Grade Level: 3-5
Time Estimate: 1-2 days

HISTORY OF SCUBA DIVING / INSTRUCTOR INFO

Summary

This lesson includes vocabulary, content, and creative activities to help students learn about SCUBA diving. Students will learn about the different methods of diving that have been practiced throughout history. They will also learn about the different influential people throughout the history of diving and how diving has impacted conservation.

Part 1. Methods of Diving
Part 2. Influential People
Part 3. Diving and Conservation
Activity 1. SCUBA Era
Activity 2. SCUBA Tank Pack

Goals & Objectives

The students will:
• Learn the different methods of diving that have been practiced;
• Learn about the most influential people that impacted the diving community;
• Learn how diving has impacted the world of conservation.

Helpful Tips

1. The content in this lesson is related to OCEARCH and the Global Shark Tracker. Spend a few minutes getting familiar with the website and the tracker if you have not done so already. The Global Shark Tracker is also available as an app for iPhone and Android.
2. This lesson plan is designed to be adaptable to suit your specific needs. Use the entire lesson plan or just parts of it. This material can be expanded to be an entire unit or condensed for just one day in the classroom.
3. Vocabulary words will be underlined as they appear in the lesson plan. A complete list of vocabulary words is included as well.
4. Answers to questions and prompts for discussions will appear in italics.
5. Optional activities and content (side notes) will appear in a box. Use these to enhance your lesson and adapt it to suit your needs!
6. Have questions for OCEARCH Expedition Leader, Chris Fischer? Email info@OCEARCH.org to schedule a Skype session and let your students/child talk directly to Chris and the OCEARCH crew!
7. Email all questions about this lesson to info@OCEARCH.org.

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// STANDARDS

This lesson aligns with the following TEKS:
Grade 3 Science: 2A, 2C, 2F, 3A, 3D, 9B
Grade 4 Science: 2A, 2C, 2F, 3A, 3D, 9B
Grade 5 Science: 2B, 2F, 3A, 3D, 9C

This lesson aligns with the following Next Generation Science Standards:

Biological Evolution: Unity and Diversity - 3-LS4

Science and Engineering Practice
Engaging in Argument from Evidence
• Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). (3-LS4-3)

Disciplinary Core Ideas
Adaptation
• For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

Crosscutting Concepts
Cause and Effect
• Cause and effect relationships are routinely identified and used to explain change. (3-LS4-3)

STEM
This lesson plan aims to assist teachers in implementing a STEM-based program into their classroom while inspiring the next generation of explorers, scientists, and stewards of the ocean. Based on real science and the Global Shark Tracker™, this lesson is intended to promote environmental awareness and to prepare students for STEM careers.

HISTORY OF SCUBA DIVING /VOCABULARY

Organism - A plant, animal or single-celled life form.

Artifacts - A human made object that is typically an item of historical or cultural interest.

SCUBA - Self-Contained Underwater Breathing Apparatus, is used to explore underwater.

Commercial - Intended to make a profit.

Hypoxia - When there is not enough oxygen reaching the tissues.

Internal - On the inside.

Vessel - A ship or large boat.

Self-contained -Having all that is needed within.

Ascend - To go up.

Compressed air - Pressurized air in a container so that more air can fit into a smaller container.

Recreational – An activity done for enjoyment.

Influential - Having power to cause change.

Oceanographer - Someone who studies the ocean.

Apparatus - A piece of equipment used for a specific activity.

Commodity - Something that is bought and sold or something or someone that is very valuable or useful.

Extinct - No longer existing, there are no more of something.

Ecosystem - Everything that exists in a specific environment.

Overpopulate - When there are too many people or animals that live in a certain area.

Hypothermia - A condition where your body loses heat faster than the body can produce heat.

Regulation - An official rule or law that says how something should be done.

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HISTORY OF SCUBA DIVING / PRE-LESSON ASSESSMENT

Use the following true/false and multiple-choice questions as an introduction/warm-up to the lesson topics. You can do this in a verbal or written format, as a game, individually, or as a whole class! A handout is provided if you wish to hand the questions out in a quiz format.

The questions do not need to be graded. They are intended to give the students an idea of what they will be learning and to see what they already know.

1. True or False
The Aqua-Lung was a redesigned car regulator.
Answer: True

2. True or False
The first method of diving was breath-hold diving.
Answer: True

3. What does SCUBA stand for?
- **a.** Self-Contained Underwater Breathing Apparatus
- **b.** Science Community for Underprivileged Adolescents
- **c.** Self-Controlled Underwater Breathing Apparatus
- **d.** Super Cool Under-Boat Adventures

Answer: a

4. Who invented the Aqua-Lung?
- **a.** Jacques-Yves Cousteau
- **b.** Emile Gagnan
- **c.** Owen Churchill
- **d.** Both a and b

Answer: d

5. Which of the following are ways diving has helped conservation?
- ***a.*** It makes it possible for filmmakers to shoot footage for documentaries about conservation.
- **b.** It allows people to do coral restoration
- **c.** It allows us to check oil rigs for any oil leaks
- **d.** All of the above

Answer: d

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Name: _____

Date: _____

History of SCUBA Diving

Select the correct answer(s) to each of the following questions.

