First and Last Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_

You will be designing and small area of a city from a top view (google earth). Each block on this paper is 10 feet by 10 feet, or 100 ft2. You must place your designs down in colors, and they must meet certain specific size dimensions. Every block of your town must have a color. **Your town must have a population of at least 80 workers, but more is better.** You want to balance the worker population with the available jobs. Perfection will receive a 3+. Many sizes are shown below. Your design requires similar job openings to number of workers.

|  |  |  |
| --- | --- | --- |
| Color | City Piece | Detailed Information about City Piece |
| Black or Gray (Reg. Pencil) | Roads/Parking | Any parking areas or roads in your town must be done in black/grey. **Every building needs road access.** Not every building needs a parking lot.* Roads must be 3-4 blocks wide (30 feet residential (2 cars plus parking; 40 feet = 4 lanes/highway)
 |
| Light Blue | Residences | These are the houses that people live in. The number of blocks of your houses determine not only the size of the house, but also the number of people who need jobs (workers).* Small Houses must be 7 to 9 blocks in size. (2 workers live here)
* Medium Houses must be 10 to 12 blocks in size. (3 workers)
* Large Houses must be 13 to 15 blocks in size. (4 workers)
 |
| Dark Blue | Government | These are the essential services that the city/state provides. The ones listed below are required, but you can have more than these.* Power Plant = 14 blocks (8 job openings)
* Police Station = 12 blocks (7 job openings)
* Fire Station = 11 Blocks (6 job openings)
* Water/Sewer Plant = 12 Blocks (4 job openings)

Medical Facility = 20 blocks (7 job openings) |
| Purple | Entertainment | These are the fun places people go to enjoy themselves. Some examples:* Movie Theatres are 18 blocks
* Bowling Alleys would be 12 blocks
* Job Opening Calculation is blocks divided by 2 minus 2. Again, round up on decimal. (Ex. 17 blocks ÷ 2 = 8.5 – 2 = 6.5. Round to 7)
 |
| Dark Green | Dirty Industry | This industry is large and has pollution, so people do not like to live near it. It also has a lot of people that can work there.* Factories can range from 22 to 36 blocks. To calculate job openings, divide the number of blocks of your plant by 2, and then add 7. If you end up with a decimal, round up to the next whole number.
* EXAMPLE 31 blocks ÷ 2 = 15.5 + 7 = 22.5 so round up to 23 jobs.
 |
| Light Green | High Tech Industry | This industry is a little smaller but much cleaner. People do not mind living near these industries. They build using the latest technologies.* High-Tech plants range from 14 to 24 blocks. Job Opening Calculation is blocks divided by 2 + 4. Again, round up on decimal.
* EXAMPLE 21 blocks ÷ 2 = 10.5 + 4 = 14.5 so round up to 15 jobs.
 |
| Yellow | Grass or Yards | This is the grass, trees, and other nature in your town. If your want a house to have a yard, it must be shown in yellow. Things like parks or playgrounds, are colored yellow. A playground should be 12 blocks of space. Parks will be much larger than playgrounds in general. |
| Orange | Commercial Offices | Offices are business spaces where people work. They are clean.* Small Offices are 10 to 14 blocks and have 8 job openings
* Large Offices are 15 to 20 blocks and have 12 job openings.
 |
| Red | Commercial Shops | These are stores where people shop. These can include grocery stores, clothing stores, sports apparel, and shoe stores.* Stores can be from 12 blocks to 24 blocks. The number of blocks divided by 2 is the number of jobs in that store. Round up decimals.
 |
| Brown | Commercial Services | These are things like gas stations, eating establishments, Laundrymats, and all other businesses that make money from consumers by providing a specific service. You Choose. All between 12-36 blocks. * Job Openings are number of spaces divided by 3. Round up.
 |



DESIGN CONSTRAINTS!

* **Must have a minimum of 80 workers in your town.**
* **Cannot have more than 200 jobs in your town.**
* **Cannot go outside the lines on the paper.**
* **Each team member must have a design idea drawn on graph paper.**
* **FINAL DESIGN on a single piece of paper for the 4-person team.**

All calculations must be shown on paper and stapled to the final design.

