WEEK 29: CELLS 101

DAY ONE

TODAY, YOU AND YOUR CHILD WILL:

1. READ THE TEXT
2. REVIEW THE TEXT WITH YOUR CHILD
3. COMPLETE THE STUDENT WORKSHEETS
4. FIND THE MATERIALS YOU WILL NEED FOR DAYS TWO AND THREE

DURING YOUR REVIEW, THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT PARTS OF YOUR CHILD'S READING FOR THIS WEEK.

ALL ORGANISMS ARE COMPOSED OF CELLS, THE FUNDAMENTAL UNIT OF LIFE. MOST ORGANISMS ARE MADE OF SINGLE CELLS CALLED PROKARYOTIC CELLS OR BACTERIA. SOME ORGANISMS, INCLUDING HUMANS, ARE MULTICELLULAR AND ARE CALLED EUKARYOTIC CELLS.

ALL CELLS CONTAIN A MEMBRANE, CYTOPLASM AND DNA; HOWEVER, ONLY EUKARYOTIC CELLS CONTAIN ORGANELLES, WHICH ARE SPECIALIZED STRUCTURES WITHIN THE CELL THAT PERFORM A UNIQUE TASK.

CELLS CARRY ON THE MANY FUNCTIONS NEEDED TO SUSTAIN LIFE. THEY GROW AND DIVIDE, THEREBY PRODUCING MORE CELLS. THIS REQUIRES THAT THEY TAKE IN NUTRIENTS, WHICH THEY USE TO PROVIDE ENERGY FOR THE WORK THAT CELLS DO AND TO MAKE THE MATERIALS THAT A CELL OR AN ORGANISM NEEDS.

DEFINITIONS:

PROKARYOTIC	"PRO-CARRY-OT-IK"; CELLS OR ORGANISMS THAT BELONG TO THE KINGDOMS ARCHAEBACTERIA OR EUBACTERIA
EUKARYOTIC	"U-CARRY-OT-IK"; CELLS OR ORGANISMS THAT BELONG TO THE KINGDOMS ANIMAL, PLANT, PROTIST OR FUNGI
MEMBRANE	A COVERING THAT SURROUNDS THE CELL AND PROTECTS IT
DNA	A GROUP OF CHEMICALS THAT CONTAIN ALL OF THE INSTRUCTIONS FOR MAKING ALL THE STRUCTURES AND MATERIALS THE ORGANISM NEEDS TO SURVIVE
CYTOPLASM	"SIGHT-O-PLAZ-M"; A GOOEY FLUID THAT FILLS UP THE INSIDE OF A CELL
ORGANELLES	"OR-GA-NELLS"; SMALL STRUCTURES INSIDE OF CELLS THAT HAVE A SPECIFIC JOB

SAMPLE QUESTIONS TO ASK AFTER YOUR CHILD FINISHES THEIR READING FOR DAY ONE:

HOW ARE PROKARYOTIC CELLS AND EUKARYOTIC CELLS ALIKE?

THEY BOTH USE FOOD, GROW, REPRODUCE, REACT TO CHANGES IN THE ENVIRONMENT AND "BREATHE". THEY ALSO CONTAIN DNA, CYTOPLASM AND A CELL MEMBRANE.

WHAT KINGDOMS WOULD YOU FIND ORGANISMS THAT HAVE PROKARYOTIC CELLS?

KINGDOMS ARCHAEBACTERIA AND EUBACTERIA

WHAT KINGDOMS CONTAIN ORGANISMS MADE UP OF CELLS THAT DO NOT HAVE ORGANELLES?

KINGDOMS ARCHAEBACTERIA AND EUBACTERIA

ANSWERS TO WORKSHEET QUESTIONS FOR WEEK 29:

PAGE ONE:

ACROSS:
1. PROKARYOTIC
5. ORGANELLES

DOWN:
2. CYTOPLASM
3. DNA
4. MEMBRANE
6. EUKARYOTIC

PAGE TWO:

3 - PROKARYOTIC
2 - EUKARYOTIC
1 - MEMBRANE
4 - DNA
6 - CYTOPLASM
5 – ORGANELLES

PAGE THREE:

1. A
2. B
3. A
4. C
5. B
6. B

DAY TWO

TODAY, YOU AND YOUR CHILD WILL:

1. REVIEW DAY ONE USING THE FOLLOWING TEXT
2. RUN THE ACTIVITY: "THE INCREDIBLE EDIBLE CELL"

THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT ITEMS TO REVIEW FOR YOUR ACTIVITY TODAY!

MOST PICTURES OF CELLS GIVE THE ILLUSION THAT THESE SMALL STRUCTURES DO NOT HAVE ANY THICKNESS TO THEM. THIS IS NOT TRUE.

PLANT, ANIMAL AND BACTERIAL CELLS ARE THREE DIMENSIONAL STRUCTURES. MODELING THIS FACT CAN HELP A CHILD UNDERSTAND THE ABSTRACT VISION OF THE WORKINGS OF A CELL.

THE INCREDIBLE EDIBLE CELL

CHILDREN WILL MODEL A 3D CELL.

Materials:

PACKAGE OF FLAVORED GELATIN (LIGHT-COLORED FLAVORS WORK BEST)
KNOX GELATIN
PLASTIC CUP/CONTAINER TO HOLD THE GELATIN
VARIOUS EDIBLE CANDIES TO REPRESENT ORGANELLES (I.E. FRUIT ROLL UPS, CAKE SPRINKLES, HOT TAMALES, CHOCOLATE COVERED RAISINS, GUMBALL, ETC.)
PLATE
KNIFE
SPOON

Activity:

FOLLOW THE DIRECTIONS ON THE BOX TO MAKE THE GELATIN. POUR THE LIQUID INTO THE PLASTIC CONTAINER AND ALLOW IT TO SET UP UNTIL IT IS FIRM.

REMOVE THE GELATIN FROM THE PLASTIC CONTAINER...YOU MAY NEED A KNIFE TO CUT AWAY THE SIDES OF IT FIRST!

CUT THE GELATIN IN HALF AND PLACE BOTH HALVES ONTO THE PLATE.

USE THE SPOON TO DIG OUT A SMALL AREA TO INSERT YOUR EDIBLE CANDIES (ORGANELLES).

PLACE THE OTHER HALF OF THE "CELL" ON TOP OF YOUR "ORGANELLES".

Explanation:

IT IS DIFFICULT FOR SOME CHILDREN TO IMAGINE WHAT A CELL LOOKS LIKE. SPEND SOME TIME SHOWING YOUR CHILD HOW ALL OF THE "ORGANELLES" INSIDE THEIR CELL ARE SPREAD OUT. THIS IS VERY SIMILAR TO A REAL CELL; HOWEVER, THE GEL THAT HOLDS ALL OF THE ORGANELLES IN A REAL CELL IS NOT AS FIRM (IT ACTUALLY IS CLOSER TO THE CONSISTENCY OF SYRUP). IN THE NEXT THREE WEEKS, YOUR CHILD WILL BE EXPLORING EACH OF THESE ORGANELLES IN MORE DETAIL. REFER BACK TO THIS ACTIVITY DURING THIS UNIT.

