

Session 2: Exploring GIS

Map Production - Exploring various GIS functions

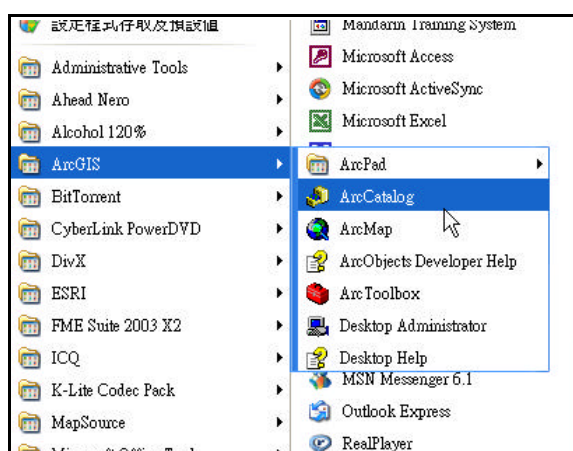
Objectives:

1. To create a map layer – Air Pollution Index (API) and its attribute table
2. To symbolize your data
3. To design a map layout

Task 1: Creating map layer and attribute table

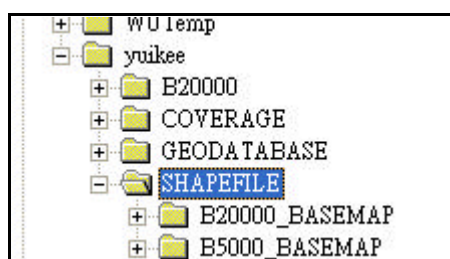
1. Start ArcCatalog

- In **Start** menu, select **ArcCatalog** under **ArcGIS** folder.

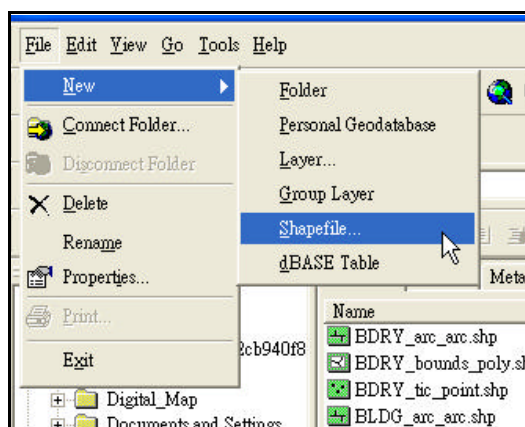


2. Create a new feature layer

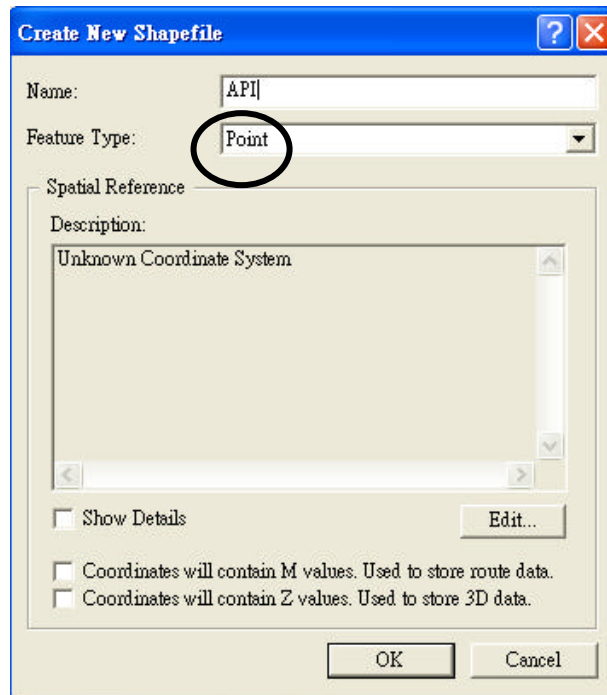
- Select the working directory **C:\yuikee\SHAPEFILE**



- In **File** menu, select **New** and then click **Shapefile** to create new Shapefile.



