

# Cell = City



7<sup>th</sup> Grade Science

# Think of a City

- How does it operate?
- Who protects the city?
- Who runs the city?
- How does the city manage its trash?
- How does the city get food?
- How does the city get its power?
- How do you know when you are in the city limits?



# A cell can be compared to a city!

- Each part of the cell has its own function or purpose.
- The parts of the cell can be compared to the parts of a city based on their similar purpose.



# Let's compare!

- Cell Part
  - A. Cell
  - B. Cell Membrane
  - C. Cytoplasm
  - D. Nucleus
  - E. Nuclear Membrane
  - F. Ribosomes
  - G. Endoplasmic Reticulum
  - H. Golgi Bodies
  - I. Mitochondria
  - J. Lysosomes
- City Analogy
  - A. City
  - B. City Limits
  - C. Environment
  - D. City Hall
  - E. Police Force
  - F. Factories & Workers
  - G. Highway or Roads
  - H. Post Office or UPS
  - I. Power Plant
  - J. Recycling Plant or Waste Management

## A. Cell = City

B.



### Cell Membrane

A continuous, almost invisible structure surrounding the cell.

C.



### Cytoplasm

The cell's environment, which is mostly made of water, but also contain salts, dissolved gasses, nutrients, and wastes.

D.



### Nucleus

The cell's computer, which uses DNA to regulate all activities of the cell.

The nucleolus is inside the nucleus and makes ribosomes.

E.



### Nuclear Membrane

The nucleus' protection that allows materials to pass in and out, except for DNA.

F.



### Ribosomes

Creates the product of the cell—the proteins that will become body structures.



### Endoplasmic Reticulum (E.R.)

G.

The cell's transportation system which has a large surface area due to its looping membrane. The E.R. allows a place for cell reactions and lipid production. Rough E.R. has ribosomes attached to it.



### Golgi Bodies

H.

Packs and carries proteins in little bubbles that separate and float into the cytoplasm.



### Mitochondria

I.

The cell's powerhouse which supplies the energy that the cell needs. This is the location of aerobic respiration.



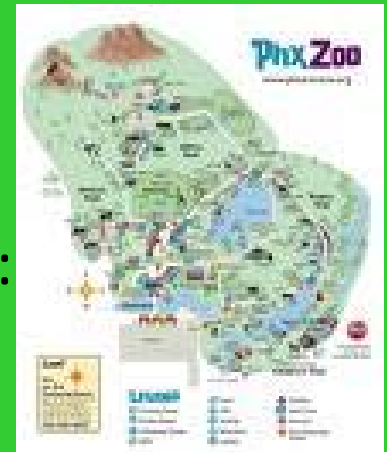
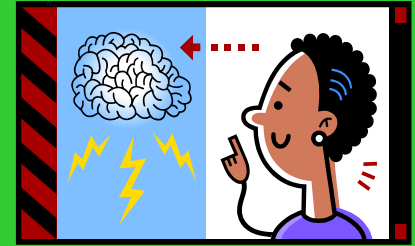
### Lysosomes

J.

The cell's recyclers which are produced by the golgi body. Lysosomes are made of a single membrane wrapped around powerful digestive enzymes. They break down worn out product to be used again.

# Create a City Cell Analogy

- You can use a city or any other place (amusement park, country, the mall). Can be a fictional place.
- Steps of the Project:
  - Step 1: Brainstorm on the cell parts and what you can draw to represent each part. Use the Parts of a Cell Page to help you.
  - Step 2: Draw a picture of your city. Label each “cell” part of the city with a letter A through J.
  - Step 3: Create a legend or map key in the corner and explain what A – J represent. Ex: D = Town Hall
  - Step 4: On a separate piece of paper, *in complete sentences*, write your analogies. This will explain why you selected each part of your city to represent the part of the cell and what function they both share.



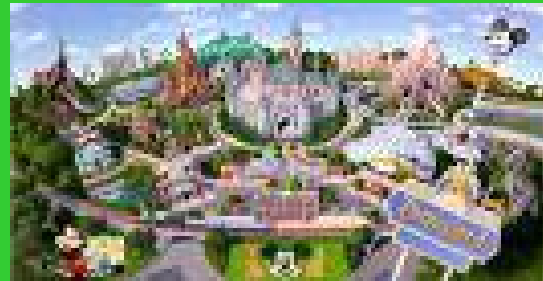
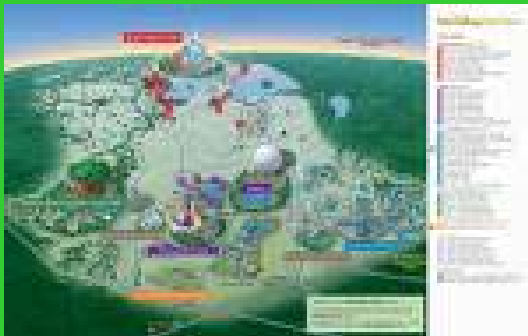
Think of the place you want to draw. Be creative. Create an analogy for each cell part. Write your ideas on a separate piece of paper

