TEACHER INFORMATION

Note: this resource is designed to be used after students have been introduced to the chemical reaction of photosynthesis.

In this assignment, students will read about diatoms; an often overlooked but vitally important photosynthesizing microalgae. They will use information from the text, combined with their knowledge of photosynthesis to fill in the blanks of a worksheet about diatoms. Then, they will complete a model that shows the photosynthesis process in diatoms. Additionally, they will use their knowledge of food chains and matter flow to model the role of diatoms in the ocean ecosystem. Students will also color this activity, which folds into a display-friendly brochure that is perfect for showcasing student work.

Teachers may choose to use this resource for a variety of purposes. Suggestions include as a graded performance task, end-of-unit project, extension opportunity or even a science fair project. The assignment can be graded on a rubric based on the aligned standards on by using a point system.

Printing note: Pages D and E should be printed separately from A, B and C so that the brochure can be printing in landscape format. TPDF of page D is "upside down" so that when printing pages D and E two-sided, the brochure is oriented the correct way.

NGSS Standards

Performance expectations are listed below, with blue text indicating a science and engineering practice, orange text indicating a disciplinary core idea, and green text indicating a cross-cutting concept.

MS-LS1-6: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

STUDENT INSTRUCTIONS

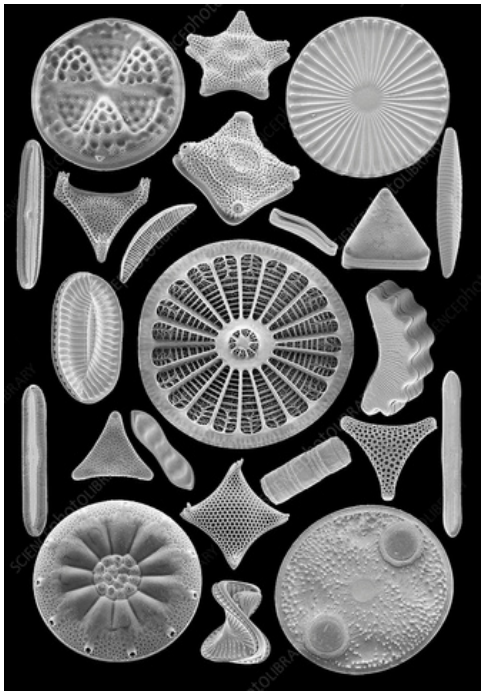
1. Read and annotate the page titled *All About Diatoms* (page B).
2. Use this information, along with what you have learned in class to fill in the blanks on page C.
3. Use the answers from the fill-in-the-blank sheet (page C) to fill in the corresponding labels on the brochure model (pages D and E).
4. Draw at least 3 organisms and arrows to complete the ocean food chain on page D.
5. Write 5 facts about diatoms inside the large centric diatoms on page E.
6. Color page E using any colors you would like. Color page D accurately and realistically. Use a dark colored marker on outlines and arrows to make them stand out.
7. Fold the flaps of page E back along both sets of dotted lines.
8. Look over your brochure to check that everything is neat and complete before turning in your work.

Additional resources:

What are diatoms?

Aquatic food webs

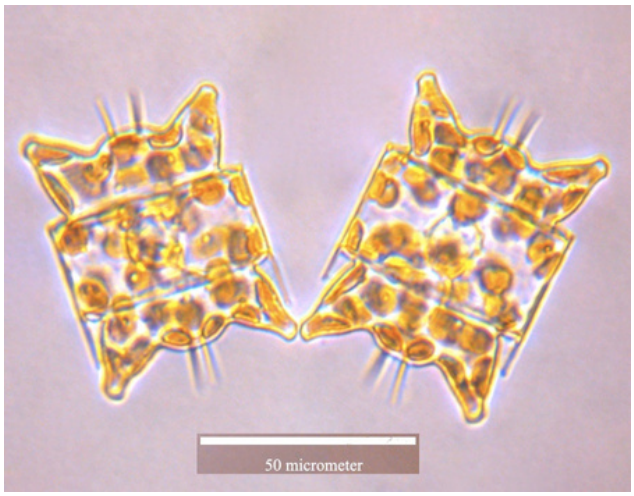
ALL ABOUT DIATOMS



Scanning electron micrograph (SEM) of an arrangement of diatoms to show their diversity. STEVE GSCHMEISSNER / SCIENCE PHOTO LIBRARY

