# HYDRATION STATION

Student Name _____

This lesson will help you understand the importance of staying hydrated while also indentifying the signs of dehydration. You will also be able to recognize the importance of hydration for humans here on Earth and astronauts exploring the outer space.

## Problem

How can I create simulated urine to identify different levels of hydration?

## Observation

Dehydration can affect an athletic performance and increase the risk of a medical emergency. During athletic events or physical activity most athletes do not make it a priority to drink sufficient liquids to prevent dehydration. The consumption of liquids can be modified by educating the athlete and increasing accessibility of liquids during physical activity. However, athletes are not the only ones who are at risk. The elderly, children, labors and individuals enjoying outdoor activities are also at risk of suffering the symptoms of dehydration. Children sweat less than adults. This makes it harder for children to cool off. Parents and coaches must make sure that children take it slow to be sure they can get used to the heat and humidity gradually. Dehydration is a major cause for hospitalization among the elderly. Elderly are more susceptible to dehydration due to less fluid content in the body, they carry about 10 percent less than the average adult body. The elderly also have a reduced sense of thirst and loss of appetite that can trigger dehydration.

Space explorers must maintain proper hydration levels while on an exploration missions. As astronauts reach the space environment, they stop feeling the pull of gravity. The normal functions of the body begin to change as the fluids in the body begin to shift towards the head. As the body detects the extra fluid in the upper body, the body believes there is too much fluid and the body begins to get rid of what it thinks are extra fluids. This large loss of fluids can result in dehydration for astronauts. In order to avoid this dehydration, astronauts must drink lots of fluids while in orbit. Dehydration can be very dangerous, astronauts must make sure they are not dehydrated while completing their tasks on a mission, whether inside or outside the space exploration vehicle, just like they do on earth astronauts need adequate hydration to maintain proper health.

Brainstorm with your group about Hydration by completeing the

### Discovery Lesson

**Materials**

Per class:

- Chart paper or small poster board
- Markers
- Pencils
- Computer with Internet access for teacher use
- Library access
- LCD projector overhead projector
- Copies of hydrate the Astronaut
- One water bottle picture per class
- 2-3 bandanas
- Plastic clear cups
- Disposable 8inch plates
- Toothpicks
- Yellow, Red and Green food coloring
- Urine color chart

Per group:

- Chart paper
- Markers
- 2 computers with internet access
- Hydration/Dehydration chart or poster
- Four clear plastic cups
- 1 disposable 8 inch plate
- Two toothpicks
- Yellow, Red and Green food coloring
- Urine hydration color chart
- Hydration cards

Per student:

- Hydration Student Section
- Hydrate the Astronaut log
- Urine hydration color chart
- 24 hour hydration log

**Safety**

It is important to stay hydrated during any type of exercise. Wear the proper attire for the appropriate physical activity. Remind the students the importance of proper internet use.

first two columns in the KWL (KNOW/WANT TO KNOW/LEARNED) chart.

| KNOW | WANT TO KNOW | LEARNED |
|---|---|---|
| | | |

## Hypothesis

Based on your observation answer the problem question with your best answer. **Problem: How can I create simulated urine to identify different levels of hydration?**

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## Test Procedure

### Hydration Poster

1. As a class discuss the importance of staying hydrated, what are some risk of dehydration and the best methods to keep hydrated.
2. You will discuss and make observations about hydration by designing and creating a hydration web poster. While creating your group poster keep the following questions in mind. Be to present your group poster to the class.
    - What is dehydration?
    - What are the causes of dehydration?
    - What are the signs of dehydration?
    - How can dehydration be prevented?
    - Why is it important to keep your body hydrated?
    - What are the best beverages to stay hydrated?
    - Do you think hydration is important to astronauts while they are in space? When should an astronaut be concerned about hydration in space?

### Hydrate the Astronaut

1. As you play hydrate the human write a small paragraph in your mission journal about the organ explaining why this body system depends on water to function properly. Color in the body system as they are hydrated during the game.

**Simulated Urine**

1. You should work in groups of three or four during this lab.
2. Collect the following materials with your group.
    a. Four plastic cups
    b. Yellow, red, and green food coloring
    c. A permanent marker
    d. Make sure your group has access to water.
3. Label your cups 1-4
4. Fill each cup with 2oz of water
5. In cup 1 use a toothpick to add 1 dab of yellow food coloring.
6. In cup 2 use a toothpick to add 2 dabs of yellow food coloring.
7. In cup 3 add 1 drop of yellow food coloring.
8. In cup 4 add 1 drop of red food coloring 2 drops of yellow food coloring and 1 drop of green food coloring.
9. Compare your simulated urine to the Urine color chart.
10. Arrange your simulated samples into the four hydration levels.
    a. Optimal
    b. Well Hydrated
    c. Dehydrated
    d. Seek Medical Aid
11. Identify each sample of hydration levels by placing the hydration card next to the appropriate simulated urine.

## Record Data

1. You will keep a 12 hour hydration log to determine your own hydration levels. You will determine is you are drinking enough liquids to maintain healthy hydration.
2. Make observations of your own urine to determine what category your urine would fall under. Is your urine Optimal, Well Hydrated, Dehydrated or do you need to See Medical Aid. Use your Hydration color chart to help you determine your hydration levels.
3. At NO time will you bring an actual urine sample into the classroom.