ENJOY YOUR TASTY TREAT! DIG IN!!!

DAY THREE

TODAY, YOU AND YOUR CHILD WILL:

1. REVIEW DAY ONE USING THE FOLLOWING TEXT
2. RUN THE ACTIVITY: "TEA BAG DIFFUSION"

THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT ITEMS TO REVIEW FOR YOUR ACTIVITY TODAY!

THE WARMER AN OBJECT IS, THE FASTER ITS MOLECULES WILL MOVE. THIS EXPLAINS WHY A WARMED LIQUID IS CHANGED INTO A GAS WHICH CAN ESCAPE ITS CONTAINER.

MOLECULES CAN MOVE THROUGH GAS, SOLIDS AND LIQUIDS.

MOLECULES THAT ARE MOVING FASTER HAVE A BETTER CHANCE OF ENTERING A CELL MEMBRANE THAN THOSE WHICH ARE MOVING SLOWER.

ESP ACTIVITY: TEA BAG DIFFUSION

TEA BAGS ARE USED TO DEMONSTRATE THE IMPORTANCE OF HEAT AROUND A CELL MEMBRANE.

Materials:

TEA BAGS
PAPER TOWELS
WATER
CONTAINER TO WATER
MEASURING TAPE

Activity:

HEAT 2 CUPS OF WATER TO A BOIL.

FOLD A PAPER TOWEL INTO FOURTHS.

PLACE THE TEA BAG INTO THE HOT WATER FOR 15 SECONDS. REMOVE TEA BAG FROM THE WATER AND PLACE IT ONTO THE CENTER OF A PAPER TOWEL FOR 15 SECONDS.

REMOVE TEA BAG AND RECORD THE DIAMETER OF THE WATER STAIN REMAINING ON THE PAPER TOWEL.

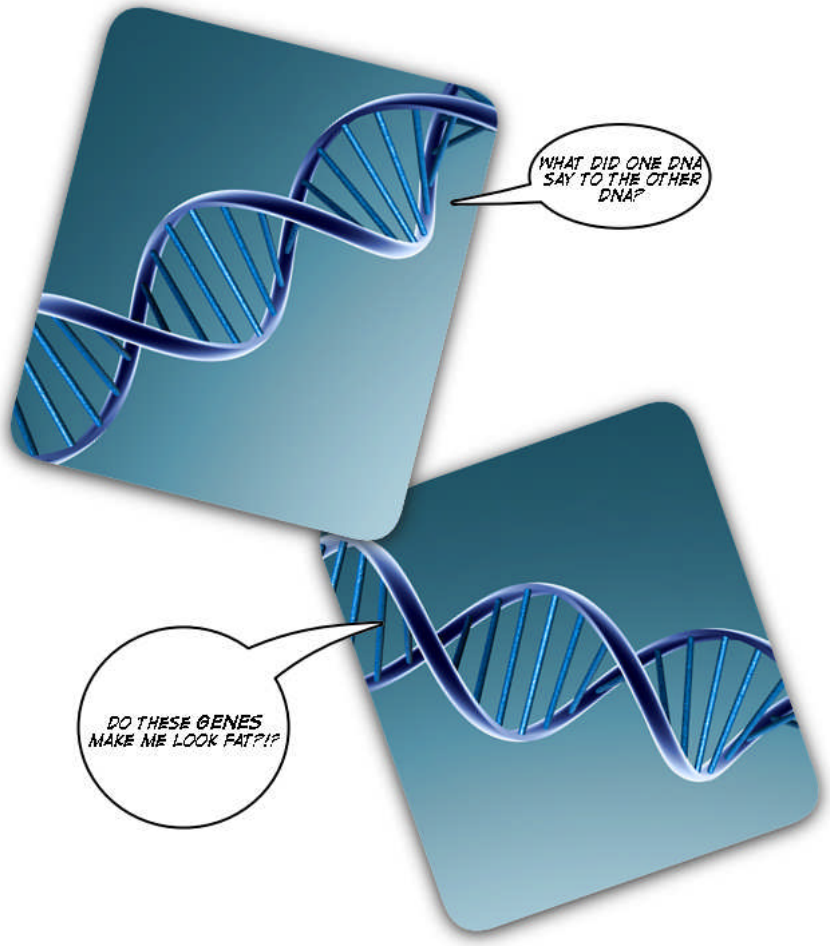
USE ROOM TEMPERATURE WATER AND ICE COLD WATER FOR EXPERIMENTATION.

Explanation:

TEMPERATURE AFFECTS THE RATE OF DIFFUSION THROUGH A CELL MEMBRANE THE SAME WAY IT DOES THROUGH A TEA BAG. THE SIZE OF THE WATER STAIN SHOULD BE NOTICEABLY GREATER WITH THE WARMER WATER. THE ADDITION OF HEAT TO THE TEA BAG CAUSES ITS MOLECULES TO MOVE MUCH FASTER THAN AT ROOM TEMPERATURE. THIS ENERGY IS MORE READILY RELEASED IN A SHORTER PERIOD OF TIME THAN A TEA BAG FILLED WITH ROOM TEMPERATURE OR COLD WATER.

Independent variable: TEMPERATURE OF THE WATER
dependent variable: SIZE OF THE WATER STAIN
hypothesis:
IF THE TEMPERATURE OF THE WATER IS (INCREASED/DECREASED), THEN SIZE OF THE WATER STAIN WILL (INCREASE/DECREASE).

WEEK 30: ORGANELLES PART I



DAY ONE

TODAY, YOU AND YOUR CHILD WILL:

1. READ THE TEXT
2. REVIEW THE TEXT WITH YOUR CHILD
3. COMPLETE THE STUDENT WORKSHEETS
4. FIND THE MATERIALS YOU WILL NEED FOR DAYS TWO AND THREE

DURING YOUR REVIEW, THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT PARTS OF YOUR CHILD'S READING FOR THIS WEEK.

CELLS HAVE ORGANELLES THAT PERFORM SPECIFIC TASKS WITHIN THE CELL. EVERY CELL IS SURROUNDED BY A MEMBRANE THAT SEPARATES IT FROM THE OUTSIDE WORLD. INSIDE THE CELL IS A CONCENTRATED MIXTURE OF THOUSANDS OF DIFFERENT MOLECULES WHICH FORM A VARIETY OF SPECIALIZED STRUCTURES THAT CARRY OUT SUCH CELL FUNCTIONS AS ENERGY PRODUCTION (MITOCHONDRIA), TRANSPORT OF PROTEIN ("ER"), SYNTHESIS OF NEW CHEMICAL MESSENGERS (RIBOSOMES), AND THE STORAGE OF DNA.

