

# High School Science Learning Plans

These plans are also available on our website:

www.accomack.k12.va.us

Please note: The online portion of these plans is optional.

# High School Learning Plans



Biology/Marine Bio/Anatomy & Physiology

# **Activities to Support Instruction During Extended School Closures**

The purpose of this document is to provide an overview of suggested activities available to ACPS students. These suggestions can be used by families to support the continuity of education. The learning experiences developed and provided will give students opportunities to go deeper into concepts, ideas, and skills independently. These activities do not require copies or additional supplies.

# ACTIVITY OPTION #1: PROPERTIES OF WATER POSTER

Create an informational poster that encompasses each of the 8 properties of water listed in the grid below. The poster should be colorful, neat, easy to read, and must include information to help people understand the amazing properties of water.

**Online option:** Create the poster using <u>Google Docs</u>, <u>Google Drawings</u>, <u>LucidPress</u>, or other software.

Offline option: Create poster on paper, posterboard, etc.

For each of the water properties listed in the chart below, you need to have:

- A picture (in color).
- A 2-3 sentence explanation. Be sure to explain all of the required elements noted in the rubric below.
- Use your Properties of Water notes for this assignment.

<ul> <li>Polar Molecule</li> <li>Draw a picture of one water molecule- label the atoms and show that it is polar</li> <li>Explanation of what it means for a molecule to be polar</li> <li>Explain what causes a water molecule to be polar</li> </ul>	Water has a high surface tension Draw a picture demonstrating an example of surface tension Define surface tension What causes surface tension Why is surface tension important to living things
<ul> <li>Hydrogen Bonding</li> <li>Draw a picture of at least 3 water molecules showing the hydrogen between them</li> <li>Explanation of what a hydrogen bond is and what is shown in the picture</li> </ul>	<ul> <li>Water can absorb a lot of heat (high specific heat)</li> <li>Draw a picture of water absorbing heat</li> <li>Explain how sweat cools a person down</li> <li>Why is this property important to living things</li> </ul>
<ul> <li>Water is Sticky! (Cohesion and Adhesion)</li> <li>Draw a picture (1 of cohesion 1 of adhesion)</li> <li>Definition and example of adhesion</li> <li>Definition and example of cohesion</li> </ul>	<ul> <li>Water is a good solvent</li> <li>Draw a picture of water dissolving a substance</li> <li>Explain how the polarity of water breaks apart an ionic substance like salt</li> <li>Explain why water cannot dissolve lipids (fat/oil)</li> <li>Why is this property important to living things</li> </ul>
<ul> <li>Water can move up thin tubes (capillary action)</li> <li>Draw a picture demonstrating and example of capillary action</li> <li>Define capillary action</li> <li>What causes capillary action</li> <li>Why is capillary action important to living things</li> </ul>	Water expands when it freezes Draw a picture of water expansion Why does water expand when it freezes What happens when you put ice into a liquid? Why is water expansion important to living things

Resources: Textbook (physical/online); YouTube video of Properties of Water (by the Amoeba Sisters); Khan Academy video

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# ACTIVITY OPTION #2: HELP WANTED ADS FOR ORGANELLES

**Objective**: Design 5 "help wanted" ads for the organelles of the cell in order to show your understanding of cellular organelles' characteristics and functions.

**Background:** Employers post "help wanted" ads when they are trying to hire new employees for a specific position. In order to make sure that only qualified people respond to the ads, employers usually include:

- The qualifications needed to perform the job
- List of responsibilities that the position requires
- A list of benefits for employees
- Contact information

### Planning:

- Open to the "Jobs" section of the newspaper and look at some of the ads to get ideas (or see samples below or check out the links on the back).
- Pick your favorite 5 organelles.
- Think about the characteristics of each organelle and the function it performs (make a list for each of your organelles).
- Put together a list of qualifications that are needed in order to perform the job of each of the organelles you chose.
- Consider where the organelle does its work- in what type of cell would be found, and where within that cell?

# Making the ads:

- Using the information from the planning stage, design a Help Wanted ad for each one of your 5 organelles. See example below. **Online option:** Create the ads in <u>Google Docs</u>, <u>Google Drawings</u>, <u>LucidPress</u>, or other software. **Offline option:** Create the ads on paper.
  - a. Include a list of qualifications needed to perform the organelle's job and characteristics of that organelle.
  - b. Use the guidelines for Help Wanted! ads found in the "background" section above.
  - c. Your ads must be neat, creative, and scientifically accurate.
  - d. Each of your ads must be at least 5 sentences long.
  - e. On the back of each ad, write the name of the organelle for which the ad is designed.

Example of ad for the nucleus: (Obviously, you can't choose the nucleus as one of your organelles.)

"Looking for a great opportunity to lead? Do you enjoy making decisions for others? Is guidance your strong point? If so, we are seeking to fill a managerial position. We are in need of a control center for a cell. Must be able to operate a cell. Should have solid experience reading and de-coding DNA. Should exhibit strong leadership skills. Benefits include: placement in low-stress arm cells, long life guaranteed...you don't die; you just divide and multiply! If interested contact The Body at 817-8-NUCLEUS."