**CALCULATIONS EXPLAINED:**

Workers – Job Opportunities = A

A ÷ Job Opportunities \* 100 = Unemployment Percentage

If Unemployment percentage is greater than 10%, you need to redesign your city.

0% to 2.5% = 3+ level 2.51% to 4.5% = 3 level 4.51% to 7% = 2 level 7.01% to 10.01% = 1 level

Job Opportunities – Workers = A

A ÷ Workers \* 100 = Business Weakness Percentage

If Business Weakness percentage is greater than 10%, you need to redesign your city.

0% to 2.5% = 3+ level 2.51% to 4.5% = 3 level 4.51% to 7% = 2 level 7.01% to 10.01% = 1 level

**Did you use all 16 building types (3 types of residences, 5 required government facilities, and all 8 other types)** **with the correct colors, labels, and correct workers or job number values, including road widths and parking?**

16/16 = 3+ 15/16= 3 14/16= 2 13/16= 2 12/16 or less = 1

Road failures lead to immediate redo of assignment. HELPER TABLES BELOW.

Counting Jobs Available

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Type | Govt/Req | Entertain | Dirty Indus. | High Tech | Offices | Shops | Services | Other | How Many |
| Workers | 32 |  |  |  |  |  |  |  | JOBS??? |
| TOTALS | 32 |  |  |  |  |  |  |  |  |

Counting Workers Available

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type Housing | Small House (7-9) | Medium House (10-12) | Large House (13-15) | How Many |
| Calculate Total | \_\_\_\_\_\_ x 2 = | \_\_\_\_\_\_ x 3 = | \_\_\_\_\_\_ x 4 = | WORKERS?? |
| TOTALS |  |  |  |  |

Design Calculations

|  |  |  |  |
| --- | --- | --- | --- |
| UNEMPLOYMENT | Salary Strength | City Variance/Beauty | Max 3 types of housesMax 8 types of businesses5 types required Government facilities |
| Total Jobs – Workers = AA / Jobs \* 100 = Unemp. % | Workers – Total Jobs = BB / Worker = Salary % | Count every different type of building in your city |
| Town % = \_\_\_\_\_\_\_\_\_\_\_\_\_ | Salary % = \_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_ types buildings |

SHOW WORK



Engineering Notebook Data Analysis of City

|  |  |  |  |
| --- | --- | --- | --- |
| Residences – LIGHT BLUE  | How Many Houses | Workers Housed | Total Workers Here |
| Small Houses2 Workers | 7 Block House |  | x2 |  |
| 8 Block House |  | x2 |
| 9 Block House |  | x2 |
| Medium House3 Workers | 10 Block House |  | x3 |  |
| 11 Block House |  | x3 |
| 12 Block House |  | x3 |
| Large House4 Workers | 13 Block House |  | x4 |  |
| 14 Block House |  | x4 |
| 15 Block House |  | x4 |
| Total Number of Workers in the Town |  |

|  |  |  |
| --- | --- | --- |
| Small Roads | 3 Block Wide RoadsCity StreetsHow many different streets? | \_\_\_\_\_\_\_\_ number of streets |
| Large Roads - Avenues | 4 Block Wide RoadsAvenuesHow many different Avenues? | \_\_\_\_\_\_\_\_ number of avenues |

REQUIRED GOVERNMENT BUILDINGS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Power Plant | 14 Blocks | 8 jobs | Is this placed in your design? | 32 jobs from these buildings.REQUIRED!!Failure to use is not proficient. |
| Police Station | 12 Blocks | 7 jobs | Is this placed in your design? |
| Fire Station | 11 Blocks | 6 jobs | Is this placed in your design? |
| Water / Sewer | 12 Blocks | 4 jobs | Is this placed in your design? |
| Medical Facility | 20 Blocks | 7 jobs | Is this placed in your design? |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Zone/Work Type | Color | Business Name or Explained Type | # Blocks | # Jobs | Has Park Lot? |
| Dirt Industry | Dark Green |  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| High Tech Industry | Light Green |  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Commercial Offices | Orange |  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Entertainment Venues | Purple |  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Commercial Shops (Places you go shopping) | Red |  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Commercial Services (Businesses that provide a service to a customer like gas station, pest control, etc.) | Brown |  |  |  |  |
|  |  |  |  |
|  |  |  |  |
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