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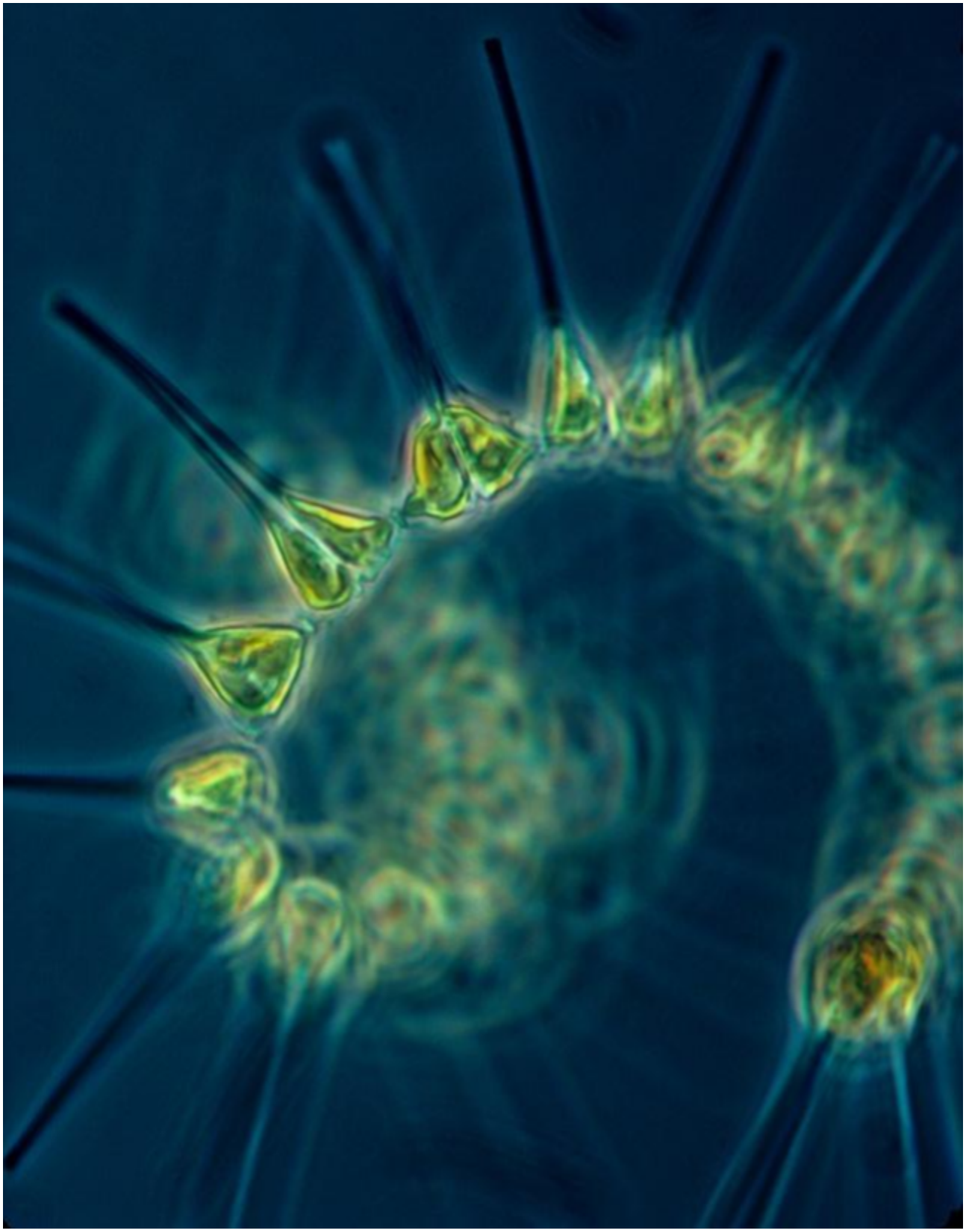

Seas of Green - Designing A Plankton

Lesson contributed by Savanna Nilsen, 2018 SCF
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Lesson Design:

- **Step 1:** Complete the introduction notes page describing plankton using the vocabulary list provided. Complete the blanks learning about plankton from reading, a teacher presentation, or personal research.
- **Step 2:** Demonstrate your knowledge by looking at a food web which relies on plankton. Begin to look for structures on the example images of plankton to incorporate into your design.
- **Step 3:** Design your own plankton with structures to prevent it from sinking so it can stay in the sunlit prime-plankton habitat of surface ocean waters. Teachers will provide materials for model construction. Simple material like scrap paper, pompoms, pipe cleaners, recycling bin boxes or bottles, glue, and paper clips work well.
- **Step 4:** Students will present their plankton design sharing key adaptations to peers according to the presentation guide.

