

# Life Processes and Water

## Summary

The function and nature of water as it effects all living things.

## Main Core Tie

Food Science

[Strand 7 Standard 6](#)

## Background for Teachers

### WATER IN THE BODY

As far as human life is concerned, oxygen is the most important element. Water is the most important compound. In the human body, water is vital. Water is second only to oxygen in importance to the body. People cannot survive without oxygen, and people cannot survive without water. A healthy adult may live for weeks without food but only a few days without water. A person can lose all reserve carbohydrate and fat and about half the body protein without real danger, but a loss of 10 of total body weight of water is serious, while a loss of 20 to 22 is fatal. Water makes up 67 to 75 of the total body weight.

Water is involved in all body processes. Water is an efficient heat conductor and serves to maintain the uniform body temperature essential for health. As a protector of internal organs, water is indispensable; it serves as a cushion and prevents the transmission of shock from the outside. It also serves as nature's solvent for many chemical compounds and is the medium for many chemical reactions to occur.

Water, in plant and animal foods and in the human body, transports other substances either in solution or suspension. Within the body cells, water migrates in and out.

When the water is inside of the cells, it is part of the INTRACELLULAR FLUID (fluid contained within a cell). When water is outside of the cells, it is part of the EXTRACELLULAR FLUID (fluid present outside the cells). Extracellular fluid is further divided into INTERSTITIAL FLUID (water between cells) and INTERVASCULAR FLUID (water in the bloodstream). Water shifts freely between one compartment to another. This aspect is very important. For example, if the blood volume falls, water can shift from the areas both inside and around cells to the bloodstream to increase blood volume. The opposite is also true if the blood volume becomes too high.

Water also acts as a temperature regulator in the body. The body secretes fluids in the form of perspiration which evaporates through skin pores. This evaporation requires heat energy and thus as the perspiration evaporates, heat energy is taken from the skin, cooling it in the process.

Water is an important vehicle for removing body waste products. As part of the digestive juices, it helps to change consumed food into nutrients the body can use. Within the bloodstream, it also helps to carry those nutrients to the body cells in need, and carry away cellular waste products. Waste products are then excreted from the body. Most unwanted substances in the body can be removed from the body via the urine.

Water helps to form the lubricants found in the joints of the body. It is also the basis for saliva, bile, and amniotic fluids (the important shock absorbing fluid which surrounds and unborn fetus).

The recommended water intake for adults per day is 8 cups. If enough water is not consumed, the body first signals by making the person feel thirsty. But this mechanism is not always reliable, especially during illness, in elderly years, and when involved in vigorous athletic events. Children who are ill, especially with a fever or diarrhea, are especially susceptible to dehydration.

## Intended Learning Outcomes

Unique physical characteristics of water enable it to function in ways essential to human and all other life processes.

### Instructional Procedures

See attachments below:

The students will participate in a PREASSESSMENT to test their knowledge of the properties of water by using beverages as a medium. They will observe the time it takes to dissolve sugar or hot chocolate mix in hot and cold water and compare and discuss the results.

The teacher will show the students a picture or glass of water and ask each student to give one fact about water. All answers should be accepted. Then read SUMMARY OF BEN GOING WITHOUT WATER IN DEATHWATCH to the class. The purpose of this reading is to help the students see the importance of the role that water plays in the maintenance of body functions.

Following the reading, it is important that the function of water in the body be discussed in detail, since it is the basis for the students' understanding of water in plant, animal, and human food sources and the basis for understanding the function of water within the body.

The students will brainstorm, make a list of, and discuss:

1. Foods that are with water as a major ingredient.
2. Foods that use water in the process of preparation of the foods for eating.

The students will EXPERIMENT WITH SOLUTIONS and complete the worksheet. To emphasize the function of water as a substance in which other substances dissolve and as a substance that both cleans and contaminates, the students will experiment and test the effects of sharing with each other a mixture of tap water and a little sodium hydroxide (NAOH). This will provoke discussion about the effects water has on the spread of disease, germs, contamination, cleaning, disinfection, etc.

NOTE: This is a good time to refer back to the food safety and sanitation unit. (For details of the activity, see EFFECTS OF MIXING NaOH AND WATER.) The students will create a poster or bulletin board illustrating important characteristic(s) of water.

The students will participate in a series of experiments to FIND FOODS' HIDDEN WATER and record their observations in their science notebooks. The students will participate in a SUMMATIVE EVALUATION. The teacher will provide the class with the ingredients for making POTS DE CREME. The students will then write the directions for the recipe using the principles of hot and cold solutions discovered in the preassessment activity to help them write the recipe. The teacher will review the directions to see how well the students were able to apply the scientific principles.

The students will make POTS DE CREME following their created recipe.

### Authors

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