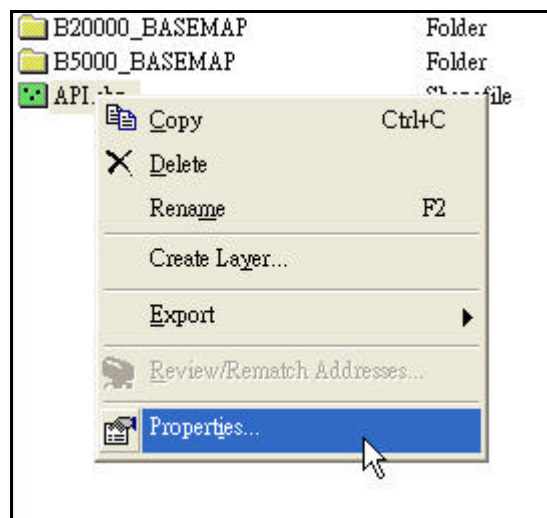
- Type “API” as the name of this new Shapefile in **Create New Shapefile** menu.



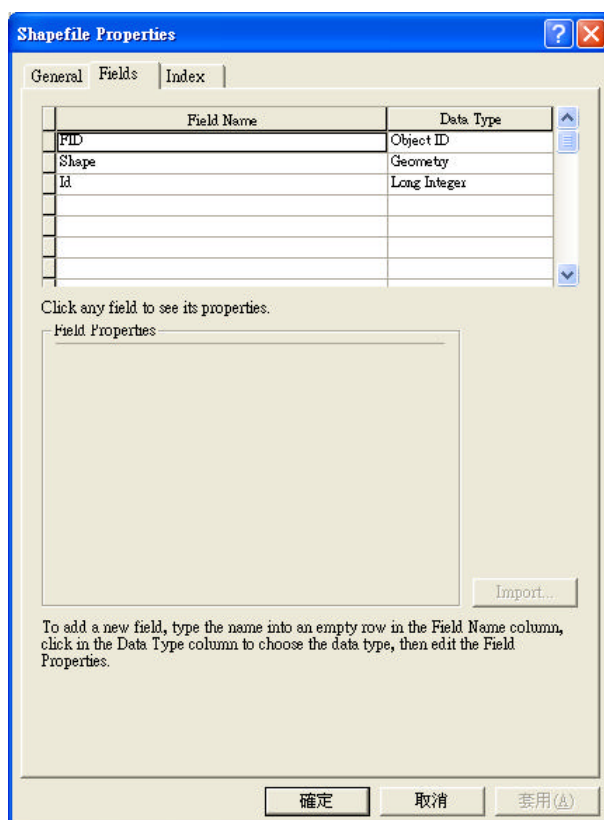
- Select “**Point**” in the field **Feature Type**.
 - Select **OK** to finish.
- (You may check that a new Shapefile was created under the working directory.)

3. Build an attribute table

- Right click the new Shapefile “API”.



- Select **Properties** to open **Shapefile Properties** menu.




- Select **Fields** tab to open field properties menu.
- In the new row, click the empty space under **Field Name** column.
- Type **“Name”** and then select **Text** under **Data Type** column.

Field Name	Data Type
FID	Object ID
Shape	Geometry
Id	Long Integer
Name	Text
API	Short Integer
Address	Text

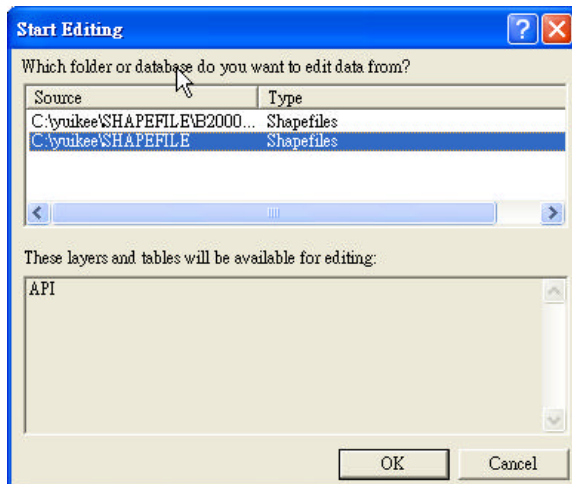
- Repeat the previous step and then add the new field **“API”** with data type **“Short Integer”** and **“Address”** with data type **“Text”**.
- Press **OK** to finish the attribute table creation.


