

TWGHs Lo Kon Ting Memorial College
Mathematics
STEM Education

S1 Chapter 9
Area and Volume
Urban Design

Name: _____

Class: _____ ()

Group: _____



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 **Interesting Trivia: Fortress in city- Goryokaku**



Figure 1 Goryokaku (五稜郭 (ごりょうかく))



Figure 2 Goryokaku in Hakodate-shi (函館市)

Bastion fort (星形要塞) in city

Goryokaku was originally built to defend the northern part of the country.

It was the first fortress in Japan to feature a pentagonal design with a five-pointed star and is designated as a special historic site. It is also famous as the site of the battle of Hakodate(函館), the final battle between imperial government forces and those of the Tokugawa Shogunate (江戸幕府).



A. Cautions and Tips

Pay attention to the cautions and tips below during the process.



- Please be careful when you are using scissor or any cutting tool.
- Try and use as many geometry elements as you build each section;
- Labeling, coloring and details are extremely important. The more you have the better your city will look;
- Follow the checklist provided on the right side of the page ;
- You can design the you like, like Skyscraper;
- Use all the information, for example, length, width and height, to calculate either total surface area and volume of your building;
- Use precise wording and sentences for presentation.

Mission : Design and build a new city for your class

The section your group are going to create (*Choose one section only)

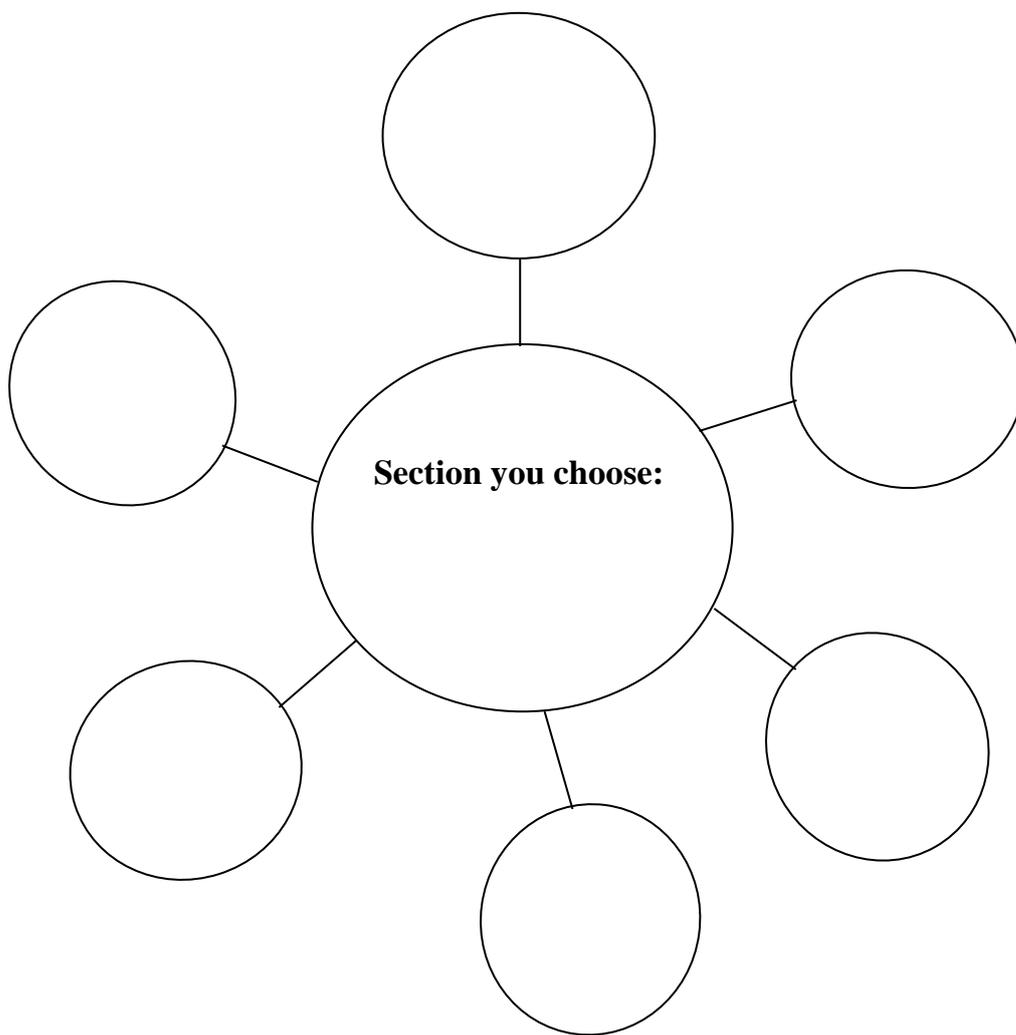
- | | | |
|------------------------------|-------------------------|--|
| 1. Downtown (市中心) | 5. Suburbs (郊區) | 8. City Hall (市政廳) |
| 2. Industrial Park | 6. Public Works | 9. Entertainment |
| 3. Business District | 7. Park District | 10. City Living |
| 4. Tourist Attraction | | (*Please circle as appropriate) |