Teaching Reference Material:

- Explainer Video (5:34): NASA Earth Science Week: The Ocean's Green Machines
- TED talk The Secret Life of Plankton by Tierney Thys
- Introduction to Plankton Adaptations Kahoot - suggested to play after lesson Step 1.
- Learn more about plankton: https://www.planktonportal.org/#/science/field-guide

Educator Answer Key included for activity step 1.

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Step 1. Plankton Introduction Notes

Use the following vocabulary bank to complete the notes.

Vocabulary Bank		
Plankton **Zooplankton** **Phytoplankton**	**Consumer(s)** **Autotroph(s)** **Producer(s)** **Heterotroph(s)**	**Adaptation(s)** **Food web** **Photosynthesis**

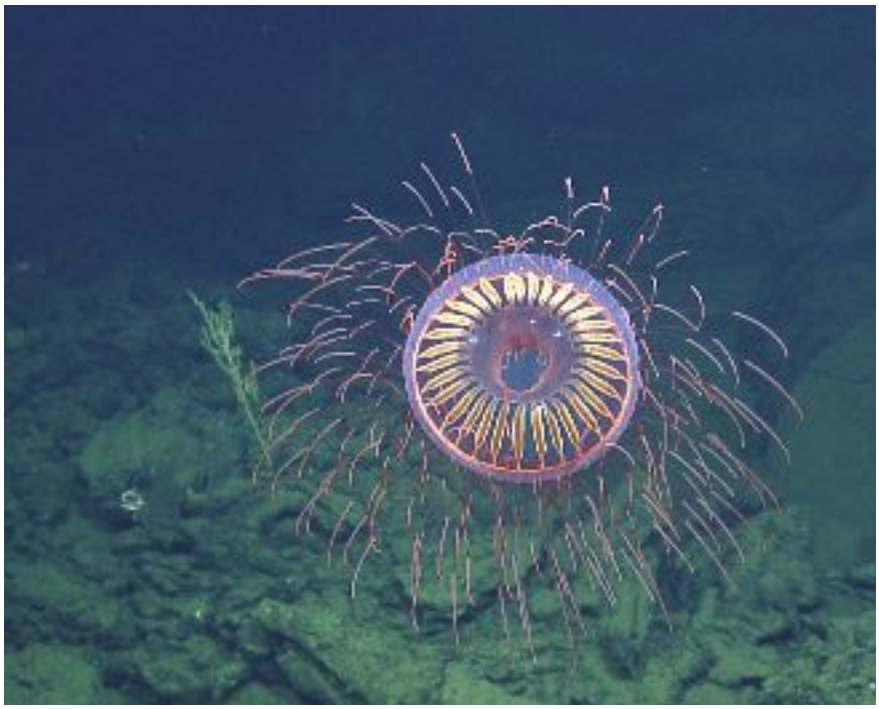
_____ are aquatic organisms that drift with water currents or swim weakly. Plankton are important because they form the basis of the _____ in the ocean. There are two types of plankton: _____ (*zoo* means *animal*) and _____ (*phyto* means *plant-like*). Many of them are microscopic, but not all of them. Jellyfish is one example of a plankton that is not microscopic.

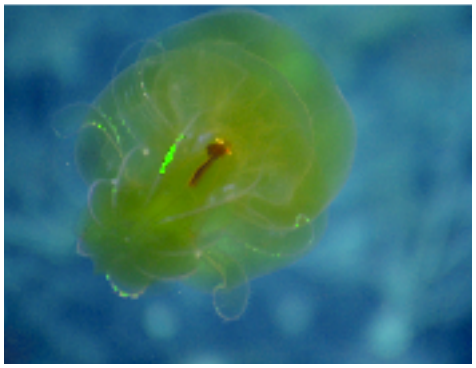
- **Zooplankton** are _____, which means they eat other organisms for food. They are _____ because they consume food. Their food is usually phytoplankton.
    - *Hetero* means *other*. What do you think *troph* means? _____
      _____
- **Phytoplankton** are _____, which means they make their own food. They are _____ because they produce their own food.