4. Start feature editing – adding, moving and deleting feature

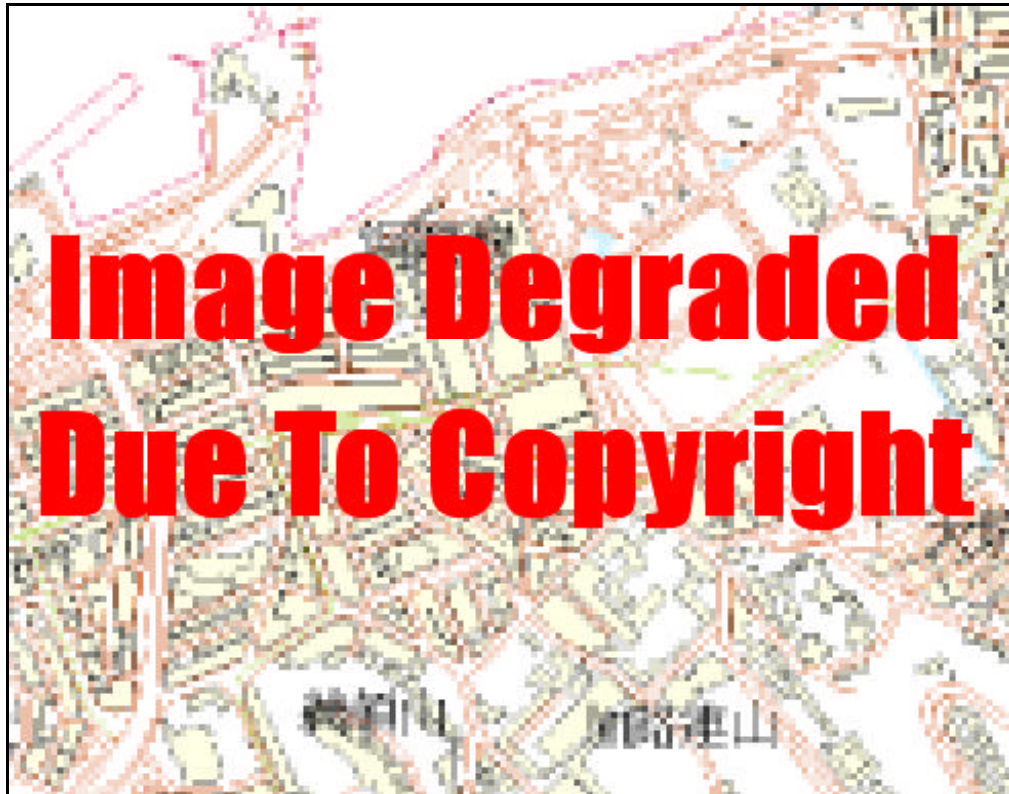
- In **ArcCatalog** toolbar, click **ArcMap** button  to start **ArcMap**.
- Open the existing **ArcMap Document Lesson_1.mxd**
- Click the **Add** button in **ArcMap** and then select **API** under the working directory **C:\yuikee\SHAPEFILE**
- Click **Start Editing** under the **Editing** menu in **Editor** toolbar.

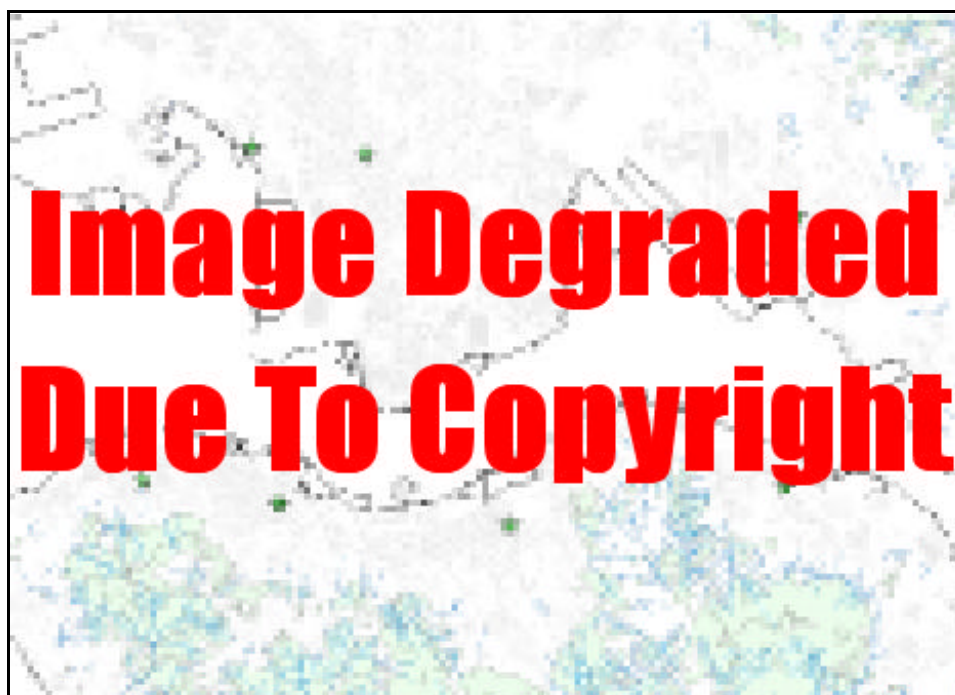
(You may click the **Editor** button  in **Standard toolbar** to add **Editor toolbar**.)

