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| **Activity 3.1.1: Resources for Life**  |

Introduction

Each year, hundreds of athletes pull on their running shoes and set out on a 160- mile, seven day race across the Sahara Desert. The Marathon des Sables, or the Marathon of the Sands, is one of the most grueling endurance events on the planet. With the potential of daytime temperatures over 120°F, runners are bombarded with superheated air flowing over their skin and into their lungs. Competitors carry limited supplies with them in backpacks and water is provided only at designated checkpoints. These endurance athletes have trained physically and prepared mentally, but will their bodies have the power to propel them to the finish?

In 1994, in the fourth leg of the marathon, endurance runner Mauro Prosperi lost sight of the trail. A sandstorm covered the course markers, leaving Mauro alone to compete in a different race - the race to stay alive. For the next nine days, on extremely limited food and water, Mauro made his way across the desert. His incredible story baffled doctors and physiologists. How could a man possibly live in these conditions for such a long period of time? Mauro’s body, however, provided more than enough evidence to corroborate his story. When he was found, he had lost 33 pounds, his body required over 16 liters of water to replace his water loss and his kidneys and his digestive system were almost completely shut down. Miraculously, he was still alive. Faced with immeasurable amounts of stress, the amazing human machine became even more amazing. Adaptations of the body and of the mind helped this man push past the thresholds of human endurance and show the power the body has to stretch vital resources to their absolute limit.

Stories of human survival in extreme environments highlight the body’s amazing ability to adapt and to fight to maintain homeostasis. Various body systems acquire and distribute critical supplies and provide power to human function. The resources we input and circulate around are critical for every major process that keeps us alive. If these resources become scarce, the body will try to adjust. If one of these supplies reaches a critical low, the body will shut down, and ultimately, fail.

In this introductory activity, you will discuss the resources that power the human machine. You will examine the key resources your body needs to survive and brainstorm the human body systems that supply power and energy and remove harmful waste.

Equipment

* Chart paper
* Graduated straightedge
* Markers/Colored pencils
* Laboratory journal

Procedure

1. Obtain a piece of chart paper to create the Powering the Human Body poster.
2. **Using the entirety of the chart paper**, with a graduated straightedge, divide the chart paper into the pattern shown below:

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| **POWERING THE HUMAN BODY** |
| Resource |  |  |  |
| Functions |  |  |  |
| Body Systems Involved |  |  |  |
| Environmental Factors |  |  |  |
| Personal/Human Factors |  |  |  |

1. Label the top of each column with one of the three main resources that are needed for human life. Which solids, liquids and gases are essential to the human machine?
2. Use colored markers or pencils to add a title and the headings for each row.
3. With your partner, brainstorm the **functions** of each resource. Think about how what you eat, drink, or breathe in affects body function. List your ideas in the appropriate space on the chart.
4. Brainstorm which of the human body systems help acquire, process, and/or distribute each resource. List your answers on the “Body Systems Involved” row of the chart. ***Formulate one sentence or phrase*** that describes ***how this system is involved with the resource***. ***Be prepared to justify your reasoning***. Write the sentence in your lab notebook.
5. Share your ideas for the first two rows with the class.
6. With a partner, rank the resources you have discussed in order of importance for the body. Ranking #1 goes to the resource that is most critical to your survival. Ranking #3 goes to the resource you can go the longest without resupplying. Use a colored marker to add your rankings to the chart. Write the number next to the name of the resource and circle this number. ***Be prepared to defend your ranking*** ***with evidence***.
7. As a class, debate rankings and discuss how each resource is used by the body.
8. Partner up with another pair to form a team of four. Brainstorm how long you think the body could go without each resource. What is the “time to empty” for each resource? Is it minutes? Hours? Days? Weeks? Years? ***Describe your evidence and reasoning in your laboratory journal. Be prepared to explain your thinking to the class.***
9. Copy your *Powering the Human Body* chart into your laboratory journal. Add additional ideas that may have been added to the class chart.
10. Store your chart paper or poster in the area designated by your teacher. You will fill in the remaining rows in the next activity.

Conclusion

1. In one sentence for each resource – food, water, and oxygen – explain how this resource helps provide power to the human body.
2. What factors do you think influence how long your body can last without food, water, or oxygen?
3. How do you think the brain and the nervous system assist in times of limited body resources?