

Cellular Biology Unit

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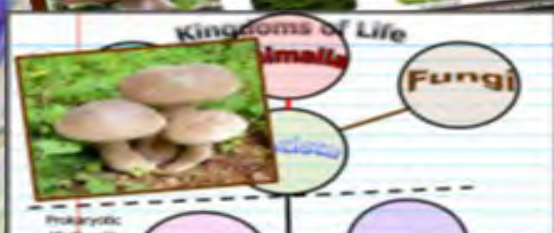
- **Organism:** An organism is any individual entity that embodies the properties of life.
- Organisms are classified by taxonomy into groups such as multicellular animals, plants, and fungi, or unicellular microorganisms such as protists, bacteria, and archaea.



- **Form Follows Function:** Means that the form, a body part or structure is related to its function.
- The form or shape of a structure within an organism is correlated to the purpose or function of that structure.



They... **Support** **Manufacture** **Breakdown** **Communicate** **Materials** **and Transport** **within the cell.**



- Answer: Because lipids are nonpolar. They don't mix with water.
- The membrane becomes a water proof barrier between two liquid areas.



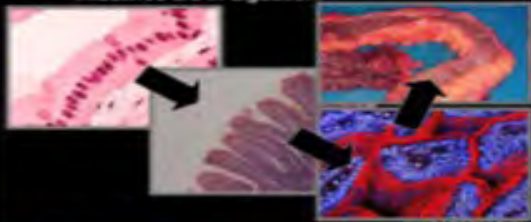
Spontaneous Origin: The belief that living organisms are produced / generated from non-living sources.



Prokaryotic cells have a nucleus, and are much larger and have more organelles. (More complex)

Form Follows Function

- Different cells include...
- Absorbing Cells such as those in your intestines aid in digestion.



- DNA makes RNA, RNA has information to make proteins.



30 Lessons

Truly Interactive Slides

- Schleiden and Schwann improved the theory.

They observed both plants and animals are made of cells.

- The 3 big principles of the cell theory.
 - All living organisms are composed of one or more cells.
 - The cell is the most basic unit of life.
 - All cells arise from pre-existing cells.

- Use the terms from class to describe A and B.
 - It has to do with how many cells it has.

11

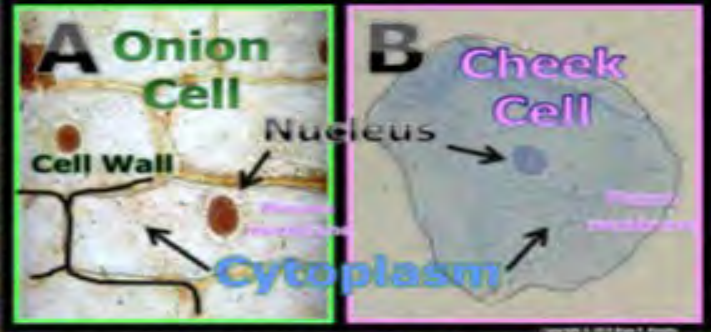


- Venn Diagram

Animal Plant



- Which is a cheek cell, and which is an onion cell? What is the difference?



Chromatin

Chromosomes

- Activity! Bouncy Ball Egg.

- Weigh raw egg.
- Place in a container with vinegar (acid)
- Cover, and let it stand for a few days.
- Make daily observations.



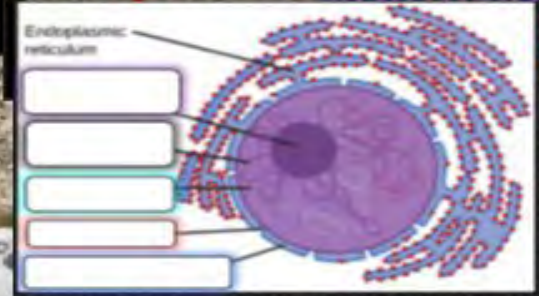
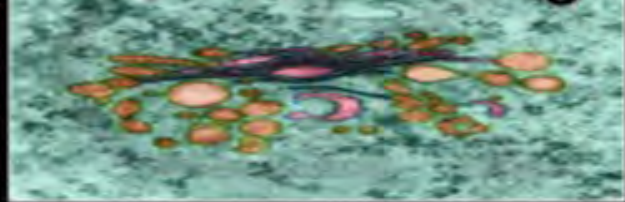
- Which one is facilitated diffusion?



This organelle packages and transports proteins and other macromolecules?

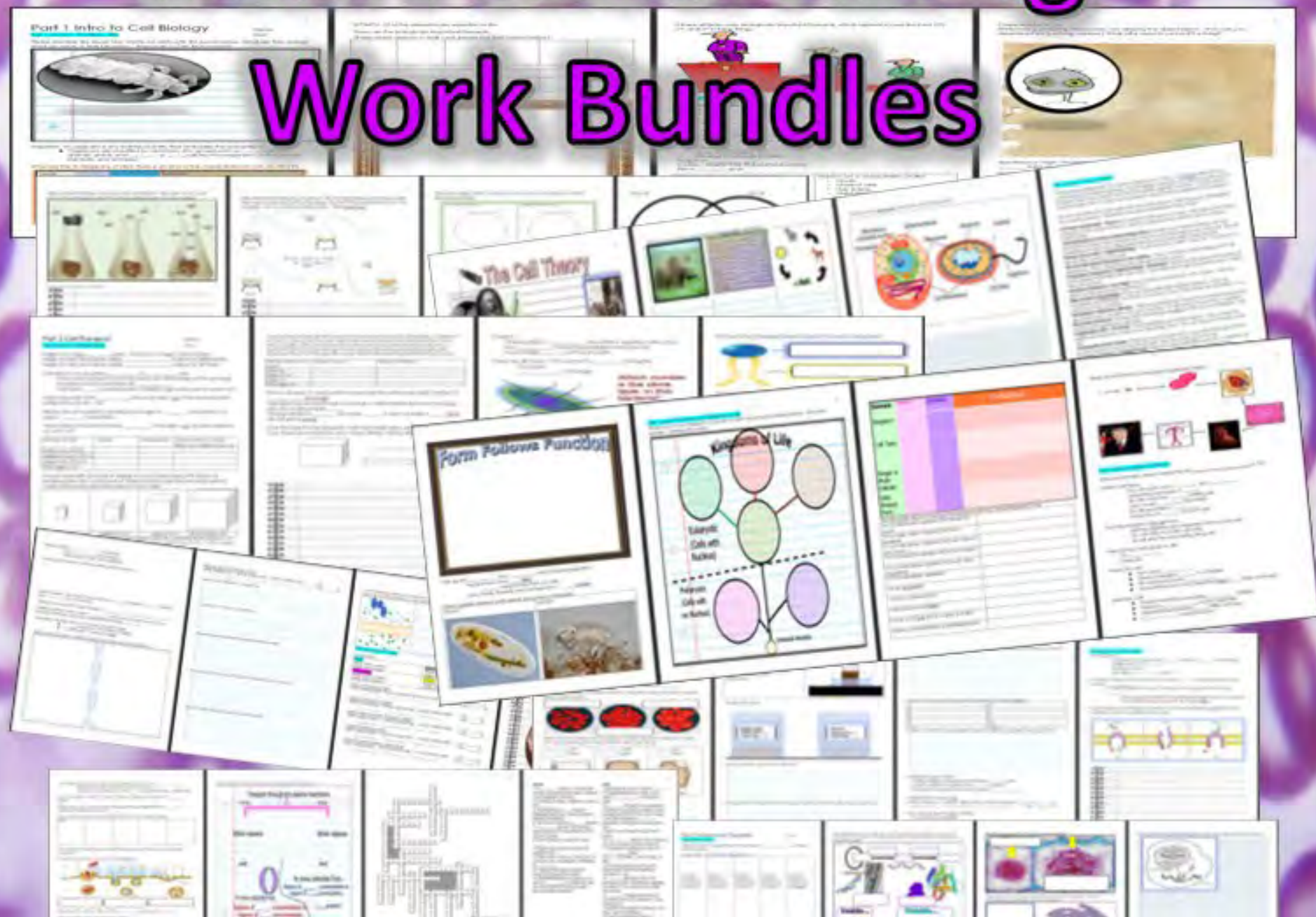
Golgi Apparatus

9



With Follow Along

Work Bundles



SlideSpark Science



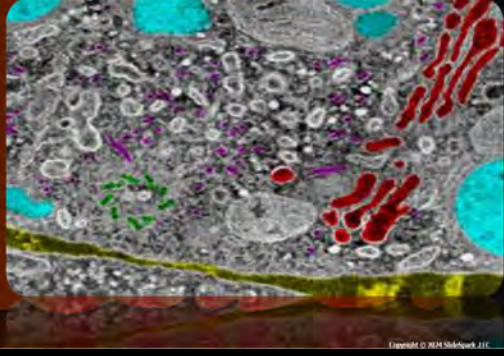
MIDDLE-LEVEL EDUCATIONAL RESOURCES

Interactive slideshows provide the roadmap for an amazing learning experience for students in grades 5-9. A Detailed set of work bundles chronologically follow the digital learning, providing a clear and intuitive roadmap to understanding. As the teacher or student advances through a slideshow, exciting hands-on activities, fantastic visuals, fill-in notes, review opportunities, video links, assessments, and much more are strategically placed throughout. Interactive learning unfolds step by step and supported by the work bundle to reach all types of learners. Everything you need to run to an amazing learning experience is provided in this one-of-a-kind science curriculum.

Each unit in the curriculum is designed to help teachers deliver the best possible learning experience for their students. Our interactive science slideshows are filled with questions and answers, important fill-in notes, hands-on activities, projects, games, built-in quizzes, and end of the unit assessment pieces. Students follow along with a work bundle that documents the entire learning experience for a fantastic review and assessment piece.



- Cellular Organelles: A membrane-bound compartment or structure in a cell that performs a special function.



Part 3 Nucleus and Organelles

Cellular Organelles: A membrane-bound compartment or structure in a cell that performs a special function.

The diagram below shows Cellular Organelles. Fill in the blanks.

Diagram / Organism / Process where it happens	Diagram / Organism / Process where it happens	Diagram / Organism / Process where it happens	Diagram / Organism / Process where it happens	Diagram / Organism / Process where it happens

The Nucleus: _____ organelle in the cell (pink spot).

Contains: _____ Information (DNA).

Reproduction to: _____ Reproduction to: _____

Chromosomes / Chromatin

Composed of: _____

Thickens to: _____

for: _____

Human: _____ (22 pairs)

Nucleolus: _____

Inside: _____

Only visible when cell is not _____

Contains: _____ for protein manufacturing.

Made: _____ and three out of nucleus.

Part 3: Nucleus and Organelles

Nuclear Membrane

Surrounds Nucleus

Composed of: _____

Nucleolus: _____

Contains: _____

for: _____

Human: _____

Nucleolus: _____

Inside: _____

Only visible when cell is not _____

Contains: _____ for protein manufacturing.

Made: _____ and three out of nucleus.

Part 3: Nucleus and Organelles

Nuclear Membrane

Surrounds Nucleus

Composed of: _____

Nucleolus: _____

Contains: _____

for: _____

Human: _____

Nucleolus: _____

Inside: _____

Only visible when cell is not _____

Contains: _____ for protein manufacturing.

Made: _____ and three out of nucleus.

Part 3: Nucleus and Organelles

Nuclear Membrane

Surrounds Nucleus

Composed of: _____

Nucleolus: _____

Contains: _____

for: _____

Human: _____

Nucleolus: _____

Inside: _____

Only visible when cell is not _____

Contains: _____ for protein manufacturing.

Made: _____ and three out of nucleus.

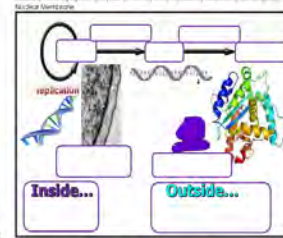
Part 3: Nucleus and Organelles

Nuclear Membrane

Surrounds Nucleus

Composed of: _____

Please fill in the spaces with the correct term as described in the notes. Word Bank: the Nucleus, the Cytoplasm, the DNA, Protein, RNA, Nucleolus, Chromosome, Chromatin, Nuclear Membrane.