- Highlight the **Source** where the **API** layer is stored.



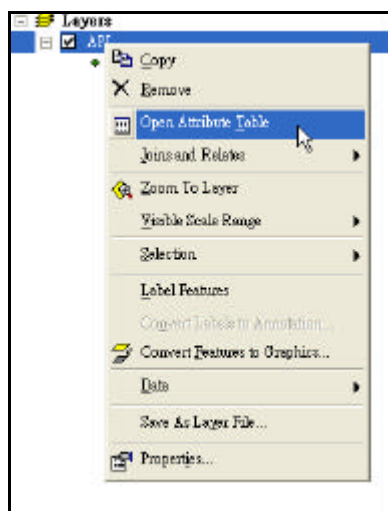
- Click the **Create New Feature** button  to add API stations on the map.





5. Edit feature attributes

- Right click the API layer in TOC.
- Select **Open Attribute Table**.



(To identify the corresponding feature from the map, click the record and then highlight the record. Corresponding feature will be highlighted)

- Type the name of API station to the field “Name” and corresponding API value and address in the field **API** and **Address** respectively.

Attributes of API			
Name	Id	API	Address
Shum Shui Po	1	39	37A Yen Chow Street
Kwun Tong	2	37	6 Tung Yan Street
Eastern	3	30	Sai Wan Ho Fire Station
Causeway Bay	4	56	1 Yee Wo Street
Central	5	47	Charter Road
Central / Western	6	31	1 High Street
Mong Kok	7	48	Nathan Road

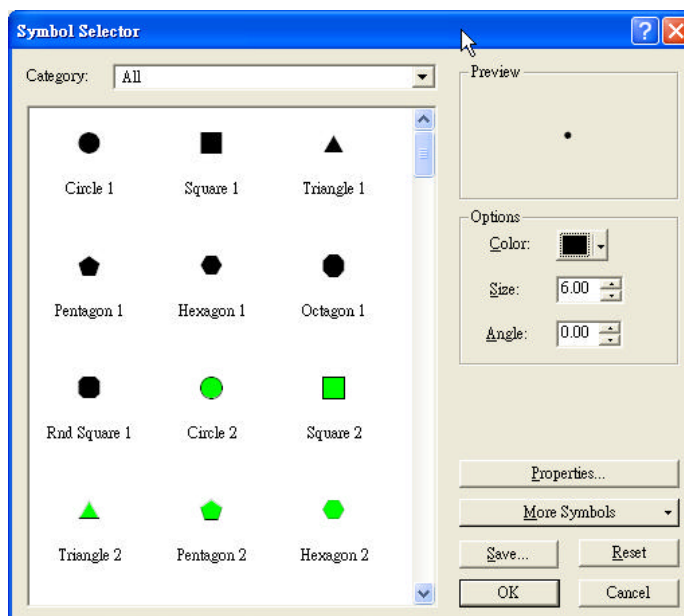


- Repeat the previous step to complete all records
 - Close the attribute table.
6. Save and Exit feature editing
- Click **Stop Editing** under the **Editing** menu in **Editor** toolbar.
 - Press **Yes** button to save the editing.