DEFINITIONS:

NUCLEUS	"NEW-KLEE-US"; THE LARGEST ORGANELLE IN A PLANT OR ANIMAL CELL; CONTAINS THE DNA
RIBOSOMES	"RI-BOW-SO-M"; MAKE PROTEIN FOR THE CELL
ER	QUICKLY SENDS PROTEIN MESSAGES TO ORGANELLES
RNA	"MESSAGES" SENT BY DNA THAT ARE READ BY RIBOSOMES
MITOCHONDRIA	"MIGHT-O-CON-DREE-ON"; AN ORGANELLE THAT TAKES NUTRIENTS FROM PLANTS AND ANIMALS AND CHANGES IT INTO ENERGY FOR THE CELL

SAMPLE QUESTIONS TO ASK AFTER YOUR CHILD FINISHES THEIR READING FOR DAY ONE:

WHAT IS THE MOST IMPORTANT JOB OF THE NUCLEUS?

THE MOST IMPORTANT JOB OF THE NUCLEUS IS TO HOLD ONTO THE DNA.

DOES DNA MAKE PROTEIN FOR THE CELL?

NOT REALLY. IT SENDS OUT "ORDERS" TO THE RIBOSOMES SO THEY CAN MAKE PROTEINS.

WHAT IS THE GOOEY FLUID THAT CONTAINS ALL OF A CELL'S ORGANELLES?

THE GOOEY FLUID IS CYTOPLASM.

WHY IS IT SO IMPORTANT THAT YOU EAT A LOT OF PROTEIN IN YOUR FOOD?

PROTEIN IS DIGESTED BY YOUR BODY AND RECYCLED TO MAKE NEW PROTEIN FOR YOUR CELLS.

ANSWERS TO WORKSHEET QUESTIONS FOR WEEK 30:

PAGE ONE:

NUCLEUS
ER
MITOCHONDRIA
RIBOSOMES

PAGE TWO:

4 – NUCLEUS
1 – RIBOSOMES
2 – ER
3 – MITOCHONDRIA

PAGE THREE:

"COLOR THE ANIMAL CELL..."

DAY TWO

TODAY, YOU AND YOUR CHILD WILL:

1. REVIEW DAY ONE USING THE FOLLOWING TEXT
2. RUN THE ACTIVITY: "THE HIDDEN CODE OF CELLS"

THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT ITEMS TO REVIEW FOR YOUR ACTIVITY TODAY!

DNA INSIDE THE NUCLEUS OF A CELL SENDS OUT "ORDERS" TO RIBOSOMES WITHIN THE CYTOPLASM TO MAKE SPECIFIC PROTEINS.

THESE "ORDERS" ARE ACTUALLY SMALL COPIES OF THE DNA ITSELF WHICH ARE MADE IN THE NUCLEUS AND THEN SENT THROUGH THE CYTOPLASM. THESE COPIES ACT AS BLUEPRINTS FOR MAKING SPECIFIC PROTEINS. THE RIBOSOMES "READ" THESE COPIES AND DECODE THE BLUEPRINTS TO MAKE SPECIFIC PROTEINS THAT WILL BE NEEDED BY THE CELL.

THE HIDDEN CODE OF CELLS

CHILDREN WILL EXPLORE HOW DNA SENDS ORDERS THROUGH A SPECIAL CODE.

MATERIALS:

POPSICLE STICKS/GLUE *OR* GUMDROPS/TOOTHPICKS *OR* CLAY/TOOTHPICKS *OR* SOME KIND OF CONSTRUCTION TOYS
HIDDEN CODE CHART AND SECRET CODE (SEE ATTACHED)

ACTIVITY:

INFORM THE CHILD THAT THE DNA INSIDE THE NUCLEUS OF A CELL SENDS OUT MESSAGES THAT ARE "DE-CODED" BY RIBOSOMES. THE CODE THAT DNA USES IS VERY GOOD; HOWEVER, SOMETIMES MISTAKES ARE MADE THAT CAN BE GOOD, BAD OR NOT IMPORTANT TO THE CELL.

IN THIS ACTIVITY, THE CHILD WILL BE PLAYING THE PART OF A RIBOSOME, DE-CODING A MESSAGE FROM THE DNA. IT IS UP TO THE CHILD TO FOLLOW THE INSTRUCTIONS THE DNA IS ASKING THEM TO DO! YOU MAY GIVE THEM A HINT...

THE CHILD IS GOING TO BE BUILDING SOMETHING!

PROVIDE THE CHILD WITH THE "HIDDEN CODE CHART". THE "SECRET CODE" CAN BE FOUND ON THE FOLLOWING PAGE.

ONCE THE CHILD DE-CODES THE MESSAGE, PROVIDE THEM WITH THE NECESSARY MATERIALS TO BUILD THEIR OBJECT.

FOR THE PARENTS: THE OBJECT THAT IS TO BE BUILT IS A CUBE WITH A FOUR-SIDED "ROOF".

EXPLANATION:
WHEN THE CHILD HAS FINISHED BUILDING THEIR HOME, INFORM THEM:

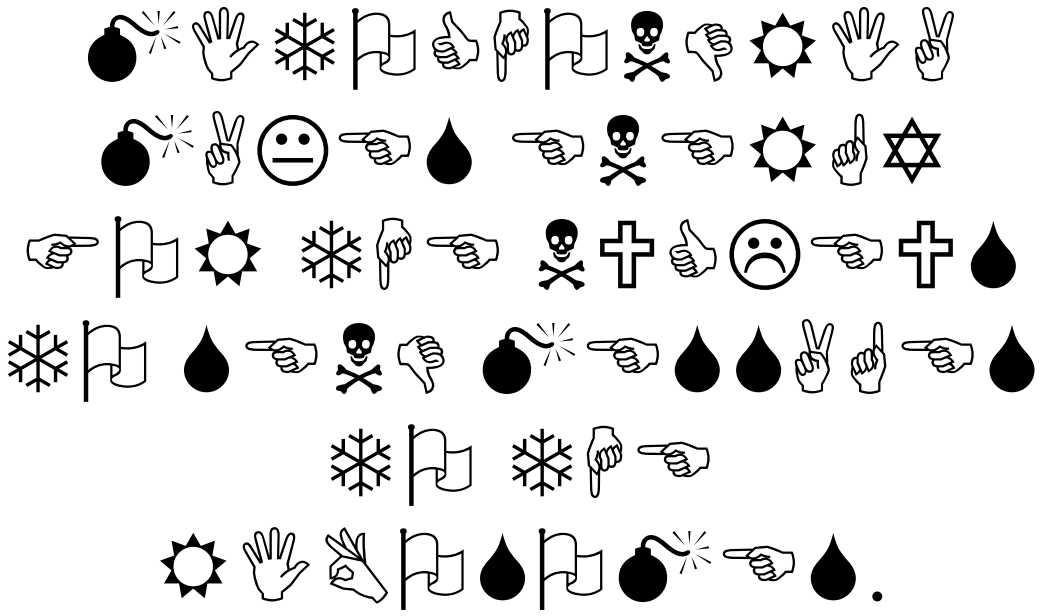
THE CODED MESSAGE WAS THE DNA,
THE RIBOSOME WAS THE CHILD,
AND THE PROTEIN WAS THE HOME.

