# Chapter 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. Collect the materials you will need for days two and three

## National Science Education Standards covered 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 your child after completing the weekly reading.

**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:

## Page 1:

**Across:**
1. prokaryotic
5. organelles

**Down:**
2. cytoplasm
3. DNA
4. membrane
6. eukaryotic

## Page 2:

3 - prokaryotic
2 - eukaryotic
1 - membrane
4 - DNA
6 - cytoplasm
5 – organelles

## Page 3:

1. a
2. b
3. a
4. b
5. b
6. b

# Day Two:

## Today, you and your child will:

1. Review Day One using the following text
2. Run the first activity this week

**The following text 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

## Objective:

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: Lab Activity

## Today, you and your child will:

1. Review Day One using the following text
2. Run the first activity this week

## The following text 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

## Objective:

Tea bags are used to demonstrate the importance of heat around a cell membrane.

## Materials:

tea bags
paper towels
water
container of water
measuring tape

## Procedure:

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).