Additional resources: Biology class cell structure notes; Textbook chapter 8 (physical/digital); https://www.cellsalive.com/; https://biomanbio.com/HTML5GamesandLabs/Cellgames/Cells.html; https://flexbooks.ck12.org/flexbooks/student

#### ACTIVITY OPTION #3: ENZYME STRUCTURE AND FUNCTION

#### **Online Options**

• Inventory the products using enzymes in your house. You need a variety of ingredient labels from items such as contact solution, meat tenderizer, laundry detergent, dish detergent, stain removers, skin care products, toothpaste, foods, etc. Select at least 10 items. Identify if the product uses enzymes. If the product does use enzymes, determine what the enzymes are from the ingredient label or from the product website. Determine what the substrates are for the enzymes you identified. Create a table that sorts the enzymes/substrates into

the four groups of macromolecules. Are there products with more than one enzyme? What purpose does the product(s) have that requires multiple enzymes? What are the storage and usage conditions for your products? Relate this information to the enzyme action that your product performs. Use Paint or some other drawing app to create a model of an enzyme and its substrate. Write a summary paragraph about what you learned about enzymes and their importance in your home.

- https://www.aboutcleaningproducts.com/science/ezyme-science/
- Online Pearson textbook
- Notes from class

# **Offline Options**

• Inventory the products using enzymes in your house. You need a variety of ingredient labels from items such as contact solution, meat tenderizer, laundry detergent, dish detergent, stain removers, skin care products, toothpaste, foods, etc. Select at least 10 items. Identify if the product uses enzymes. If the product does use enzymes, determine what the enzymes are from the ingredient label. Using the word clues in the enzymes' names determine what the substrates are for the enzymes you identified. Create a table that sorts the enzymes/substrates into the four groups of macromolecules. Are there products with more than one enzyme? What purpose does the product(s) have that requires multiple enzymes? What are the storage and usage conditions for your products? Relate this information to the enzyme action that your product performs. Draw a model of an enzyme and its substrate. Write a summary paragraph about what you learned about enzymes and their importance in your home.

- Pearson textbook
- Notes from class

#### ACTIVITY CHOICE #4: INFECTIOUS DISEASE ONE PAGER

Being informed is a really good way to not get sick! After doing research on a virus or bacterial infection that affects the RESPIRATORY SYSTEM, come up with a one pager to describe your disease to the rest of the class. Think of an infographic that would be in a doctor's office.

If a disease affects a large number of people in a particular location such as a town, region or country, it is referred to as an epidemic. When the disease is prevalent over a whole country or the world, it is referred to as a pandemic. Diseases are capable of affecting many people or impact on their lives even if they are not epidemics or pandemics.

#### Procedure:

- Pick an infectious disease that affects the respiratory system.
- Use reliable resources to search for information about your disease.
- Make sure you follow the rubric (see below).

#### Include in your one pager:

- Virus/Bacteria Name
- Type of organism
- A world map showing places where there have been outbreaks/cases
- A picture of an infected person and a microscope/diagram of the virus/bacteria
- Identifying characteristics of the disease
- How is the disease transmitted or why/how does one get it? (casual contact, etc...)
- How can you keep from contacting the disease?
- What populations/races of people are most affected by this disease?

- What are the treatment options, if any?
- Is the disease curable? What is the success rate for the cure?
- At least 3 reliable resources cited

#### **Online Options:**

Students will complete a virtual "one pager" on the topics below using Google Slides:

- Marine Students should choose a virus/bacteria that infects MARINE LIFE (For example: <u>CDC website's</u> <u>"Harmful Algal Blooms - HAB - Associated Illness"</u> and <u>NIH - Waterborne Diseases</u>)
- Biology and Anatomy students may choose a virus/bacteria that affects ANY of the human body systems

Helpful Websites:

- <u>WHO</u>
- <u>CDC</u>
- Infographic COVID-19
- Medical Microbiology Chapter 93-Infections of the Respiratory System
- Officials say coronavirus targets elderly and ill, children mostly unaffected
- Special Education/ English as a Second Language- <u>Officials say coronavirus targets elderly and ill,</u> <u>children mostly unaffected</u>

#### **Offline Options:**

Students will complete a one pager on the topics below using paper, colored pencils, and the textbook.

- Marine Students should choose a virus/bacteria that infects MARINE LIFE
- Biology and Anatomy Students may choose a virus/bacteria that affects ANY of the human body systems

Helpful Resources:

- Biology Textbook/Workbook Chapter 1 (Characteristics of Living Things), Chapter 8 (Cytology), Chapter 21 (Prokaryotic Organisms & Viruses)
- Anatomy Textbook pages 398-459 (Immune System & Respiratory System)

#### **Online minimal expectations:**

	Requirement
1	Appropriate Title (Topic)
2	Clear Time & Effort are Shown
	Purposeful arrangement
Ĩ	2 quotes from notes/reading
	Pg. #'s must be cited for credit
	3 images related to the title
	5 key vocabulary words with definitions
	Main idea (5 sentence summary)
	Must demonstrate mastery of content
	2 questions w/ answers
E	mbedded Video that highlights understanding of the topic (Links will not receive credit)

#### **Offline minimal expectations:**

