

## Cell Analogies Book

**Objective:** You will be making a children's book to show the functions of the organelles in a cell.

1. Choose either a plant or animal cell. Below are the organelles required to be included in your children's book:

<u>Plant Cell</u>	<u>Animal Cell</u>
Nucleus	Nucleus
Cytoplasm	Cytoplasm
Mitochondria	Mitochondria
Golgi Body	Golgi Body
Endoplasmic Reticulum	Endoplasmic Reticulum
Ribosomes	Ribosomes
Cell Wall	Cell Membrane
Chloroplast	Lysosome
Vacuole	Vacuoles



2. Select an everyday object that has a similar function as each of the cell organelles required in your chosen cell.

3. Write an analogy to show the similarity between each cell organelle and the everyday object.

\*YOU MUST INCLUDE YOUR JUSTIFICATION. (Ex. The nucleus is like a brain because it controls and directs the activities of the cell in the same way the brain controls and coordinates the activities of the body.)

\*YOU MAY NOT USE ANY LIVING ORGANISMS OR THINGS THAT COME FROM LIVING ORGANISMS IN YOUR ANALOGIES (Note: you would not be able to use the nucleus example above because a brain comes from a living organism).

4. Create a visual for your analogies.

\*EACH ORGANELLE PAGE IN YOUR BOOK SHOULD HAVE AT LEAST TWO VISUALS: AN IMAGE OF THE SPECIFIC CELLULAR ORGANELLE IN QUESTION and AN IMAGE OF THE OBJECT SELECTED WITH SIMILAR FUNCTION.

*\*\*\*Remember this is a children's book so it should be **colorful** and **easy to read!!!**\*\*\**

5. Here are the specific requirements:

- A. Front Page: needs to contain a multi-colored, detailed, labeled picture of a plant or animal cell. You may draw this cell or print one out, but the labeling needs to be hand written. Please do not include an already labeled cell from the Internet. Also... be sure to include your name, the date, and your class block.
- B. Page two: List all 10 of the required organelles and their corresponding functions.
- C. Contents: Each organelle with its analogy should have its own page. (Ex. cell membrane + analogy = page 1, nucleus + analogy = page 2, cytoplasm + analogy = page 3, etc...)

<u>Grading Rubric</u>	
Criteria	Score
Correctly identified and labeled cell on the front cover (9 points-1 point for each of the organelles) (-5 for a colorless image)	
List of organelles with corresponding functions on the second page (27 points-3 points for each organelle and function)	
Analogy for each of the cell organelles (45 points-5 for each of the organelles)	
Colorful visuals on each page (9 points-1 point for each visual)	
Neatness, spelling, and creativity (10 points)	
<b>Total 100</b>	

### 3D Cell Model Project

You will be creating a 3-dimensional model to represent either a plant cell or an animal cell.

1. Choose either a plant or animal cell. Below are the organelles required to be included in your model:

<u>Plant Cell</u>	<u>Animal Cell</u>
Nucleus	Nucleus
Cytoplasm	Cytoplasm
Mitochondria	Mitochondria
Golgi Body	Golgi Body
Endoplasmic Reticulum	Endoplasmic Reticulum
Ribosomes	Ribosomes
Cell Wall	Cell Membrane
Chloroplast	Lysosome
Vacuole	Vacuoles

2. Create a 3-dimensional cell model.

\*YOU MAY USE ANY TYPE OF MATERIALS TO CREATE THIS MODEL – Styrofoam, string, cardboard, clay, beads, random everyday objects, or even edible items such as candy, cakes, etc.

3. Here are the *specific* requirements:

- If you choose to work on this project in a group... THIS PROJECT MUST BE DONE AS A GROUP – do not have one person make the model and others just put their name on it. You'll have an **individual** evaluation after projects have been turned in
  - Each of the 10 organelles listed above must be, of course, included on the model, but also positioned in a logical place (use cell pictures to help with this)
  - All organelles must be labeled by using a key – you can use colors, numbers, or some other labeling mechanism.
- D. What must be turned in:**
- ORGANELLE KEY: A key to the group-made model
  - ORGANELLE FUNCTIONS: A list of all organelles with corresponding functions
    - Example: Cell Membrane – functions to...
  - GROUP EVALUATION (not necessary if project is done individually): Each group member must fill out an evaluation form grading the effort of each member of the group including themselves