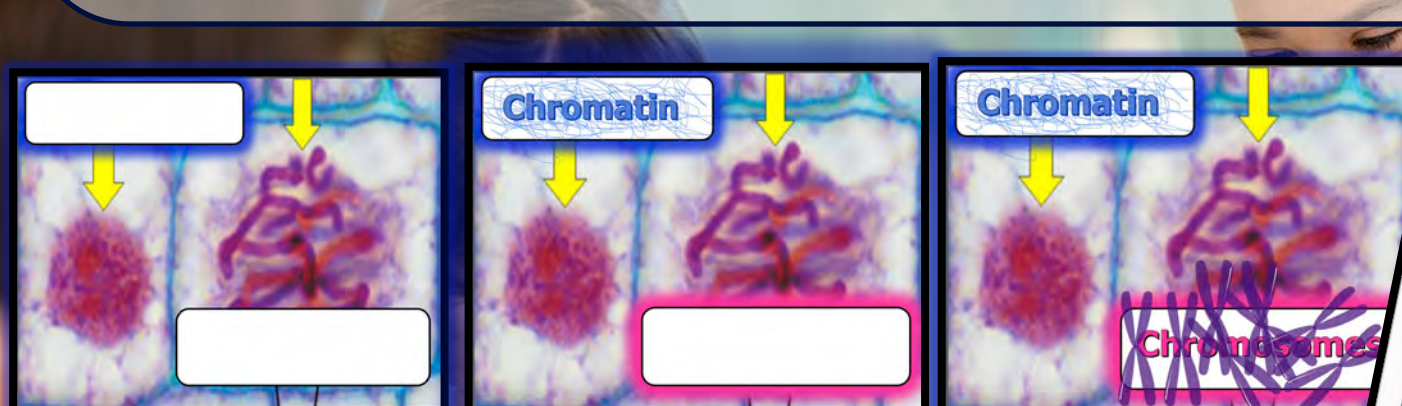


Please label the below: Word Bank: Cell, Nucleus, Chromosome, DNA



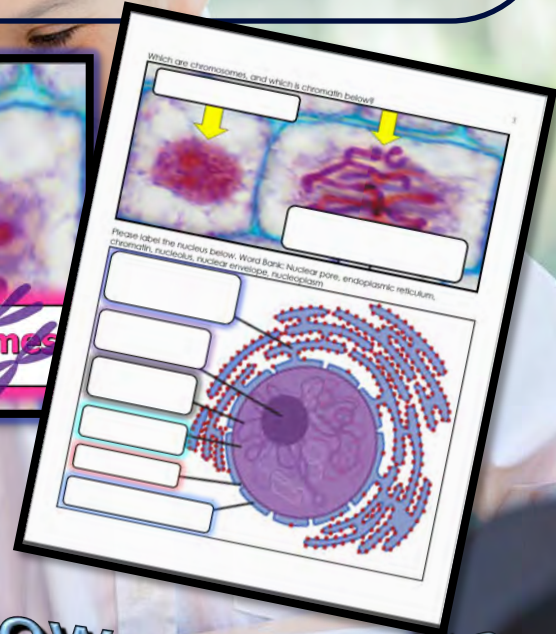
Red Slide Notes: Help students record important information in a fun and easy-to-understand way. Designed red-colored slides contain a few pieces of crucial information that students must record into their work bundle to complete the notes. Students will use these important notes throughout the work bundle.

The set-up of the slideshows are designed to make learning fun and interactive for students. With a mix of questions and answers, teachers can use these slides to get their students thinking and actively participating in their education. Plus, the answers are always revealed on the next slide, providing students with immediate feedback and helping teachers assess their understanding.



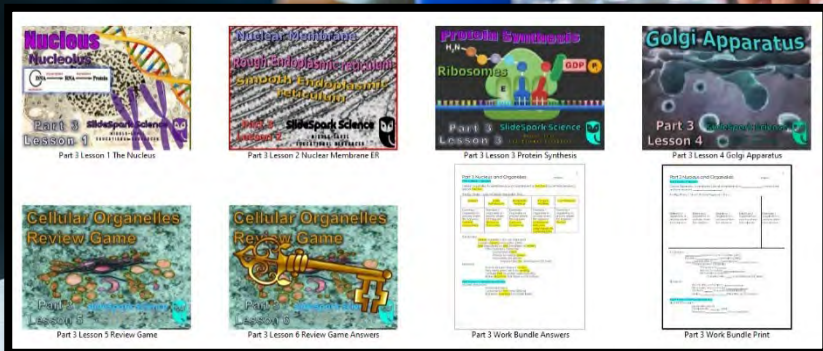
Next Slide

slideshow supports
Work Bundle



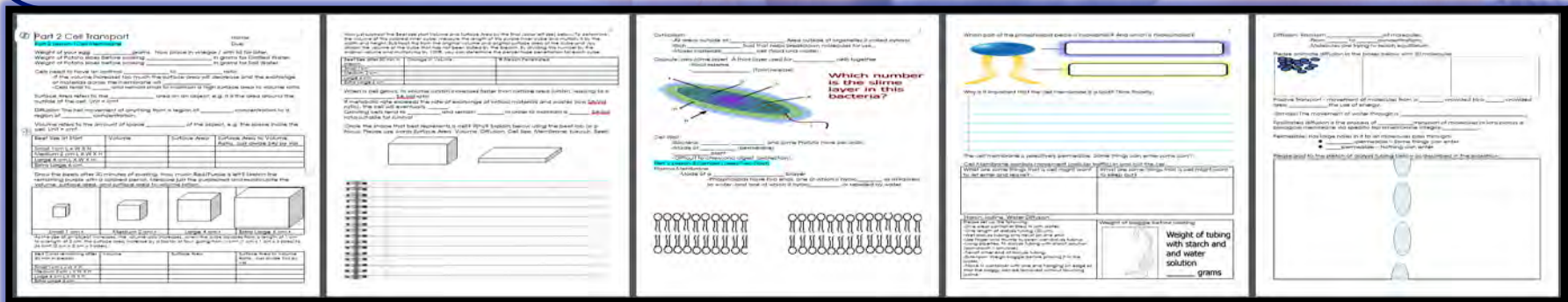
Lesson Planning

Daily lessons space exciting hands-on activities, red slide notes, video and academic links, projects, simulations, readings, built-in quizzes, and review opportunities throughout the slideshows. A typical day may have many different learning styles being targeted. Daily lesson planning becomes advancing through the slideshow roadmap the night before. Each lesson is roughly 50 minutes, but sometimes things can speed up or slow down. The best strategy is just to go at your classes own pace. The work bundle chronologically follows the interactive slideshow and you can always spend extra time assessing the quality of the writing within. If you don't quite finish a lesson, you can always pick it up the next day where you left off. The only real trick in timing is not starting a larger activity if you don't have the available time to complete. The slideshows have been designed to be a low stress, go at your classes own pace experience. Most activities are designed to be cost effective, using general materials that can be gathered from your local stores.



4 Follow Along Work Bundles

Each science unit comes with several work bundles. The bundles should be printed before the unit begins and distributed to the students on the first day of the unit. The work bundles will be due shortly after the completion of the unit. The work bundle will become a resource for the review games, crossword puzzles, and will be collected for assessment. The work bundle follows the entire learning experience and will be used every day. They are chronological to the lessons and provide places to record fill-in notes, answer questions, collect data, graph and much more. An answer version is provided that can that be distributed to your support professionals. A digital version of the work bundle and some writable .pdf versions are provided if you want to go paperless. These work bundles are perfect for students looking for an easy and organized way to track their progress and stay on top of their studies.



4 Review Games / Assessments

This unit concludes with a review quiz. Answers are provided in slideshow form so students can self assess. A blank template sheet is provided in the work bundle. Students can benefit from working together in small table groups with quiet communication. You can decide if you want to allow the use of work bundles or not. These are a nice review opportunity and get the students looking through their work bundles for the answers.

Cellular Organelles Review Game

Part 3
Lesson 5

SlideSpark Science
MIDDLE-LEVEL
EDUCATIONAL RESOURCES



Part 4 Review Game

Part 4
Lesson 10

SlideSpark Science
MIDDLE-LEVEL
EDUCATIONAL RESOURCES



Part 3 Review Game
1-10 = 10 pts
Generally write out in correct spelling + 1 pt
Final Question = 3 pt bonus

Name: _____ Score: _____ / 100

1) NUCLEUS	2) RIBOSOME	3) MITOCHONDRION	4) GOLGI BODY	5) LYSOSOME
1)	2)	3)	4)	5)

Part 3 Review Game
1-10 = 10 pts
Generally write out in correct spelling + 1 pt
Final Question = 3 pt bonus

Name: _____ Score: _____ / 100

1) NUCLEUS	2) RIBOSOME	3) MITOCHONDRION	4) GOLGI BODY	5) LYSOSOME
1)	2)	3)	4)	5)

Part 4 Review Game
1-10 = 10 pts
Generally write out in correct spelling + 1 pt
Final Question = 3 pt bonus

Name: _____ Score: _____ / 100

1) CYTOSKELETON	2) FLAGELLUM	3) PHOTOSYNTHESIS	4) CELLULOSE	5) CELL WALL
1)	2)	3)	4)	5)

Part 4 Review Game
1-10 = 10 pts
Generally write out in correct spelling + 1 pt
Final Question = 3 pt bonus

Name: _____ Score: _____ / 100

1) CYTOSKELETON	2) FLAGELLUM	3) PHOTOSYNTHESIS	4) CELLULOSE	5) CELL WALL
1)	2)	3)	4)	5)

Intro to Cell Biology Review Game

• Life comes from pre-existing life. Except...
• Abiogenesis: The first life came from non-living materials.

Abiogenesis

• This experiment was created in 1668 by Francesco Redi that helped disprove spontaneous origin.

Flies spontaneously came from meat. flask, left one open to air, laying eggs on meat. then 1 the container from life.

Francesco Redi

and the answer is...

• The 1860's showed that micro-organisms are even carried in the air.

Both flasks boiled to sterilize
• Open to air (broth spoils).
Micro-organisms trapped in swan and broth does not spoil.

CARBON

C

• Which one is older (evolved)? Can you provide a reference of time?

– A.) Prokaryotic (appeared about 3.8 billion years ago.)
– B.) Eukaryotic (Appeared approx. 2.2 billion years ago.)

Older Prokaryotic
Younger Eukaryotic

• Name A, B, and C?

Plasma Membrane (CELL MEMBRANE)
No Cell Wall (Animal)

A Nucleus
B Cytoplasm
C

Final Wager Question

20 Questions Followed by Answer

• [] experiments (1860's) showed that micro-organisms are even carried in the air.

- Both flasks boiled to sterilize
- Open to air (broth spoils).



and the answer is...

Micro-organisms trapped in swan and broth does not spoil.

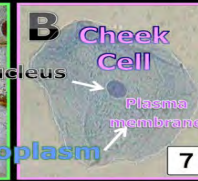
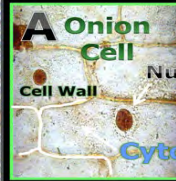


• Living things need...

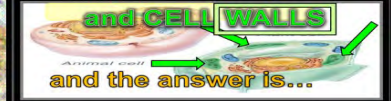
- Energy** Supplied by the sun (most of the time) and stored in food.
- Oxygen** To burn the food in cells. (Respiration)
- To keep things moving in and out of cells. (Universal Solvent)
- For proper chemical balance.



• Which is a cheek cell, and which is an onion cell?



- Plant and animal cells both have all of the following except...
- A.) Nucleus to hold DNA
 - B.) Cytoplasm as fluid.
 - C.) Cell Membrane to keep materials in.
 - D.) Chloroplast to make sugar from light.



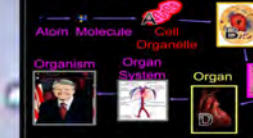
• Life comes from life. Name these two sex cells?



• Use the terms from class to describe A. It has to do with how many cells it has.



• Name, A, B, C, and D?



• Humans have some...

- 17,000 Cells
- 1 Million total cells
- 100-300 Trillion cells
- 100-300 Trillion cells
- 100-300 Trillion cells
- We are not made of tr



and the answer is

cells are the **structural** and **functional** units of living organisms.