1) True or False

The Aqua-Lung was a redesigned car regulator.

2) True or False

The first method of diving was breath-hold diving.

3) What does SCUBA stand for?

a. Self-Contained Underwater Breathing Apparatus

b. Science Community for Underprivileged Adolescents

c. Self-Controlled Underwater Breathing Apparatus

d. Super Cool Under-Boat Adventures

4) Who invented the Aqua-Lung?

a. Jacques-Yves Cousteau

b. Emile Gagnan

c. Owen Churchill

d. Both a and b

5) Which of the following are ways diving has helped conservation?

a. It makes it possible for filmmakers to shoot footage for documentaries about conservation.

b. It allows people to do coral restoration

c. It allows us to check oil rigs for any oil leaks

d. All of the above

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HISTORY OF SCUBA DIVING / LESSON PLAN

INTRODUCTION **2-4 mins**

The ocean has always intrigued many people and has led them to discover different ways to explore the marine world and the abundance of organisms that live there. Diving is not something that was recently started; it has been performed for centuries! There are many reasons why people have always wanted to explore underneath the ocean, a few of them being to hunt for food, repair or sink ships, uncover artifacts, or to simply explore and observe all of the life in the ocean.

PART 1. METHODS OF DIVING **10-15 mins**

There are four main methods of diving that have been used throughout the history of diving. The methods are breath-hold diving, diving in heavy-walled vessel, diving with compressed air supplied from the surface, and diving with compressed air or other gas mixtures that are carried by the diver (SCUBA diving).

Breath-Hold Diving
This is the earliest form of diving and is still practiced today for sport and commercial reasons. With this type of dive, the diver will take a large breath of air and hold it underwater only letting a small amount of air out at a time. As soon as they cannot release any more air and need to take a breath, the diver will come to the surface of the water to take a breath of air. Divers will repeat this, because they can typically only hold their breath for a minute or less. This type of dive is limited depending on how long the diver can hold their breath and the risk of drowning from hypoxia.

Diving in a Heavy-Walled Vessel
This method of diving involves divers using a vessel with thick and heavy walls that can maintain their internal atmosphere at or near sea level pressure. This prevents the pressure of the surrounding water from affecting the divers inside the vessel. An example of this type of vessel is a bathysphere. A bathysphere is an unpowered hollow vessel made of steel that is lowered from the main ship by a steel cable. This type of vessel is called a one atmosphere vessel and requires a source of fresh air as well as a way to clean the exhaled air.

Another type of a one atmosphere vessel is the self-contained armored diving suit. This diving suit can withstand pressures at great depths, with great flexibility, which results in the diver being able to act like a small submarine. This also gives them access to dive at greater depths and for a longer period of time.

Diving with Compressed Air Supplied from the Surface
With this method of diving, the diver and the supply of fresh air is kept on the surface of the water resulting in a separation between the diver and supply of air. In order for the diver to receive the air, it is sent through a long umbilical which contains a regulator and a mouth piece at the end. With this type of device, the air that the diver breathes in is the same pressure as the surrounding water. Because of this, divers cannot ascend too quickly or they could get sick!

SCUBA diving

SCUBA diving is the method of diving where the air supply is carried by the diver and is either compressed air or a mixture of other gases. Two types of SCUBA exist: open and closed circuit. Open circuit releases all of the expired air into the water and is the type that is used in recreational diving. Closed circuit systems involves the exhaled air being rebreathed after the carbon dioxide has been removed and oxygen has been added. This type of SCUBA diving was very popular until open circuit became available and was especially popular amongst military divers whom did not want to show any air bubbles during their dives.