Animal Cell Model Example



Plant Cell Model Example



## GRADING RUBRICS

<b><u>Animal Cell Model Grading Rubric</u></b>		
<b>Criteria</b>	<b>Points Possible</b>	<b>Score</b>
Cell Membrane correctly shaped and positioned on model	5	
Nucleus correctly shaped and positioned on model	5	
Cytoplasm correctly shaped and positioned on model	5	
Mitochondria correctly shaped and positioned on model	5	
Golgi Body correctly shaped and positioned on model	5	
ER correctly shaped and positioned on model	5	
Ribosomes correctly shaped and positioned on model	5	
Lysosome correctly shaped and positioned on model	5	
Vacuoles correctly shaped and positioned on model	5	
Organelle Key 10 points	10	
Organelle Functions (2 pts per correct organelle function)	18	
Group Evaluation	10	
Neatness, spelling, and creativity	17	
<b>Total</b>	<b>100</b>	

<b><u>Plant Cell Model Grading Rubric</u></b>		
<b>Criteria</b>	<b>Points Possible</b>	<b>Score</b>
Cell Wall correctly shaped and positioned on model	5	
Nucleus correctly shaped and positioned on model	5	
Cytoplasm correctly shaped and positioned on model	5	
Mitochondria correctly shaped and positioned on model	5	
Golgi Body correctly shaped and positioned on model	5	
ER correctly shaped and positioned on model	5	
Ribosomes correctly shaped and positioned on model	5	
Chloroplast correctly shaped and positioned on model	5	
Vacuole correctly shaped and positioned on model	5	
Organelle Key 10 points	10	
Organelle Functions (2 pts per correct organelle function)	18	
Group Evaluation	10	
Neatness, spelling, and creativity	17	
<b>Total</b>	<b>100</b>	

## The Organelle Rap

### **You've just been offered the chance of a lifetime...**

You and your friends formed a rap group 2 years ago and have been performing at various locations for the last year and a half. You have finally been recognized by the producer, Mr. D.N.A., of the Cell Factory Records, Inc. This is a huge break for you and you really want this job - this could put money in your pocket, world wide fame and thousands of adoring fans. All the details and paper work are complete and the deal is almost finalized except for one thing - the Cell Factory Records, Inc. likes to have at least one song on every album that deals with cells - a kind of gimmick to promote the Cell Factory name. Mr. D.N.A. has asked you to compose a rap about the cell and its organelles for your first CD.

Although you are allowed to compose the song anyway you like, Mr. D.N.A. has given you the following guidelines which you **MUST** follow in order to close the deal. Follow these guidelines carefully - your reputation and future as a performer depends on it.

### **Guidelines:**

- 1) You must have a name for your rap group in order to sell CDs and promote your music.** Think of a name and try to use the name of your rap group in your song at some point.
- 2) The song must mention 9 organelles and the function of each organelle.** A list of the options for organelles is provided below-make SURE that you have the proper function of each organelle; points will be deducted for incorrect organelle function.
- 3) The song MUST be at least 10 lines.**
- 4) The song MUST be appropriate-Cell Factory Records does not allow their artists to have parental advisory CDs, therefore your rap must be appropriate for ALL children under 17.**
- 5) Lyrics MUST be clean and accurate-they are going to be printed on the CD cover and they must be legible.**
- 6) In addition to writing your song, you must also design the cover for your CD. Mr. D.N.A. believes it adds a personal touch to the CD. Design the front and back CD cover.** The front should have the name of your rap group, the members of the group, and some colorful image. The back should include the name of your rap song and the lyrics to your rap song. Be creative!

**NOTE: I have Googled and looked up every cell/organelle song out there, if you find one and attempt to pass it off as your own I will know. If you still attempt to try it you group will received a zero for this project.**

<u>Organelles</u>	
<u>Plant Cell</u>	<u>Animal Cell</u>
Nucleus	Nucleus
Cytoplasm	Cytoplasm
Mitochondria	Mitochondria
Golgi Body	Golgi Body
Endoplasmic Reticulum	Endoplasmic Reticulum
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<b>Cell Rap Grading Rubric</b>		
<b>Criteria</b>	<b>Points Possible</b>	<b>Score</b>
9 organelles mentioned in the Organelle Rap (2 pts per organelle)	18	
Correct function expressed for each organelle in Organelle Rap (5 pts per included organelle function)	45	
Creativity and Rhyme in the Organelle Rap lyrics	10	
Front cover with name, members, and image	10	
Back cover with name of rap song and lyrics	10	
Neatness, spelling, and creativity	7	
<b>Total</b>	<b>100</b>	