- **Robert Hooke**
- Named first cells.
 - Advanced early microscopes and work.



- **Rudolf Virchow (1900)** came up with an early cell theory.
- All cells come from pre-existing cells.

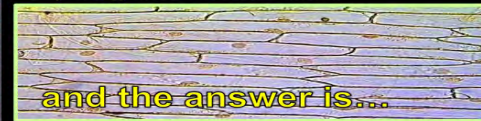


• Name A and B that helped create the modern cell theory.



• All of the following are part of the modern cell theory except?

- A.) -Living things are made of cells.
- B.) -All cells come from pre-existing cells.
- C.) -Cells contain genetic information.
- D.) -All cells are different in composition.
- E.) -Energy flow of life occurs in cells.



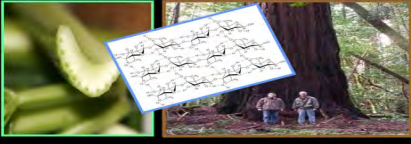
• There are two main groups of cells.

- A.) Prokaryotic
- B.) Eukaryotic

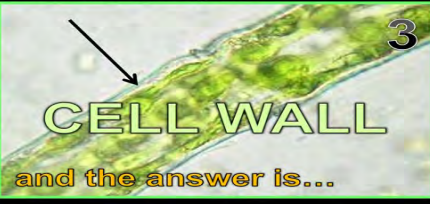


Cell Transport Review Game

- Cell Walls... (1 point each)
- Found in plants, bacteria, and fungi
- Made of cellulose sugar (permeable)
- Strong and rigid plants



- Name this cellular organelle?

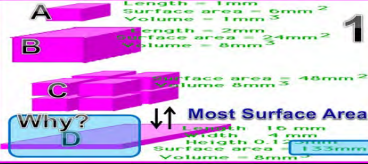


- This is the rich chemical fluid that helps breakdown molecules for use.
- Moves materials through cell (food and waste)

Cytoplasm

and the answer is...

- Which letter represents the shape of a typical cell? Why in two words? answer is...



20 Questions Followed By Answer

- Name A and B?



Outside Watery Environment

philic = attraction to something
phobic = Afraid of / repelled

- Molecules try to reach equilibrium.
- They go from areas of... (finish)

high concentration
to areas of low
concentration

and the answer is...

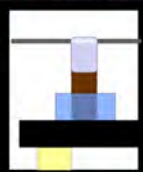
- Name some things an animal cell would want to let in. (1 point each) The cell wants to let in...



- The animation below best represents...



The corn syrup was hypertonic (more solute). Water was hypotonic. The water moved into the dialysis tubing to equal the concentrations.



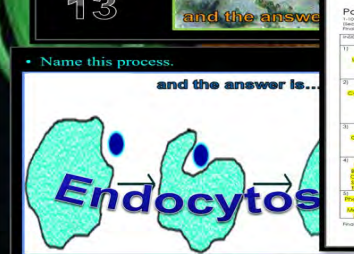
- What process is this?



- The Solution that these plants cells are in must be...



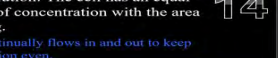
- Name this process.



- The Solution that these plants cells are in must be...



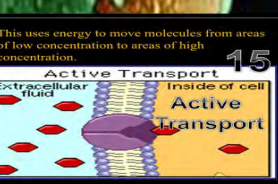
- The Solution: The cell has an equal proportion of concentration with the area surrounding.



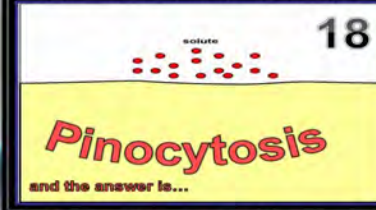
- This uses energy to move molecules from areas of low concentration to areas of high concentration.



- This is the process where the membrane surrounds large solid particles.



- Process where the membrane surrounds a liquid.



- This is the process where the membrane surrounds large solid particles.



- How did this virus enter the cell?



- Why don't the plant cells burst?



Cellular Organelles Review Game

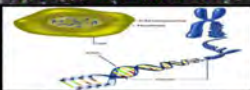
This is the _____ organelle in the cell?

The Nucleus

and the answer is...

This genetic molecule is contained in the nucleus?

DNA / Chromatin



credit: Shire Antwerp, Inc.

Name A, B, C, D, E

A NUCLEOLUS
B NUCLEUS
C MEMBRANE
D NUCLEAR PORE
E GOLGI BODY

This important organelle is a...

- Round dark spot in center of nucleus
- Only visible when cell is not dividing
- Contains RNA for protein manufacturing
- Makes ribosomes that travel out of nucleus.

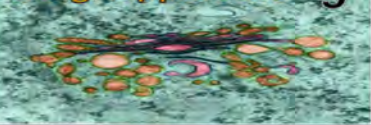
The Nucleolus

and the answer is...

20 Questions Followed with Answers

This organelle packages and transports proteins and other macromolecules?

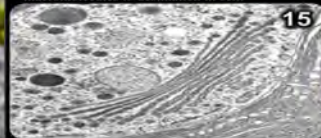
Golgi Apparatus



Name this a simple organic compound containing both a carboxyl ($-\text{COOH}$) and an amino ($-\text{NH}_2$) group.



The Golgi Apparatus sends vesicles of macromolecules to destination in cell.



This cellular organelle synthesizes sugars, calcium, makes

Smooth Endoplasmic Reticulum

These are protein messengers which help to coordinate certain bodily activities.

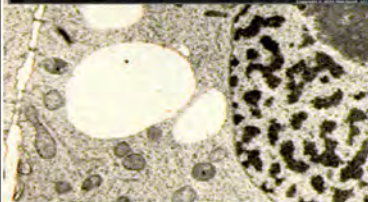


Every cell in the human body contains these. The basic structure of these is a chain of amino acids. You need these in your diet to help your body repair cells and make new ones. It is important for growth and development in children, teens, and pregnant women.



Cellular Organelles: A membrane-bound compartment or structure in a cell that performs a special function.

They... **Support** **Manufacture** **Breakdown** **Communicate** **Materials** **and Transport** **Materials** **within the cell.**



Enzymes of the **lysosomes** are synthesized in the rough endoplasmic reticulum and exported to the Golgi apparatus

18 **LYSOSOMES**



True or False? The nucleolus is only visible when cell is not dividing.

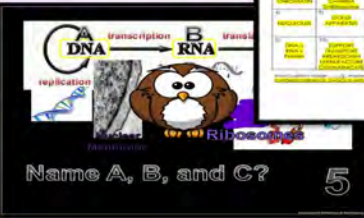
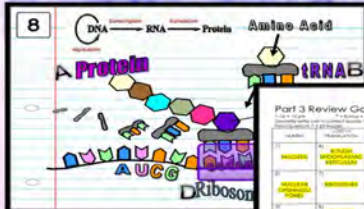
TRUE

Name the four important roles of proteins.

Grrr...
G-Growth
r-Repair
r-Reproduction
r-Regulate

This serves to separate the chromosomes from the rest of the cell and includes an array of small holes or pores that permit the passage of certain materials, such as nucleic acids and proteins, between the nucleus and cytoplasm.

17 **Nuclear Membrane**



These very numerous and small organelles are mini protein synthesizing factories?

Ribosomes

Part 3 Review Game

Player	1	2	3	4	5	6	7	8	9	10
Player 1										
Player 2										
Player 3										
Player 4										
Player 5										
Player 6										
Player 7										
Player 8										
Player 9										
Player 10										

Rough Endoplasmic Reticulum

Form **Follows** **Function**

and the answer is...

Cellular Organelles Quiz Game

These have digestive enzymes and break down materials.



Which is not true of the Lysosome?

- A.) has digestive acids / enzymes
- B.) digestive organelle, recycles old cell parts
- C.) creates proteins, lipids, and carbohydrates
- D.) transports undigested material for removal
- E.) can cause a cell to self destruct

2

This is a microscopic network of protein filaments and tubules in the cytoplasm of many living cells, giving them shape and

Cytoskeleton

4

Peroxisome

3

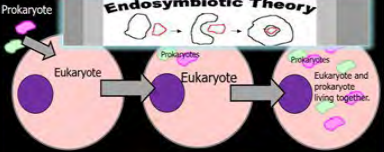
Which letter is which fiber?

- C.) Microfilaments (thin fibers)
- A.) Intermediate filaments (medium sized)
- B.) Microtubules (Large hollow cylinders)



5

This theory states that some of the organelles in today's eukaryotic cells were once primitive prokaryotic microbes.



Endosymbiotic Theory

Prokaryote

Eukaryote

Prokaryote

Eukaryote

Prokaryote

Eukaryote and prokaryote living together

20 Questions with Answers

This is a hairlike structure that acts primarily as an organelle of locomotion.

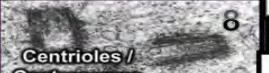
- Made of a bundle of nine pairs of microtubules surrounding two central pairs of microtubules



Flagellum

Centrioles

- Look like golden nuggets (Pairs)
- Made of nine tubes
- Aid in cell division (Mitosis)



Centrioles / Centrosomes

10

These are the membrane-bound compartments inside chloroplasts and cyanobacteria.

- They are the site of the light-dependent reactions of photosynthesis



Thylakoids

This is a small structure that extends out from the surface of cell and is used for movement.



Cilia

Organelle that conducts photosynthesis.

- Where the photosynthetic pigment chlorophyll captures the energy from sunlight, converts it, and stores it in the energy-storage molecules



Chloroplast

9

This is the process by which green plants and some other organisms use sunlight to synthesize foods from carbon dioxide and water.



Photosynthesis

11

This cycle is a series of chemical reactions used by all aerobic organisms to generate energy.

- Requires the oxidation of acetate—derived from carbohydrates, fats, and proteins—into carbon dioxide.



Acetyl-CoA

1,4-BPG

1,3-BPG

1,4-BPG

1,3-BPG

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1,4-BPG

1,3-BPG

1,4-BPG

17

This is a membrane-bound sac for storage, digestion, and waste removal.



Vacuole

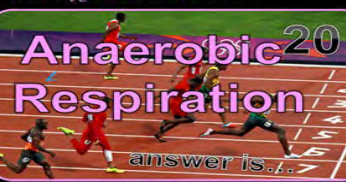
19

Which is not true of cellular respiration?

- A.) Burns sugars for energy.
- B.) Energy is released.
- C.) Occurs in most cells.
- D.) Oxygen is used.
- E.) Water is produced.

18

This is a form of cellular respiration that occurs when oxygen is absent or scarce.



Anaerobic Respiration

20

answer is...

This is the processes whereby certain organisms obtain energy from organic molecules.



Cellular Respiration

14

Which of the following statements is false of photosynthesis?

- A.) Photosynthesis requires sunlight, carbon dioxide, and water.
- B.) Oxygen and glucose are produced in photosynthesis.
- C.) Carbon dioxide and water are produced.
- D.) In photosynthesis, plants use radiant energy from the sun to create chemical energy in the form of sugars.
- E.) None of the above.

13

This cellular organelle uses sugar and oxygen to make energy?



Mitochondria

15

Which of the following equations is the correct equation for photosynthesis?

- A) $6O_2 + 6H_2O + \text{light energy} = C_6H_{12}O_6 + 6O_2$
- B) $6CO_2 + 6H_2O + \text{sugar} = C_6H_{12}O_6 + 6O_2$
- C) $6CO_2 + 6O_2 + \text{light energy} = C_6H_{12}O_6 + 6H_2O$
- D) $6CO_2 + 6H_2O + \text{light energy} = C_6H_{12}O_6 + 6O_2$
- E) $6CO_2 + H_2O + \text{light energy} = C_6H_{12}O_6 + 6O_2$
- F) $6CO_2 + 6H_2O + \text{light energy} = C_6H_{12}O_6 + 6O_2$
- G) $6CO_2 + 6H_2O + \text{sugar} = C_6H_{12}O_6 + 6O_2$
- H) $6CO_2 + 6H_2O + \text{light energy} = C_6H_{12}O_6 + 6O_2$
- I) $6CO_2 + 6H_2O + \text{light energy} = C_6H_{12}O_6 + 6CO_2$
- J) $C_6H_{12}O_6 + 6CO_2 + 6H_2O + \text{light energy} = 6O_2$

12

Which of the following equations is the correct one for the respiration equation?

