

# HUMAN SCIENCE Lesson Plan

## Day 1: Cell Hydration. What's That About?



### Outcomes for Today

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1. The fundamental life process of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:
  - 1.a Students know that cells are enclosed within semi permeable membranes that regulates their interaction with their surroundings.

### PREPARE

#### 1. Background Background knowledge to engage the content

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##### Why is cellular hydration so important?

Hydration is another very essential step to whole body health. We are made up of over 70% water. Every metabolic function in our cell needs water.

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

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Word:	Definition
Hydration tissues.	The process of providing an adequate amount of liquid to bodily tissues.
Homeostasis	The ability of the <u>body</u> or a <u>cell</u> to seek and maintain a <u>condition</u> of <u>equilibrium</u> or <u>stability</u> within its <u>internal environment</u> when dealing with <u>external</u> changes.
Consumption	progressive wasting of the body
Dehydration	Excessive loss of body water.

### READ

#### 3. View

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##### Video:

Go to: [discoveryunited streaming](https://discoveryunited.com/streaming)

Search: cells and hydration

Locate: Introduction to Cells (3:35 minutes)

Have students use note taking form to take notes during the video.

## RESPOND

### 4. Visual Process.

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Activity Name: **Quick Hydration Status Test**

Pinch the skin on the back of your hand and if when released your skin remains raised, you may be dehydrated. (Two pictures are provided in the article (below), demonstrating the procedure above). Discuss with a partner your results. Try this test at two different times. Once, in the morning before you eat and again after lunch. See if there is a difference!

## EXPLORE

**5. Activity** Explore more deeply with a visual or oral language activity.

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Article:

Go to: <http://www.healthynewage.com/blog/how-hydration-works/>

Search: Type in article name

Locate: Daily Water Intake: Hydration and How Much Should We Consume Each Day? By Dr. Linda Kennedy

Read: As a class

Write A Summary:

Complete the Main Ideal Organizer below for the article read. Then use the organizer to write a summary.

- First fill in the box "Topic"
- Then, locate the Main Ideas from the article.
- After this has been completed, find Details that support the Main Ideas.
- Lastly, write a summary using the information in the organizer.

**6. Discussion** Ask discussion questions that engage at many levels

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### Key Questions

- How long can a human survive without water?
- What is the name of the fluid surrounding the cell?
- What is the main component of this fluid?
- What functions does the fluid around the cell serve?
- Why is hydration essential?
- What is the primary source of water loss?

## EXTEND

### 7. Write, Draw or Speak.

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Write a paragraph by answering the following questions. Make sure you have the sentences flow as one piece of work.

What are the various ways in which the body loses water? What is the function of cell fluids? Describe various ways that humans consume water? How does dehydration come about and how is it treated?

### 8. Close

Close by extending today's lesson to what you can do in your life and the world.

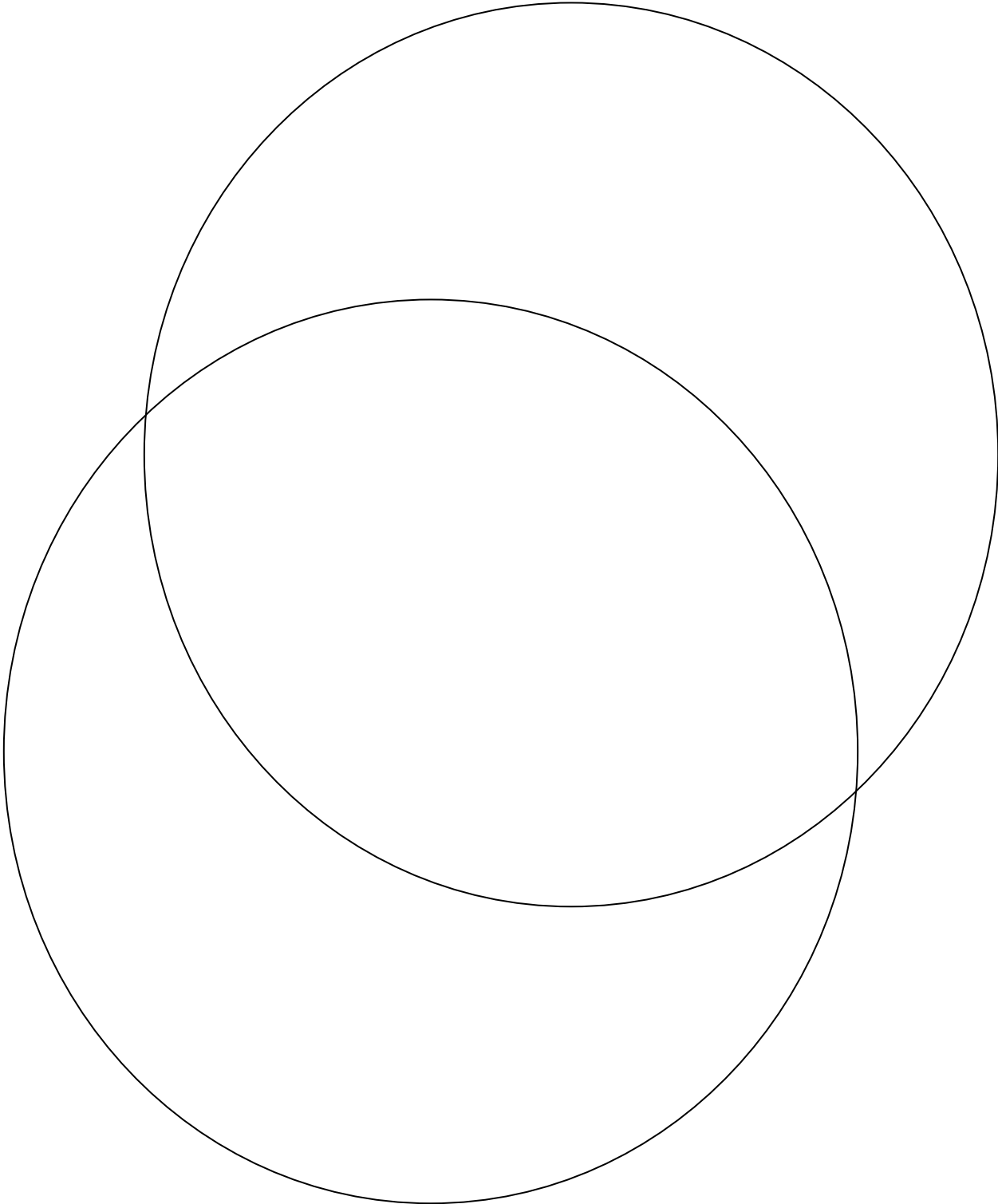
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Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

# 6g6 Venn Diagram Chart



# HUMAN SCIENCE Video Notes



Name:

Introduction to Cells

Part I:

Note taking tips: (Cornell Notes)

- Write important details from the video, segment, article, or passage in the second column;
- After you write your notes, return to the first column and add phrases, words and questions related to the details. A sketch or picture may also be helpful.

Title:

Date:

Column 1: Phrases, words, questions or a sketch related to the details in column 2.	Column 2: Important Details

Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

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# HUMAN SCIENCE Write A Summary



Name:

## Hydration and How Much Should We Consume Each Day?

Directions: Complete the Main idea Organizer below for the article. Then use the organizer to write a summary.

Topic	Main Idea	Details

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# HUMAN SCIENCE Lesson Plan

## Day 1: Bloating?? Got Gas?? Why?



### Outcomes for Today

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1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1B. Students know enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the actives of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.

### PREPARE

#### 1. Background Background knowledge to engage the content

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##### **Why do some people get diarrhea, abdominal pain, and gas when they eat cheese or drink milk?**

The reason some people get sick when they eat dairy products such as cheese and milk is due to their being lactose intolerant. Lactose intolerance is the inability or insufficient ability to digest lactose, a natural sugar found in milk and milk products. Lactose intolerance is caused by a deficiency of the enzyme lactase, which is produced by the cells lining the small intestine. Lactase breaks down lactose into two simpler forms of sugar called glucose and galactose, which are then absorbed into the bloodstream.

The most common symptoms of lactose intolerance are diarrhea, abdominal pain, bloating, gas, and nausea.

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

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Lactose: A sugar that is made up of two smaller sugars, glucose and galactose.  
Lactase: The enzyme that splits lactose into glucose and galactose  
Glucose: A type of sugar the body uses for energy  
Galactose: A sugar contained in milk. Galactose makes up half of the sugar called lactose that is found in milk.