**\*\*\*\*\*EXTRA CREDIT\*\*\*\*\***

**Mr. D.N.A. has offered you a signing bonus. If you perform your rap LIVE at the opening of the CD (hint: one day in class), you will receive an extra \$50,000 (10 points extra credit). The whole group does not have to perform the rap but ONLY the members that perform will receive the bonus. A member who just stands at the front of the room while the others rap do NOT get the extra credit!**

## Visiting the Cell – Travel Brochure

**You will be designing a Travel Brochure that describes a plant or animal cell as if it were a real life attraction.**



\*Think of attractions like: amusement parks, ball parks, zoos, farms, malls, etc., there are certainly more possibilities than this.

**The Task:** Accurately describe/paste/draw/explain the 9 organelles (attractions) in the table below and justify how they have represented their functions.

<u>Plant Cell</u>	<u>Animal Cell</u>
Nucleus	Nucleus
Cytoplasm	Cytoplasm
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### **The Requirements:**

1. Front cover includes student name, date, block, as well as the attraction that is being used (i.e. amusement park, mall, etc.)
2. Brochure includes the 9 specified organelles and their corresponding functions
3. An organelle picture and a 'real-world' attraction picture should be included for each organelle.

<b>Example:</b>		
	<p>The Golgi Bodies package and distribute proteins. Be sure to visit the Golgi center inside the gift shop, and have your purchases gift wrapped for you before you leave.</p>	

4. Must be in a brochure-like format. Please do not turn in random pages stapled together - Be creative!
5. Make sure you have a good justification as to why you have represented your organelles in the manner you have in your brochure

**Cell Travel Brochure Grading Rubric**

<b>Criteria</b>	<b>Points Possible</b>	<b>Score</b>
Includes the 9 required organelles with picture representation (2 pts each)	18	
Function for each organelle (5 pts each organelle)	45	
Justified 'real-world' attraction entry with picture for each organelle (3 pts each)	27	
Neatness, spelling, and creativity	10	
<b>Total</b>	<b>100</b>	

## Cell Song Video Project

**You will be filming a video of you and your group members performing one of three provided cell songs.**

**1. Choose one of the three songs below (see song lyrics to these songs on the next few pages)**

- A. Two main types of Cells – Song
- B. Cell Theory – Rap
- C. The Cell Song – Song

**2. Brainstorm for your video**

\*Decide WHERE your video will be filmed, WHEN you will get together with your group to film the video, WHICH group member will perform each part of the chosen song, and WHAT music the lyrics will be performed to

**3. Memorize the lyrics!**

\*You cannot be reading the lyrics during the video – If you want to make large note cards that the camera and viewers will not see that is fine, but you cannot film yourself reading the song on off a piece of paper.

**4. Here are the specific requirements:**

- A. All group members must be in the video at some point. (If a group member is not seen in the video at some point they will not be getting ANY credit for participating. Yes, even if you are the cameraman!)
- B. Whenever a cell organelle is mentioned in the song/rap the group must illustrate that organelle in some way (this can be done with a hand drawn picture or any organelle representation that creatively shows the organelle structure). I WILL COUNT THESE...
- C. There must be some type of background music – It can be a real song or you can make up your own beat, either way, please do not turn in a video of you and your group members talking the lyrics. The group will NOT receive credit if that is done!
- D. The lyrics of the song/rap must be understandable (if you would like to edit your video and put the words as subtitles on the bottom of the screen that always helps, but is NOT required)
- E. The video must be at least 1 minute long. It is expected for them to be much longer, but your requirement is more then 1minute.
- F. **BE CREATIVE!** Google or YouTube some examples for ideas, they are out there!

\*You can create a storyline to the video, you can dress up, create a backdrop that goes along with the song, etc. It doesn't matter what you do to make it creative just understand that creativity is part of your grade therefore simply performing the lyrics to some type of music will not earn an A grade.

<b>Grading Rubric</b>		
<b>Criteria</b>	<b>Points Possible</b>	<b>Score</b>
Picture, drawing, or representation for EACH organelle mentioned (3 pts each)	27	
Background music/beat	10	
Video is over 1 minute long	10	
Lyrics are understandable	20	
A creative touch is added	33	
<b>Total</b>	<b>100</b>	

**\*\*\*\*\*EXTRA CREDIT\*\*\*\*\***

All of your group members have the option of receiving 5 extra credit points if you offer to show your music video during class time.



