**WEEK 28 – Urban Planning**

**Grade:** Intermediate (7/8)

**Unit:** Spatial Sense

**Curriculum Expectations**  
**Math:** solve problems involving the perimeter, circumference, area, volume, and surface area of composite two-dimensional shapes and three-dimensional objects, using appropriate formula  
**Science:** evaluate the importance for individuals, society, the economy, and the environment of factors that should be considered in designing and building structures and devices to meet specific needs

**Activity  
1)** For this activity, you are planning a new development section in a city. You have the option of various building types such as detached homes, townhouses, apartments that you will need to choose between to house people. You can find the details on the specific building on the sheet below **2)** You have a space of 40 km2 to fit 4,000 people. You must also include parks and shopping centres in your planning  
**3)** You will start by determining the surface area required for the various housing types based on their measurements. You will also need to determine the surface area of the various other facilities  
**4)** You then need to make decisions about how best to fit 4,000 people into your set area. You will need to consider and make decisions on things such as what building type do you think people may prefer to live in? What type of housing is more affordable? And what balance of housing is best suited so that everyone can access housing?

**Check for Understanding**   
I understand the importance of diversity in housing developments  
I can create and determine surface area of composite shapes  
I understand the relevance of calculating surface area in the city planning

**Materials**   
Recording sheet (attached below), pencil, information sheet below or internet access, calculator

Housing Types:

-Bungalow one-storey houses are 11 m wide by 15 m deep and can house 6 people

-Two-storey house houses are 11 m wide by 13 m deep and can house 8 people

-Townhouses come in a block of and 120 units each total of 100 m wide by 120 m deep unit can hold 5 people each

Additional Housing Needs:

-These buildings require a park for every 200 units. The park is in the shape of a circle with a radius of 20m

-They also require a commercial centre (grocery stores etc.) for every 200 units. It is in the shape of a triangle 80 by 100 m

Apartment Styles:

-Low-rise apartments require 75 m by 45 m as the base. There are 3 stories with 18 units per story which can hold 4 people per unit.

-The main story has a convenience store and additional amenities, so does not require a commercial area. A park is required for every 3 units built. The park is in the shape of a circle with a radius of 20 m.

-High-rise apartments require a base of 50 m by 50 m There are 15 stories 20 units per story which can hold 4 people per unit.

-Each high-rise building will need to have a park at the base. The park is in the shape of a circle with a radius of 20 m. It also requires a commercial park in the shape of a triangle 80 by 100 m for every 2

Questions for consideration?

What is the surface area required of the bungalow? What is the population density (i.e., number of people that would live there) per km2?

What is the surface area required of the two-storey house? What is the population density (i.e., number of people that would live there) per km2?

What is the surface area required of the townhouses? What is the population density (i.e., number of people that would live there) per km2?

What is the surface area required of the low-rise apartment building? What is the population density (i.e., number of people that would live there) per km2?

What is the surface area required of the high-rise apartment building? What is the population density (i.e., number of people that would live there) per km2?

What is the surface area required of the park?

What is the surface area required of the commercial area?

What is the required population density to meet your population target in the entire new development?

What kind of housing is most environmentally friendly (i.e., uses the least amount of space, destroys the fewest natural areas)? What kind of housing usually costs the most/is the most affordable?

Keeping in mind the required population density and the need for parks and commercial areas, how would you design your new development? What combination of buildings might you use to have diversity in housing and to meet the needs of various families.