## READ

### 3. View

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- Go to: [discoveryeducation.com](http://discoveryeducation.com) (**Subscription Based Website**)  
Search: Lactose Intolerance (located in video segments)  
Locate: Lactose Intolerance (a segment of Managing your health. Digestive System). Run time 03:42 seconds)  
Read: As a class  
Article: Lactose Intolerance, read pages 1-3  
Go to: [www.digestive.niddk.nih.gov/ddiseases/pubs/lactoseintolerance/Lactose\\_Intolerance.pdf](http://www.digestive.niddk.nih.gov/ddiseases/pubs/lactoseintolerance/Lactose_Intolerance.pdf)  
Locate: Lactose Intolerance  
Read: As a class

## RESPOND

### 4. Visual Process.

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KWL chart: Individually or as a class create a KWL chart of everything you *know* about Lactose Intolerance and what you *want* to learn about Lactose Intolerance.

## EXPLORE

### 5. Activity

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Explore more deeply with a visual or oral language activity.

- Take a class survey and find out if anyone has a family member or knows someone who is lactose intolerance. Write down race and age of the person on the board.
- Have each person in class bring a food item, in its original packaging, to school the following day. (You will use the information for Day 2 of activity assignment).

### 6. Discussion

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Ask discussion questions that engage at many levels

#### Key Questions

- What is lactose intolerance?
- What are some symptoms of being lactose intolerance?
- What type of sugar is lactose?
- Who is at risk for Lactose Intolerance?

## EXTEND

### 7. Write, Draw or Speak.

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With a partner, make a list of at least ten items a person who is lactose intolerance cannot or should not eat.

**8. Close** Close by extending today's lesson to what you can do in your life and the world.

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Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

# HUMAN SCIENCE Lesson Plan

## Day 2: Bloating?? Got Gas?? Why?



### Outcomes for Today

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1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1B. Students know enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the actives of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.

### PREPARE

#### 1. Background Background knowledge to engage the content

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##### What Causes Lactose Intolerance?

Lactose intolerance occurs when the small intestine does not produce enough of an enzyme called lactase. Another cause of lactase deficiency occurs when the small intestine or digestive diseases reduces the amount of lactase that an individual produces.

Some individuals are lactose intolerance because they inherited the gene from a family member and it has passed to him or her genetically.

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

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Please review the words from day one:

**Lactose:** A sugar that is made up of two smaller sugars, glucose and galactose.

**Lactase:** The enzyme that splits lactose into glucose and galactose

**Glucose:** A type of sugar the body uses for energy

**Galactose:** A sugar contained in milk. Galactose makes up half of the sugar called lactose that is found in milk.

### READ

#### 3. View

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Article: Lactose Intolerance

Go to: [http://kidshealth.org/teen/food\\_fitness/nutrition/lactose\\_intolerance.html](http://kidshealth.org/teen/food_fitness/nutrition/lactose_intolerance.html)

Search: Lactose Intolerance

Notes: This article has a link where you can listen to the article, as well. In this article you will learn about the causes and treatments of lactose intolerance.

Read: As a class

## RESPOND

### 4. Visual Process.

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#### Process Grid:

Directions: Use the information provided in the **Lactose Intolerance** article to complete the following process grid. Make a list of the causes and treatments of lactose intolerance as you read the article.

<b>Causes of Lactose Intolerance</b>	<b>Treatments of Lactose Intolerance</b>	<b>Who gets Lactose Intolerance</b>

## EXPLORE

### 5. Activity

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Explore more deeply with a visual or oral language activity.

- Using the food packages from Day 1 that the students brought in, create a class list of the items brought into class.
- Without looking at the food label, predict which items have dairy in them
- Locate the food label on the food items and write down all the ingredients in the food item
- Take a tally of which items have dairy in them and which do not.

**6. Discussion** Ask discussion questions that engage at many levels

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**Key Questions**

- How is ethnicity a factor in lactose intolerance?
- What are the five reasons a person can be lactose intolerance?
- What happens if a person who is lactose intolerance drinks milk?
- How do doctors diagnose a person who is lactose intolerance?
- Why is it important to look at food labels?

**EXTEND**

**7. Write, Draw or Speak.**

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Note taking tips: (Cornell Notes):

- Summarize the article in the space below. Use your own words.

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**8. Close** Close by extending today's lesson to what you can do in your life and the world.

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Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

# HUMAN SCIENCE Lesson Plan

## Day 1: Bacteria vs. Virus



### Outcomes for Today

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1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1C. Students know how prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structures.

### PREPARE

#### 1. Background Background knowledge to engage the content

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##### What is the difference between Bacteria and a virus?

Bacteria are single-celled microorganisms that thrive in many different types of environments. Some varieties live in extremes of cold or heat, while others make their home in people's intestines, where they help digest food. Most bacteria cause no harm to people.

Viruses are even smaller than bacteria and require living hosts — such as people, plants or animals — to multiply. Otherwise, they can't survive. When a virus enters your body, it invades some of your cells and takes over the cell machinery, redirecting it to produce the virus.

Perhaps the most important distinction between bacteria and viruses is that antibiotic drugs usually kill bacteria, but they aren't effective against viruses. In some cases, it may be difficult to determine whether bacteria or a virus is causing your symptoms. Many ailments — such as pneumonia, meningitis and diarrhea — can be caused by either type of microbe.

*“What's the difference between a bacterial infection and a viral infection?”* Mayo Clinic.com. web. Oct. 13, 2009

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

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**Bacteria:** Bacteria are microscopic organisms whose single cells have neither a membrane-bounded nucleus nor other membrane-bounded organelles. They are unicellular organism that have a cell wall, cell

membrane, cytoplasm no nucleus.

**Prokaryotes:** Prokaryotes are the single-celled organisms, such as bacteria, and are roughly one micrometer in diameter. Prokaryotes do not have a nucleus that houses its genetic material.

**Eukaryotes:** Any organism composed of one or more cells, each of which contains a clearly defined nucleus enclosed by a membrane, along with organelles

**Organelles:** Any of a number of membrane-bound structures within a cell that have specific functions, such as reproduction or metabolism.

**Cells:** Any of the protoplasmic masses making up organized tissue, consisting of a nucleus surrounded by cytoplasm enclosed in a cell or plasma membrane. It is the fundamental, structural, and functional unit of living organisms. In some of the lower forms of life, such as bacteria, a morphological nucleus is absent, although nucleoproteins (and genes) are present.

**Virus:** A submicroscopic infectious agent that is unable to grow or reproduce outside a host cell. It is non-cellular but consisting of a core of DNA or RNA surrounded by a protein coat.

## READ

### 3. View

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Video: Comparing Prokaryotes and Eukaryotes  
Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (Subscription Based Website)  
**Search:** Prokaryotes and Eukaryotes: A Segment of: Biology: Asexual Reproduction and Alternation of Generations  
Locate: Comparing Prokaryotes and Eukaryotes (approximate run time 00:30)

Video: **Understanding Bacteria**  
Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (Subscription Based Website)  
**Search:** Prokaryotes and Eukaryotes  
Locate: Understanding Bacteria (approximate run time 03:55)

## RESPOND

### 4. Visual Process.

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#### Venn Diagram

Compare and contrast prokaryotes and eukaryotes. Create a Venn diagram to show their similarities and differences.

## EXPLORE

**5. Activity** Explore more deeply with a visual or oral language activity.

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Video notes:

You will take notes on the video shown today. Use the worksheet at the end of the lesson to help guide the students.

**6. Discussion** Ask discussion questions that engage at many levels

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**Key Questions**

- What is the major difference between prokaryotes and eukaryotes?
- What is bacteria?
- Explain good and bad bacteria?
- What is the difference between bacteria and viruses?

## EXTEND

**7. Write, Draw or Speak.**

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Have students create a list of the different types of viruses a person can catch.