- A) $C_6H_{12}O_6 + 6H_2O = \text{Released energy} + 4CO_2 + 6H_2O$
- B) $C_6H_{12}O_6 + 6O_2 = \text{Released energy} + 6CO_2 + 6H_2O$
- C) $C_6H_{12}O_6 + 6O_2 = \text{Released energy} + 6O_2 + 6H_2O$
- D) $C_6H_{12}O_6 + 6O_2 = \text{Released energy} + 6CO_2 + 6H_2O$
- E) $C_6H_{12}O_6 + 6CO_2 = \text{Released energy} + 6O_2 + 6H_2O$
- F) $C_6H_{12}O_6 + 6CO_2 = \text{Released energy} + 6CO_2 + 6H_2O$
- G) $C_6H_{12}O_6 + 6O_2 = \text{Released energy} + 6CO_2 + 6H_2O$
- H) $C_6H_{12}O_6 + 6O_2 = \text{Released energy} + 6CO_2 + 6H_2O$
- I) $C_6H_{12}O_6 + 6O_2 = \text{Released energy} + 6O_2 + 6H_2O$
- J) $C_6H_{12}O_6 + 6O_2 = \text{Released energy} + 6CO_2 + 6H_2O$
- K) $C_6H_{12}O_6 + 16O_2 = \text{Released energy} + 6O_2 + 6H_2O$
- L) $\text{Released energy} + 6CO_2 + 6H_2O + C_6H_{12}O_6 + 6O_2 = G$

16

Activities / Labs

Our science activities are designed to help students explore and understand complex scientific concepts in an engaging and interactive way. Each science unit includes several hands-on activities that encourage students to collect data and think critically about the world around them. Our easy-to-follow slideshow provides detailed visuals, simple materials, and clear directions, making it easy for both students and teachers to navigate the activities.

Activity! Osmosis and Diffusion in Gummy Bears.



Procedure:

- Everyone gets four Gummy Bears (Worms work?)
- Measure the height of each bear in cm.
- They should be same but check to make sure.
- Label four cups or Petri dishes below and place gummy bear in each cup with that fluid.
- Water
- Saltwater
- Baking Soda and Water
- Vinegar
- Place a Gummy of the same color taped to the outside of the cup to compare at the end.





How measure cm after soaking

Gummy Bear	Height before soaking	Height after soaking	% Change
Water	2cm	2cm	0%
Saltwater	2cm	1.5cm	-25%
Baking Soda and Water	2cm	2.5cm	25%
Vinegar	2cm	4.5cm	125%

Amount still

Amount still	Height before soaking	Height after soaking	% Change
Water	2cm	2cm	0%
Saltwater	2cm	1.5cm	-25%
Baking Soda and Water	2cm	2.5cm	25%
Vinegar	2cm	4.5cm	125%

We'll Check them Out Tomorrow

Do Not Eat after Soaking!



How measure cm after soaking

Gummy Bear	Height before soaking	Height after soaking	% Change
Water	2cm	2cm	0%
Saltwater	2cm	1.5cm	-25%
Baking Soda and Water	2cm	2.5cm	25%
Vinegar	2cm	4.5cm	125%

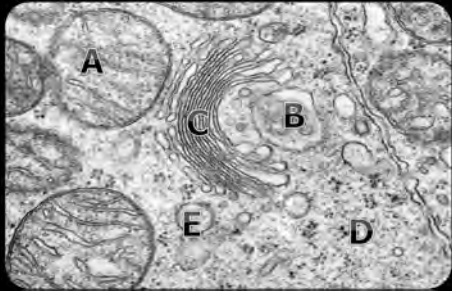
Which bear was placed in Saltwater?



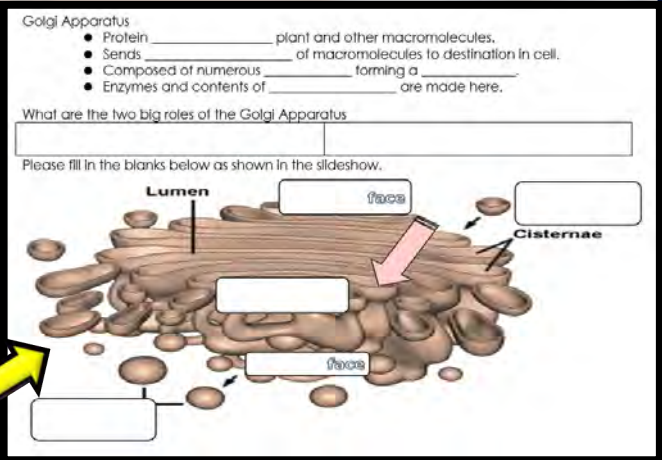
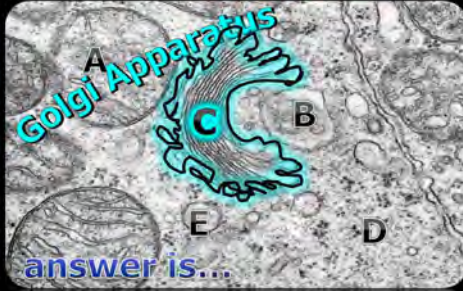
Built-in Assessment

Each unit contains several built-in assessment questions that students answer in their work bundle. With the question revealed before the answer, the teacher can easily call on individual students or table groups to respond. These provide an effective and efficient way for teachers to assess student learning.

• Which letter is the Golgi Apparatus?



• Which letter is the Golgi Apparatus?

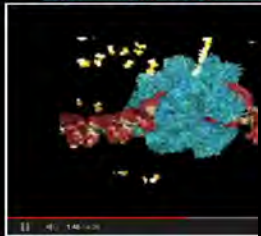


Questions in Work Bundle

Built-in Video Links

Our science education program is designed with the modern, multimedia learner in mind, and our video links are a perfect complement to our educational materials. These short clips are embedded into the slideshow at just the right places for a fantastic review. Whether you're studying biology, chemistry or physics, our video links are an excellent way to reinforce your learning.

- Video Link! Transcription and Translation.
- Optional / Advanced
– http://www.youtube.com/watch?v=41_Ne5m



- Video! Protein Synthesis
– <http://www.youtube.com>

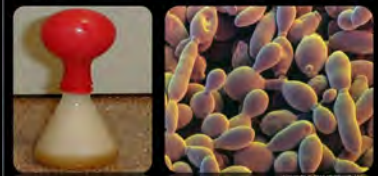


- Activity! Optional. Let's see some Chlorophyll / Pigments and Carotenoids
– Short Video with set-up:
<https://www.youtube.com/watch?v=qH-AJDqsSI>

Pigment: A pigment is a material that changes the color of reflected or transmitted light as the result of wavelength-selective absorption.



- Blow up a balloon with cellular respiration.
<https://www.scienceworld.ca/resource/yeast-inflated-balloons/#~:text=Pour%201%20tablespoon%20of%20yeast,balloon%20in%20a%20warm%20place>



- "Thriller" – Photosynthesis
– Photosynthesis Song ("Thriller" (youtube.com))



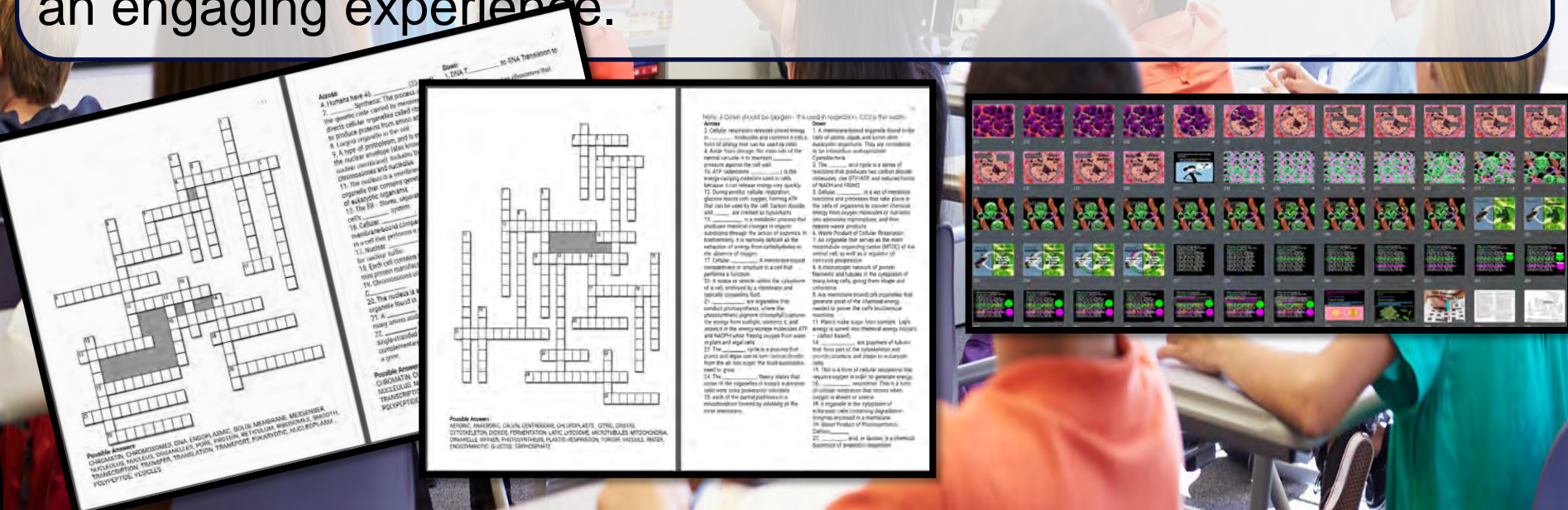
- If you're interested to learn more / significantly more advanced than this lesson.
– <https://www.mrgscience.com/topic-82-cell-respiration.html>



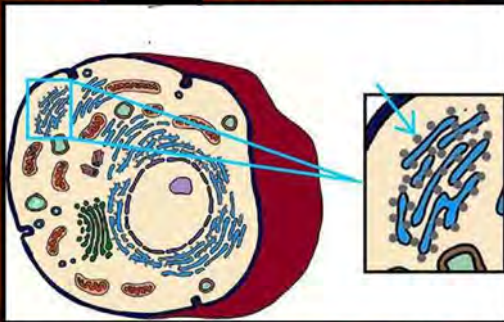
- Citric Acid Cycle summarized in 4 minutes.
– <https://www.youtube.com/watch?v=SkPwVO9BFI>



Games are a fantastic way for students to learn scientific concepts while having fun. We incorporate a variety of games into our curriculum, including interactive quizzes and puzzles that challenge students to think critically about the material. Our Hidden Box Games are a particularly popular feature, which conclude each unit by revealing a picture related to the topic. Students try to guess what the picture might be, making learning an engaging experience.

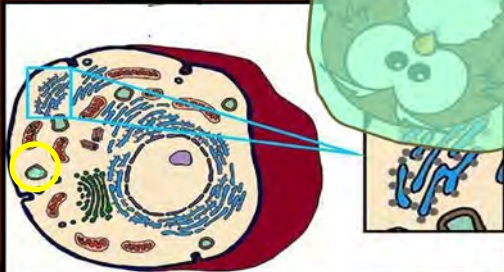


- Makes : that travel out of nucleus.



Copyright © 2014 SlideQuest, LLC

- Makes : that travel



Copyright © 2014 SlideQuest, LLC



The Owl - Each Part of the slideshow has a small clipart Owl hiding somewhere in a slide. The owl is incredibly small and blended into just the right slide. If a student spots the “Owl” they can raise their hand high into the air. When you call upon the student they can say “Owl” and be the student who spotted the Owl. Each PowerPoint Review game also has an owl hiding in it worth one point. Remind the students that they secretly write the word “owl” rather than yell it out during the review games. The Owl search is not included in every lesson. A slide at the beginning of the lesson will alert the students that today is an “Owl” day. Everything arrives editable so delete if you wish. You will find that some students will become the expert owl hunters in the group.