Task 2: Setting the style and symbol

1. Select single symbol

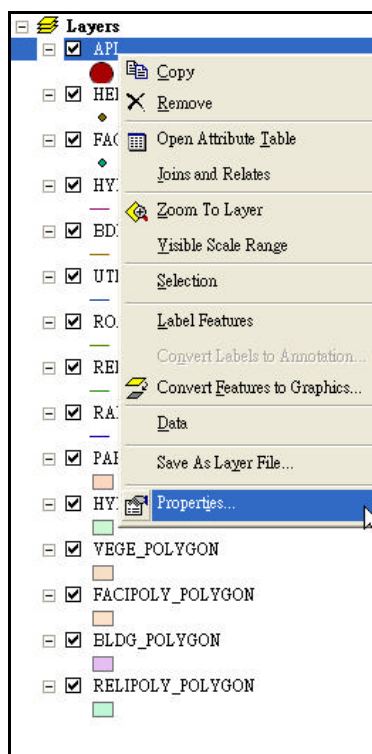
- Double click the symbol below the layer **API** in TOC to open Symbol Selector menu



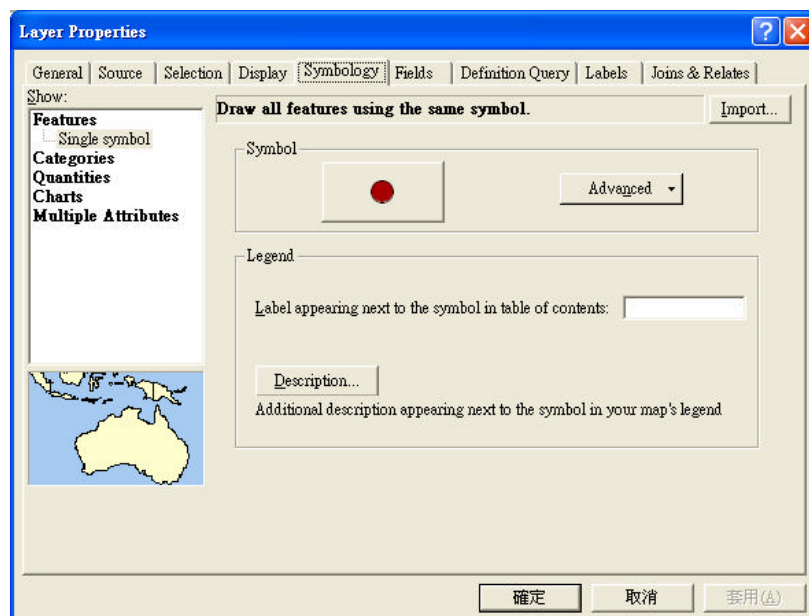
- Select **“Circle 2”** symbol and then change the color to red in **Options**.
- Press **OK** to finish.

2. Select different symbol to represent different feature type

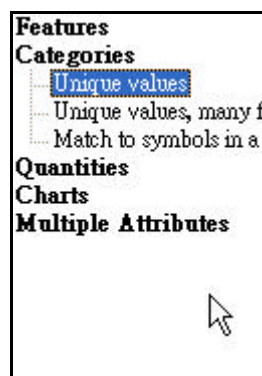
- Right click the layer in **TOC**



- Select **Properties** to open **Layer Properties** menu
- Select **Symbology** tab



- Select **Categories** in **Show** menu and then highlight **Unique Value**

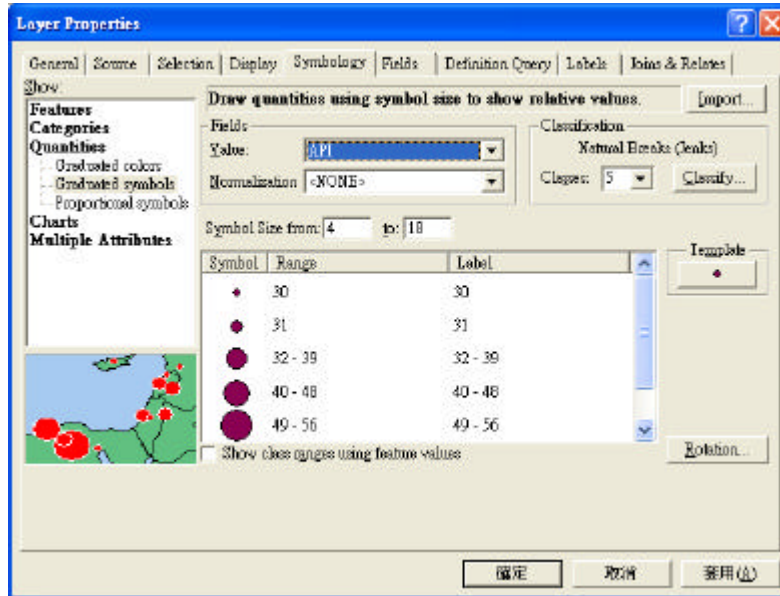


- In **Value Field**, select **ID**.
- Press **Add All Values** to set different symbol for different ID.
- Press **OK** to finish.