**8. Close** Close by extending today's lesson to what you can do in your life and the world.

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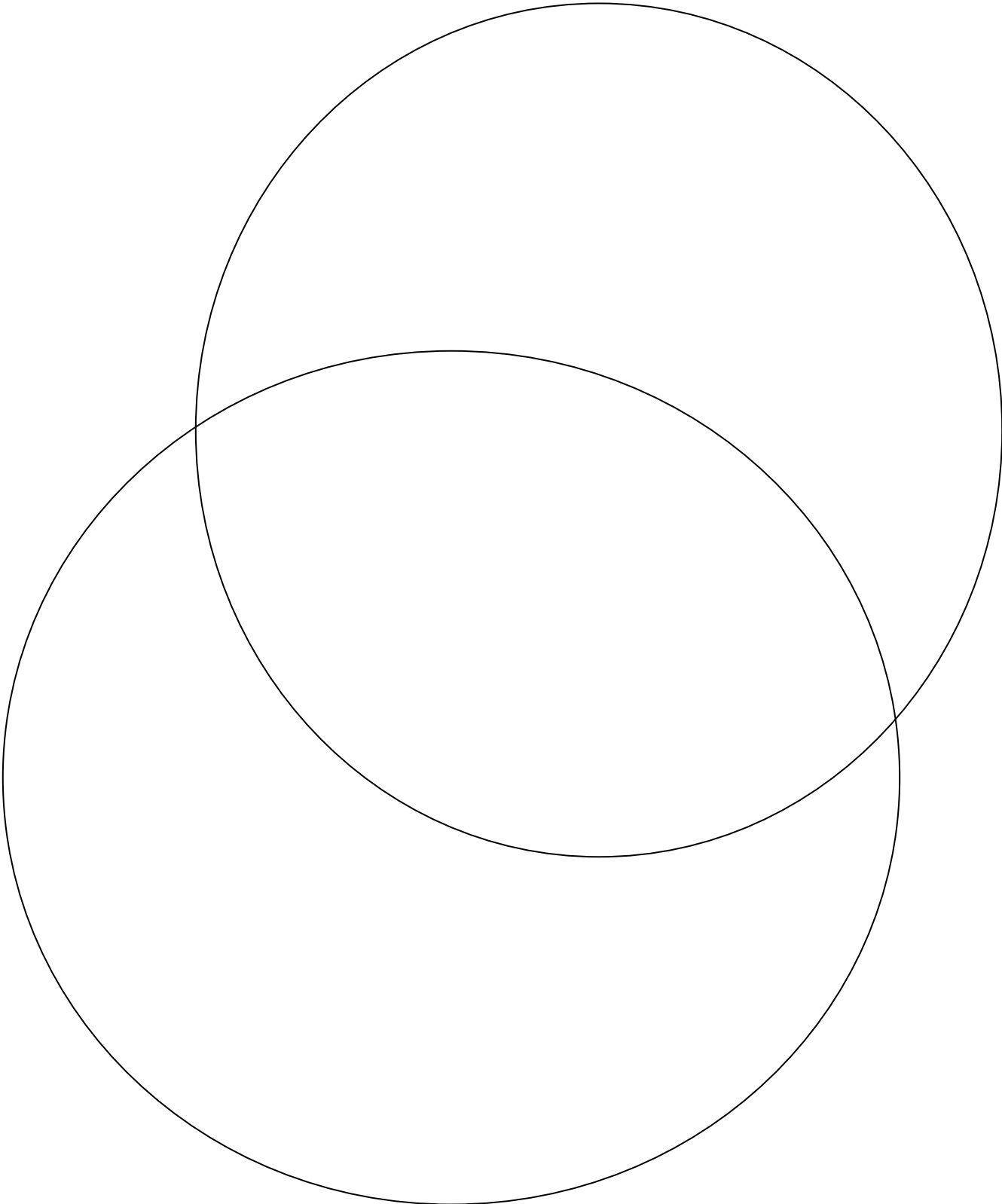
Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	



# 6g6 Venn Diagram Chart



# HUMAN SCIENCE Video Notes



Name:

Part I:

Note taking tips: (Cornell Notes)

- Write important details from the video, segment, article, or passage in the second column;
- After you write your notes, return to the first column and add phrases, words and questions related to the details. A sketch or picture may also be helpful.

Title:

Date:

Column 1: Phrases, words, questions or a sketch related to the details in column 2.	Column 2: Important Details

Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

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# HUMAN SCIENCE Lesson Plan

## Day 1: How is the Flu like HIV?



### Outcomes for Today

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1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1D. Students know the central dogma of molecular biology outlines the flow of information from transcription of ribonucleic acid (RNA) in the nucleus to translation of proteins on ribosome's in the cytoplasm.

### PREPARE

#### 1. Background Background knowledge to engage the content

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##### How is the Flu like HIV (Human Immunodeficiency Virus)?

Influenza, commonly shortened to "flu," is an extremely contagious respiratory illness caused by influenza A or B viruses. You usually become infected with the flu when the virus enters your mouth or nose. Typically, the flu lasts from 1 to 2 weeks and is passed through the air. Flu appears most frequently in winter and early spring. The flu virus attacks the body by spreading through the upper and/or lower respiratory tract. The flu is a viral infection of the respiratory tract.

HIV, also known as Human Immunodeficiency Virus, is the virus that causes AIDS. Viruses such as HIV cannot grow or reproduce on their own, they need to infect the cells of a living organism in order to replicate (make new copies of themselves). The human immune system usually finds and kills viruses fairly quickly, but HIV attacks the immune system itself – the very thing that would normally get rid of a virus.

Both the Flu and HIV are considered viral infections. A viral infection is any type of illness or disease caused by a virus, a type of microbe. Microbes are tiny organisms that cannot be seen without a microscope and include bacteria, fungi, and some parasites, as well as viruses. A viral infection occurs when a virus enters the body through such processes as breathing air contaminated with a virus, eating contaminated food, or by having sexual contact with a person who is infected with a virus. In a viral infection, the virus invades the inside of the body's cells in order to reproduce. A virus then spreads to other cells and repeats the process.

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

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<b>Virus:</b>	nonliving particle made up of a piece of nucleic acid covered with a protein
<b>Pathogens:</b>	an agent that causes disease
<b>Viral:</b>	relating to, typical of, or caused by a virus
<b>Phagocytes:</b>	blood cells absorb virus in bacteria
<b>T-cells:</b>	special type of white blood cell that attacks antigens
<b>Antigen:</b>	single molecule that produces an immune response

## READ

### 3. View

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Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)

Search: Flu

Locate: Catching the Flu Virus (approximate run time 02:11)

Video: Flu-fighting Cells

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)

Search: Flu: A Segment of: [The Ultimate Guide: Human Body \(Grades 09-12\)](#)

Locate: Catching the Flu Virus (approximate run time 02:46)

## RESPOND

### 4. Visual Process.

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Venn Diagram: Compare and contrast the similarities and differences of the Flu and HIV. Use the information in the video to help fill out the chart.

## EXPLORE

### 5. Activity

Explore more deeply with a visual or oral language activity.

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Graphic Organizer: T-Chart

- In the first column write the word Flu. In the second column write down all the symptoms of having the Flu.
- Underneath the word Flu, write down the word HIV. In the second column write down the symptoms of HIV virus.

### 6. Discussion

Ask discussion questions that engage at many levels

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#### Key Questions

- How does a person catch a virus?
- How does our body fight a virus?
- What are some weapons our body uses to fight viruses?
- What are symptoms of the flu?

## EXTEND

### 7. Write, Draw or Speak.

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**Science Journal:** Please write and answer the following question in your science journal: What is the importance of your immune system?