THIS ACTION TAKES PLACE EVERY TIME THAT DNA NEEDS TO SEND A MESSAGE TO THE ORGANELLES IN THE CELL. A CODED MESSAGE IS SENT OUT THAT IS READ BY THE RIBOSOMES. THE RIBOSOMES THEN SEND THE MESSAGE TO THE ORGANELLES IN THE FORM OF PROTEIN!

HIDDEN CODE CHART

A		N	
B		O	
C		P	
D		Q	
E		R	
F		S	
G		T	
H		U	
I		V	
J		W	
K		X	
L		Y	
M		Z	

SECRET CODE:



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DAY THREE

TODAY, YOU AND YOUR CHILD WILL:

1. REVIEW DAY ONE USING THE FOLLOWING TEXT
2. RUN THE ACTIVITY: "CRACKING OPEN THE NUCLEUS"

THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT ITEMS TO REVIEW FOR YOUR ACTIVITY TODAY!

REMOVING DNA FROM CELLS IS THE PRIMARY JOB FOR SCIENTISTS WHO STUDY MOLECULAR GENETICS.

EXPENSIVE EQUIPMENT IS NOT NEEDED TO OBTAIN A SAMPLE OF DNA FROM AN ORGANISM.

CRACKING OPEN THE NUCLEUS

CHILDREN WILL TAKE THE DNA OUT OF A BANANA.

MATERIALS:

BANANA
SALT
WARM WATER
BLENDER
LIQUID SOAP
TOOTHPICKS
STRAINER
GLASS JAR
RUBBING ALCOHOL

ACTIVITY:

CUT THE BANANA INTO SMALL PIECES.

PLACE THE PIECES INTO A BLENDER. ADD A TEASPOON OF SALT AND COVER THE MIXTURE WITH WARM WATER.

MIX IN THE BLENDER FOR 10 SECONDS.

POUR THE BLENDED MIXTURE THROUGH THE STRAINER AND COLLECT THE LIQUID IN THE GLASS JAR. YOU SHOULD RECEIVE A GENEROUS AMOUNT OF LIQUID!

ADD TWO TEASPOONS OF LIQUID SOAP TO THE LIQUID AND SLOWLY MIX IT IN! DO NOT CREATE BUBBLES WHILE YOU STIR!

CAREFULLY POUR AN EQUAL AMOUNT OF RUBBING ALCOHOL DOWN THE SIDE OF THE GLASS. ALLOW THE MIXTURE TO STAND FOR AT LEAST FIVE MINUTES. DO NOT MIX!!!

USE THE TOOTHPICK TO SCOOP UP THE WHITE/MILKY-LOOKING SUBSTANCE THAT IS FLOATING IN THE RUBBING ALCOHOL. THIS SUBSTANCE IS YOUR DNA!

Explanation:

THE MATERIAL YOUR CHILD REMOVED FROM THE BANANA WAS THE BLUEPRINTS FOR A BANANA TREE TO STAY ALIVE. THE DNA YOU TOOK FROM THIS FRUIT, AT ONE TIME, WAS CONTAINED INSIDE OF THE PLANT CELL'S NUCLEUS. THIS IS THE MATERIAL THAT SENT MESSAGES THROUGHOUT THE CYTOPLASM FOR THE RIBOSOMES TO READ AND MAKE PROTEIN.

WHY LIQUID SOAP? THE CELL MEMBRANE AND NUCLEAR MEMBRANE OF ANY PLANT IS MADE UP OF FATS CALLED LIPIDS. WE USE SOAP EVERYDAY (HOPEFULLY) TO BREAK APART THINGS LIKE DIRT AND GRIME. BUT SOAP ALSO BREAKS APART OILS AND FATS TOO. SO, ALL OF THOSE LIPIDS THAT ARE USED TO PROTECT THE CELL IN ITS MEMBRANE CANNOT STAY TOGETHER WHEN YOU PUT A LOT OF SOAP ON THEM! THE SOAP ACTUALLY BREAKS APART THE MEMBRANES OF THE CELL, WITHOUT HURTING THE ORGANELLES INSIDE! COOL, HUH?!?!

WEEK 31: ORGANELLES PART II

DAY ONE

TODAY, YOU AND YOUR CHILD WILL:

1. READ THE TEXT
2. REVIEW THE TEXT WITH YOUR CHILD
3. COMPLETE THE STUDENT WORKSHEETS
4. FIND THE MATERIALS YOU WILL NEED FOR DAYS TWO AND THREE

DURING YOUR REVIEW, THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT PARTS OF YOUR CHILD'S READING FOR THIS WEEK.

CELLS HAVE STORAGE AREAS, CALLED VACUOLES, WHERE EXTRA WATER AND NUTRIENTS CAN BE FOUND. IN ADDITION, OTHER ORGANELLES, KNOWN AS GOLGI BODIES, PACKAGE CHEMICAL MESSENGERS TO BE SENT OUTSIDE THE CELL MEMBRANE TO OTHER CELLS. SPECIAL ORGANELLES CALLED LYSOSOMES REMOVE WASTE FROM INSIDE THE CELL.

PLANT CELLS CONTAIN CHLOROPLASTS, THE SITE OF PHOTOSYNTHESIS. PLANTS USE SOLAR ENERGY TO COMBINE CARBON DIOXIDE AND WATER INTO FOOD THEY CAN USE. THIS PROCESS OF PHOTOSYNTHESIS PROVIDES A VITAL CONNECTION BETWEEN THE SUN AND THE ENERGY NEEDS OF LIVING SYSTEMS.

DEFINITIONS:

LYSOSOME	"LIE-SO-SO-M"; AND ORGANELLE THAT GETS RID OF THE WASTE INSIDE A CELL
GOLGI BODY	AN ORGANELLE THAT WRAPS UP PROTEINS INTO A BUNDLE INSIDE A CELL
VACUOLE	AN ORGANELLE THAT STORES EXTRA WATER AND NUTRIENTS
CELL WALL	A STIFF STRUCTURE THAT SURROUNDS A PLANT CELL AND PROTECTS IT FROM HARM
CHLOROPLAST	SPECIAL ORGANELLES THAT CONTAIN CHLOROPHYLL
CHLORPHYLL	"KLOR-O-FILL"; AN ORGANELLE FOUND INSIDE CHLOROPLASTS THAT USES SUNLIGHT TO MAKE FOOD FOR THE CELL

SAMPLE QUESTIONS TO ASK AFTER YOUR CHILD FINISHES THEIR READING FOR DAY ONE:

WHAT ARE TWO ORGANELLES YOU WOULD NEVER FIND IN AN ANIMAL CELL?