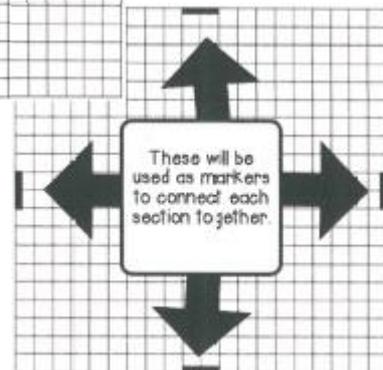
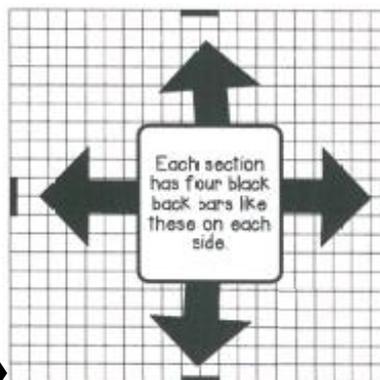
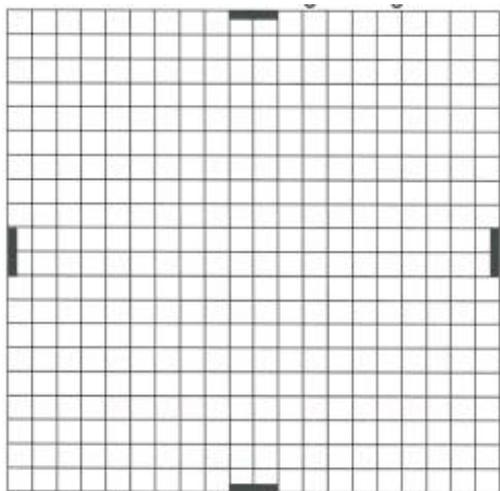


B. Brainstorm

No good idea ever came out of a brainstorm.

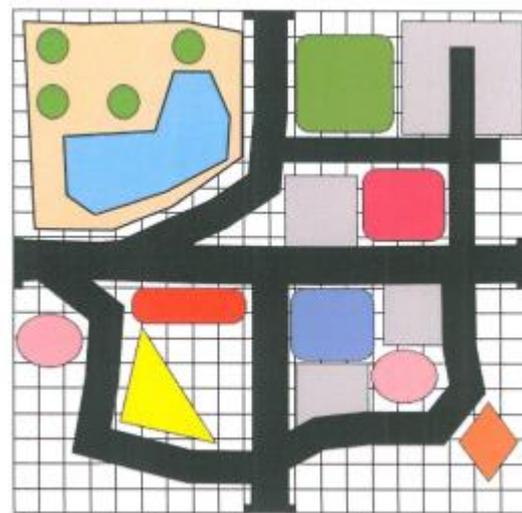
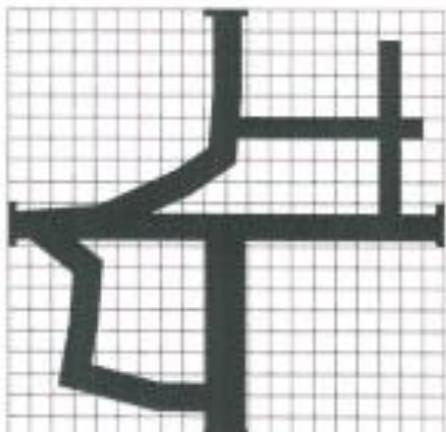


C. Instruction for your own section – Road part



At the beginning, each group will receive an empty section map as shown above.
*The map provided on page 12 – 21.

Each section has 4 black bars on each side.
*You **MUST** have roads coming in and out at each black bar per section.