## CELL THEORY - RAP

Listen close to the story I tell.  
It's the rapping story of the living cell.  
It's a happy tune that's sort of cheery.  
About a real tough topic called the cell theory.

All animals, plants, and protists too,  
Are made of cells with different jobs to do.  
They're the basic units of all organisms,  
And I hope by now you got the rhythm.

It all started with one dude named Hooke.  
Who at some cork cells took a look.  
He used a scope and took his time.  
'Cause a cell is small and thinner than a dime.

Say 1, 2, 3, 4,  
Are you ready to learn some more?  
The animal cell has many parts,  
And you must know each one by heart.

Like the farmer man in the dell.  
The nucleus controls the cell.  
its gives the orders -- kind of like a brain.  
And it's protected by a nuclear membrane.

Around the cell, you'll find another "skin,"  
The cellular membrane holds the whole cell in  
But its job isn't simple there's no doubt,  
It lets some particles go in and out.

Now please don't lose your science enthusiasm,  
Listen to the story of the cytoplasm.  
All around the cell this thick fluid does go,  
But in the nucleus it will not flow.

And don't forget those ribosomes -  
This is where proteins come from.  
These protein factories are so small, you'll agree,  
You need an electron microscope to see.

Just when you thought you weren't having any  
fun,  
Along comes the endoplasmic reticulum.  
These tubelike structures serve as a track,  
To carry stuff to the membrane and back.

Now have you ever seen any doughnuts without  
holes?  
In a cell, they're called vacuoles.  
They're filled with stuff like H<sub>2</sub>O  
And they carry food so the cell can grow.

Las of all, but not the very least,  
Mitochondria - mighty cellular beasts,  
Since they turn sugars into energy so well,  
We call them the powerhouse of the cell.

Now my friend, you know it well,  
The unforgettable story of the living cell.

## YOU CAN TELL IT'S A CELL - SONG

You can tell it's a cell by the way it looks  
When it's under a microscope or in a book  
It may be an animal or a plant it's true  
But I know it's a cell, cause I see all the clues

Chorus:

You can tell  
You can tell it's a cell  
Yeah, you can tell  
You can tell it's a cell

Now you and I've got a brain, it helps us do what we do  
It helps with walkin' and talkin' and eatin' our food  
And cells need one too, to keep 'em stayin' alive  
It's called a NUCLEUS and floats around inside

Chorus

Well CYTOPLASM is that jelly-like goo  
That oozes round inside a cell, yeah, it's in you too!  
But if there wasn't something there called the  
CELL MEMBRANE  
There'd be cytoplasm everywhere, we'd really complain!

Chorus

Now plant cells are unique, they're really something to see  
Yeah they've got a CELL WALL to make 'em stronger, you see  
They've got CHLOROPHYLL and CHLOROPLASTS on their list  
And they make their own food by PHOTOSYNTHESIS

Chorus

Now cells are really small, yeah, they're hard to see  
But look on down through a microscope there they'll be  
And you and I are made of cells and so are birds and bees  
Just like apples and bananas and the leaves on the trees

Chorus

## THE CELL SONG

Chorus:

Cells of the animal, cells of the plant  
Cells are basic units of all that I am  
Cells help the plant to bloom and grow  
Cells are in every organism I know!

The nucleus is the brain  
The center of the cell could be its name  
Chromatin, in long strands  
With dna and chromosome bands

Chorus

Two types of cells we all know  
We're eukaryotic and the other one's pro  
Animals and plants are with our eu  
Prokaryotic's scum and bacteria, too

Chorus

Cytoplasm is like egg whites  
It's very fluid and jelly —like  
Parts in the cytoplasm — organelles  
Are like baby organs inside of a cell

Chorus

The endoplasmic reticulum  
Pronouncing it is lots of fun

It winds from the nucleus — out in the cell  
Moving materials extremely well

Chorus

The ribosomes — look like dots  
Looking like the er's covered in spots  
"Ribes" make proteins, it's what they do  
Proteins are the building blocks for me and you

Chorus

Mitochondria's the powerhouse  
It breaks down food to get energy out  
Or lysosomes — that break down waste  
Without them — what a problem we'd face

Chorus

Golgi bodies are like garbage men  
Removing waste is part of their plan  
They lead from the cytoplasm — out of the cell  
Moving waste and proteins out of the gel

Chorus

We certainly can't forget the vacuole  
Stores food and waste like a storage hole  
In plants and animals both, you'll find  
And that's the end of our cell rhyme!!!!

Chorus