CELL WALL AND CHOLORPLASTS

WHAT ORGANELLE IS VERY IMPORTANT IN SENDING MESSAGES TO OTHER CELLS? WHAT DOES THIS ORGANELLE DO?

GOLGI BODY; THIS ORGANELLE WRAPS UP MESSAGES TO BE SENT TO OTHER CELLS AND SHIPS THEM OUT OF THE MEMBRANE.

WHAT IS THE DIFFERENCE BETWEEN THE GOLGI BODY AND THE "ER"?

ALTHOUGH BOTH OF THESE ORGANELLES MOVE PROTEIN MESSAGES FOR THE CELL, THE "ER" SENDS MESSAGES WITHIN THE CELL ONLY. THE GOLGI BODY SENDS PROTEN MESSAGES OUTSIDE OF THE CELL.

ANSWERS TO WORKSHEET QUESTIONS FOR WEEK 31:

PAGE ONE:

GOLGI BODY – AN ORGANELLE THAT WRAPS UP PROTEINS INTO A BUNDLE INSIDE A CELL

CHLOROPHYLL – AN ORGANELLE FOUND INSIDE CHLOROPLASTS THAT USES SUNLIGHT TO MAKE FOOD FOR THE CELL

VACUOLE – AN ORGANELLE THAT STORES EXTRA WATER AND NUTRIENTS

CHLOROPLAST – SPECIAL ORGANELLES THAT CONTAIN CHLOROPHYLL

CELL WALL – A STIFF STRUCTURE THAT SURROUNDS A PLANT CELL AND PROTECTS IT FROM HARM

LYSOSOME – AN ORGANELLE THAT GETS RID OF THE WASTE INSIDE A CELL

PAGE TWO:

2 – LYSOSOME
4 – GOLGI BODY
1 – VACUOLE
6 – CELL WALL
3 – CHLOROPLAST
5 – CHLOROPHYLL

PAGE THREE:

"COLOR THE PLANT CELL..."

DAY TWO

TODAY, YOU AND YOUR CHILD WILL:

1. REVIEW DAY ONE USING THE FOLLOWING TEXT
2. RUN THE ACTIVITY: "WHO TURNED OUT THE LIGHTS"

THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT ITEMS TO REVIEW FOR YOUR ACTIVITY TODAY!

THE CHLOROPLASTS WITHIN PLANT CELLS CONTAIN A GREEN CHEMICAL CALLED CHLOROPHYLL WHICH IS USED TO MAKE FOOD FOR ITSELF THROUGH A PROCESS CALLED PHOTOSYNTHESIS.

WHEN THE CHLOROPLASTS ARE BLOCKED FROM A LIGHT SOURCE, THEIR CELLS CANNOT PRODUCE FOOD FOR THEMSELVES AND THEY WILL PERISH.

WHO TURNED OUT THE LIGHTS?

CHILDREN WILL CHANGE THE PATTERNS OF A PLANT'S LIGHT SOURCE.

MATERIALS:

SMALL SHRUB, TREE OR HOUSEPLANT
ALUMINUM FOIL OR CARDBOARD
PAPERCLIPS
SCISSORS

ACTIVITY:

FIND A PLANT YOU CAN USE FOR AN EXPERIMENT.

CUT OUT RANDOM SHAPES OUT OF THE CARDBOARD OR ALUMINUM FOIL THAT ARE BIG ENOUGH TO COVER NEARLY HALF OF THE PLANT LEAF.

PAPERCLIP EACH SHAPE ONTO A DIFFERENT LEAF.

HAVE THE CHILD PREDICT WHAT WILL HAPPEN TO THE LEAF WITH THESE SHAPES ON THEM.

AFTER THREE-FOUR DAYS, REMOVE THE SHAPES FROM THE LEAVES AND COMPARE THE COVERED AREAS WITH THE NON-COVERED AREAS. WHERE THE CHILD'S PREDICTIONS CORRECT?

EXPLANATION:

GREEN PLANTS HAVE THE ABILITY TO MAKE THEIR OWN FOOD IN A PROCESS CALLED PHOTOSYNTHESIS. WHEN LIGHT STRIKES THE PLANT LEAVES, A GREEN PIGMENT CALLED CHLOROPHYLL (WHICH IS FOUND INSIDE OF THE CHLOROPLASTS) STARTS MAKING FOOD FOR THE PLANT.

BLOCKING THE SUNLIGHT FROM A PLANT'S LEAVES WILL KEEP THE CELLS IN THESE AREAS FROM MAKING FOOD. WITHOUT FOOD, THE CELLS WILL DIE. THIS IS WHAT YOU PROBABLY WITNESSED UNDERNEATH THE SHAPES ATTACHED TO THE LEAVES. THE COLOR CHANGE IS DUE TO THE HUGE NUMBERS OF DEAD CELLS THAT COULD NOT GET THE RESOURCES THEY NEED TO SURVIVE!

DAY THREE

TODAY, YOU AND YOUR CHILD WILL:

1. REVIEW DAY ONE USING THE FOLLOWING TEXT
2. RUN THE ACTIVITY: "RAISING AND LOWERING YOUR VITAMIN C"

THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT ITEMS TO REVIEW FOR YOUR ACTIVITY TODAY!

THE PROTECTIVE PEEL SURROUNDING AN ORANGE IS SIMILAR TO THE PROTECTIVE WALL THAT IS FOUND SURROUNDING A PLANT CELL.

BOTH AN ORANGE PEEL AND A CELL WALL ALLOWS WATER AND NUTRIENTS TO ENTER AND LEAVE THE STRUCTURE.

ESP ACTIVITY: RAISING AND LOWERING YOUR VITAMIN C

STUDENTS WILL IDENTIFY HOW AN ORANGE CAN FLOAT AND SINK IN WATER.

MATERIALS:

SEVERAL ORANGES (OTHER CITRUS FRUIT WILL DO AS WELL)
CONTAINER OF WATER (LARGE ENOUGH TO HOLD THE ORANGE)
KNIFE (OPTIONAL)

ACTIVITY:

PLACE AN ORANGE INTO THE CONTAINER OF WATER. RECORD WHETHER IT SINKS OR FLOATS.

REMOVE A PORTION OF THE SKIN FROM THE ORANGE.

PLACE THE ORANGE INTO THE WATER AND RECORD WHETHER IT SINKS OR FLOATS.

FOR EXPERIMENTATION, REMOVE MORE OF THE PEEL AND TEST THE ORANGE'S ABILITY TO SINK OR FLOAT.

