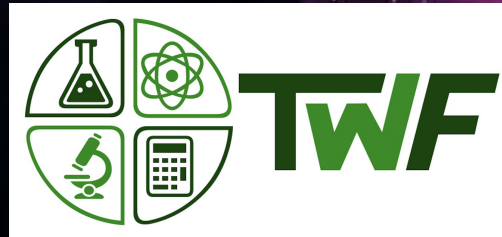


Cell Membrane and Transport

5E Lesson

The 5E model is a scientifically proven method to improve student engagement and learning in your classroom

- ✓ Engagement
- ✓ Exploration
- ✓ Explanation
- ✓ Elaborate
- ✓ Evaluate



Cell Membrane and Transport

5E Lesson

Cell Membrane and Transport – 5E Le

- The lesson covers the following topics:
 - The cell membrane
 - Phospholipids

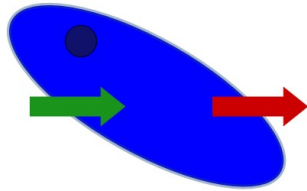
Each phase is clearly described

A Complete Lesson

The Cell Membrane

- Cells need an inside & an outside therefore, there needs to be something in between (like a wall for your house)
 - this separates the cell from its environment
- Certain things need to come in and other things need to be sent out of the cell**

IN
food
- sugars
- proteins
- fats
O₂
H₂O



OUT
wastes
proteins

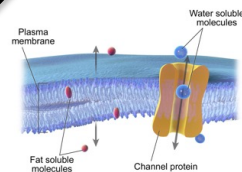
← Make sure your students are on track

Student copies with blanks

Videos embedded right into your slideshow

Cell membrane channels

- Certain substances can't pass through the membrane (too big, water soluble, etc.) but need to get in/out

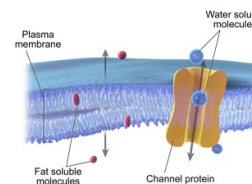


Diffusion Across the Plasma Membrane

- _____

Protein Pumps

- Some molecules can't pass through the membrane
- Instead, they use proteins as "pumps" or "doors" to diffuse across the molecules**



Diffusion Across the Plasma Membrane



Interactive and Engaging Activities

Cystic Fibrosis

Scientific Reading Comprehension Article and Extension Activity

Cystic Fibrosis

What is Cystic Fibrosis?

Cystic fibrosis (CF) is an inherited, progressive disease that causes breathing and digestive problems. In order to inherit the disease, a person must get two copies of a defective gene, one from each parent. The parents are unlikely to have the disease themselves, but to rather be carriers for it.



What Causes Cystic Fibrosis?

CF is caused by a defective protein called Cystic Fibrosis Transmembrane Regulator (CFTR). This protein allows chloride ions to pass through cell membranes. In people with CF, it doesn't work. Chloride is one half of the compound sodium chloride (NaCl), common table salt. As a result of this malfunctioning CFTR protein, people with CF have a salt imbalance. The excess salt within their cells causes them to draw water from the surrounding tissues. Mucus is created by cells lining various organs in the respiratory, digestive, and reproductive systems, among others. It is generally thin and slippery to lubricate the linings of the organs and keep them from becoming dehydrated or infected. When cells take water from the mucus, it becomes thick and sticky, building up and hindering essential body functions. In the lungs and airways, this mucus buildup causes difficulty breathing and allows bacteria to grow. The pancreas, an organ in the abdomen, secretes insulin (which helps control the body's blood sugar levels) and enzymes that aid in digestion. Mucus buildup clogs passageways, resulting in less insulin production and preventing digestive enzymes from reaching the small intestine. In men, CF can cause a condition called congenital bilateral absence of the vas

deferens (CBAVD). In this condition, the vas deferens (the tubes that carry sperm) is blocked by excess mucus and fail to properly develop.

What are Some Symptoms of Cystic Fibrosis?

The salt-water imbalance in the body causes the sweat - and, by extension, the snot - to become salty-thick, meaning it has an excess of salt. This causes the body to lose a lot of salt, which can further disrupt the salt-water balance in the blood. Such further imbalance can lead to fatigue, weakness, low blood pressure, high heart rate, and dehydration.



In the respiratory system, mucus buildup causes inflammation, a persistent cough, occasional lunging up phlegm, wheezing, and shortness of breath. Bacterial growth in the lungs causes infections (e.g. bronchitis, pneumonia), which can become severe. Such infections return again and again, over time causing permanent lung damage (including cysts and scar tissue) and respiratory failure. In fact, respiratory failure is the leading cause of death in CF patients.

Reduced insulin can eventually lead to cystic fibrosis-related diabetes mellitus (CFRD).

In the digestive system, the blockage of digestive enzymes leads to difficulty breaking down and absorbing nutrients from food. This leads to malnutrition, vitamin deficiencies, abnormally low growth, and weight loss, despite a healthy appetite and diet, as well as gas, diarrhea, large bulky stools and difficulty passing stool. In the liver, mucus buildup can clog the bile duct, leading to liver disease.

In the reproductive system, the improperly developed vas deferens leads to infertility in men. Women with CF may suffer pregnancy complications.



Get away from tired practices and unengaged students



Provide a Scientifically-Proven means of instruction



Incorporate Technology and Increase Collaboration