Google Classroom Compatible

Our digital learning programs are designed for students to learn science in a flexible and engaging environment. Our Google Classroom-compatible units provide a seamless learning experience whether your students are in the classroom or learning from home. Our step-by-step slideshows and student work bundles ensure that students can complete their work independently. The PowerPoint Slideshows and step-by-step work bundles can easily be loaded to your Google Drive and posted in your Google Classroom. These are great for daily lessons, students who need additional time, and for a student who was absent and looking to catch up in their work bundle.





[Part 1 Lesson 3 Cheek and ...](#)

Google Slides



[Part 1 Lesson 2 Characterist...](#)

Google Slides



[Part 1 Lesson 6 Cell Theory](#)

Google Slides



[Part 1 Lesson 5 Domains an...](#)

Google Slides



[Part 1 Lesson 4 Form Functi...](#)

Google Slides



[Part 1 Lesson 1 Sewer Lice S...](#)

Google Slides



[Part 1 Lesson 7 Cell City Pro...](#)

Google Slides



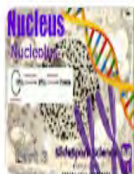
[Part 1 Lesson 8 Review Game](#)

Google Slides



[Part 3 Lesson 2 Nuclear Me...](#)

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[Part 3 Lesson 1 The Nucleus](#)

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[Part 3 Lesson 3 Protein Synt...](#)

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[Part 3 Lesson 4 Golgi Appar...](#)

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[Part 3 Lesson 5 Review Game](#)

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[Part 2 Lesson 1 Cell Membra...](#)

Google Slides



[Part 2 Lesson 5 Active Trans...](#)

Google Slides



[Part 2 Lesson 3 Gummy Bea...](#)

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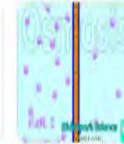
[Part 2 Lesson 4 Extensions](#)

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[Part 2 Lesson 6 Review Game](#)

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[Part 2 Lesson 2 Osmosis](#)

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[Part 4 Lesson 1 Lysosomes](#)

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[Part 4 Lesson 8 Vacuoles](#)

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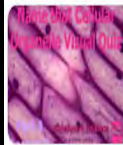
[Part 4 Lesson 10 Review Ga...](#)

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[Part 4 Lesson 6 Respiration ...](#)

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[Part 4 Lesson 9 Wrap Up an...](#)

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[Part 4 Lesson 2 Endo Symb](#)

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[Part 4 Lesson 3 Chloroplast](#)

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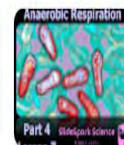
[Part 4 Lesson 4 Photosynth...](#)

Google Slides



[Part 4 Lesson 5 Mitochondria](#)

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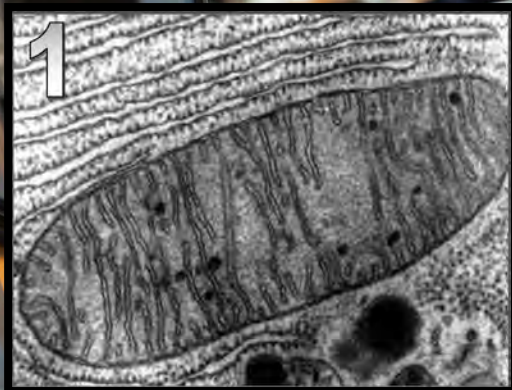


[Part 4 Lesson 7 Anerobic](#)

Google Slides

Built-in Questions and Assessments

Many slides will have relevant terms covered with a box. When advancing through the slideshow an outline around the box will glow with a bright color. The next slide will make the box disappear. These slides allow the teacher to call upon students or table groups / check for understanding before advancing. The team at SlideSpark has found that using this technique helps to keep the students focused. Constantly recalling and reviewing information learned is necessary when moving through a large unit. The slideshows don't just give everything away for free. Students should be able to demonstrate knowledge before moving on. Some slides have full questions instead of just covered terms. In these slides, the teacher should encourage small group work. The teacher can then call upon one or two groups to share before advancing the slide. The next slide will always reveal the correct answer.



Cellular Biology Unit

Cell Biology Unit



30 Lessons 3 Parts. (8th-10th Most Difficult) Part 1 is an Introduction to Cells and contains 8 Lessons and 20 Page Work Bundle. Part 2 about Cell Transport and contains 7 Lessons and 17 Page Work Bundle. Part 3 explores Cellular Organelles and has 5 Lessons and 13 Page Work Bundle. Part 4 Finishes exploring Cell Organelles and wrap up. It contains 11 Lessons and 18 Page Work Bundle.

Part 1: Cell Biology Unit: 8 Lessons of 50 minutes and 20 Page Follow Along Work Bundle, What is Life, Sewer Lice / Raisins in Ginger Ale Activity, What is an Organism, Introduction to CHNOPS/SPONCH biologically Important Atoms/Molecules, % of CHNOPS graph in Animals, Characteristics of Living Things, Spontaneous Origin, Case Study of Francesco Redi Experiment, Case Study of Pasteur's Swan Necked Flask Experiment, Needs of Living Things, Cheek and Onion Cells Under the Microscope Activity, Differences between Plants and Animal Cells, Plant and Animal Cell Venn Diagram, Visual Tour of Types of Cells, Introduction to Forms Follows Function Concept, Forms Follows Function Object Activity, Multicellular vs. Unicellular, Kingdoms of Life Step by Step Diagram, Adding of Bacteria to Venn Diagram, Eukaryotic Cells vs. Prokaryotic Cells, Energy Flow of Life through Cells, Chemosynthesis, Deep Ocean Life at Hydrothermal Vents, Archaea, Domains and Kingdoms Diagram, Autotrophic vs. Heterotrophic, Levels of Biological Organization, Introduction to the Cell Theory, Microscope Creation by Hans and Zacharias Janssen, Robert Hooke, Anton van Leeuwenhoek, Schleiden and Schwann, Rudolf Virchow, Robert Remak, The Modern Cell Theory, Three Big Principles of the Cell Theory, Introduction to the Cellular Organelle Poster Project, Cell City Project, Students design a cell modeled after the Jobs and Functions of a City, Box Games, Crossword Puzzle, End Unit Assessment

Intro to Cells, Cell Theory

- The 3 big principles of the cell theory.
 - All living organisms are composed of one or more cells.
 - The cell is the most basic unit of life.
 - All cells arise from pre-existing, living cells.

- Cells are the structural and functional units of all living organisms.
 - Humans have some 37.2 Trillion
 - Multi-cellular (More than one cell)
 - Protists, Archaea, and Bacteria have 1 - Unicellular

- Pasteur's experiments (1860's) showed that micro-organisms are even carried in the air.

- Both flasks boiled to sterilize
- Micro-organisms trapped in swan neck flask and broth does not spoil



- Spontaneous Origin: The belief that living organisms are produced / generated from non-living sources.

Do turtles come from the sand?



Do flies emerge from meat?



Do fish emerge from the mud in a pond?



- Questions? Plant Cell and Animal Cell

- What are differences you noticed between a plant cell and an animal cell - Study these pictures and the next two slides.
- What are the similarities?



- Answer: Eukaryotic cells have a nucleus, and are much larger and have more organelles. (More complex)

Form Follows Function

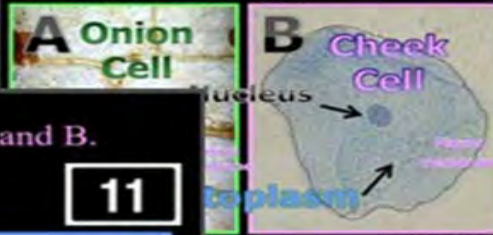
- Use the
- It has to do with the way they look and feel.

- Form Follows Function: Means that the form of a body part or structure is related to its function.

- The form or shape of a structure within an organism is correlated to the purpose or function of that structure.

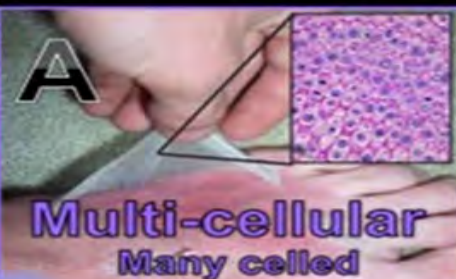


- Which is a cheek cell, and which is an onion cell? What is the difference?



and B.

11



Robert Hooke called them after monastery cells.



8 Lessons

Prokaryotic Cell

Eukaryotic Cell

A Living Cell

No Nucleus and no membrane bound organelles. Smaller, less complex, evolved first, always unicellular. DNA is circular, single haploid chromosome, divide by binary fission (split)

Prokaryote

- 
- Review and Full of Info

-

-
- 10 Humans have some...
- A) 1.7 Million Cells
 - B) 1.5 Trillion total cells
 - C) 100,000,000,000 cells
 - D) 100% Quasitumor cells
 - E) We are not made of true cells
- STUDY!**

The diagram on the left shows a simplified model of a hydrogen atom with a central nucleus labeled 'proton' and a surrounding electron cloud. The text 'Hydrogen Atom' is written above it. To the right, a 3D ball-and-stick model of a molecular structure is shown, with a yellow box highlighting a specific region of the molecule.

Answers	Unicellular	Answers	Multicellular
	 <p>Has a nucleus and many membrane bound organelles. This is a member of the Kingdom Protista</p>	 <p>Tardigrades, known as water bears, are a multicellular phylum of eight-legged segmented micro-animals</p>	

They observed both plants and animals are made of cells.

Bin	Prokaryota	Archaea	Eukarya			
Dom	Bacteria	Archaea	Protista	Plantae	Fungi	Animalia
Type	Prokaryotic (No)	Prokaryotic (No)	Eukaryotic (Nucleus)	Eukaryotic (Nucleus)	Eukaryotic (Nucleus)	Eukaryotic (Nucleus)

Prokaryotic

Eukaryotic

Nucleus

Follow Along Bundle

Part 1 Intro to Cell Biology



Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

Write on all of the worksheets for questions 1 and 2.

Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

Question	Answer
1. What is the function of the nucleus?	
2. What is the function of the cytoplasm?	

Write on all of the worksheets for questions 1 and 2.



Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?



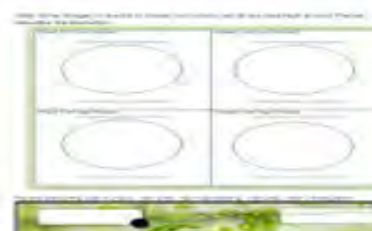
Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?



Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?



Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?



Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?



Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

Form Follows Function

Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?



Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

Domain	Kingdom	Cell Type	Single or Multi-Cellular	Energy Source
Eukarya				

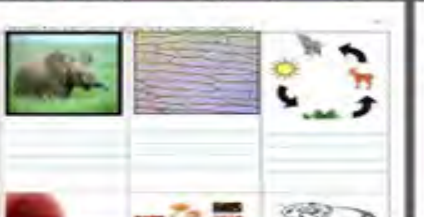
Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?



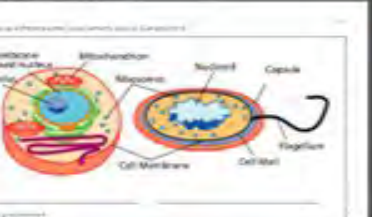
Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

The Cell Theory

Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?



Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

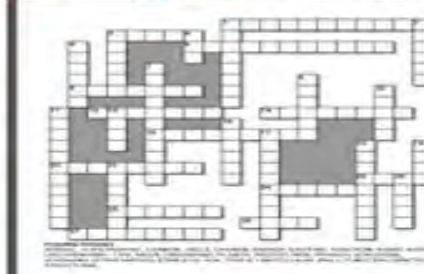


Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

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Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

Port 1 Review Game	Question	Answer
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Questions for questions 1 and 2: What is the function of the nucleus? What is the function of the cytoplasm?

20 Pages

Activities, Assessments, Keys, and more all built in

- Until recently (1984), scientists believed all life got its energy from the sun. A whole new system existed on the ocean floor.



- Plant and animal cells both have all of the following except...
 - A.) Nucleus to hold DNA
 - B.) Cytoplasm as fluid.
 - C.) Cell Membrane to keep materials in.
 - D.) Chloroplast to make sugar from light.