3. Select graduated symbol to represent different value of attribute

- Right click the **API** layer in TOC.
- Select **Properties** to open **Layer Properties** menu.
- Select **Symbology** tab.
- Select **Quantities** in **Show** menu and then highlight **Graduated Symbol**.

- In **Value** Field, select **API**



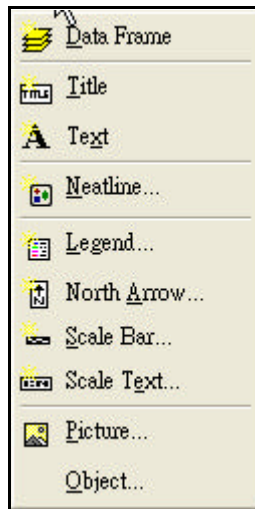
*(Remark: You may set the classification method to equal interval in **Classification** dialog box by clicking the button **Classify**.)*

- Press **OK** to finish

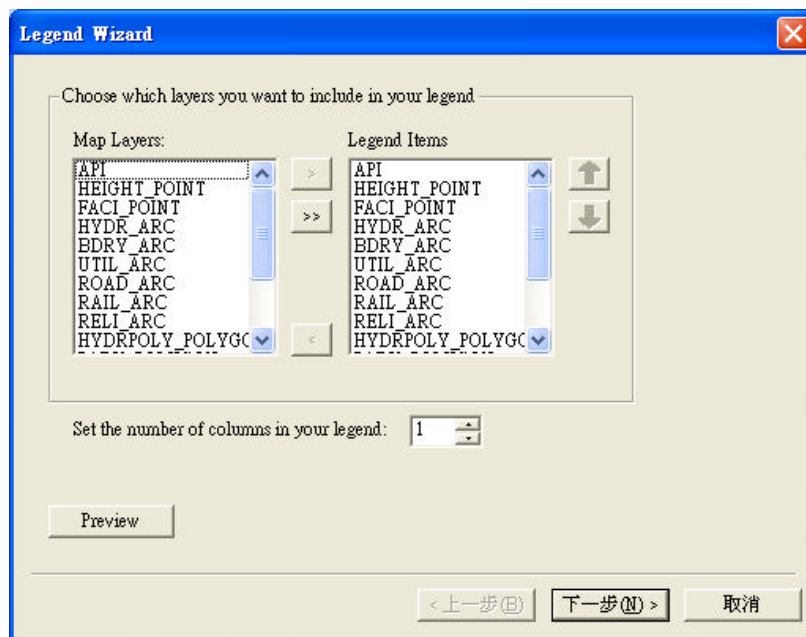


Task 3: Setting the map layout and printing

1. Set map window to layout view
2. Add map element



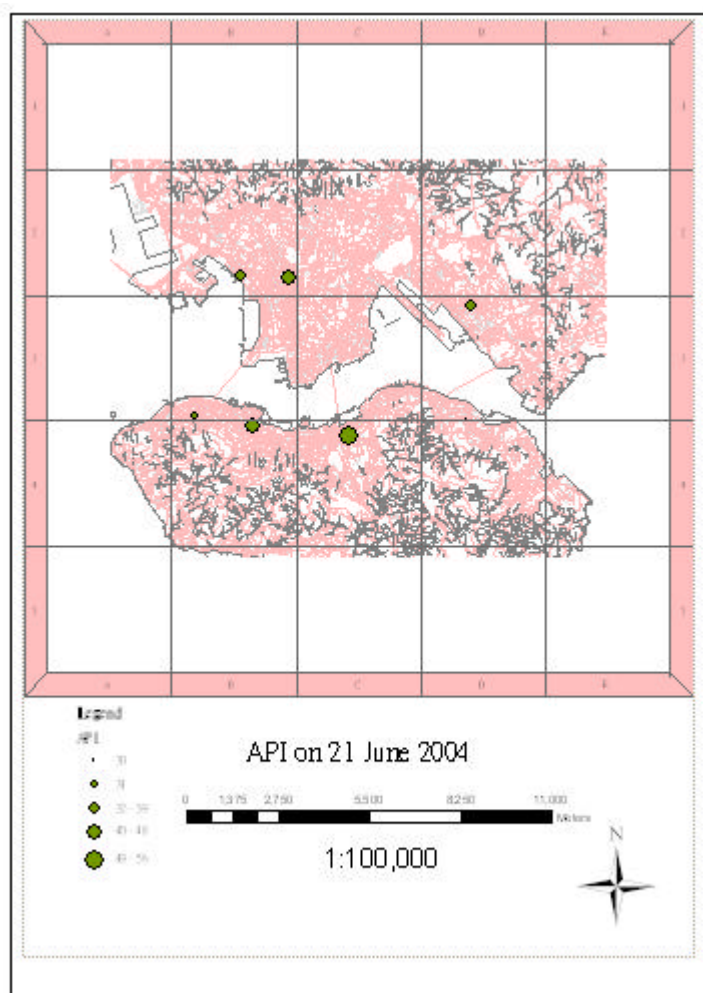
- In **Insert** menu, click the **Title** to add map title
- Click the **Legend** to open **Legend Wizard**



