

Design Your Own City Project



Congratulations! You have been specially selected to design a city of the future! The city review board has some very special requirements for this city. Follow the requirements...but don't

forget to use your creativity!!

2659413

Your Role as a City Planner:

- Design blue prints for the city
- Stay within a planning budget
- Plan the power source for the city
- Build a Power plant while keeping environmental health in mind
- Build a 3-dimensional model of the city
- Model how your plant will power at least 3 lights in the city that can turn off and on individually
- Include all elements necessary for a thriving city to function well

Required Math Elements For Your City:

- | | |
|--|---|
| <input type="checkbox"/> 2 sets of parallel roads | <input type="checkbox"/> 5 regular polyhedron: tetrahedron, octahedron, hexahedron, icosahedron, dodecahedron |
| <input type="checkbox"/> 2 sets of perpendicular roads | <input type="checkbox"/> Driveways must be $1\frac{1}{4}$ inch wide |
| <input type="checkbox"/> Rhombus' | <input type="checkbox"/> Streets must be 6 cm wide |
| <input type="checkbox"/> Parallelograms | <input type="checkbox"/> Sidewalks must be $\frac{1}{2}$ inch wide |
| <input type="checkbox"/> Rectangles | <input type="checkbox"/> School yards must have an area of at least 80 cm square |
| <input type="checkbox"/> Squares | <input type="checkbox"/> Parks must have a perimeter of at least 36 cm |
| <input type="checkbox"/> Isosceles Triangles | <input type="checkbox"/> Homes must be on a lot of at least 50 cm square |
| <input type="checkbox"/> Right Triangles | <input type="checkbox"/> The power plant can take up no more than a perimeter of 50 cm |
| <input type="checkbox"/> Equilateral Triangles | <input type="checkbox"/> Each building must be named according to it's purpose and it's shape |
| <input type="checkbox"/> Pentagons | |
| <input type="checkbox"/> Hexagons | |
| <input type="checkbox"/> Polygons | |
| <input type="checkbox"/> Circles | |
| <input type="checkbox"/> Congruent shapes | |
| <input type="checkbox"/> Similar shapes | |
| <input type="checkbox"/> A shape and it's reflection | |
| <input type="checkbox"/> A shape and it's translation | |
| <input type="checkbox"/> A shape and it's rotation | |

JOBS



City Planners & Architects:

1. Create a **glossary** of all the geometry terms listed. Glossary must be in the form of a booklet, with a picture or image to illustrate each term.
2. **Answer:**
 - a. Which buildings are critical for our survival in the future?
 - b. Which buildings can we do without?
 - c. Are there some buildings we can do without but are worth keeping because they would enhance the quality of life?
3. Create a **list of necessary buildings** so that there is at least one per student in your class. Each student also gets to build one housing unit.
4. **Plan a rough draft layout** of each city element and building so that your layout works and makes sense. Keep the natural resources and the environment in mind when planning. Make sure all the required elements are included.
5. Write a **paragraph** explaining why your arrangement is a good one. Vote to choose the best arrangement.
6. Prepare each district land plot by **measuring** for roads and assigned buildings.
7. Figure the **perimeter** and **area** of each 2-dimensional shape used for the building.
8. Figure the **price** of each 2-dimensional shape if each square cm is worth \$26.25 each.
9. Create a **price chart** for district designers to use that clearly shows the prices of each shape.
10. Build each polyhedron using **2-dimensional shapes**
11. Complete an **attribute chart** for each polyhedron.
12. Create **net templates** for each polyhedron that can be used by other architects.
13. Keep within a budget of **\$100,000** per district. (The power plant gets one district to itself)
14. Design and build the **Power plant**, keeping in mind the energy source chosen by the class.
15. Plan a **Powergrid** to light the city capitol building and two other places of your choice. Each light must be able to turn on and off separately.
16. Build your housing and any additional buildings not built by the district designers.
17. Complete the district designers & architects assignment for your assigned buildings and location.



District Designers & Architects:

1. Use the buildings and elements assigned to you to collaboratively design your district, including building & street placement.
2. Use the shape templates to design and build each of your assigned buildings and elements.
3. Name each of your buildings according to its purpose and shape.
4. Light up one building in your district, using your knowledge of electricity & circuits.

All Students:

Research assigned power source. Prepare assignment about power source to present to class. Vote on which power source will be approved for your city.

SCHEDULING CALENDAR

WORK DATES	INSTRUCTIONS	DUE DATE
Monday, April 21	<p>As A Group</p> <ol style="list-style-type: none"> 1. Create glossary of terms. Divide terms amongst group members. 	Monday, April 21
Wednesday, April 23	<p>As A Group</p> <ol style="list-style-type: none"> 1. Discuss and list buildings required or needed for survival in the future. 2. Sort buildings into 7 categories. 3. Discuss city layout as a group. <p>Independently</p> <ol style="list-style-type: none"> 4. Begin working on city layout ideas, using grid paper. 5. Draw rough sketch of city layout. 6. Write a paragraph explaining why your layout is a good one. (<i>homework</i>) 	Thursday, April 24
Thursday, April 24	<p>As A Group</p> <ol style="list-style-type: none"> 1. Present city layout sketch & paragraph to group. 2. Vote as a group on best layout design or decide how to incorporate elements of each person's design into one final design 3. Divide districts among group members. (# of districts TBD) <p>Independently</p> <ol style="list-style-type: none"> 4. Each member now prepares the district template by measuring for road connections between each district. 5. Each member prepares a list of buildings that go on that district and staples it to template. 	Thursday, April 24
Friday, April 25	<p>As A Group</p> <ol style="list-style-type: none"> 1. Begin figuring area and perimeter of 2-d shapes. 2. Agree on area & perimeter of 2-D shapes 3. Create comprehensive price chart. 	Friday, April 25
Monday, April 28	<p>Independently</p> <ol style="list-style-type: none"> 1. Build each polyhedron using 2-dimensional shapes 2. Complete an attribute chart for each polyhedron. (<i>homework</i>) 	Monday, April 28
Tuesday, April 29	<p>Independently</p> <ol style="list-style-type: none"> 1. Create net templates for each polyhedron that can be used by other architects. 	Tuesday, April 29

Thursday, May 1	<p>Independently</p> <ol style="list-style-type: none"> 1. Build your housing and any additional buildings not built by the district designers. 2. Present your plan to district designers and architects. 3. Explain how nets work. 	TBD
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Science/Math Connection

TBD	<ol style="list-style-type: none"> 1. Keep within a budget of \$100,000 per district. (The power plant gets one district to itself) 2. Begin designing & building the Power plant, keeping in mind the energy source chosen by the class. 3. Plan a powergrid to light the city capitol building and two other places of your choice. Each light must be able to turn on and off separately. 	TBD
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