**8. Close** Close by extending today's lesson to what you can do in your life and the world.

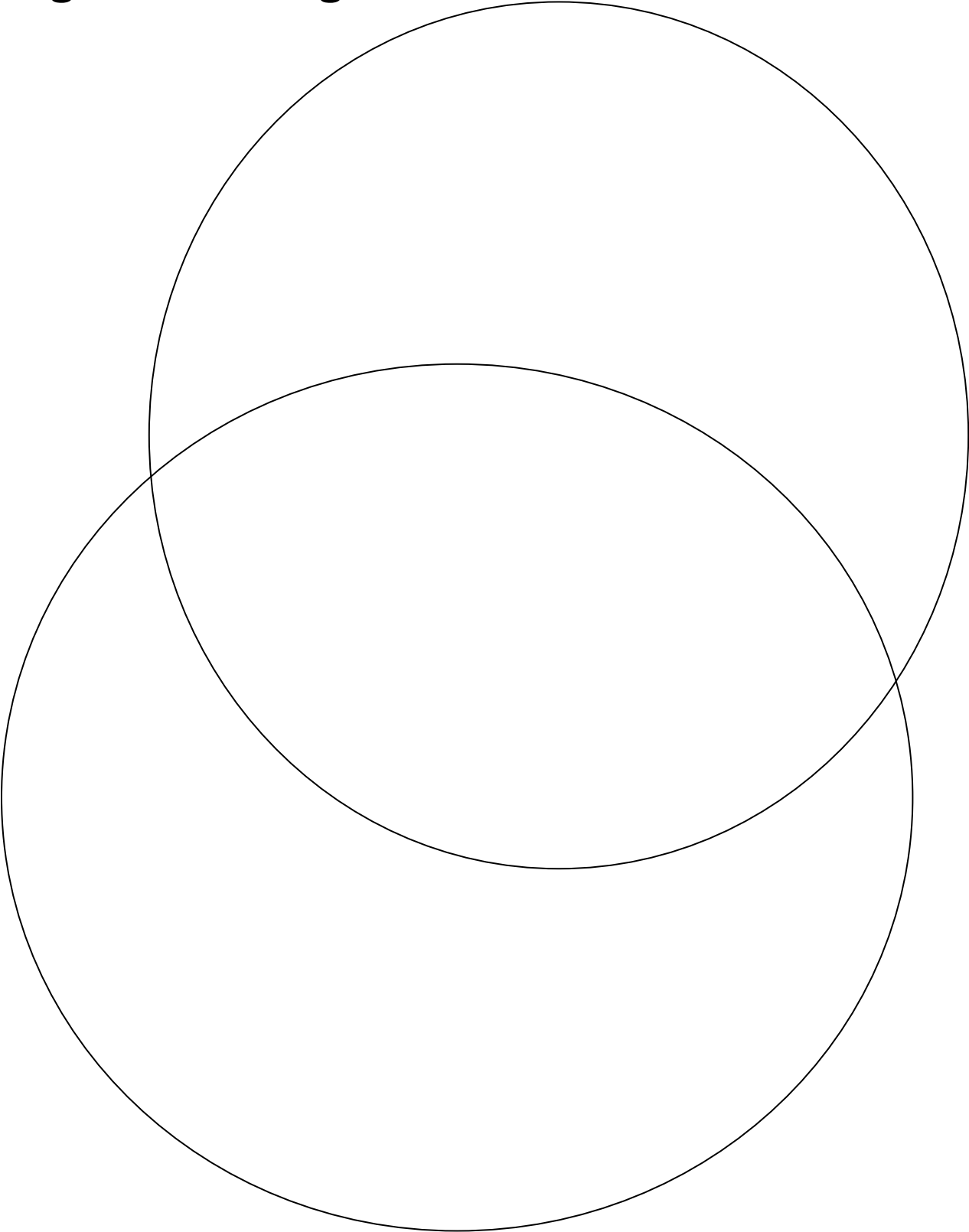
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Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

# 6g6 Venn Diagram Chart



# T-Chart Graphic Organizer

Name:

Date:

A large T-shaped graphic organizer template. The top bar is a wide, rounded rectangle. A vertical line extends downwards from the center of the bottom edge of this bar, forming the stem of the T. The rest of the page is blank space for writing.



# HUMAN SCIENCE Lesson Plan

## Day 2: viral vs. bacteria diseases



### Outcomes for Today

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1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1D. Students know the central dogma of molecular biology outlines the flow of information from transcription of ribonucleic acid (RNA) in the nucleus to translation of proteins on ribosome's in the cytoplasm.

### PREPARE

#### 1. Background Background knowledge to engage the content

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##### **What is the difference between viral and bacterial diseases?**

Every infection that the human body is afflicted by is primarily caused by two sources - bacteria or viruses. Both these class of organisms are pathogens (dangerous microscopic organisms), and have the ability to cause some form of illness to human beings.

Bacterial infections are caused by bacteria and viral infections are caused by viruses. Bacteria are one celled organisms that are asexual in nature. This means that they are capable of reproducing on their own. Infections caused by bacteria include strep throat, tuberculosis and urinary tract infections. Viruses are microscopic organisms that are parasitic in nature. What this means is that they are dormant when they exist by themselves in the air, but when they enter a host's body they get active and begin multiplying and reproducing. Diseases that result from viruses include chickenpox, AIDS and the common cold.

Bacteria thrive in many different types of environments. Some varieties live in extremes of cold or heat, while others make their home in people's intestines, where they help digest food. Most bacteria cause no harm to people.

Viruses are even smaller than bacteria and require living hosts — such as people, plants or animals — to multiply. Otherwise, they can't survive. When a virus enters your body, it invades some of your cells and takes over the cell machinery, redirecting it to

produce the virus.

The most important distinction between bacteria and viruses is that antibiotic drugs usually kill bacteria, but they aren't effective against viruses.

<http://www.mayoclinic.com/health/infectious-disease/AN00652>

<http://www.buzzle.com/articles/viral-infection-vs-bacterial-infection.html>

## 2. Wordwall

vocabulary words to teach and add to the Word Wall.

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**Contagious:** Can spread from one person to another

**Antibiotic:** Chemical made by a living organism that kills bacteria

**Bacteria:** ubiquitous one-celled organisms, spherical, spiral, or rod-shaped and appearing singly or in chains, comprising the Schizomycota, a phylum of the kingdom Monera (in some classification systems the plant class Schizomycetes), various species of which are involved in fermentation, putrefaction, infectious diseases, or nitrogen fixation.

**Viral:** The gel-like substance inside the cell membrane that contains structures that carry out life processes

### READ

## 3. View

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### Article:

Go to: [http://www.emedicinehealth.com/flu\\_in\\_adults/article\\_em.htm](http://www.emedicinehealth.com/flu_in_adults/article_em.htm)

Search: Flu in Adults

Locate: Flu in Adults Causes

Read: As a class, when you are done with section on causes please read *Flu in Adults Symptoms*

### Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)

Search: Bacterial and Viral diseases

Locate: **Origins of New Diseases** in the segment of: *Swine Flu: Anatomy of a Pandemic* (approximate run time 02:45)

### Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)

Search: Bacterial and Viral diseases

Locate: **How Viruses Reproduce** in the segment of: *Swine Flu: Anatomy of a Pandemic* (approximate run time 03:21)

## RESPOND

### 4. Visual Process.

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#### Venn Diagram:

Compare and contrast the similarities and differences of viral and bacterial diseases?

## EXPLORE

### 6. Discussion Ask discussion questions that engage at many levels

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#### Key Questions

- Name three ways diseases can spread?
- Based on the information that you have studied so far what body system are affected viral and bacterial diseases?
- Explain why some viral diseases are curable and some are not?
- How does a person get infected with a viral or bacterial disease?
- Explain why viruses are deadly to humans.

## EXTEND

### 7. Write, Draw or Speak.

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As a class come up with a list of bacterial and viral infections. See how many you can come up. Next to each disease, list ways of preventing getting each disease.

### 8. Close Close by extending today's lesson to what you can do in your life and the world.

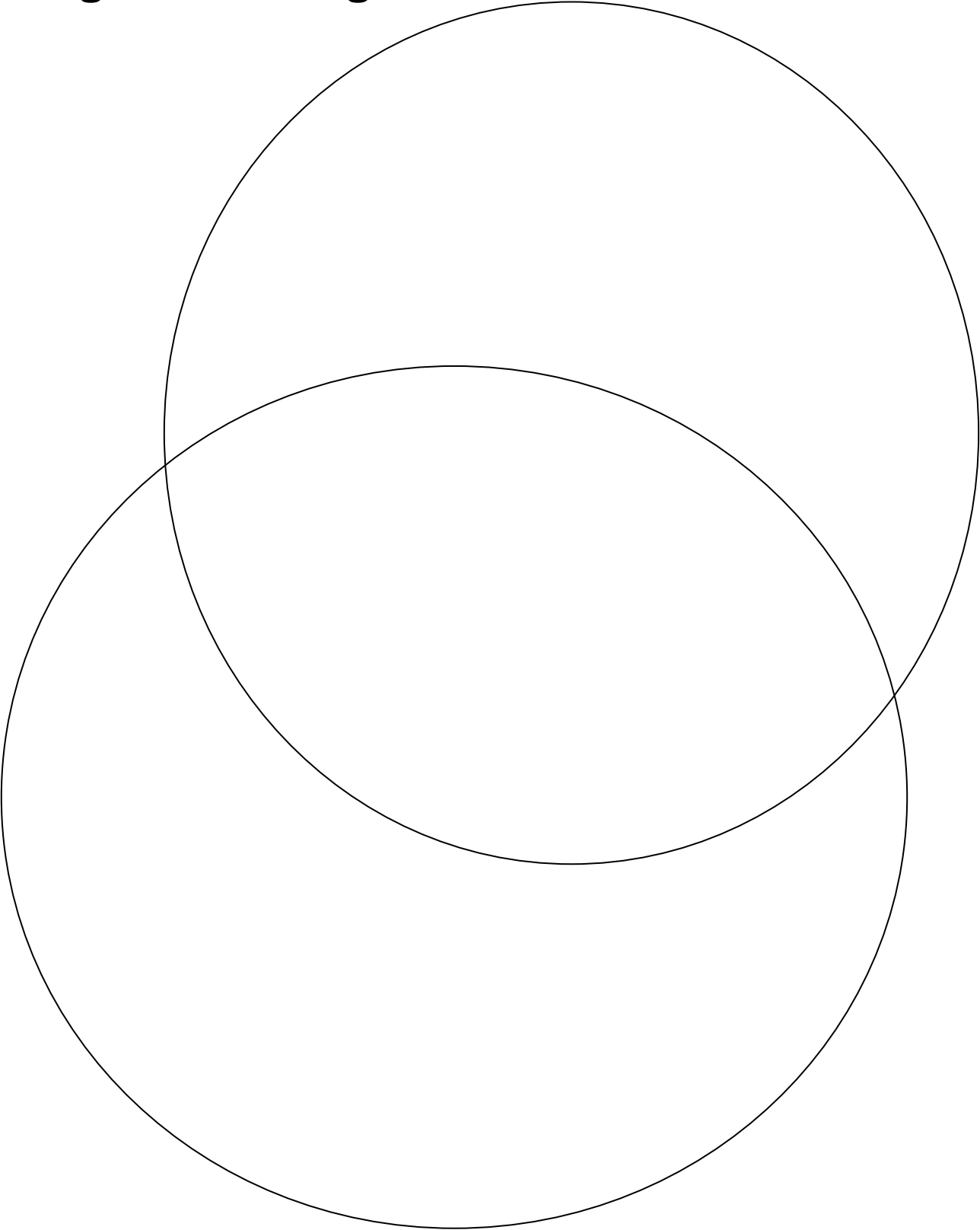
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Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