Diatoms are tiny, single-celled organisms that live in water, both fresh and salty. You can't see them without a microscope, but they are all around us—in oceans, lakes, rivers, and even in damp soil. What makes diatoms special is their outer shell, called a frustule, which is made of glass-like silica. The molecular composition of silica allows them to take on vast and unique shapes and patterns, like stars, circles, triangles and more. Diatoms show symmetry, and can be classified as either centric (radially symmetrical) or pennate (bilaterally symmetrical). There are about 2 million different species of diatoms - with new ones being discovered every year.

Diatoms only live for a few days. When they die, they sink to the ocean floor and become buried in the sediment (mud). Their frustules remain well-preserved over long periods of time and can serve as useful tools for scientists studying the ocean and climate. Some species of diatoms can even come back to life after thousands of years of laying dormant - like a tiny ocean zombie!



Diatoms *(Odontella aurita)* under a microscope with chloroplasts visible. By Richard A. Ingebrigtsen, Department of Arctic and Marine Biology, University of Tromsø - Own work, CC BY-SA 3.0

Diatoms are super important for many reasons. A big reason is that they make a lot of the oxygen we breathe—about 20 to 30 percent of it! They use sunlight to make their own food through photosynthesis, just like plants. When they do this, they take in carbon dioxide and release oxygen. Diatoms are also a big part of the food chain. Tiny animals like krill eat diatoms, and then those animals are eaten by fish and bigger sea creatures.

FILL IN THE BLANK

1. _____ are microscopic, single-celled organisms that live in oceans and other bodies of water.
2. Diatoms are _____, which means they are photosynthetic and float in the water.
3. A chemical reaction happens inside green structures inside diatoms called _____.
4. This chemical reaction is called _____ , in which plants and other organisms like diatoms use energy from the _____ to make food.
5. In addition to energy from the sun, diatoms have to take in _____. The chemical formula for this is _____because one molecule contains a carbon atom and two oxygen atoms.
6. Diatoms also have to take in _____ .The chemical formula for this is _____because one molecule contains two hydrogen atoms and one oxygen atom.
7. The purpose of this chemical reaction is to create food for the diatom in the form of _____, which is a simple _____. The chemical formula for this is _____, as one molecule contains six carbon atoms, twelve hydrogen atoms and six oxygen atoms.
8. The food created by the diatom can be converted into energy through a chemical reaction called _____.
9. _____ is released as a byproduct of photosynthesis. The chemical formula for this is _____ one molecules contains two oxygen atoms.
10. Diatoms play an important role in the Earth's _____ cycle, as diatoms take in the carbon dioxide released by ocean creatures, humans, and the burning of fossil fuels. Then diatoms release the oxygen we all need to breathe!