- What do you think *auto* means here? _____

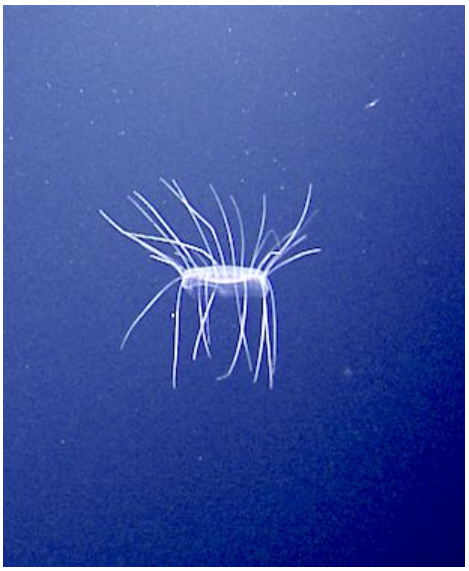
  _____

Phytoplankton have access to plenty of sunlight to do photosynthesis in the top 50 meters of the ocean. _____ is the process of making food using sunlight, water, and carbon dioxide. Some wavelengths of light can reach a depth of 200m, but this light isn't strong enough for many photosynthetic organisms to live there. Plankton can't swim against the current, so they have specialized _____ to help keep them from sinking too deep to make food via photosynthesis. For example, some have spines or appendages that increase the surface area and keep them afloat. Some form chains or colonies. Some have extended body shapes to keep from sinking. Others have gas-filled chambers.





All these plankton images were all captured from Remotely Operated Vehicle *Hercules'* camera. Credit: OET/Nautilus Live



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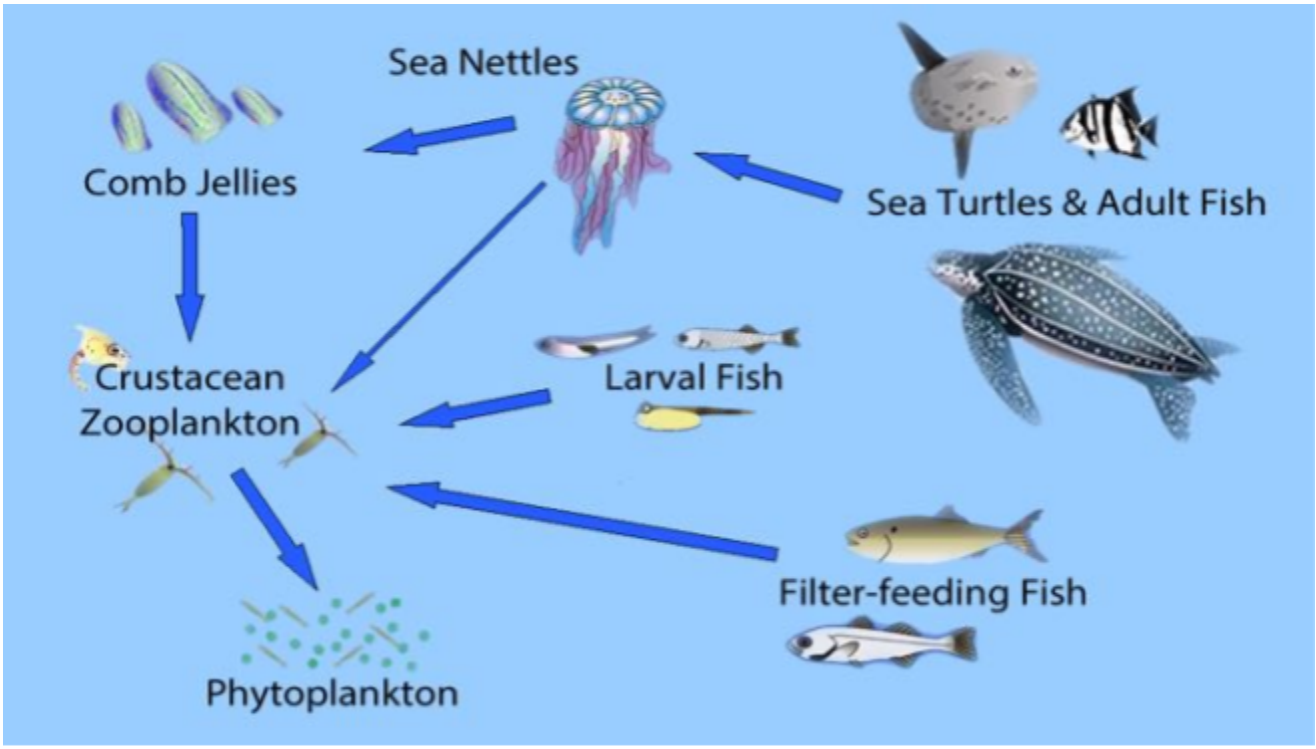
Step 2. Demonstrate your Knowledge

Use your notes to complete these activities. This page is designed to help you process the notes.