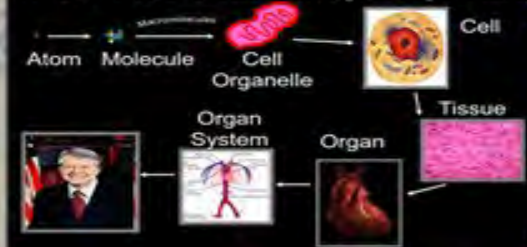
- Name A, B, and C?



- Organism: An organism that embodies the properties of life.
- Organisms are classified such as multicellular and unicellular microorganisms: bacteria, and archaea.



- Area of Focus: Levels of Biological Organization



asts
lls
ape
cu

- Is this a plant cell or animal cell?



Kingdoms of Life



- Francesco Redi – (1668)

- Life comes from pre existing life. Except...
- Abiogenesis: The first life came from non-living materials.

He believed flies spontaneously came from meat.
He covered one flask, left one open to air.
He observed flies laying eggs on meat.
He concluded that flies come from flies. Life comes from life.

Abiogenesis



Experimental Group

- Made of cells.



Part 2: Cell Biology Unit: 7 Lessons of 50 minutes and 17 Page Follow Along Work Bundle Placing Eggs into Vinegar for Later in Unit, Surface Area to Volume Ratio, Why Surface Area Matters, Reasons for being multi-cellular, Explanation of Surface Area and Volume, Introduction to Diffusion, Beets in Bleach Lab Activity / Demonstration, Calculating Surface Area to Volume Ratio, Finding the % Bleach penetration into the Beets, How various cells increase their surface area to volume ratio, Set-Up for Gummy Bears in water, saltwater, vinegar, soda Lab in two Days, Potato Slices in Water vs. Salt Water Lab, Cytoplasm, Capsule Slime Layer in Bacteria and Need for good oral hygiene, Cell Wall, Functions of the Cell Wall, Set-up of Osmosis and Diffusion lab with Iodine Solution and Starch / Dialysis Tubing, Cell Membrane, Aquaporins, Phospholipid Bilayer, Hydrophilic vs. Hydrophobic, Transport Proteins, Polarity of the Phospholipid, Oil vs Water demo, Selectively Permeable, What might go in and out of a cell, Diffusion, Diffusion Demo, Bumper Boats Diffusion Activity, Visiting the Iodine and Starch Lab, Sketching Out the Dialysis Tubing, Osmosis, Calculating the % Change in Mass, Passive Transport, Permeable vs. Impermeable, Facilitated Diffusion, Active vs. Passive Transport with Visuals, Finding % Change of Gummy Bears placed in various Solutions, Hypertonic Solutions, Hypotonic Solutions, Isotonic Solutions, Built-In Visual Quiz, Cells Walls preventions in Lysis, Prefixes Visual Quiz, Why we can't drink Saltwater, Set-up Syrup in Dialysis Tubing Demo, Revisiting Potato Slice in Water and Salt Water and calculating % change in Mass, Visiting Eggs in Vinegar and explanation of what occurred, Find % change, Active Transport, Sodium Potassium Pump, Class Simulation of Active Transport, Cell Communication, Endocytosis, Phagocytosis, Class Engulfs a Particle Activity, Pinocytosis, Transmembrane Proteins Receptor Mediated Endocytosis, Exocytosis, Movement through a cell Flow Chart, Box Game Review, Crossword Puzzle, End Unit Assessment

Cell Transport Unit

Cells can increase their SA to Vol ratio by...
- Folding like the cells in your intestine.

Endocytosis: (Endo - means to bring in)
Energy requiring process where a cell engulfs a particle.

Bacteria, Plants, Fungi, and some Protista have cell walls.

No Energy
passive transport

With Energy
active transport

After Procedure:
- Gently remove the Gummy Bear or worm from the container by pouring out the liquid.
- Dry gently with paper towel and record the height in centimeters on work bundle.
- Observations:

Follow-up Questions:
- What moved into and out of the dialysis tubing? How do you know?
- The water moved both into and out of the dialysis tubing. The iodine moved into the tubing but the starch was unable to leave the tubing.

Glucose test strip

By being a multicellular creature, animals and plants have overcome the problems of cell sizes and surface area. Very small cells and even larger ones are able to feed themselves.

Unicellular creatures must be extremely small and must be extremely efficient at exchanging materials with their environment.

It's why we don't find giant Amoeba's that could eat us!

- Cells can increase their SA to Vol ratio by...
 - Folding like the cells in your intestine.
- 



- Endocytosis: (Endo - means to bring in) Energy requiring process where a cell engulfs a particle.
- Endocytosis**
- Active Transport?**
- Requires Energy
-
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- Endocytosis: (Endo - means to bring in) Energy requiring process where a cell engulfs a particle.

Endocytosis

Active Transport?

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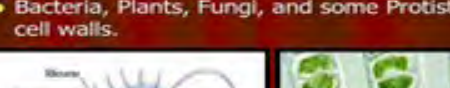
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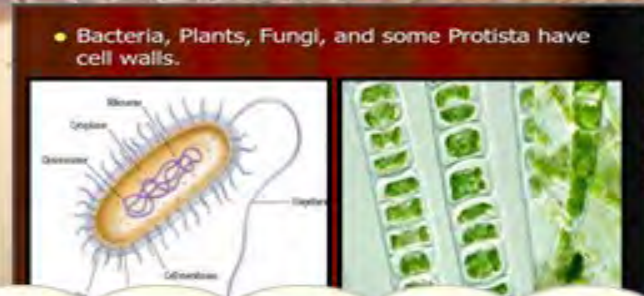
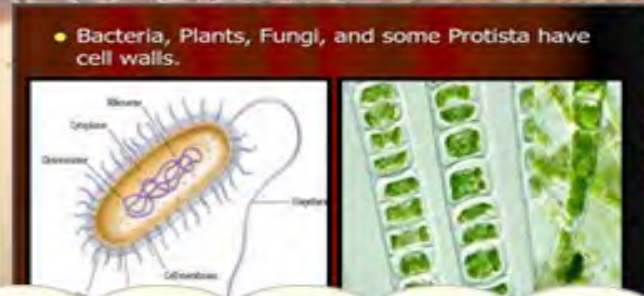
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- Bacteria, Plants, Fungi, and some Protista have cell walls.
- 
- The diagram on the left illustrates a bacterium with various labeled parts: Ribosome, Cytoplasm, Quaternary, Capsule, and Cell membrane. To the right, two micrographs show plant cells, highlighting their rigid cell walls and internal structures.

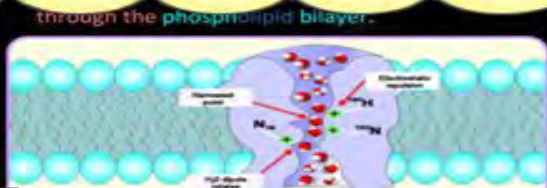
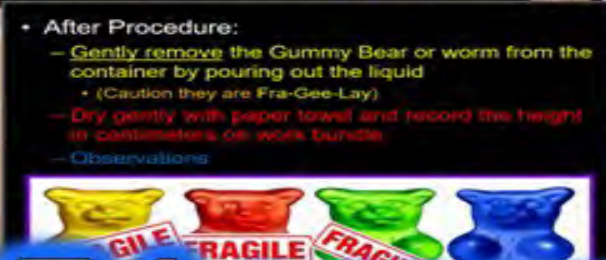



- After Procedure:
 - Gently remove the Gummy Bear or worm from the container by pouring out the liquid
 - (Caution they are Fra-Gee-Lay)
 - Dry gently with paper towel and record the height in centimeters on work bundle.
 - Observations:




The image shows four gummy bears standing in a row. From left to right, they are yellow, red, green, and blue. Each bear has a white label with the word 'FRAGILE' in red, slanted capital letters. The yellow bear's label is partially obscured by a red 'X' mark.

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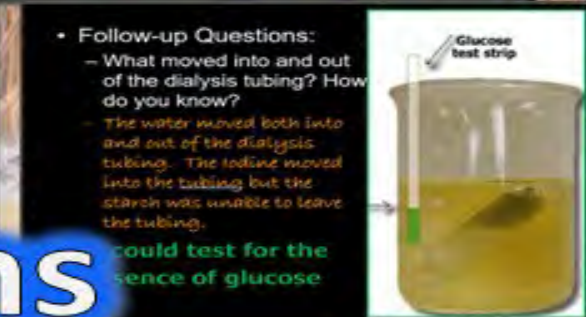

- Follow-up Questions:
 - What moved into and out of the dialysis tubing? How do you know?
 - The water moved both into and out of the dialysis tubing. The iodine moved into the tubing but the starch was unable to leave the tubing.
- MS
- could test for the presence of glucose
- 


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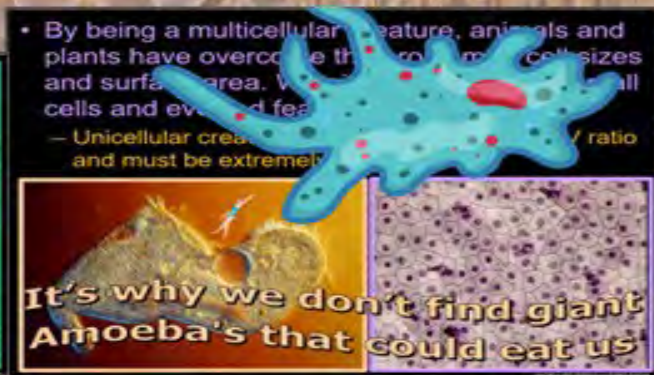
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- By being a multicellular creature, animals and plants have overcome the problems of cell sizes and surface area. With small cells and even folded features
- Unicellular creatures have a high surface area to volume ratio and must be extremely small
- 
- It's why we don't find giant Amoeba's that could eat us**



• By being a multicellular creature, animals and plants have overcome the problems of cell sizes and surface area. With small cells and even folded features

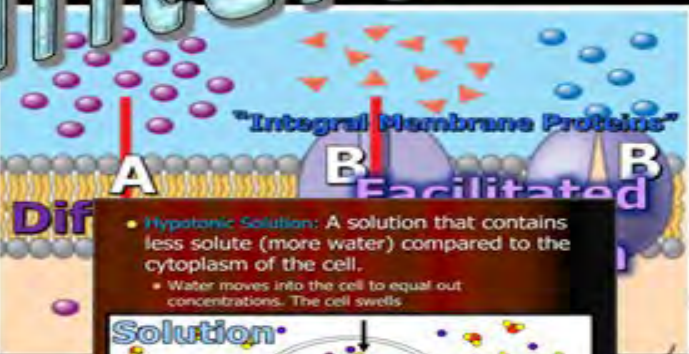
- Unicellular creatures have a high surface area to volume ratio and must be extremely small



It's why we don't find giant Amoeba's that could eat us

7 Lessons

Interactive Slideshows



- **Hypotonic Solution:** A solution that contains less solute (more water) compared to the cytoplasm of the cell.
- Water moves into the cell to equal out concentrations. The cell swells.



- Cells volume
- If the volume will decrease and the exchange of materials the cell membrane will decrease. (Cell may)
- Cells tend to divide and remain small to maintain a high surface area to volume ratio.



- Calculate the following.

Bee Size at Start	Volume	Surface Area
Small 1cm L x W x H	1x1x1=1cm ³	1x1x6=6cm ²
Medium 2cm L x W x H	2x2x2=8cm ³	2x2x6=12cm ²
Large 4cm L x W x H	4x4x4=64cm ³	4x4x6=96cm ²
Extra Large 6cm	6x6x6=216cm ³	6x6x6=216cm ²

$$96/64 = 1.5$$



- **Endocytosis:** (Endo - means to bring in) Energy requiring process where a cell engulfs a particle.