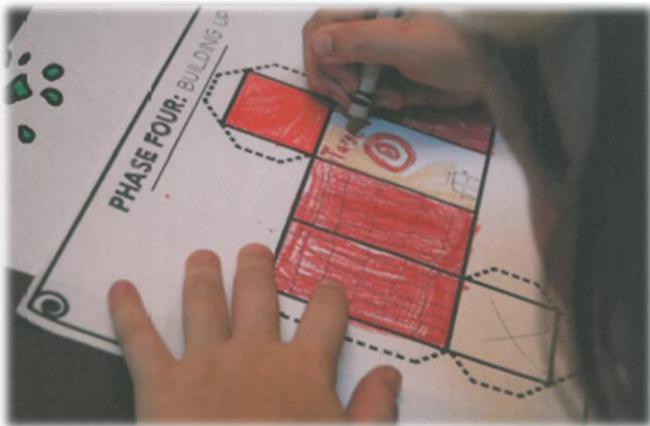
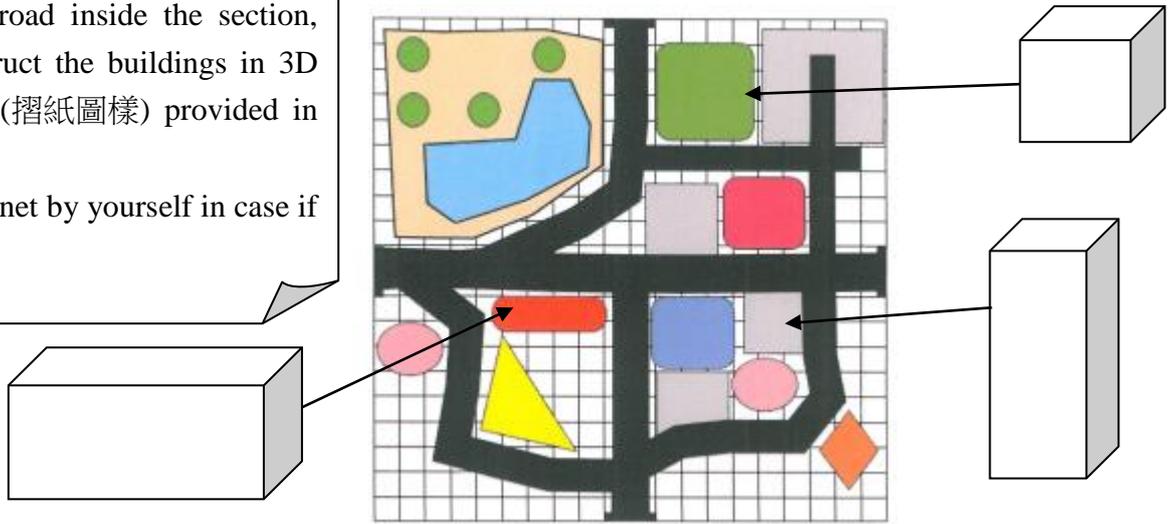
You may add more roads in each inside each section as shown above.

Then, your job is to fill this section by using the listed elements and your creativity to build your own city.
You get to make it look like above and create your class-based city. Enjoy!



D. Instruction for your own section – Building part

After created the road inside the section, you have to construct the buildings in 3D by using the nets (摺紙圖樣) provided in the Appendix.
 *You can copy the net by yourself in case if you want to do so.



Before you cut the net, draw and color it, i.e. "Bank" or "Stadium" as shown at the left.

*If you would like to give it a proper name such as "LKT Tower" or "1A Building" you are encouraged to do so.

Cut out the nets and put them together by using glue. Follow the folds very carefully and ask your neighbor for assistance.

*You might find that some buildings require more than one net. Combine the nets to create the most realistic (or outrageous) building.



The possibilities are limitless.



Name of Building 3 : _____ (Type of solid: _____)

Volume :

Building Design:

Total Surface Area:

Name of Building 4 : _____ (Type of solid: _____)

Volume :

Building Design:

Total Surface Area:



Name of Building 5 : (Type of solid:)

Volume :

Building Design:

Total Surface Area:

Name of Building 6 : (Type of solid:)

Volume :

Building Design:

Total Surface Area:



F. Discussion – Greenbelt (綠化帶) part

1. Estimate the total surface area of greenbelt inside your section.



2. Do the area of greenbelt enough for the section? Why?



Complete the peer evaluation form below.

Peer Evaluation	Target group: _____	
Good Urban Planning Criteria	Rating (Highest: 5, Lowest:1)	Explanation (The rationale for rating)
Different types of land use (commercial, industry, greenbelt, residential, institutional land use, i.e. schools, hospital etc.)		
Convenient transport		
Avoidance of land use conflict		

Appendix