EXPLANATION:

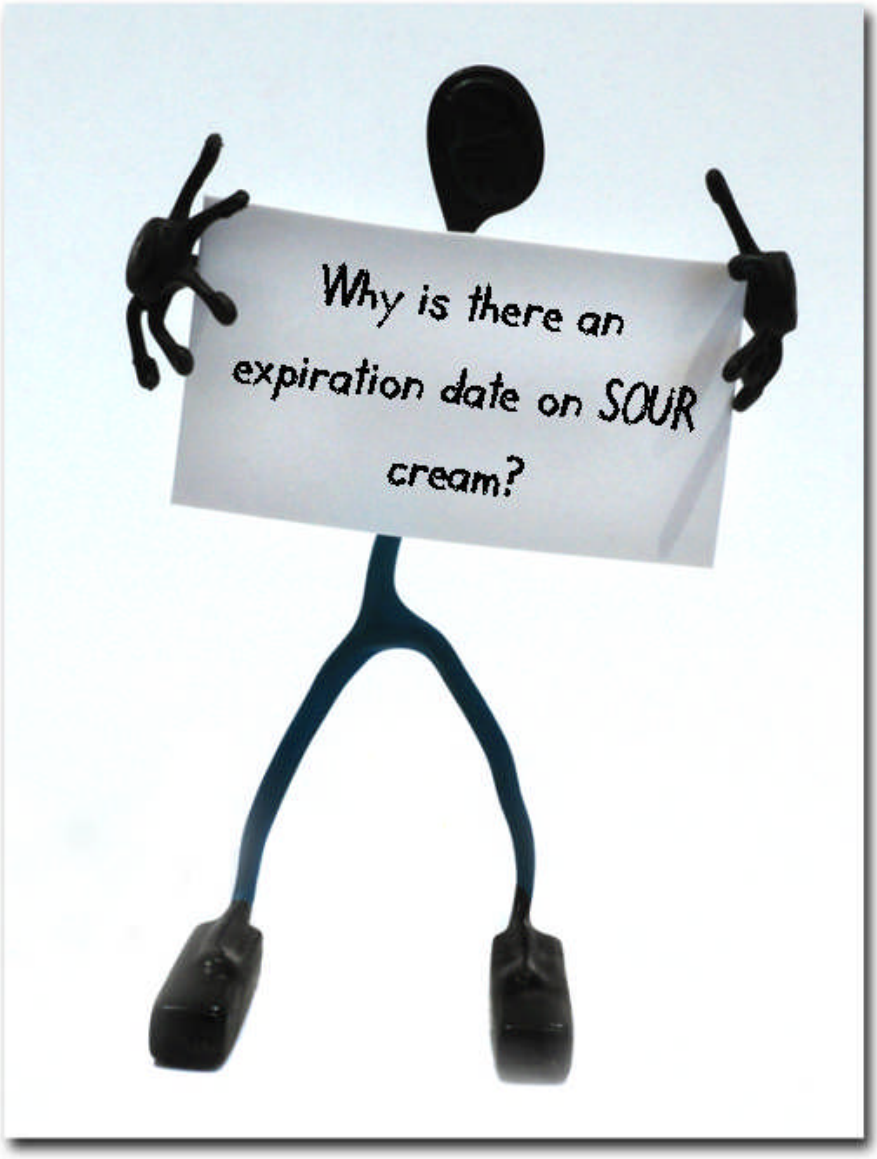
AN ORANGE IS MORE BUOYANT AS ITS SKIN PROVIDES A WATER-TIGHT BOUNDARY BETWEEN THE ORANGE AND THE WATER. THE INSIDE OF THE ORANGE (WHICH IS MOSTLY A MIXTURE OF SUGARY, PULP-FILLED WATER) IS MORE DENSE THAN THE WATER IN THE CONTAINER. WITHOUT IT'S SKIN TO ACT AS A LIFE-PRESERVER, IT SINKS TO THE BOTTOM.

THIS OUTER PROTECTION IS SIMILAR TO HOW A CELL WALL PROTECTS THE INSIDE OF A PLANT CELL. EVERY ORANGE HAS A STEM ON ITS TOP. THIS IS WHERE THE NUTRIENTS FROM AN ORANGE TREE CAN BE SENT INTO THE ORANGE ITSELF! A CELL WALL HAS MANY SIMILAR OPENINGS, ALLOWING MATERIALS INTO AND OUT OF, THE CELL!

INDEPENDENT VARIABLE: AMOUNT OF SKIN ON THE ORANGE
DEPENDENT VARIABLE: ABILITY OF THE ORANGE TO FLOAT
HYPOTHESIS:

IF THE AMOUNT OF SKIN ON THE ORANGE IS (INCREASED/DECREASED), THEN THE ABILITY OF THE ORANGE TO FLOAT WILL (INCREASE/DECREASE).

WEEK 32: BACTERIAL CELLS



DAY ONE

TODAY, YOU AND YOUR CHILD WILL:

1. READ THE TEXT
2. REVIEW THE TEXT WITH YOUR CHILD
3. COMPLETE THE STUDENT WORKSHEETS
4. FIND THE MATERIALS YOU WILL NEED FOR DAYS TWO AND THREE

DURING YOUR REVIEW, THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT PARTS OF YOUR CHILD'S READING FOR THIS WEEK.

PROKARYOTIC/BACTERIAL CELLS REQUIRE NUTRIENTS AND WATER IN ORDER TO SURVIVE. HOWEVER, THESE ORGANISMS DO NOT CONTAIN ORGANELLES TO HELP WITH THIS TASK. THEREFORE, SOME BACTERIA USE FLAGELLA TO MOVE THEM TOWARDS THESE RESOURCES WHILE OTHERS MAKE THEIR OWN FOOD THROUGH PHOTOSYNTHESIS. IN ADDITION, BACTERIAL CELLS PROTECT THEMSELVES, MUCH LIKE PLANT CELLS, WITH THE USE OF A CELL WALL.

THERE ARE NO NEW DEFINITIONS FOR THIS CHAPTER. IT IS INTENDED TO BE A REVIEW OF THE CELL ORGANELLES AND A BRIEF BACKGROUND INTO THE STRUCTURE OF A BACTERIAL CELL.

SAMPLE QUESTIONS TO ASK AFTER YOUR CHILD FINISHES THEIR READING FOR DAY ONE:

WHAT ARE SOME WAYS THAT BACTERIA CAN GET THE NUTRIENTS THEY NEED TO SURVIVE?

Some bacteria can move towards a food source through the use of a flagella. Other bacteria can make their own with the help of chloroplasts.

WHICH KINDS OF CELLS HAVE A CELL WALL TO PROTECT THEM?

Plant cells and bacteria have cell walls

WHAT IS THE MAIN DIFFERENCE BETWEEN BACTERIAL CELLS AND ALL OTHER KINDS OF CELLS?

Bacterial cells do not contain organelles. This is not the case for all other kinds of cells.

ANSWERS TO WORKSHEET QUESTIONS FOR WEEK 32:

PAGE ONE:

A FLAGELLA IS A LONG WHIP-LIKE TAIL THAT HELPS TO PUSH THE BACTERIA THROUGH A LIQUID.