Diatoms

DOING THE MOST

4b

5a

5b _____

9a

9b _____

2 _____

4a _____

6a

6b _____

7a

7b _____

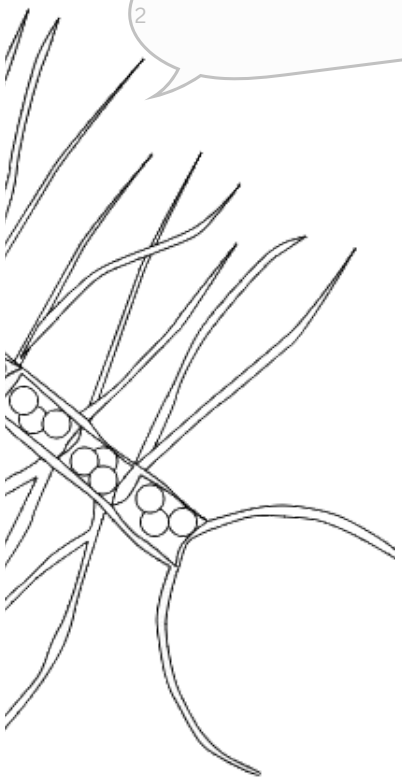
7c _____

OUT THESE

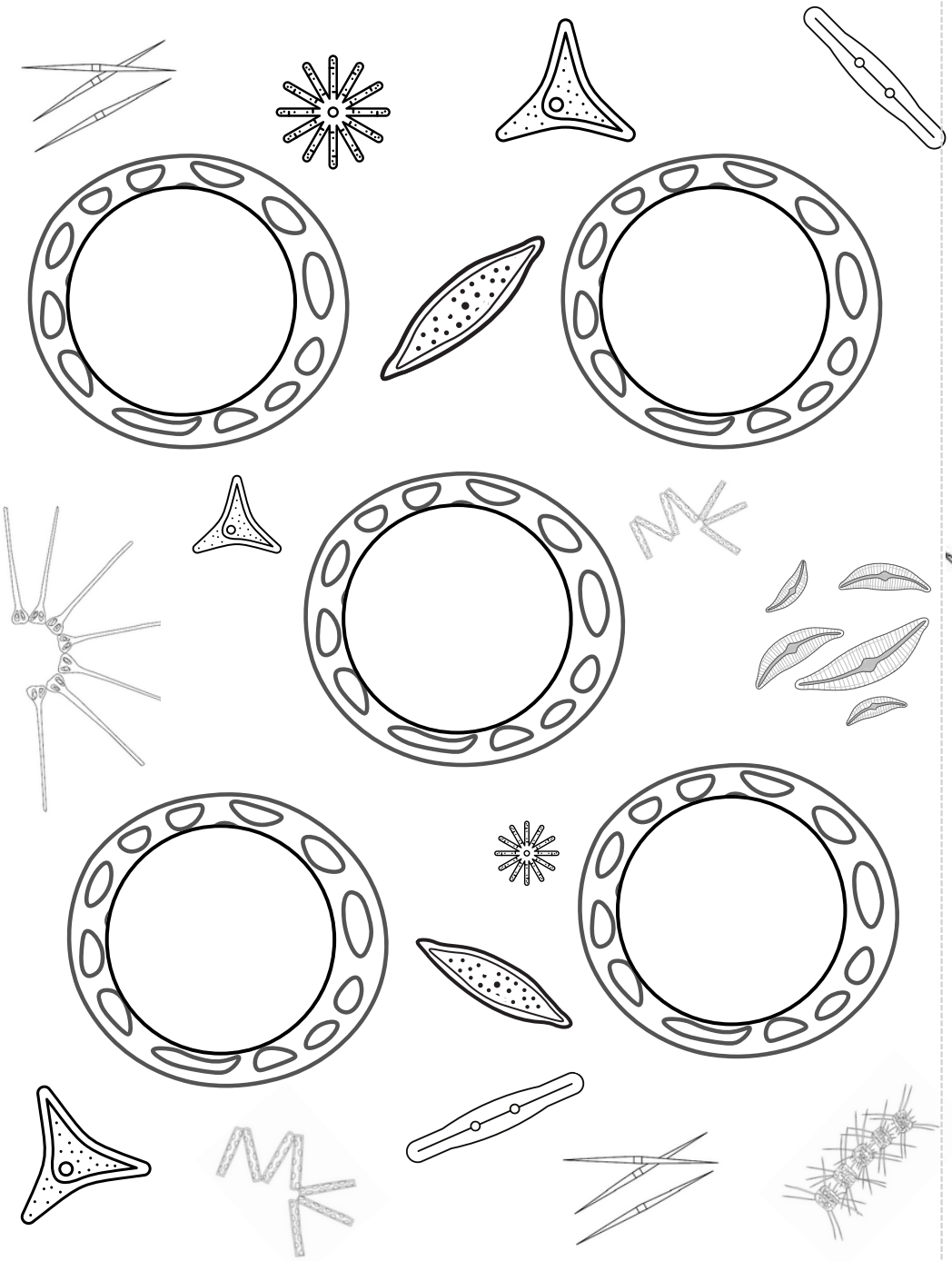
OMS!

WHAT ON EARTH IS A DIATOM?!

2



COOL FACTS ABOUT DIATOMS



DUDE, CHECK

DIAT

1