As a cell grows, its volume (units³) increases faster than surface area (units²), leading to a **decreased** SA:Vol ratio

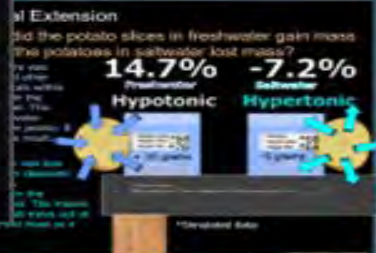
- If metabolic rate exceeds the rate of exchange of critical materials and waste (low SA:Vol ratio), the cell will eventually die.
- Growing cells tend to **divide** and remain small in order to maintain a **high** SA:Vol

Now measure cm after soaking

GUMMY BEAR	Before	After
Height before soaking =	2cm	3cm
Height after soaking =	5cm	1.5cm
Width before soaking =	2cm	2cm
Width after soaking =	3cm	4.5cm
Water %Change in height	(After soaking height - before soaking height) / before soaking height x 100 =	(5cm - 2cm) / 2cm x 100 = 150%
Saltwater %Change in height	(After soaking height - before soaking height) / before soaking height x 100 =	(1.5cm - 2cm) / 2cm x 100 = -25%
Baking Soda and Water %Change in height	(After soaking height - before soaking height) / before soaking height x 100 =	(3cm - 2cm) / 2cm x 100 = 50%
Vinegar %Change in height	(After soaking height - before soaking height) / before soaking height x 100 =	(4.5cm - 2cm) / 2cm x 100 = 125%
Other % Mystery/Optional	(After soaking height - before soaking height) / before soaking height x 100 =	(7cm - 2cm) / 2cm x 100 = 250%

- The Solution that these plants cells are in must be...
 - A.) Hypotonic
 - B.) Hypertonic
 - C.) Isotonic
 - D.) Facilitated
 - E.) None of the above.

Water moves in



Circle the shape that best represents a cell? Why? Explain below using the best lab as a focus. Please use words Surface Area, Volume, Diffusion, Cell Size, Membrane, bleach, Beets.



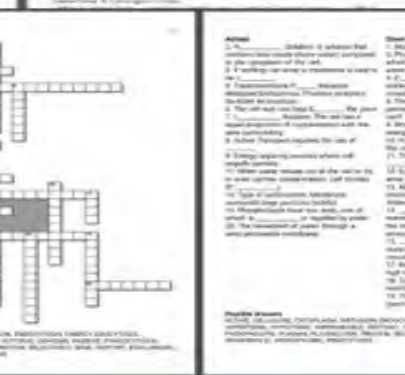
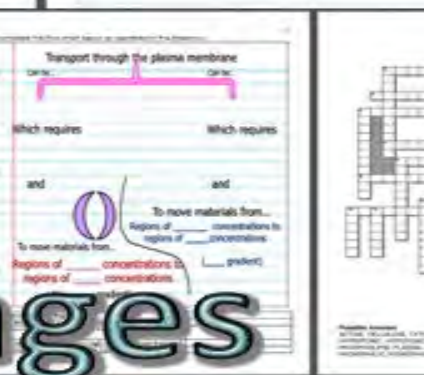
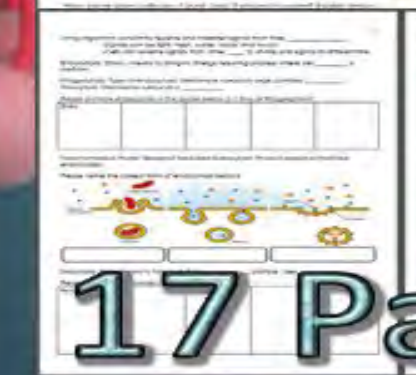
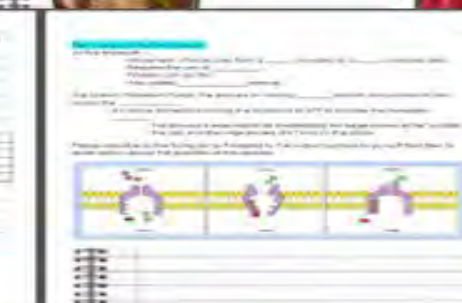
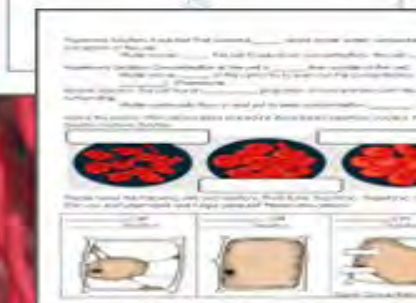
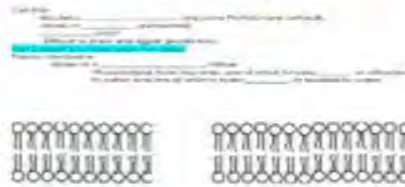
Use below to assist you

- When a cell grows, its volume (units³) increases faster than surface area (units²), leading to a decreased SA:Vol ratio
- If metabolic rate exceeds the rate of exchange of critical materials and wastes (low SA:Vol ratio), the cell will eventually die.
- Growing cells tend to divide and remain small in order to maintain a high SA:Vol ratio suitable for survival.

Function

Activity! Revisiting the egg in vinegar. Did the egg gain or lose mass? Describe the egg's properties. How else has it changed?

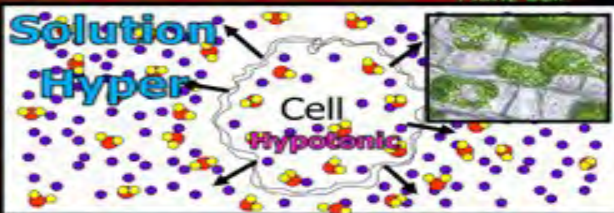




17 Pages

Activities, Labs, Assessments, Keys and more all built-in

- Hypertonic Solution: Concentration of the cell is less than outside of the cell.
 - Water moves out of the cell to try to even out the concentration. Cell Shrinks (**Plasmolysis**)



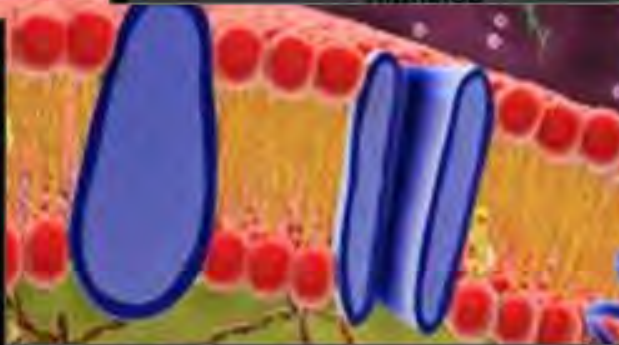
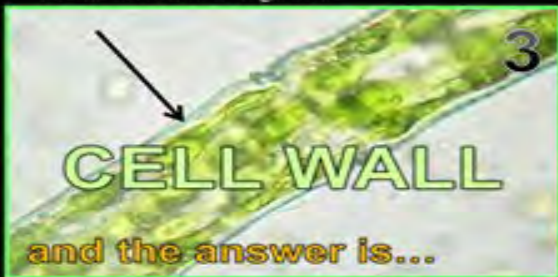
- Follow-up Questions:
 - Use the word "diffusion" in a sentence that has to do with this lab.



- Answer: Because lipids are nonpolar. They don't mix with water.
 - The membrane becomes a water proof barrier between two liquid areas.



- Name this cellular organelle?



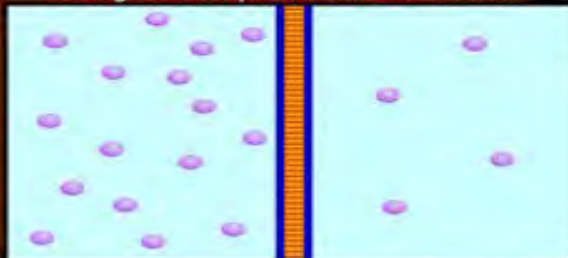
- Made of a phospholipid bilayer.



Phospholipids have two ends, one of which is **hydrophilic**, or attracted to water, and one of which is **hydrophobic**, or repelled by water.

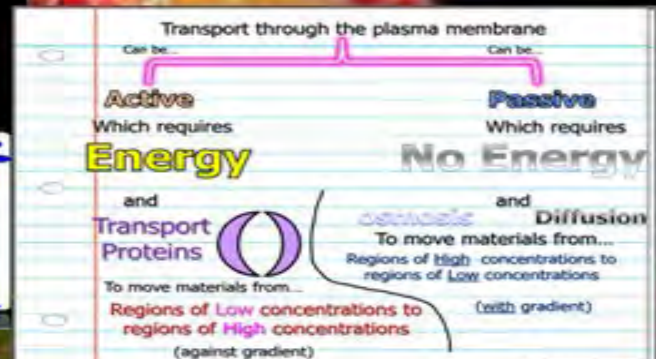


- Osmosis: The movement of water through a semi-permeable membrane.



- Activity! (Optional) Bumper Boats.
 - Teacher will assign a few students to move in one direction. If they bump into another student or object they change directions.
 - Open doors in the classroom. What will happen to our molecule students eventually?

They moved from regions of **High** concentrations to regions of **Low** concentrations



[Parts 3 and 4: Cellular Organelles](#) Part 3: 8 Lessons of 50 minutes and 20 Page Follow Along Work Bundle, Special Functions of Cellular Organelles in a Cell, Nucleus, Functions of the Nucleus, Information Flow of Life, DNA-RNA-Proteins, Transcription, Translation, Important Role of Proteins, Chromosomes, Chromatin, Unwinding 6 feet of string Chromosome activity, Nuclear Membrane, Nucleolus, Ribosome Creation, Visuals Matching Activity, Nuclear Pores/Openings, Phospholipid bilayer, Nucleoplasm, Rough Endoplasmic Reticulum, The Lost Art of Maze Making Activity, Smooth Endoplasmic Reticulum, Ribosomes, Flow of Information Class Simulation to Music, Gene Expression, Review of Transcription and Translation, Protein Synthesis, Initiation, Step by Step Drawing Protein Synthesis, Elongation, Termination, Review of the Steps with Visuals, Importance of Protein in our Diet, Hormones, Golgi Apparatus, Cis Face, Trans Face, Build Golgi Body Fanny Packs Activity, Visual Review of the flow of molecules, Box Game Review, Crossword Puzzle, End Unit Assessment

[Parts 3 and 4: Cellular Organelles](#) Part 4: 11 Lessons of 50 minutes and 18 Page Follow Along Work Bundle Special Functions of Cellular Organelles in a Cell, Lysosomes, Function of Lysosomes and the Breakdown of Materials, Cytoskeleton, Microfilaments, Intermediate Filaments, Microtubules, Flagellum, Cilium, Centrioles, Role in Mitosis, Endosymbiotic Theory, Step by Step Visual, Mitochondria, Chloroplast, Optional Chromatography Activity to see Plastids in Leaves, Plastids, Thylakoids, Granum, Photosynthesis Equation, Learning the Equation with M&M's Activity, Description of Photosynthesis Main Parts, Video Options for Photosynthesis in more detail, Four Main Steps of Photosynthetic Process, Cellular Respiration, Foods Macronutrients, Mitochondria, Function of Mitochondria, Cristae, Learning the Respiration Equation, M&M's again as a manipulative, Blowing a balloon with Yeast Demo, Step by Step of Calvin Cycle, Review of Cellular Respiration, The Carbon Dioxide and Oxygen Balance of Life, Aerobic vs. Anaerobic Respiration, Fermentation, Fermentation Equation, Activity with Cabbage Indicator and Yeast, Venn Diagram of Anaerobic and Aerobic Respiration, Dangers of Botulism, Vacuoles, The Many Functions of Vacuoles, Turgid Pressure in Plants, Contractile Vacuoles, Name that Organelle Visual Quiz, Box Game Review, Crossword Puzzle, Unit Assessment

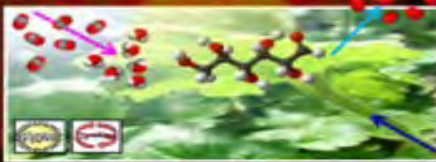
Cellular Organelles Bundle

Compressed File

• This is the largest organelle in the cell?

The Nucleus

- Equation for Photosynthesis
- $6CO_2 + 6H_2O + \text{Energy} \rightarrow C_6H_{12}O_6 + 6O_2$



performs a special function:

They... **Support**
Manufacture "Make"
Breakdown Materials
Communicate and Transport Materials

- DNA makes RNA, RNA has information to make proteins.



The RNA molecule



Enzymes of the Golgi apparatus are involved in the transport of materials to the Golgi apparatus

18

LYSOSOMES



...of macromolecules to their destination in cell.