PAGE TWO:

	PLANT CELL	ANIMAL CELL	BACTERIAL CELL
CELL PARTS			
DNA	YES	YES	YES
CELL MEMBRANE	YES	YES	YES
CYTOPLASM	YES	YES	YES
NUCLEUS	YES	YES	NO
RIBOSOMES	YES	YES	NO
"ER"	YES	YES	NO
MITOCHONDRIA	YES	YES	NO
LYSOSOME	YES	YES	NO
GOLGI BODY	YES	YES	NO
VACUOLE	YES	YES	NO
CELL WALL	YES	NO	YES
CHLOROPLAST	YES	NO	NO
CHLOROPHYLL	YES	NO	SOME DO

UNIT EIGHT REVIEW
ANSWER KEY

MATCH THE WORDS IN THE FIRST COLUMN TO THE BEST AVAILABLE ANSWER IN THE SECOND COLUMN.

3 - MITOCHONDRIA
5 - ER
6 - VACUOLE
1 - NUCLEUS
4- GOLGI BODY
2 - LYSOSOME

FILL IN THE MISSLING BOXES WITH "YES" OR "NO".

	PLANT CELL	ANIMAL CELL	BACTERIAL CELL
CELL PARTS			
DNA	YES	YES	YES
CELL MEMBRANE	YES	YES	YES
CYTOPLASM	YES	YES	YES
NUCLEUS	YES	YES	NO
CHOLORPLAST	YES	NO	NO
CELL WALL	YES	NO	YES

BE CERTAIN TO GO OVER YOUR DEFINITIONS FOR THE TEST!!!

DAY TWO

TODAY, YOU AND YOUR CHILD WILL:

1. REVIEW DAY ONE USING THE FOLLOWING TEXT
2. RUN THE ACTIVITY: "CELL MOBILE"

THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT ITEMS TO REVIEW FOR YOUR ACTIVITY TODAY!

THE USE OF ANALOGIES IS AN EFFECTIVE WAY FOR CHILDREN TO IDENTIFY THE FUNCTIONS OF CELLULAR ORGANELLES.

THE RELATIONSHIP BETWEEN THE ORGANELLES IS THE MOST IMPORTANT PART OF LEARNING ABOUT THESE STRUCTURES. IN FACT, NON OF THESE STRUCTURES CAN SURVIVE WITHOUT ALL OF THEM WORKING TOGETHER!

CELL MOBILE

CHILDREN WILL REVIEW THE FUNCTIONS OF CELL ORGANELLES THROUGH THE CONSTRUCTION OF A 3D MOBILE.

MATERIALS:

CARDBOARD SHEET (5"X36")
FISHING LINE
DUCT TAPE
SCISSORS
SEVERAL DIFFERENT ITEMS CHOSEN BY THE CHILD
ORGANELLE REVIEW SHEET (SEE ATTACHED)

ACTIVITY:

BEND THE CARDBOARD SHEET AROUND AND OVERLAP THE ENDS BY THREE TO FOUR INCHES. DUCT TAPE THESE ENDS TOGETHER TO FORM A LARGE HOOP OF CARDBOARD. POKE A HOLE IN THE TOP OF THE HOOP AND ATTACH A LONG PIECE OF FISHING LINE TO THE STRUCTURE SO THAT IT CAN BE HUNG FROM A STURDY STRUCTURE. DO NOT HANG IT UP AT THIS TIME!!!

USE THE ATTACHED SHEET TO REVIEW THE ORGANELLES THEY HAVE BEEN STUDYING. THE CHILD WILL NEED TO FIND SMALL OBJECTS THAT CAN FIT INTO THEIR "HOOP" THAT MAY HAVE SIMILAR FUNCTIONS. FOR EXAMPLE:

"ER" – TOY CAR

THE TOY CAR MOVES PEOPLE AROUND LIKE THE "ER" MOVES PROTEIN AROUND

MITOCHONDRIA – CANDY BAR

THE CANDY BAR GIVES US ENERGY JUST LIKE THE MITOCHONDRA GIVES ENERGY TO THE CELL

ONCE THE CHILD FINDS ALL THE MATERIALS FOR EACH OF THE FOLLOWING ORGANELLES, THEY CAN START ATTACHING THEM TO THE FISHING LINE. THE FISHING LINE IS THEN ATTACHED TO THE TOP OF THE CARDBOARD LOOP WITH DUCT TAPE.

THE MOBILE CAN THEN BE HUNG FROM A STABLE STRUCTURE SO THAT THE SMALLER OBJECTS ARE ALL CONTAINED WITHIN THE CARDBOARD HOOP ("CELL MEMBRANE")

ORGANELLE REVIEW SHEET

ORGANELLE	FUNCTION	OBJECT CHOSEN
NUCLEUS	PROTECTS THE DNA	
RIBOSOMES	MAKES PROTEINS FOR THE CELL	
"ER"	SENDS PROTEIN MESSAGES TO THE ORGANELLES	
MITOCHONDRIA	MAKES ENERGY FOR THE CELL	
LYSOSOME	GETS RID OF WASTES	
GOLGI BODY	WRAPS UP PROTEINS FOR THE CELL	
VACUOLE	STORES EXTRA WATER AND NUTRIENTS	
CHLOROPHYLL	MAKES FOOD FOR A PLANT CELL	
FLAGELLA	HELPS SOME CELLS MOVE	
CELL WALL	PROTECTS A PLANT CELL	

DAY THREE

TODAY, YOU AND YOUR CHILD WILL:

1. REVIEW DAY ONE USING THE FOLLOWING TEXT
2. RUN THE ACTIVITY: "A BEDTIME STORY"

THE FOLLOWING LIST WILL GIVE YOU THE MOST IMPORTANT ITEMS TO REVIEW FOR YOUR ACTIVITY TODAY!

CHILDREN LEARN BY DIFFERENT MEANS AND THE LARGE AMOUNT OF INFORMATION THAT EXISTS WITHIN THIS UNIT REQUIRES PRACTICE IN ORDER TO UNDERSTAND.

A CREATIVE WRITING EXERCISE PROVIDES A BREAK FROM THE TYPICAL SCIENCE ACTIVITY AND ALLOWS A CHILD TO EXPRESS THEMSELVES IN OTHER WAYS WHILE STILL REFLECTING UPON THE SCIENTIFIC CONTENT.

A BEDTIME STORY...

CHILDREN WILL WRITE A BEDTIME STORY ABOUT ALL OF THE ORGANELLES THEY HAVE STUDIED SO FAR.

MATERIALS:

PAPER AND PENCIL

ACTIVITY:

REVIEW THE FOLLOWING ORGANELLES WITH YOUR CHILD:

NUCLEUS	VACUOLE
RIBOSOMES	CELL WALL
ER	CHLOROPLAST
MITOCHONDRIA	CHLOROPHYLL
NUCLEAR MEMBRANE	LYSOSOME
GOLGI BODY	

INSTRUCT THEM TO USE THE ANALOGIES THAT HAVE BEEN PROVIDED, OR MAKE NEW ONES UP, TO WRITE A BEDTIME STORY.

