

Welcome to the Supercharged Science

Marine Biology, Oceanography and Underwater Robots Teleclass Webinar!

You can fill out this worksheet as we go along to get the most out of time together, or you can use it as a review exercise at the end of the class to see where your strengths are.

What we're going to cover today:

- Ocean floor
 - Ocean zones
 - Temperature, pressure
 - Salinity
 - Marine plants and animals
 - Exploration techniques
 - Observing techniques
 - Submersibles & Submarines
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Write down two things you really want to know about marine biology or oceanography:

1. _____

2. _____

Do this NOW: Write down WHY you want to learn about the things you mentioned above. What will it give you, or provide you with, or make possible for you if you now understand these things that you wanted to learn?

IMPORTANT: During class, you can either fill out the worksheet, OR if that's too stressful or a hassle, just set it aside and fill it out after class is over so you can enjoy watching the class.

Answer key is on the last page, so put it in a place where you won't be tempted to peek at the answers until after you've given it your best shot.

Material List:

Please note: If you have participated in previous teleclass webinars (Electricity, Robotics, Magnetism...) then you already have most of the materials you need for this class as the electrical components are reusable. The easiest way to obtain electrical components is to purchase a personal fan available at drug stores and grocery stores during the summer months, as these mini-fans include the motor, battery pack, wires, and the propeller all in one unit! Just make sure to disassemble the fan prior to class so you parts are ready to go.

- Salt (about a cup)
- Hard boiled egg
- Glass of water
- Popsicle sticks (tongue-depressor size)
- Soda or water bottles (at least 3)
- 2 AA batteries (cheap “dollar store” kind work great)
- AA battery case (Radio Shack: 278-1157, [Jameco: 10444](#))
- Alligator wires (Radio Shack: 270-408, [Jameco: 216081](#))
- 3V DC motor (Radio Shack: 273-233, [Jameco: 231925](#))
- Propeller*
- Hot glue gun with glue sticks (“low temperature” kind)
- Scissors



*PROPELLER: You can find propellers in all sorts of interesting places! You can use those *aerocopters* or *roto-copters* – the kind you spin in your hands (image at lower left) or you can rip them off an old airplane or helicopter toy.



Propellers

If you purchase one of those battery-powered mini personal fans, the kind that fit in your pocket or have a sprayer or big clip attached, then you also get a battery pack, wires, motor, and a switch along with the propeller!

You can also find propellers at hobby shops. In any case, make sure your propeller is easily attached to the motor shaft before class starts (you make have to drill out the hole size so it fits your shaft), so make sure you are ready to go for class when it starts!

During the Lesson:

You can look over the worksheet so you know what to listen for as you go through the class with me, or you can go through it along with me during class. OR... flip it over and forget about it and just enjoy the class. When class is over, flip it back over and fill it out and be amazed at how much you've picked up and learned!

1. Marine Biology studies life in _____
environments.
2. Oceanographers study _____, currents, waves, seafloor geology,
chemical composition, sea _____ and animals.
3. Remotely Operated Vehicles are _____, unoccupied
underwater robots that _____.
4. For every _____ meters you descend, _____ atmosphere of
pressure is added.
5. There are main three _____ of the ocean:
6. The ocean floor has _____ and _____
just like on land.
7. Hydrothermal _____ are surrounded by thriving communities of
organisms that _____ from the vents for chemosynthesis.

8. _____ in the ocean comes from _____

on land.

9. Cephalopods _____ their environment by matching color,

texture, brightness, and pattern.

10. What I didn't know about marine biology and oceanography until class today was:

Vocabulary Words:

Aphotic Zone: the depths beyond which less than 1% of sunlight penetrates.

Bioluminescence: The ability to glow in the dark; production of visible light by living organisms

Chemosynthesis: similar process to photosynthesis but uses chemical energy instead of light energy to make food from the carbon in carbon dioxide.

Cephalopod: marine mollusk characterized by well-developed head and eyes and sucker-bearing tentacles

Crustacean: mainly aquatic arthropod usually having a segmented body

Disphotic Zone: known as the twilight layer, this zone has only a small amount of light.

Echolocation: determining the location of objects by reflected sound

Invertebrate: any animal lacking a backbone or notochord

Mollusk: invertebrate with a soft unsegmented body usually in a shell

Photic Zone: is the depth of the water nearest to the surface where enough light penetrates to allow photosynthesis.

Photosynthesis: synthesis of compounds in plants aided by radiant energy

Phytoplankton: Single celled microscopic organisms that are found scattered throughout the photic zone

Pressure: the continuous physical force exerted on or against an object by something in contact with it.

Salinity: The total amount of dissolved salts in seawater. Measured in parts per thousand

Symbiosis: the relation between two interdependent species of organisms

Temperature: the degree or intensity of heat present in a substance or object, especially as expressed according to a comparative scale and shown by a thermometer or perceived by touch.

Answer Key:

1. Marine Biology studies life in salt water environments.
2. Oceanographers study tides, currents, waves, seafloor geology, chemical composition, sea plants and animals.
3. Remotely Operated Vehicles are tethered, unoccupied underwater robots that explore oceans.
4. For every 10 m you descend, 1 atmosphere of pressure is added.
5. There are main three zones of the ocean.
6. The ocean floor has canyons and seamounts just like on land.
7. Hydrothermal vents are surrounded by thriving communities of organisms that use energy from the vents for chemosynthesis.
8. Salt in the ocean comes from rocks on land.
9. Cephalopods mimic their environment by matching color, texture, brightness, and pattern.