# 6g6 Venn Diagram Chart



# HUMAN SCIENCE Lesson Plan

## Day 3: What happens when you get the flu?



### Outcomes for Today

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1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1D. Students know the central dogma of molecular biology outlines the flow of information from transcription of ribonucleic acid (RNA) in the nucleus to translation of proteins on ribosome's in the cytoplasm.

### PREPARE

#### 1. Background Background knowledge to engage the content

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##### What happens when you get the flu?

A virus can enter your body through a variety of ways including the skin, nose, mouth, and sharing utensils, glasses or makeup. Once a virus enters your body it attacks the healthy cells in the affected area. The virus cells, also called pathogens will then take control over the healthy cells and begin duplicating itself.

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

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<b>RNA:</b>	Ribonucleic acid, carries codes for making proteins
<b>Ribosome:</b>	A cell organelle on which protein is made
<b>DNA:</b>	Deoxyribonucleic acid; a chemical in the nuclei of cells that codes and stores genetic information; consists of strands of molecules that control cell activities using coded instructions
<b>Cytoplasm:</b>	The gel-like substance inside the cell membrane that contains structures that carry out life processes

### READ

#### 3. View

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##### Article:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (Subscription Based Website)

Search: Common Colds

Locate: Common Colds article

Read: As a class

Video:  
 Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (Subscription Based Website)  
 Search: Common Cold  
 Locate: [Understanding: Viruses](#) Part 1 (approximate run time 22:58)

## RESPOND

### 4. Visual Process.

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Video Note Taking:

- You will use the attached note taking worksheet to take notes on information gathered while watching the video. You will complete the following:
  - Write important details from the video in the second column
  - After you write your notes, return to the first column and add phrases, words and questions related to the details. A sketch or picture may also be helpful.

## EXPLORE

### 5. Activity Explore more deeply with a visual or oral language activity.

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With a partner, restate in your own words what happens when you get the flu or a common cold.

## EXTEND

### 6. Close Close by extending today's lesson to what you can do in your life and the world.

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Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

# HUMAN SCIENCE Video Notes



Name:

Part I:

Note taking tips: (Cornell Notes)

- Write important details from the video, segment, article, or passage in the second column;
- After you write your notes, return to the first column and add phrases, words and questions related to the details. A sketch or picture may also be helpful.

Title:

Date:

Column 1: Phrases, words, questions or a sketch related to the details in column 2.	Column 2: Important Details

Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

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# HUMAN SCIENCE Lesson Plan

## Day 1: How alcohol affects the liver.



### Outcomes for Today

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1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1E. Students know the role of the endoplasmic reticulum and Golgi apparatus in the secretion of proteins.

### PREPARE

#### 1. Background Background knowledge to engage the content

---

##### How does alcohol affect the liver?

Normal liver function is essential to life. Liver disease is a term for a collection of conditions, diseases, and infections that affect the cells, tissues, structures, or functions of the liver.

The liver is responsible for:

- filtering the blood
- making bile, a substance that helps digest fat and excrete certain fatty substances
- processing and hooking fats to carriers (including cholesterol), and storing sugars, helping the body transport and save energy.
- making important proteins, such as most of those involved in blood clotting
- metabolizing many medications, such as barbiturates, sedatives, and amphetamines
- storing iron, copper, vitamins A and D, and several of the B vitamins
- making important proteins like albumin that regulate fluid transport in the blood and kidneys.
- helping break down and recycle red blood cells

If the liver becomes inflamed or infected, its ability to perform these functions may be impaired. Liver disease and infections are caused by a variety of conditions including viral infections, bacterial invasion, and chemical or physical changes within the body. The most common cause of liver damage is malnutrition, especially that which occurs with alcoholism. Alcohol-induced liver damage disrupts the body's metabolism, eventually impairing the function of other organs.

## 2. Wordwall

vocabulary words to teach and add to the Word Wall.

---

**Endoplasmic reticulum:** small network of tubes inside a cell that substances move along

**Lipids:** Another word for "fats." Lipids can be more formally defined as substances such as a fat, oil or wax that dissolves in alcohol but not in water. Lipids contain carbon, hydrogen and oxygen but have far less oxygen proportionally than carbohydrates.

**Golgi apparatus:** An organelle in eukaryotic cells that stores and modifies proteins for specific functions and prepares them for transport to other parts of the cell. The Golgi apparatus is usually near the cell nucleus and consists of a stack of flattened sacs.

**Ribosome:** small, round structure that makes proteins

**Cirrhosis:** liver disorder that may be caused by excessive use of alcohol

## READ

### 3. View

---

Article:

Go to: <http://science.jrank.org/pages/1312/Cell-Endoplasmic-reticulum.html>

Search: Cell - Endoplasmic Reticulum

Locate: Cell - Endoplasmic Reticulum

Read: As a class

Article:

Go to: <https://www.etap.org/demo/biology1/instruction5tutor.html>

Locate: The Role of the Endoplasmic Reticulum and the Golgi Apparatus

Read: As a class

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (Subscription Based Website)

Search: Endoplasmic reticulum

Locate: Endoplasmic reticulum (approximate run time 00:33)

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (Subscription Based Website)

Search: Endoplasmic reticulum

Locate: **Organelles: Golgi Bodies** (approximate run time 00:19)

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (Subscription Based Website)

Search: Alcohol: Think, Don't Drink

Locate: Alcohol and Your Liver (approximate run time 01:45)

## RESPOND

### 4. Visual Process.

---

Drawing: Draw a picture of smooth endoplasmic reticulum(ER) and rough endoplasmic reticulum (ER)

## EXPLORE

### 5. Activity

Explore more deeply with a visual or oral language activity.

---

Science Journal:

- In your science journal write down in your own words the definition of endoplasmic reticulum
- Redraw smooth and rough endoplasmic reticulum

### 6. Discussion

Ask discussion questions that engage at many levels

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#### Key Questions

- What affects does alcohol have on the body and the liver?
- What is the role of rough and smooth endoplasmic reticulum?

## EXTEND

### 7. Write, Draw or Speak.

---

Virtual tour: On the web site, called The Virtual Cell, students are invited to take a self-guided tour of various organelles within a cell. Click on the appropriate organelle for the tour and information. Then (virtually) cut the organelle in half to see what's inside. Click on the strange pink folded thing in the upper part of the Cell diagram -- it represents the Rough ER, the Smooth ER and the Golgi Apparatus. Go to:  
<http://www.ibiblio.org/virtualcell/tour/cell/cell.htm>

### 8. Close

Close by extending today's lesson to what you can do in your life and the world.