- The Nucleus
 - Largest organelle in the cell (dark spot)
 - Contains **genetic** information (DNA)
 - DNA **transcription** to RNA Translation to Proteins.
 - Chromosomes / Chromatin
 - Composed of **DNA**
 - Thicken for cellular division.
 - Set number per species.
 - » Humans have **46** chromosomes (23 pairs)



- Nucleolus
 - Round dark spot shape in nucleus.
 - Only visible when cell is not dividing.
 - Contains **RNA** for protein manufacturing.
 - Makes **ribosomes** that travel out of nucleus.
- Nuclear Membrane
 - Surrounds nucleus.
 - Composed of two layers.
 - Numerous **openings** for nuclear traffic.



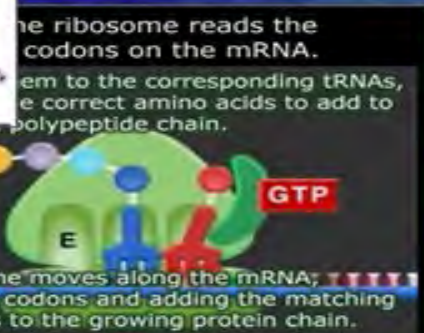
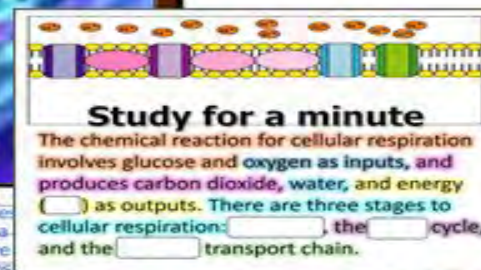
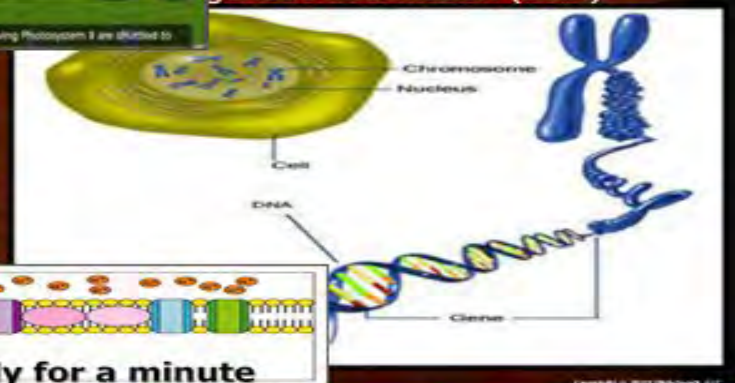
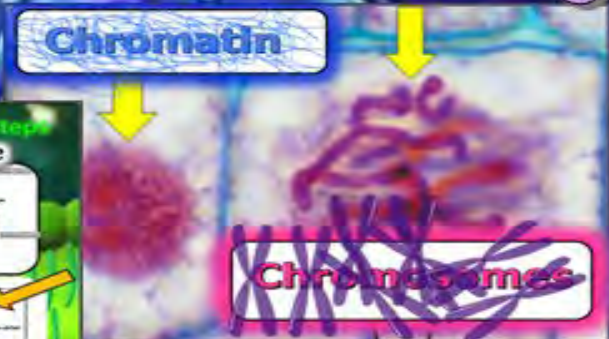
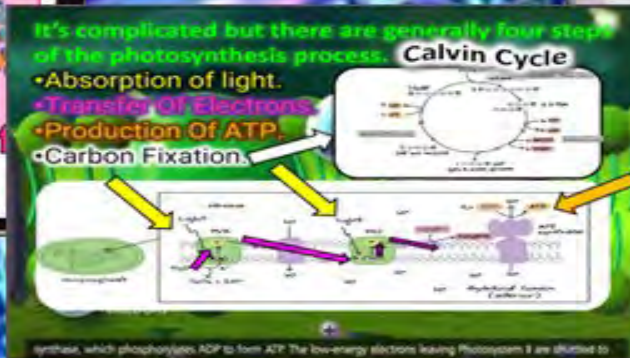
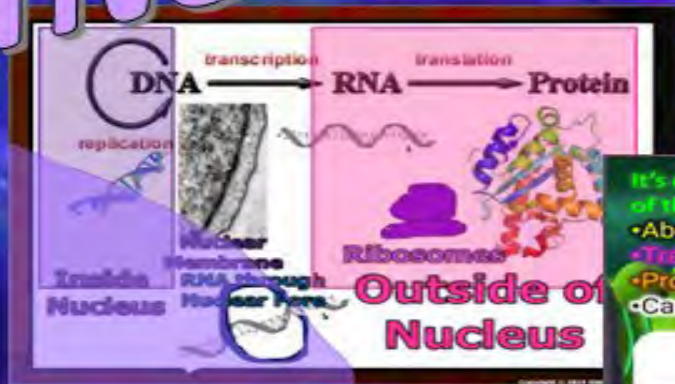
is cellular organelle synthesizes sugars, stores enzymes, regulates calcium, makes lipids and steroids.

11

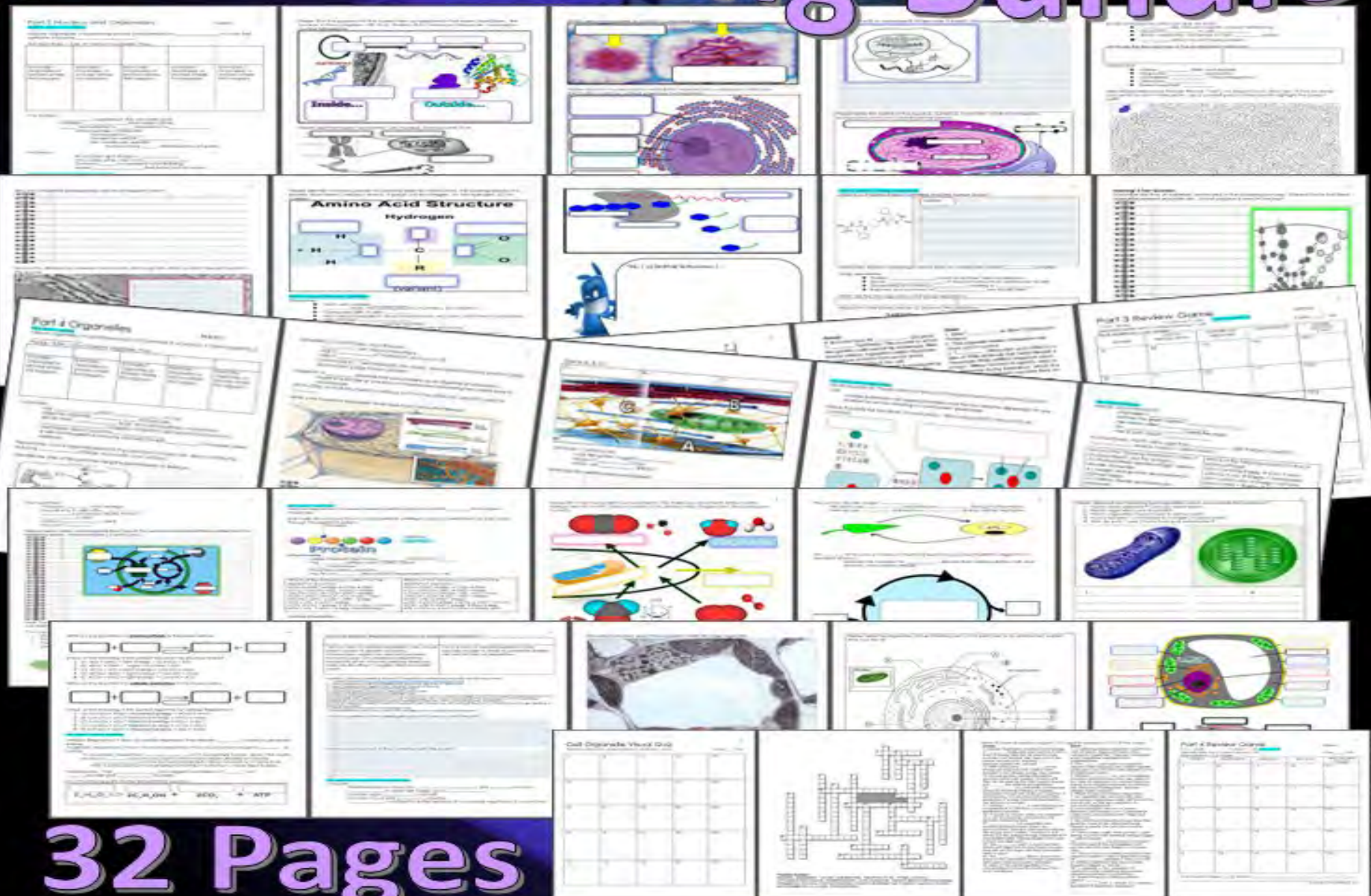
Smooth Endoplasmic Reticulum

16 Lessons

Interactive Slideshows



Follow Along Bundle



32 Pages

Activities, Assessments, Keys, and more all built-in

Please label the sketch of the nucleus, nucleolus, chromatin, nucleoplasm, nuclear envelope, and nuclear pores below.



• Respiration – The plant burns the sugar to make energy.



These are the membrane-bound compartments inside chloroplasts and cyanobacteria.

– They are the site of the light-dependent reactions of photosynthesis.



ation: The second stage of synthesis.

es the genetic information in RNA to a sequence of amino acids, ultimately ng a protein.

ion occurs on ribosomes, which ctures in the cell that are ble for protein synthesis.

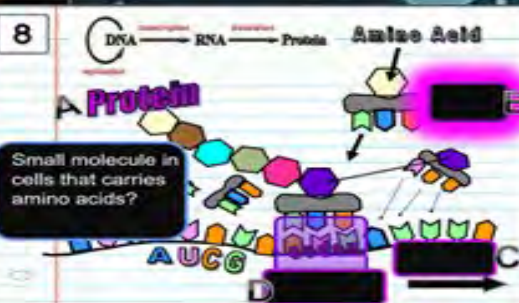
• Digestive organelle, recycles old cell parts.

Which is the lysosome and which is the mitochondria?



The rough ER, studded with millions of membrane bound ribosomes, is involved with the production, folding, quality control and dispatch of some proteins.

• Each cell contains millions.



Each Golgi stack has two distinct ends, or faces. The cis face of a Golgi stack is the end of the organelle where substances enter from the endoplasmic reticulum for processing, while the trans face is where they exit in the form of smaller detached vesicles.







Curriculum Guide

Number of Lessons in each unit (50 min, daily lessons) and difficult rating scale / intended grade level.











 =Easier,

 = More difficult,





 =Most difficult

Earth Science Units	Daily Lessons	Intended Grade	
Geology Topics Unit	60 Lessons	6-8 medium difficulty	
Weather and Climate Unit	40 Lessons	6-8 medium difficulty	
Astronomy Unit	60 Lessons	6-8 medium difficulty	
Weathering, Soil Sciences	28 Lessons	5-7 easier	
Rivers and Water Quality	25 Lessons	5-7 easier	
Water Molecule Unit	20 Lessons	5-7 easier	

Life Science Units

Life Science Units	Daily Lessons	Intended Grade	
Ecology Feeding Levels Unit	13 Lessons	5-6 easier	
Ecology Interactions Unit	30 Lessons	5-6 easier	
Ecology Abiotic Factors Unit	24 Lessons	5-6 easier	
Botany Unit	50 Lessons	5-7 easier	
Evolution and Natural Selection	40 Lessons	5-7 easier	
Taxonomy and Classification	50 Lessons	6-8 medium difficulty	
Infectious Diseases Unit	30 Lessons	7-9 more difficult	
DNA and Genetics Unit	42 Lessons	8-10 most difficult	
Human Body Systems Unit	85 Lessons	6-8 medium difficulty	
Cell Biology Unit	30 Lessons	8-10 most difficult	

Physical Science

	Daily Lessons	Intended Grade	
Laws of Motion and Machines Unit	33 Lessons	8-10 most difficult	
Matter Energy and the Environment	58 Lessons	7-10 medium difficulty	
Atoms and Periodic Table Unit	44 Lessons	8-10 most difficult	
Science Skills Unit	30 Lessons	5-7 medium difficulty	

[Physical Science Curriculum](#)

[Entire SlideSpark Science Curriculum](#)



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