**Study Data**

After completing all investigations, study data by answering the following questions.

1. Why is hydration important to you?

2. What color best describes your urine color?

3. Would you consider yourself to be hydrated or dehydrated? What do you need to do to reach optimal hydration?

4. In your opinion, what can change your urine colors?

5. Why should you be concerned if your urine is a darker color rather than a light yellow to clear color?

6. After observing your hydration levels for 12 hours, what time of the day did you find you were dehydrated the most?

7. What circumstances do you think made your urine a darker color at this time of day?

8. What actions did you take to change your hydration levels?

## Conclusion

- Fill in the learned column in the KWL chart.
- Restate your hypothesis then explain what happened during testing, including your results.

## 12-Hour Hydration Log

Track your liquid intake within 12 hours. Use your Urine Color Test chart to categorize your urine. You will complete the log on your own. At no time should you bring an actual urine sample into the classroom.

| **Bathroom Time** (hr) | **Urine Color** | **Urine Category** | **What I drank** | **How much I drank** | **Physical Activity (None, Low, Moderate, High)** |
|---|---|---|---|---|---|
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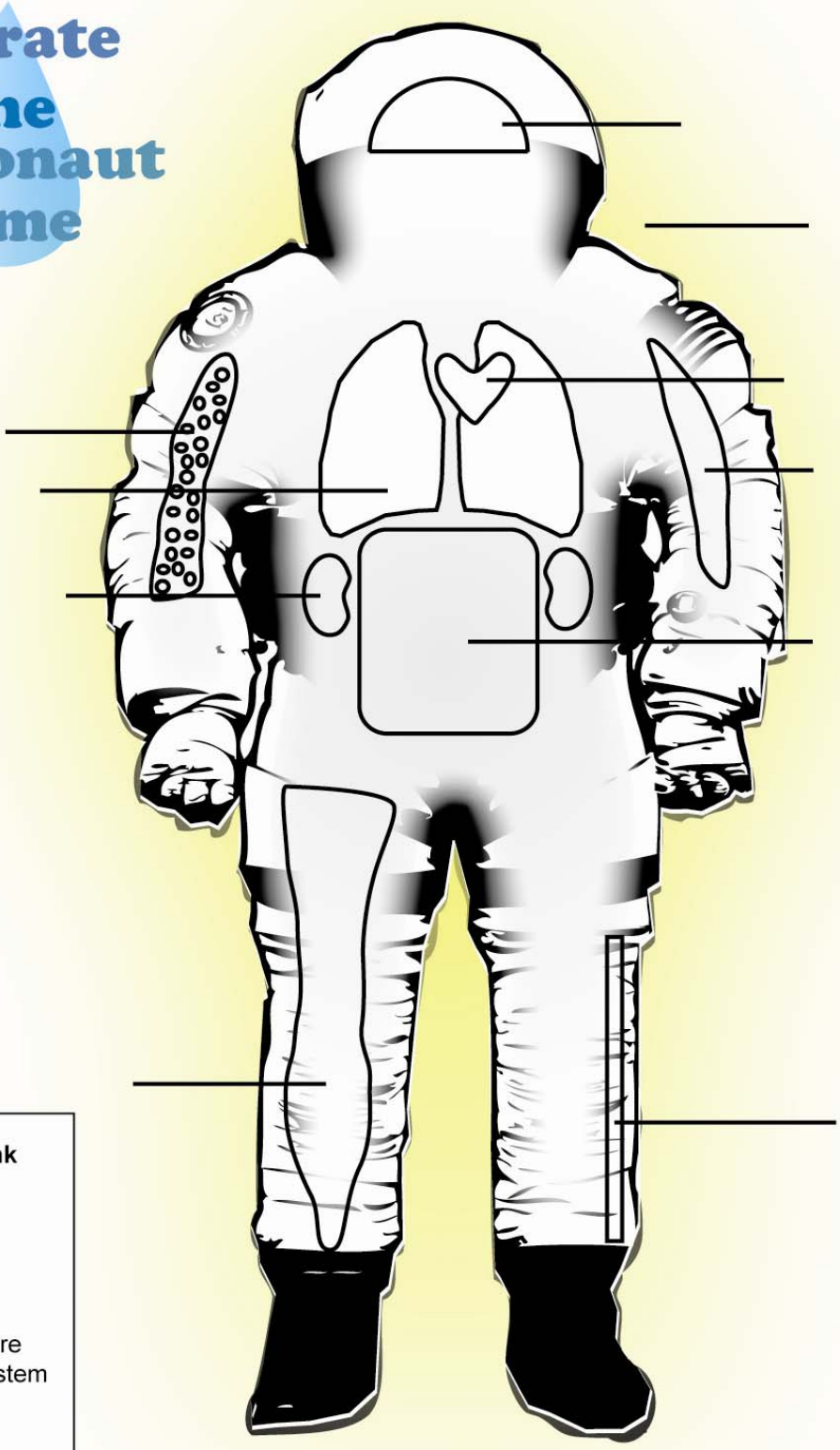
# Hydrate The Astronaut Game



**Word Bank**

Cells
Heart
Muscles
Brain
Kidneys
Temperature
Digestive System
Skin
Lungs