---

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

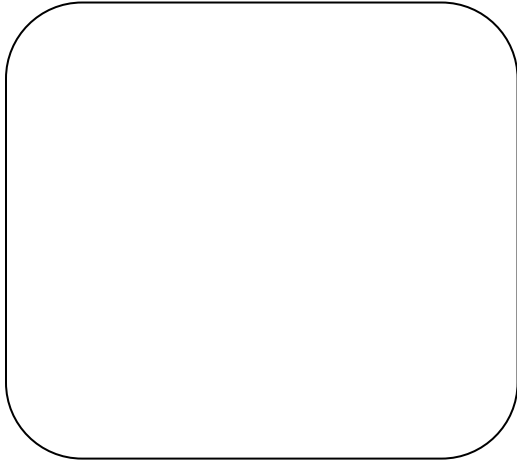
<i>Change I can make</i>	
Habit I can build	

# Pictorial Drawings

Name:

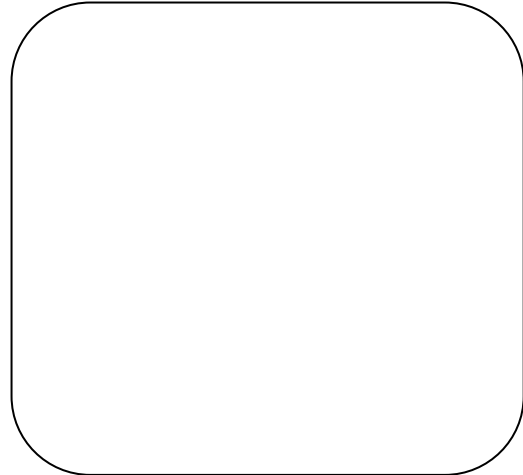
Smooth

Endoplasmic reticulum



Rough

Endoplasmic reticulum



# HUMAN SCIENCE Lesson Plan

## Day 1: Why its good to eat your vegetables😊



### Outcomes for Today

---

1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1F. Students know usable energy is captured from sunlight by chloroplasts and is stores through the synthesis of sugar from carbon dioxide.

### PREPARE

#### 1. Background Background knowledge to engage the content

---

##### Why is eating vegetables important?

Photosynthesis is the making of food by plants. They are the only ones that manufacture their own food. The essential ingredients in making this food are sunlight, the chlorophyll that is present in green plants, water and carbon dioxide in the air. Photosynthesis is necessary not just for plants to make food for themselves, but for animals, including us.

Eating vegetables allows us to obtain this energy directly by eating the plant itself or its products, like carrots, rice or potatoes. Photosynthesis is the first step in the food chain which connects all living things. Every creature on earth depends to some degree on green plants.

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

---

**Energy:** the ability to do work or cause change

**Photosynthesis:** food making process in plants and other organism that uses sunlight

**Chloroplasts:** organelle in a plant cell that contains chlorophyll

**Organelle:** small structure in the cytoplasm that does a special job

### READ

#### 3. View

---

Article:

Go to: [http://www.ehow.com/facts\\_6741270\\_need-photosynthesis\\_.html](http://www.ehow.com/facts_6741270_need-photosynthesis_.html)

Search: What Is the Need for Photosynthesis?

Locate: What Is the Need for Photosynthesis?

Read: As a class

**Video:**

**Go to:** [http://www.ehow.com/facts\\_6741270\\_need-photosynthesis\\_.html](http://www.ehow.com/facts_6741270_need-photosynthesis_.html)

Search: Photosynthesis

Locate: What Is the Function of Photosynthesis? (approximate run time 1:54)

**Video:**

**Go to:** <http://player.discoveryeducation.com>

Search: Photosynthesis

Locate: The World of Plants: Photosynthesis (approximate run time 3:27)

## RESPOND

### 4. Visual Process.

---

Food chain web:

You will draw the photosynthesis process.

- Draw and label the photosynthesis process
- Explain why it is important to animal and human life form under food chain web

## EXPLORE

### 5. Activity

Explore more deeply with a visual or oral language activity.

---

Photosynthesis Quiz☺

Test your knowledge and take the photosynthesis quiz below.

- True or False? People can lie out in the sun and get the energy they need to live.
- The process of making food in a plant is called \_\_\_\_\_?
- Plants have chloroplasts in their cells that are filled with \_\_\_\_\_ that makes them green.
- Which of these is not needed to make food in a plant? A) Sunlight B) Chlorophyll or C) Flowers
- The tubes that bring water from the roots to the leaves are called A) Stomata B) Phloem or C) xylem
- True or False? Without enough sunlight, plants cannot use the process of photosynthesis to produce food.

### 6. Discussion

Ask discussion questions that engage at many levels

---

#### Key Questions

- Why is photosynthesis important?
- Why do humans need photosynthesis?
- Why is the sun an important part of the photosynthesis process?

## EXTEND

### 7. Write, Draw or Speak.

---

#### Photosynthesis: TRACING BACK

Many things can be traced back to plants. For example, petroleum, which is used to run cars and trucks, was formed millions of years ago when prehistoric plants and animals died and were buried under layers and layers of rock and soil.

**DIRECTIONS:** Try to trace things listed below back to plants. The first one has been done for you.

- |                   |                        |                      |
|-------------------|------------------------|----------------------|
| 1. woolen sweater | Wool comes from sheep. | Sheep feed on grass. |
| 2. book           |                        |                      |
| 3. leather purse  |                        |                      |
| 4. bread          |                        |                      |
| 5. coal           |                        |                      |
| 6. honey          |                        |                      |

#### 8. Close

Close by extending today's lesson to what you can do in your life and the world.

---

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

# HUMAN SCIENCE Lesson Plan

## Day 1: What is a cell?



### Outcomes for Today

---

1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1G. Students know the role of mitochondria in making stored chemical-bond energy available to cells by completing the breakdown of glucose to carbon dioxide.

### PREPARE

#### 1. Background Background knowledge to engage the content

---

##### What is a cell?

Cells carry out all life processes. Cells take in and break down food. Cells also break down a simple sugar called glucose to produce energy. The first person to observe and describe cells was a guy named Robert Hooke. Cells have three main parts: the cell membrane, nucleus and cytoplasm. The cell member surrounds the cell and controls the movement of materials into and out of a cell. For example, food, water, and oxygen. Most cell parts are located in the cytoplasm.

Cells are like a factory. Each machine, or part of a cell, has a special job or task. The “machines” of the factory are called organelles cells. They work to produce energy, transport materials, and get rid of waste.

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

---

<b>Cells:</b>	basis unit of structure and function in living things
<b>Microscope:</b>	tool that makes things look larger than they really are
<b>Cell membrane:</b>	thin structure that surrounds a cell
<b>Cytoplasm:</b>	gel like substance inside the cell where most of the cells activities take place
<b>Nucleus:</b>	control center of a cell
<b>Nuclear membrane:</b>	thin structure that surrounds and protects the nucleus
<b>Mitochondria:</b>	known as the “powerhouses” of the cell, releases energy that the cell can use



## READ

### 3. View

---

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)

Search: Cells

Locate: **The Wonders of the Cell:** A Segment of: Assignment Discovery: Cells (approximate run time 04:43)

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)

Search: Cells

Locate: **Cells:** A Segment of: [Science Investigations: Life Science: Investigating Cells and Genetics](#) (approximate run time 09:10)

## RESPOND

### 4. Visual Process.

---

KWL chart of what you know about cells.

## EXPLORE

### 5. Activity

Explore more deeply with a visual or oral language activity.

---

Sketch:

Draw and label the cell and its parts.

### 6. Discussion

Ask discussion questions that engage at many levels

---

#### Key Questions

- Who was the first to see cells?
- Every plant is made up of \_\_\_\_\_?
- True or False. Only plants and animals are made up of cells?
- Describe what happens when a cell dies.
- Describe the relationship and importance of cells and blood.
- How are plant cells and animal cells different?
- Name 3 examples of cells in the body.

## EXTEND

### 7. Write, Draw or Speak.

---

With a partner come up with five reasons why cells are important to human life.

**8. Close** Close by extending today's lesson to what you can do in your life and the world.

---

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

# HUMAN SCIENCE Lesson Plan

## Day 2: How do body builders get their muscles?



### Outcomes for Today

---

1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1G. Students know the role of mitochondria in making stored chemical-bond energy available to cells by completing the breakdown of glucose to carbon dioxide.

### PREPARE

#### 1. Background Background knowledge to engage the content

---

##### Where do body builders get their muscle?

Some people might say that body builders work out five days a week, four hours a day, and eat only raw foods and egg yolks to achieve their large muscles. Contrary to what some people believe it is not only the long hours in the gym and the strict diet that help with building muscles for body builders. It is what is *in* our body that body builders are able to achieve the muscles they desire.