- A. Cell = City
- B. Cell Membrane = City limits
- C. Cytoplasm = Environment
- D. Nucleus = Town Hall
- E. Nuclear Membrane = Police
- F. Ribosomes = Factory
- G. Endoplasmic Reticulum = Roads
- H. Golgi Bodies = Post Office
- I. Mitochondria = Power Plant
- J. Lysosomes = Recycling Plant

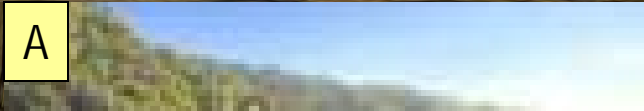


# Create your map and legend.

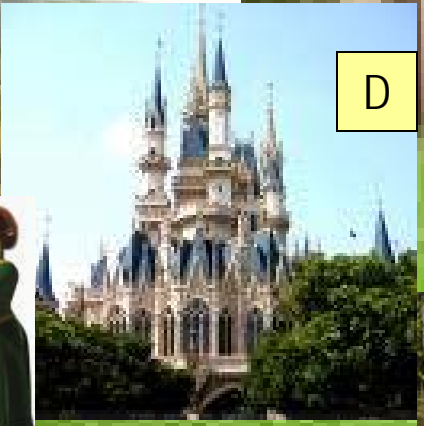
- Draw your place. Pencil first, then crayons or colored pencils. No markers.
- Label each part on your city A – J. Circle the letter.
- Create a map legend or key in the corner of your map which lists the letters A-J and identifies the name of each place.
  - Example. A= Far Far Away;  
B=city limits



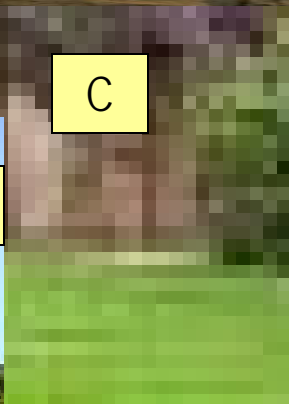




A



D



C

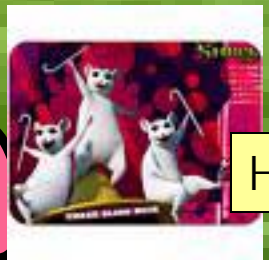


I

B



G



H



E



J



F



Legend

- A: Far Far Away
- B: Brick Wall
- C: Environment
- D: Shrek's Castle
- E: Puss-n-boots Security Service
- F: Gingerbread Man's Cookie Factory
- G: Roads
- H: 3 Blind Mice Delivery Service
- I: Dragon Power Service (DPS)
- J: Donkey Recycling

Explain why you chose the items to represent each cell part.

- List the letters A-J
  - For each letter:
    - State the name of the city place
    - The name of the cell part it corresponds to
    - Why you selected that item to represent the cell part
  - Must be in complete sentences.
    - Example: B: The town hall represents the nucleus because its function is to control the town's activities
- On notebook paper.



## Cell city Analogy

Name  
Date  
Period

- A. The city represents the cell because they are both areas with a fixed boundary.
- B. The city limits represents the cell membrane because they both surround and border.
- C. The environment represents the cytoplasm because they are both inner space.
- D. The city hall represents the nucleus because they both control activities.
- E. The police force represents the nuclear membrane because they both protect.
- F. The factory represents the ribosomes because they both make products.
- G. The roads represent the endoplasmic Reticulum because they are both transportation systems.
- H. The post office represents the golgi bodies because they both pack and carry.
- I. The power plant represents the mitochondria because they both provide power and energy.
- J. The recycling plant represents the lysosomes because they both recycle and dispose of waste.





# Final Product:

- Your analogies must be in complete sentences and stapled/glued to the back of your map.
- Your map/picture must be neat, colorful, correctly labeled, and have a legend or key.
- Use pencil first then color.
- Be creative! Have fun with it.
- Past examples included underwater cities, prehistoric cities, a skate park, amusement parks, etc...



<b>Cell Part</b>	<b>City Analogy</b>	<b>Purpose</b>
A. Cell	City	Area with fixed boundary
B. Cell Membrane	City Limits	Surrounds & border
C. Cytoplasm	Environment	Inner space
D. Nucleus	City Hall	Controls the activities
E. Nuclear Membrane	Police Force	Protects
F. Ribosomes	Factory & Workers	Makes products
G. Endoplasmic Reticulum	Roads or Highways	Transportation system
H. Golgi Bodies	Post Office or UPS	Packs & carries
I. Mitochondria	Power Plant	Provides power
J. Lysosomes	Recycling Plant or Waste Management	Recycle & waste disposal