Illustration Credit: Sarah Rich, Landry's Downtown Aquarium, Houston

PART 2. INFLUENTIAL PEOPLE **5-10 mins**

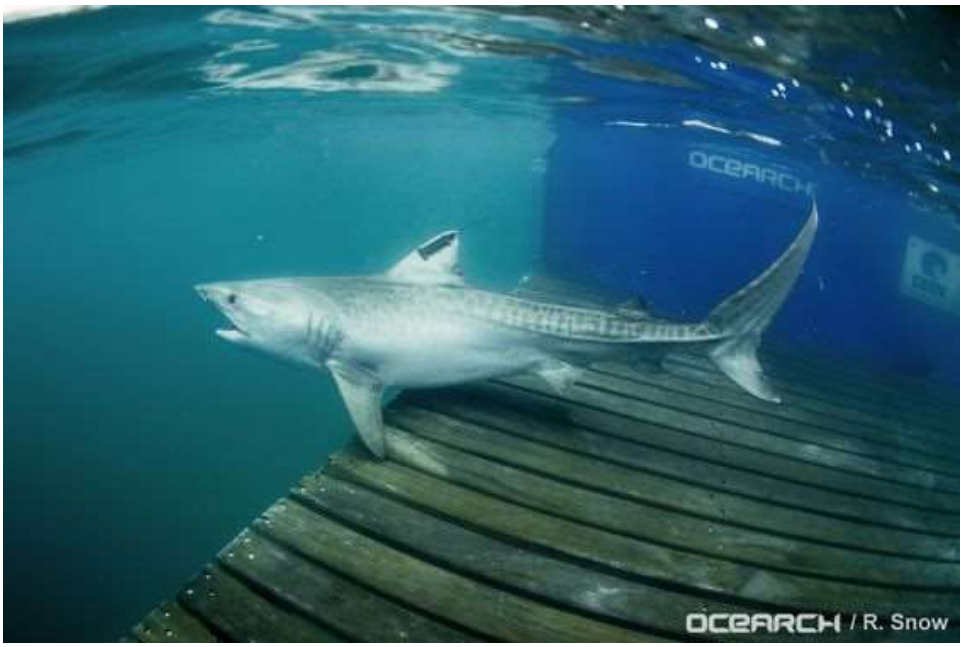
Jacques-Yves Cousteau, a French naval lieutenant, was a very influential person in the diving community. Cousteau was an oceanographer and an award-winning filmmaker that fought to protect the environment. One of the most influential inventions in diving was invented by Jacques-Yves Cousteau and Emile Gagnan. Together they worked to create the Aqua-Lung, which would provide compressed air to a diver when they took a breath, even with the smallest intake of breath.

They created this by redesigning a car regulator and is known today as a diving regulator or demand valve. The Aqua-Lung made a huge impact on the diving community, especially in the area of sport diving. This regulator was reliable thanks to its simple design and solid construction as well as low cost. Before their invention, all self-contained apparatus's being used at that time either provided continuous air or had to be manually turned on and off. With the invention of the Aqua-Lung, recreational diving was safer and more efficient making it a hot commodity for people in the recreational diving community.

Due to this advancement, the interest in diving increased significantly, because of this John Cronin and Ralph Erickson felt that a professional organization for diving should be created. They believed that this organization should make it easy for anyone interested in diving to become a skilled and confident diver. Therefore in 1966 they worked together to create the Professional Association of Diving Instructors also known as PADI to provide this service. PADI provides SCUBA training to thousands of people a year through certified dive instructors. Throughout the years PADI has issued millions of certifications and today has more than one hundred and thirty-six thousand PADI Professionals. Because this organization provides quality training, people know the proper procedures to follow while they are diving which makes the safer when they dive.

PART 3. DIVING AND CONSERVATION **10-15 mins**

Thanks to the advancements that have been made throughout the years, filmmakers and photographers can capture incredible underwater images that inspire everyday people to learn more about the ocean. As more and more people are intrigued by the ocean, the more they become aware of what is happening to the oceans today. These people are more likely to spread the word about conservation and educate others on how they can help make a positive difference on the environment.



Over the years, the health of our oceans has steadily declined. With the ability to SCUBA dive, scientists can explore the underwater world to evaluate the conditions of the ocean and the animals that live there. This helps us learn how much damage has been done, track population increases and decreases, monitor the health of coral reefs, and even physically clean the ocean. Many SCUBA divers go on diving trips simply to remove trash from an area of ocean or another body of water. SCUBA diving ultimately allows scientists to provide scientific evidence to help pass laws and regulations that can help save the environment and wildlife.

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HISTORY OF SCUBA DIVING
ACTIVITY 1. SCUBA ERA

INTRODUCTION

During this activity, students will be given a specific time era in history to research and report on. Their report will include important advancements that were made in diving and what type of equipment was being used at that time, along with important people who impacted diving during that era.

MATERIALS

- SCUBA Era Handout
- Computer
- Internet access
- Writing utensil

INSTRUCTIONS

Give each student a SCUBA Era Handout and a specific time era for them to research. Have students use a computer to research their time era and fill out their handout.

TIPS

This activity can be done individually or in groups. If a computer and internet access are not available you can find a timeline of diving history or articles about diving instead. To get a bigger grade from this activity it could include a presentation of their time era to the class.

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SCUBA TIME ERA

Name: _____

Research the diving community during your assigned time era and answer the questions below.

Time Era: _____

1) What diving equipment was being used during this time?

2) Who was the most influential person in the diving community at this time?

3) What advancements were made in diving equipment?

4) What new discoveries were made during this time?

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HISTORY OF SCUBA DIVING
ACTIVITY 2. SCUBA TANK PACK

INTRODUCTION

During this activity, students will get a chance to create their own SCUBA tank that can be worn on their back as a costume.

MATERIALS

- 2 Liter bottles (1 or 2)
- Black duct tape
- Black ribbon
- Colored pens or permanent markers (optional)

INSTRUCTIONS

Rinse the liter bottles and let them dry. If using two bottles have students tape them together near the bottom and the top using the black duct tape, the two bottles should be side by side. After this have students tape the ribbon to the bottle to make them wearable.

TIPS

When attaching the ribbon, you can either use duct tape or hot glue. Students may need help getting the tape on right so they can help a partner out by holding them together. To add more creativity, you can have students decorate their SCUBA tanks however they want.