- Remove all the items in **Legend Items** except **API** and then click **Next** to finish.
- Click the **North Arrow** to add north symbol.
- Click the **Scale Bar** to add scale bar
- Click the **Scale Text** to add scale text

3. Set map grid

- In map layout view, right click the map layout and then select **Properties**
- Select **Grid** tab in **Data Frame Properties**
- Press **New Grid** to create new grid
- Select **Reference Grid** and then press **Next** to finish



4. Export the map

- In **File** menu, click **Export Map**
- Enter the filename and set the file to JPEG format

Demonstrations and practice: Applying GIS in teaching S1-S3 curriculum
Brainstorming exercise

The list below is the main themes you may have to teach at Junior Secondary level. For each, try to think about a teaching or learning activity which may make use of GIS:

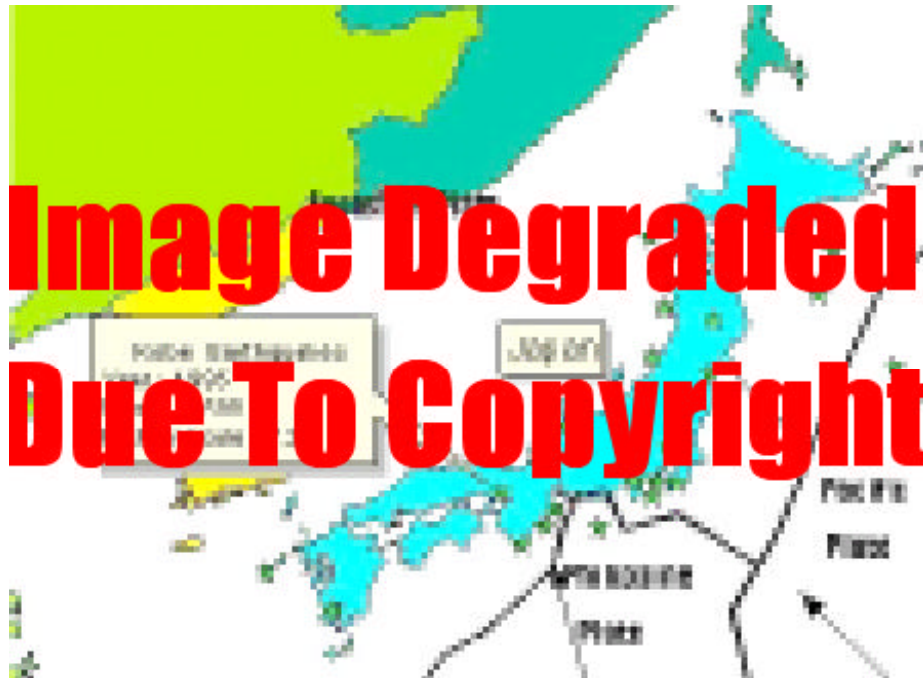
**For the detailed syllabus, go to Education and Manpower Bureau (www.emb.gov.hk) English Kindergarten, Primary and Secondary Education Curriculum Development Personal, Social and Humanities Education Curriculum & Syllabuses Geography Geography (Secondary 1-3)*