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

---

<b>Organelle:</b>	specialized cellular structure having a specialized function; structures within the cytoplasm that break down food, move wastes and store materials.
<b>Mitochondria:</b>	known as the powerhouses” of the cell. They release energy that the cell can use. Food molecules are broken down and energy is released.
<b>ATP (Adenosine Triphosphate):</b>	a substance that powers most cell activities
<b>Bond energy:</b>	the energy required to break a chemical bond
<b>Cellular respiration:</b>	the process that converts the potential energy of food into other useful forms; its most important product is ATP
<b>Chemical reaction:</b>	an event in which matter changes form as a result of bonds breaking and new bonds forming; the new substance has different properties from those of the original
<b>Energy efficiency:</b>	the percent of the input energy which is converted to a desired form of energy; useful energy output

## READ

### 3. View

---

Article:

Go to: <http://www.mitoresearch.org/mitodiseases.html>

Search: Mitochondrial Myopathy: An energy crisis in the cells

Locate: Mitochondrial Myopathy: An energy crisis in the cells

Read: As a class

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)

Search: ATP

Locate: Simply Science: Energy Converters approximate run time 27:13)

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)

Search: Mitochondria and muscle building

Locate: ATP: The Energy Currency: a segment of Elements of Biology: Matter and Energy: Organization in Living Systems (approximate run time 02:26)

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)

Search: Mitochondria and Muscle building

Locate: From Food to ATP: A Segment of Matter and Energy: Organization in Living Systems (approximate run time 01:56)

## RESPOND

### 4. Visual Process.

---

Sketch:

Visually illustrate how mitochondrion is like a factory of energy for muscle building.

- Under each picture label and describe the function

## EXPLORE

### 5. Activity

Explore more deeply with a visual or oral language activity.

---

With a partner explain your sketch and have them explain their sketch to you.

### 6. Discussion

Ask discussion questions that engage at many levels

---

#### Key Questions

- Write the word equation for cellular respiration.
- What is the input energy form for photosynthesis?
- What is the useful output energy from cellular respiration?
- Where is energy stored in a chemical compound?

- Most reactions involving oxygen release a lot of heat and light. Do the bonds of the products contain more or less energy than the original compounds?
- Name the organelles involved in energy conversion in a plant cell.
- Describe how a cell would get energy from an ATP molecule.
- Name the chemicals that are involved in making ATP.
- What evidence suggests that energy conversions in the body produce waste energy?

### EXTEND

**7. Close** Close by extending today's lesson to what you can do in your life and the world.

---

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
<i>Habit I can build</i>	

# HUMAN SCIENCE Lesson Plan

## Day 1: Polymers vs Monomers. What is the difference?



### Outcomes for Today

---

1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1H. Students know most macromolecules (polysaccharides, nucleic acids, proteins, lipids) in cells and organism are synthesized from a small collection of simple precursors

### PREPARE

#### 1. Background Background knowledge to engage the content

---

##### What is the difference between polymers and monomers?

Many of the molecules necessary for life are made up of either single molecule called monomers or many molecules called polymers. For example, protein, lipids and nucleic acids are polymers of smaller monomers.

A polymer is like a train and a monomer is like the individual cars within the train.

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

---

**Polymer:** compound with repeating small molecules: a natural or synthetic compound that consists of large molecules made of many chemically bonded smaller identical molecules

**Monomers:** single unjoined organic molecule. A relatively light, simple organic molecule that can join in long chains with other molecules to form a more complex molecule or polymer

**Polymerization:** process of making polymers. The chemical reaction in which a compound is made into a polymer by the addition or condensation of smaller molecules

**Macromolecules:** A large complex molecule, such as nucleic acids, proteins, carbohydrates, and lipids, with relatively large molecular weight.

## READ

### 3. View

---

Article:

Go to: <http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/polymers.htm>

Search: Polymers

Locate: Polymers

Read: As a class

Article:

Go to:

<http://materialsworldmodules.org/resources/polimarization/2-polymers+monomers.html>

Search: Polymers and monomers

Locate: Polymers and monomers

Read: As a class

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (Subscription Based Website)

Search: Polymers and Monomers

Locate: **Natures Polymers: A Science Investigations: Physical Science: Investigating Chemical Properties** (approximate run time 09:27)

## RESPOND

### 4. Visual Process.

---

Sketch:

Draw a picture of a monomer and polymer. Label each picture

## EXPLORE

### 5. Activity

---

Macromolecules Chart:

Fill out the chart below with your own examples of monomers turned polymers.

Organism	Precursor
Protein	Amino Acid
Lipids	Fatty Acids

## 6. Discussion Ask discussion questions that engage at many levels

---

### Key Questions

- Explain in your own words the difference between monomers and polymers.
- What are the compounds required to achieve liquidity?
- How are polymers essential to everyday household items and such necessities of life such as gasoline?
- How are monomers and polymers the building blocks of life?
- Give examples of synthetic polymers. What are advantages and disadvantages of using them?

### EXTEND

## 7. Write, Draw or Speak.

---

Building Tree of Life worksheet: Use the link to fill out the worksheet:

[Tree of Life Worksheet](#)

Explore the macromolecules in the Tree of Life by clicking on the squares with pictures, noticing the basic features of the macromolecules you find. Most macromolecules are polymers -long chains of similar subunits called monomers. What monomers can you find for the different kinds of macromolecules?

## 8. Close Close by extending today's lesson to what you can do in your life and the world.

---

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

Change I can make	
Habit I can build	



# HUMAN SCIENCE Lesson Plan

## Day 1: What enzyme is a necessity for life and human function?



### Outcomes for Today

---

1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1I. Students know how chemiosmotic gradients in mitochondria and chloroplast store energy for ATP production.

### PREPARE

#### 1. Background Background knowledge to engage the content

---

##### Why is ATP synthase important for animal and human life?

ATP synthase is one of the most abundant proteins in every organism. It is responsible for synthesizing the molecule adenosine tri-phosphate (ATP), the cells' energy currency. ATP is used to power and sustain virtually all cellular processes needed to survive and reproduce. Even when at rest, the human body metabolizes more than half its body weight in ATP per day, this figure rising to many times the body weight under conditions of physical activity.

[http://www.ks.uiuc.edu/Research/atp\\_hydrolysis/](http://www.ks.uiuc.edu/Research/atp_hydrolysis/)

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

---

**ATP (adenosine triphosphate):** The energy molecule of cells, synthesized mainly in mitochondria and chloroplasts; energy from the breakdown of ATP drives many important reactions in the cell.

**Phosphates:** an organic compound of phosphoric acid in which the acid group is bound to nitrogen or a carboxyl group in a way that permits useful energy to be released (as in metabolism)

**Adenosine diphosphate (ADP):** A nucleotide consisting of adenine, ribose, and two phosphate groups; formed by the removal of one phosphate from an ATP molecule.

**Protons:** stable elementary particles having the smallest known positive charge, found in the nuclei of all elements. The proton mass is less than that of a neutron. A proton is the nucleus of the light hydrogen atom, i.e., the hydrogen ion.

**Chemiosmotic:** A process in which a proton gradient across a mitochondrial membrane and ATP synthesis pump metabolites across a membrane.

## READ

### 3. View

---

Article:

Go to: <http://www.trueorigin.org/atp.asp>  
Search: ATP: The Perfect Energy Currency for the Cell  
Locate: ATP: The Perfect Energy Currency for the Cell  
Read: As a class

Article:

Go to: <http://www.atpsynthase.info/Basics.html>  
Search: ATP synthase  
Locate: ATP synthase: a brief introduction  
Read: As a class

Video:

Go to: [www.metacafe.com](http://www.metacafe.com)  
Search: ATP synthase  
Locate: Evolution Vs ATP Synthase - Molecular Machine (approximate run time 08:42)

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)  
Search: Mitochondria  
Locate: Mitochondria A Segment of: Greatest Discoveries with Bill Nye: Biology (approximate run time 03:41)

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)  
Search: Energy and the Chemistry of Life  
Locate: Energy and the Chemistry of Life, Part 2: Energy (approximate run time 19:41)

## RESPOND

### 4. Visual Process.

---

#### Video Note Taking:

- You will use the attached note taking worksheet to take notes on information gathered while watching the video. You will complete the following:
- Write important details from the video in the second column
- After you write your notes, return to the first column and add phrases, words and questions related to the details. A sketch or picture may also be helpful.

