

# Cell City Project<sup>1</sup>

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Congratulations! You have just won the contract to design a new city! As head architect for your firm, you have the responsibility to write a descriptive report of the “City of Tomorrow”. In the proposal you promised to apply your knowledge of Cellular Biology in your descriptive report. In order not to lose the contract, your description must have structures that are analogous to the cell membrane, ribosomes, lysosomes enzymes, nucleus, ER, Golgi, chloroplast, mitochondria, and the 4 major organic macromolecules. In addition, you must discuss the manner in which information flows in your city that is analogous to the events in the central dogma. You must explain how your city is different then Prokaryotic and Viral City. Finally you must show evidence of comprehension of osmosis by describing how water enters the city.

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**Your descriptive report should include a description of how your city:**

- Is better than a city modeled after a prokaryotic cell and how your city is better than a city modeled after a virus.
- Has a structure that functions like the cell membrane functions in a eukaryotic cell
- Has a structure that functions like the nucleus functions in a eukaryotic cell
- Has a structure that functions like the endoplasmic reticulum of a eukaryotic cell
- Has structure that functions like the Golgi apparatus of a eukaryotic cell
- Has structures that function like the chloroplast and vacuole of plant cells
- Has a structure that functions like the mitochondria that is able to process raw material into usable energy
- Has a structure that functions like ribosomes function in eukaryotic cells
- Has structures that functions like enzymes function in a eukaryotic cell
- Has a structure that functions like the lysosome of a eukaryotic cell
- Is made up of four materials just like all cells are made up of four macromolecules: carbohydrates, lipids, proteins, and nucleic acids.
- Descriptions of how the City of Tomorrow will have an efficient flow of information similar to that found in the process of central dogma.
- Describing how water enters the city that is analogous to how water enters a cell.

### Clear Expectations for Performance:

<b>A</b>	Report demonstrates an analysis of the function of the cell membrane, nucleus, vacuole, ribosomes, enzymes, E.R., lysosome, Golgi apparatus, chloroplast, and mitochondria. Able to apply knowledge of central dogma, and osmosis. Shows evidence of understanding of differences between eukaryotic cells, prokaryotic cells, and viruses. Report is typed or neatly written. Minimal grammar and spelling errors. For extra credit a design is drawn neatly with all structures labeled, or model is creative and original.
<b>B</b>	Report demonstrates an understanding of the function of the cell membrane, nucleus, vacuole, ribosomes, enzymes, E.R., lysosome, Golgi apparatus, chloroplast, and mitochondria. Not able to apply knowledge of central dogma, and osmosis. Missing some evidence of understanding of differences between eukaryotic cells, prokaryotic cells, and viruses. Report is not typed or not so neat. Minimal grammar and spelling errors. For extra credit: design is drawn neatly with all structures labeled. Model lacks creativity.
<b>C</b>	Report missing an understanding of the function of two or more of; cell membrane, nucleus, vacuole, ribosomes, enzymes, lysosome, E.R., Golgi apparatus, chloroplast, and mitochondria.. Missing any mention of central dogma, and osmosis. Shows evidence of understanding of differences between eukaryotic cells, prokaryotic cells, and viruses. Report is messy. Many grammatical and spelling errors. For extra credit: messy design and missing model.
<b>D</b>	Report does not demonstrate any understanding of processes occurring within cell. Report is messy with lack of attention to grammar or spelling.

### **Recommended activities:**

- Comparison of prokaryotic vs. eukaryotic cells
- Analyze structural differences between viruses and cells
- Microscope investigations
- Application of genetic coding rules (central dogma)
- Photosynthesis/respiration labs
- Gather research and information from other sources on organelle function, etc.

### **Resources for you to complete that assignment:**

[California Biology Standards](#): 1a, 1c, 1d, 1e, 1f, 1g, 1i, 1j\*

Your Biology Textbook

Organelle worksheet

Venn diagram of Prokaryotic, Eukaryotic, and Viruses

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[Class PowerPoint's](#)

1. This document was modified from Los Angeles Unified School District's Instructional Guide Performance Task #1