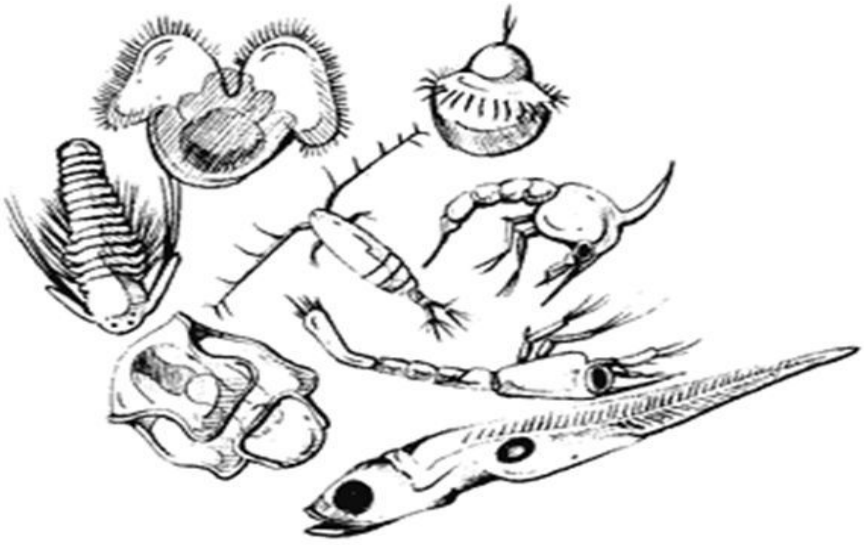
1. Circle all of the plankton in this food web.



Pelagic (open ocean) Food Web
Image by Virginia Institute of Marine Science

2. Highlight or color the physical adaptations on this plankton that help keep each one from sinking.

Image from Science Spotlight T. Trimpe 2006



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Step 3. Design your own Plankton

Your project is to design your own plankton and give a presentation sharing its special features. Your plankton must have at least two adaptations that keep it from sinking, but the rest is up to you! Get creative! Use this set of questions to plan your plankton.

1. (Circle one) Your plankton gets energy by

eating other organisms OR producing its own food

2. This makes it a (circle one):

producer / autotroph OR consumer / heterotroph

3. How big is your plankton? In the box, sketch something about the same size as your plankton to help people understand the size of your organism.

4. What is your plankton's name? _____

5. What adaptations does your plankton have to keep from sinking? Circle yours or write in others:

Appendages	**Body Shape**	**Grouping in chains**	**Large Surface Area**	**Gas-filled chambers**
Other Ideas:				

6. List the materials provided to build your model: _____

_____

_____

7. Sketch your plankton idea in the box.

.

Teacher initials to get materials and build: _____

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Step 4: Presentation Checklist

My presentation has:

_____ an explanation of what plankton is (1 point)

_____ the name of my plankton (1 point)

_____ whether my plankton is phytoplankton or zooplankton (1 point)

_____ whether is it is a heterotroph / consumer or an autotroph / producer (1 point)

_____ a short explanation of how I know it is a heterotroph/consumer or an autotroph/producer (1 point)

_____ a list and explanation of at least two adaptations that keep my plankton from sinking (2 points)

_____ a short explanation of how I chose to design the plankton the way I did (3 points)

Total: _____ / 10 points

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Educator Answer Key

Step 1. Plankton notes

Vocabulary Bank	Plankton Consumer(s) Autotroph(s) Producer(s) Heterotroph(s)	Adaptation(s) Food web Photosynthesis Zooplankton Phytoplankton

Plankton are aquatic organisms that drift with water currents or swim weakly. Plankton are important because they form the basis of the food web in the ocean. There are two types of plankton: zooplankton (*zoo* means *animal*) and phytoplankton (*phyto* means *plant-like*). Many of them are microscopic, but not all of them. Jellyfish is one example of plankton that is not microscopic.

- **Zooplankton** are heterotrophs, which means they eat other organisms for food. They are consumers because they consume food. Their food is usually phytoplankton.
    - *Hetero* means *other*. What do you think *troph* means? Answers will vary but should relate to making or obtaining food.
- **Phytoplankton** are autotrophs, which means they make their own food. They are producers because they produce their own food.
    - What do you think *auto* means here? Answers may vary around self, personal, or solo

Phytoplankton have access to plenty of sunlight to do photosynthesis in the top 50 meters of the ocean. Photosynthesis is the process of making food using sunlight, water, and carbon dioxide. Some wavelengths of light can reach a depth of 200m, but this light isn't strong enough for many photosynthetic organisms to live there. Plankton cannot swim against the current, but they have specialized adaptations to help keep them from sinking deeper than the photic zone where they would be unable to make food via photosynthesis. For example, some have spines or appendages that increase their surface areas like long spines or extended body shapes to keep them afloat; some form chains or colonies with one another; and others have gas-filled chambers.