## EXPLORE

### 5. Discussion Ask discussion questions that engage at many levels

---

#### Key Questions

- Where is ATP synthesized?
- Why is ATP synthase important to life?
- ATP directly or indirectly delivers energy to almost all metabolic pathways. Explain the functioning of the ATP/ADP cycle.
- ATP levels in cells are renewed from ADP and inorganic phosphate through what metabolic process?

## EXTEND

### 6. Write, Draw or Speak.

---

With a partner, explain how ATP is important to all living things.

### 7. Close Close by extending today's lesson to what you can do in your life and the world.

---

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

# HUMAN SCIENCE Video Notes



Name:

Part I:

Note taking tips: (Cornell Notes)

- Write important details from the video, segment, article, or passage in the second column;
- After you write your notes, return to the first column and add phrases, words and questions related to the details. A sketch or picture may also be helpful.

Title:

Date:

Column 1: Phrases, words, questions or a sketch related to the details in column 2.	Column 2: Important Details

Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

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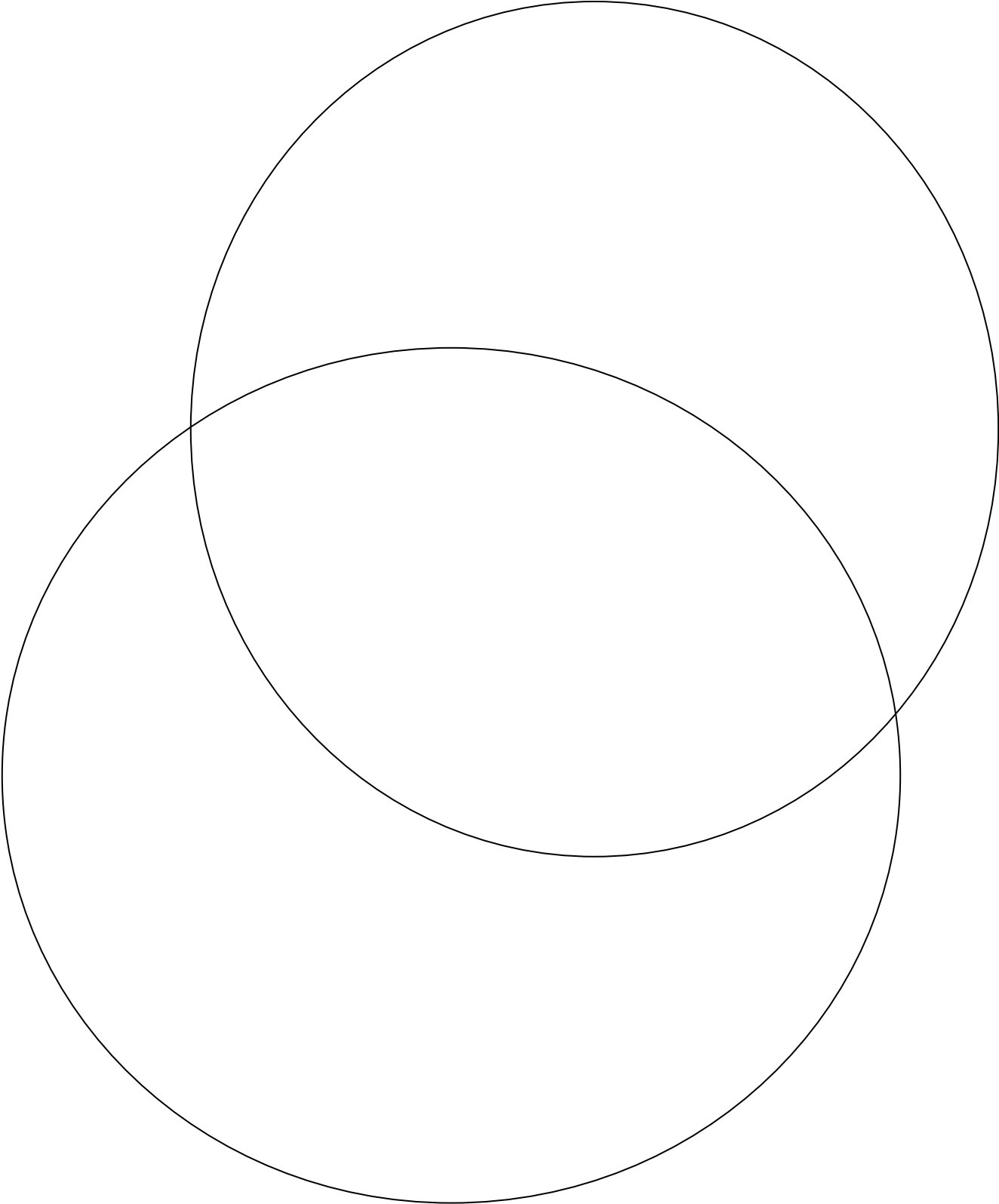
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# 6g6 Venn Diagram Chart



# HUMAN SCIENCE Lesson Plan

## Day 1: What is sickle cell disease? Why do some people have it and some don't.



### Outcomes for Today

---

1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organisms cells. As a basis for understanding this concept:

1J. Students know how eukaryotic cells are given shape and internal organization by a cytoskeleton or cell wall or both.

### PREPARE

#### 1. Background Background knowledge to engage the content

---

##### What is Sickle Cell disease?

Sickle cell disease is the disruptions in the cytoskeleton. Sickle cell anemia is a genetic disease that results in the production of a defective form of hemoglobin, which distorts red blood cells into the classic sickle shape. Red blood cells maintain their shape with a specialized cytoskeleton composed of a network of the proteins actin and spectrin. In sickle cell anaemia, this actin/spectrin lattice 'locks', making red blood cells much less deformable, and causing them to obstruct the microcirculation.

<http://www.nature.com/horizon/livingfrontier/background/diseases.html>

#### 2. Wordwall vocabulary words to teach and add to the Word Wall.

---

- Eukaryotic cells:** A single-celled or multicellular organism whose cells contain a distinct membrane-bound nucleus
- Cytoskeleton:** The internal framework of a cell, composed largely of actin filaments and microtubules
- Microfilaments:** They are long, thin, and stringy proteins (mainly **actin**). They work with microtubules to form the structure that allows a cell to hold its shape, move itself, and move its organelles.
- Microtubules:** thin protein tubes; Microtubules act as a scaffold to determine cell shape, and provide a set of "tracks" for cell organelles and vesicles to move on.
- Cilia:** Common in single-cell organisms, this hair-like structures wave to move a cell around, or to move something around the cell.

- Flagella:** a long tapering process that projects singly or in groups from a cell and is the primary organ of motion of many microorganisms
- Hemoglobin:** An iron containing protein molecule found in great abundance in red blood cells that binds oxygen and carbon dioxide.
- Red blood cells:** The blood cell that carries oxygen from the lungs to cells throughout the body

## READ

### 3. View

---

Article:

Go to: <http://www.sciencedaily.com>  
Search: red blood cells and cytoskeleton  
Locate: How Blood Cells Change Shape  
Read: As a class

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)  
Search: Sickle Cell Anemia  
Locate: What Is Sickle Cell Anemia? A Segment of: Science Investigations: Life Science: Investigating Cells and Genetics (approximate run time 02:12)

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)  
Search: Protein Synthesis and Sickle Cell  
Locate: Protein Synthesis and Sickle Cell: A Segment of: Science Investigations: Life Science: Investigating Cells and Genetics (approximate run time 04:39)

Video:

Go to: [www.discoveryeducation.com](http://www.discoveryeducation.com) (**Subscription Based Website**)  
Search: red blood cells  
Locate: Red blood cells: Blood (approximate run time 03:59)



## RESPOND

### 4. Visual Process.

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Sketch:

In two separate boxes draw the red blood cells of a healthy person and a person who has sickle cell disease. Please label each picture.

## EXPLORE

### 5. Activity

Explore more deeply with a visual or oral language activity.

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Sketch:

Go to the website [www.sparknotes.com](http://www.sparknotes.com)

- Search cytoskeleton
- Draw and label the components of cytoskeleton and its intermediate filaments

### 6. Discussion

Ask discussion questions that engage at many levels

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#### Key Questions

- What is sickle cell disease?
- What causes sickle cell disease?
- Red blood cells do two things: they transport \_\_\_\_\_ and \_\_\_\_\_ in the blood stream.

## EXTEND

### 7. Write, Draw or Speak.

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Science Journal: Write down five facts you learned about cytoskeleton, sickle cell anemia/disease, and red blood cells.

### 8. Close

Close by extending today's lesson to what you can do in your life and the world.

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Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

Change I can make	
Habit I can build	

# 6g6 Venn Diagram Chart