Theme	Teaching/Learning Activity
Secondary 1	
Scramble for land! – Urban land use	
Fixing our cities' problems – Urban problems	
Where are our factories moving to? – Industrial location	
Moving out or into cities – Urbanization and suburbanization	
Where to spend our holidays? – Recreation and travel	
Secondary 2	
Weather and climate – do they matter?	
Collapsing slopes!	
Too much water! – Water cycle and flooding	
Taming the spreading deserts – Deserts and desertification	
The unstable Earth – Earthquakes and volcanoes	
Farming the wrong way? – Agriculture and technology	
Too many and too few – Population problems	
Secondary 3	
Save our rainforests! – Natural vegetation	
Oceans in trouble – Marine resources	
How clean is our atmosphere? – Air pollution and acid rain	
Struggle for power resources	
Industrial miracle – Industrial development	
The rich and the poor – Development and interdependence	

Creating your own step-by-step manual

Exercise 1

The map below was worked out by a S2 student. It shows the close relationship between some major earthquakes, including the Kobe earthquake, and the plate boundaries around Japan.



You may ask your students to produce a similar map, showing Japan, other regions or the world. Work out a detailed step-by-step manual for yourself. You will find it helpful for your students:

1. Switch on your computer.
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Demonstrations and practice: Applying GIS in teaching CE curriculum

Brainstorming exercise

The list below is the main themes and issues you have to teach at the new CE level. For each, try to think about a teaching or learning activity which may make use of GIS:

**For the detailed syllabus, go to Education and Manpower Bureau (www.emb.gov.hk) English Kindergarten, Primary and Secondary Education Curriculum Development Personal, Social and Humanities Education Curriculum & Syllabuses Geography S4-5 Geography Curriculum Guide*

Theme/Issue	Teaching/Learning Activity
Climate - Climatic Types	
Climatic Anomalies - Global Warming	
Landforms and Endogenetic Processes - Plate Tectonics	
Natural Hazards - Earthquakes, Volcanoes and Tsunami	
Landforms and Exogenetic Processes - Rivers	
The Trouble of Water Floods and Droughts	
Agriculture -Farming systems	
Food and Hunger - Famines	
Industry - Industrial Location	
The Choice of Power - Energy problem	
City -Urban development	
Sustainable City - Sustainable Development	

Creating your own step-by-step manual

Exercise 2

At CE level, you may let your students try a more complicated work. Now try to prepare a map showing the close relationship between the location of active volcanoes and the plate boundaries. Work out a detailed step-by-step manual for your students:

1. Switch on your computer.

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

Demonstrations and practice: Applying GIS in teaching AL curriculum

Brainstorming exercise

The list below is the main themes you have to teach at Advanced Level. For each, try to think about a teaching or learning activity which may make use of GIS:

**For the detailed syllabus, go to Education and Manpower Bureau (www.emb.gov.hk) English Kindergarten, Primary and Secondary Education Curriculum Development Personal, Social and Humanities Education Curriculum & Syllabuses Geography Geography (Advanced Level)*

Theme	Teaching/Learning Activity
Natural Landscapes	
Climatic System	
Energy budget & flow - insolation and temperature	
Atmospheric moisture - condensation and precipitation	
Atmospheric circulation - pressure and wind	
Climatic variation - climatic types	
Landform System	
Plate tectonics -plate movement and tectonic landforms	
Drainage basin - water cycle and basin subsystems	
Biotic System	
Ecosystem - energy flow and nutrient cycles	
Soils -soil forming processes	
Vegetation - plant ecology and natural vegetation	
Biomes - vegetation response to environment	
People-environment Relationships	
Tropical rain forest - deforestation and afforestation	
Tropical desert - human adaptations and desertification	
Agricultural Landscapes	
Farming systems - agroecosystems and farming types	
Agricultural location - von Thünen and Sinclair models	
Impact of urbanization and industrialization - farming changes	
Farming hazards - flooding and droughts	

Urban and Industrial Landscapes	
Urban functions and hierarchy - functions of cities and Christaller model	
Urban structure - urban land use models	
Manufacturing location - Weber model	
Urban problems - housing and transport problems	
Environmental impact - pollution and environmental changes	

Creating your own step-by-step manual

Exercise 3

Your Advanced Level students should be capable of manipulating data with the GIS. Now try to prepare a map showing the close relationship between the location of most recent major earthquakes and the plate boundaries. Work out a detailed step-by-step manual for your students:

1. Switch on your computer.

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____