YOU MAY NEED TO PROVIDE THEM A POSSIBLE BEGINNING TO THE STORY SUCH AS...

ONCE UPON A TIME, THERE WAS AN EVIL RULER NAMED NUCLEUS, WHO DID NOTHING ALL DAY LONG BUT DEMAND THINGS BE DONE FOR HIM...

OR...

ONCE UPON A TIME, THERE WAS A HAPPY LITTLE CANDY MAKER NAMED CHLOROPHYLL WHO SPENT ALL DAY LONG MAKING SUGARY SWEETS FOR HIS TOWN...

REVIEW OF ANALOGIES FROM CHAPTERS 29-32:

THE DNA **(THE BOSS)** WANTS TO SEND OUT MESSAGES BUT IT CANNOT LEAVE ITS OFFICE **(THE NUCLEUS).** SO IT MAKES RNA **(THE MESSAGE)** AND SENDS IT OUT INTO THE CYTOPLASM FOR THE RIBOSOMES **(THE DECODERS)** TO READ. THE RIBOSOMES READ THE MESSAGE **(RNA)** AND MAKE NEW MESSAGES **(PROTEINS)** THAT CAN BE READ BY THE OTHER ORGANELLES. THESE NEW MESSAGES WILL TELL THE ORGANELLES WHAT TO DO AND WHEN TO DO IT.

SOMETIMES, THESE MESSAGES **(PROTEINS)** ARE DELIVERED FASTER BY TRAVELING ON THE "ER" **(THE HIGHWAY).**

OTHER TIMES, THESE PROTEINS ARE SENT OUTSIDE OF THE CELL AFTER THEY ARE BUNDLED UP IN THE GOLGI BODY **(PACKING STATION).**

IF ANY EXTRA PROTEIN, NUTRIENTS OR WATER IS NEEDED TO BE STORED, IT GOES INTO THE VACUOLE **(THE WAREHOUSE).**

WHEN THERE IS ANY WASTE THAT THE CELL MAKES, IT GOES TO THE LYSOSOME **(GARBAGE DISPOSAL)** TO BE BROKEN DOWN INTO SMALLER PIECES.

UNIT EIGHT TEST

MATCH THE WORDS IN THE FIRST COLUMN TO THE BEST AVAILABLE ANSWER IN THE SECOND COLUMN.

____	MITOCHONDRIA	1. AN ORGANELLE FOUND INSIDE CHLOROPLASTS THAT USES SUNLIGHT TO MAKE FOOD FOR THE CELL
____	ER	2. ORGANISMS BELONGING TO THE KINGDOMS ARCHAEBACTERIA OR EUBACTERIA
____	MEMBRANE	3. BODY PART THAT ACTS LIKE A TAIL TO MOVE BACTERIA THROUGH A LIQUID
____	NUCLEUS	4. ORGANELLE THAT SENDS PROTEIN MESSAGES TO OTHER ORGANELLES
____	VACUOLE	5. THE LARGEST ORGANELLE IN A PLANT OR ANIMAL CELL; CONTAINS THE DNA
____	CHLOROPHYLL	6. A COVERING THAT SURROUNDS ANIMAL CELLS
____	LYSOSOME	7. AN ORGANELLE THAT STORES EXTRA WATER AND NUTRIENTS
____	EUKARYOTIC	8. AN ORGANELLE THAT TURNS NUTRIENTS INTO ENERGY FOR THE CELL
____	FLAGELLA	9. AN ORGANELLE THAT GETS RID OF THE WASTE INSIDE A CELL
____	CELL WALL	10. CELLS OR ORGANISMS THAT BELONG TO ANY KINGDOM EXCEPT ARCHAEBACTERIA AND EUBACTERIA
____	PROKARYOTIC	11. AN ORGANELLE THAT WRAPS UP PROTEINS INTO A BUNDLE INSIDE A CELL
____	GOLGI BODY	12. A STIFF STRUCTURE THAT SURROUNDS AND PROTECTS A PLANT CELL

WHICH ONE IS RIGHT? CIRCLE THE CORRECT ANSWER.

1. THE MAIN DIFFERENCE BETWEEN PROKARYOTIC AND EUKARYOTIC CELLS IS...

A. PROKARYOTIC CELLS HAVE ORGANELLES
B. EUKARYOTIC CELLS HAVE DNA
C. EUKARYOTIC CELLS HAVE ORGANELLES

2. THE DIFFERENCE BETWEEN THE "ER" AND RIBOSOMES IS:

A. "ER" MAKES THE PROTEINS THAT THE RIBOSOMES SEND
B. RIBOSOMES MAKE THE PROTEINS THAT THE "ER" SENDS TO OTHER ORGANELLES
C. THE RIBOSOMES ARE FOUND INSIDE THE NUCLEUS

3. PLANT CELLS ARE PROTECTED BY:

A. A CELL WALL
B. A CELL MEMBRANE
C. A CELL WALL AND A CELL MEMBRANE

4. CELL WALLS CAN BE FOUND AROUND...

A. BACTERIA
B. ANIMAL AND PLANT CELLS
C. PLANT CELLS AND BACTERIA

5. "THE BOSS" OF A CELL IS THE:

A. NUCLEUS
B. DNA
C. MITOCHONDRIA

6. DNA SENDS MESSAGES TO OTHER CELLS BY THE USE OF:

A. GOLGI BODIES
B. ER
C. CYTOPLASM

IMAGINE YOU ARE THE DNA INSIDE AN ANIMAL CELL. TELL ME HOW YOU ARE GOING TO SEND A MESSAGE TO ANOTHER CELL THAT IS FAR AWAY FROM YOU. INSIDE YOUR STORY, YOU WILL NEED TO USE THE FOLLOWING CELL PARTS:

NUCLEUS
RIBOSOME
GOLGI BODY
CELL MEMBRANE

UNIT EIGHT TEST ANSWER KEY

MATCHING

8 MITOCHONDRIA
4 ER
6 MEMBRANE
5 NUCLEUS
7 VACUOLE
1 CHLOROPHYLL
9 LYSOSOME
10 EUKARYOTIC
3 FLAGELLA
12 CELL WALL
2 PROKARYOTIC
11 GOLGI BODY

MULTIPLE CHOICE

1. C
2. B
3. A
4. C
5. A
6. A

WRITE A STORY...

ANSWERS WILL VARY. HOWEVER, THE CHILD MUST USE THE WORDS NUCLEUS, RIBOSOME, GOLGI BODY AND CELL MEMBRANE WITHIN THEIR DESCRIPTION OF HOW THEY (AS A NUCLEUS) WILL BE SENDING A MESSAGE TO ANOTHER CELL.