

## Oxygen Analyzer Lesson Plan

**Beckman Center Collection Area:** Oxygen Analyzer

**Grade:** Middle School, recommended 6<sup>th</sup> Grade

**Subject Area:** Science, English Language Arts

**Duration:** 1 hour

### Objectives:

#### Goals:

1. Students will understand that oxygen is a component of Earth's atmosphere and plays many important biological and chemical roles.
2. Students will understand the role that oxygen plays in respiration and that humans require it for basic functions and increased amounts for higher levels of physical activity.
3. Students will understand why it is important to monitor oxygen levels in an enclosed space and some common applications of the Beckman Oxygen Analyzer.

### Standards:

#### Next Generation Science Standards:

MS-LS1-7: Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem

#### Common Core State Standards English Language Arts

CCSS.ELA-LITERACY.RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

CCSS.ELA-LITERACY.W.8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

CCSS.ELA-LITERACY.RST.6-8.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

### Classroom Activities:

1. Warm-up Discussion: What is oxygen? What is air and how are they different? What things need oxygen? Can you think of things or processes other than living organisms that need oxygen (fires need oxygen, oxygen causes rust)?

2. Pass out the respiration student hand out and work through it as a class.  
Suggested comprehension and discussion questions following the activity:
  - o *Do we need more oxygen when sitting still or exercising? Why?*
  - o *What do you think would happen if the oxygen level in a space was less than 20%? Would this be a positive or negative effect?*
2. Discuss the invention of the oxygen analyzer and some popular applications, namely use in submarines and incubation chambers.
3. Make connections to the oxygen cycle. In our ecosystem – what things consume oxygen? What things produce oxygen?
4. As a whole class, review the lesson and share:
  - *What surprised you today?*
  - *What is something new you learned?*

### **Extension Activities:**

- Have students split up into groups to research explore some important chemical reactions which require oxygen.
  - o Combustion (fire)
  - o Oxidation (rust)
  - o Cellular Respiration, have another group look up anaerobic respiration to see how cells produce energy when not enough oxygen is present.
- Students divide into groups and explore at a deeper level applications of the oxygen analyzer and scenarios where oxygen concentration is critical
  - o Submarines
  - o Spaceships
  - o Incubation Chambers
  - o SCUBA Tanks

### **Additional Beckman Center Resources:**

[About the Foundation | Beckman Foundation \(beckman-foundation.org\)](http://beckman-foundation.org)

[Impact Videos | Beckman Foundation \(beckman-foundation.org\)](http://beckman-foundation.org)

### **Sources:**

[Classroom Activities on the Respiratory System \(sciencing.com\)](http://sciencing.com)