joined together known as terrace houses.

A) When do you think these houses were built? _________________________
B) Why did people need to live so close together and so close to the centre of Sydney at that time? ________________________________

11. Is this type of housing found at the same distance from the Tower in all directions? Give reasons for your observations. ___________________________________________
12. Identify changes in technology that have allowed Sydney to grow across the Cumberland Plain and North Shore. Rank them in order of which came first.

______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________

13. Which of the technologies listed above has had the greatest impact on the environment. Why is this so?

______________________________________________________________________
______________________________________________________________________
______________________________________________________________________

14. Sydney is often described as a bowl or basin. Explain the impact of this topography (shape of the land) on air quality.

______________________________________________________________________
______________________________________________________________________

15. Any other observations:

______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
Handout 6

Assessment Task for Urban Growth and Decline

This is an assessment of learning task for 5A3. It is the final activity for the study of urban growth and decline using research, including fieldwork. It is focussed on the following outcomes from the syllabus:

5.2 analyses, organises and synthesises geographical information
5.3 selects and uses appropriate written, oral and graphic forms to communicate geographical information
5.6 explains the geographical processes that form and transform Australian environments
5.10 applies geographical knowledge, understanding and skills with knowledge of civics to demonstrate informed and active citizenship.

Background
You have investigated Sydney’s urban area through fieldwork and research around the inner city area. You have identified many issues around the processes of urban growth and decline in the area. As part of your determination to be a responsible citizen and take action on these issues, you decide to communicate your findings to your local Council Member.

Task
Write a letter (two to three pages) to your local Council Member. The letter will be a summary of your findings and conclusions and your recommendations for action on matters of urban growth and decline around Sydney’s inner city area.

Rubric
In your answer include:

• a map and images of Sydney’s inner city area, showing the main features of the area
• a description of the characteristics of the area
• a summary of your research findings and conclusions
• your recommendations for action
• inclusion of relevant primary and secondary data to support recommendations
• geographical terminology, mapping conventions and formal letter conventions

<table>
<thead>
<tr>
<th>Marking criteria</th>
<th>Mark range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides a detailed description of the characteristics of Sydney’s inner city area including a map and images</td>
<td>9 – 10</td>
</tr>
<tr>
<td>Provides a detailed summary of the research findings</td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>Description of Characteristics of Sydney's Inner City Area</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>7 – 8</td>
<td>Provides a description of the characteristics of Sydney's inner city area including a map and images</td>
</tr>
<tr>
<td>5 – 6</td>
<td>Provides a limited description of the characteristics of Sydney's inner city area, including a map or images</td>
</tr>
<tr>
<td>3 – 4</td>
<td>Makes some attempt at a description of characteristics of Sydney’s inner city area</td>
</tr>
<tr>
<td>1 - 2</td>
<td>Makes general statements about characteristics and/or Sydney’s inner city area</td>
</tr>
</tbody>
</table>