Southeast Alaska Tribal Toxins

Informal Guide to Plankton ID

A Collaboration between:
Southeast Alaska Tribal Ocean Research
and University of Alaska Fairbanks' BLaST Program

By Raven Shaw
Edited by Esther Kennedy

How to Use this Book

Welcome to the wonderful world of plankton!

This booklet is an informal visual guide to the plankton that are most commonly seen in Southeast Alaska, and will help you get started in identification. This guide doesn't cover every genus you might run into, so remember to reference other sources as well. Rita Horner has an excellent book, *A Taxonomic Guide to Some Common Marine Phytoplankton,* which can provide you with photos and accompanying phenotype descriptions. The National Oceanic and Atmospheric Administration (NOAA) website also provides information on phytoplankton and harmful algal blooms. You may also contact Southeast Alaska Tribal Ocean Research with questions:

(907) 747-7395
seator@sitkatribe-nsn.gov
456 Katlian St.
Sitka, Alaska 99835

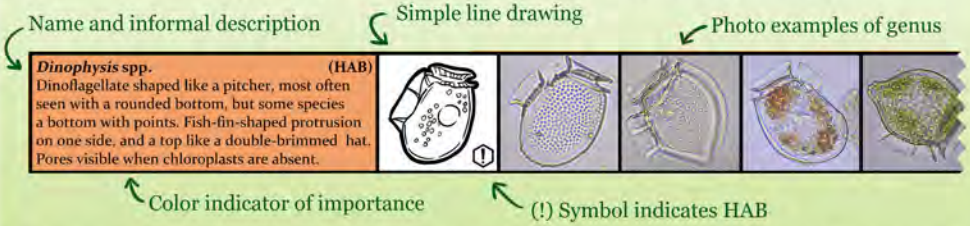
Hey!

This booklet is designed so that some pages may be removed, photocopied, and distributed for free use by students and the scientific community. The removeable pages include full acknowledgment of support and ownership of intellectual property. Do not remove or alter any of these **acknowledgments**, **logos**, or **disclaimers** for any reason.

The Color-Photograph Pages

Within this booklet there are 5 pages that alphabetically list the plankton that you are most likely to see in Southeast Alaska on a regular basis, including our three genera of HABs (harmful algal blooms). There is also a page of less likely genera, that includes some interesting "happenings" you might get to see.

The 5 alphabetical pages contain color photos taken with a microscope, at 4x, 10x, and 40x. Some of the photos have been lightened up to 15% to improve clarity. Each plankton genus has its own set of horizontally arranged species photos, a simple line-drawing example, and an informal description of phenotype.

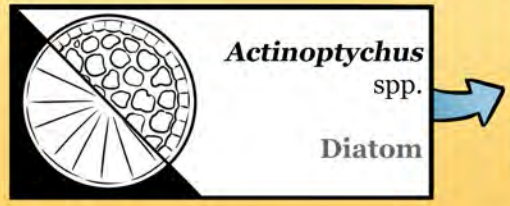


The color of the description box indicates threat level. Yellow means the genus is generally not a toxin-producer; green labels zooplankton or trash; orange flags a genus as a potential HAB. The HAB genera will include a (!) symbol.

The Black and White Pages

This booklet contains 2 black and white pages which are meant to be removed from the book and photocopied for distribution among students or workstations.

One of these pages is a grid of plankton genus linedrawings for quick ID. Each gridspace includes a linedrawing of the genus, the latin name, and the type of algae. HAB genera will be marked with a (!) symbol.



There are two genera: *Actinoptychus* and *Coscinodiscus,* which are depicted differently than the others. The cell is shown in split veiw so that you can ID it when it is empty of chloroplasts. The half with a black background shows the empty cell, and the half with a white background shows a full cell.

The other black and white page is a sampling log. Its layout allows you to fold multiple copies in half and staple them, creating a log book for your fieldwork. Print pages on *BOTH* sides before stapling, so that the front and back of each half page can be used for one sampling occasion. The book will work better if you fold each page individually before stapling, but you can fold a small number of pages together like a magazine if it's more convenient. If possible, print on Write-in-the-Rain paper so that your book survives the vigorous Alaskan weather.

Another option is to leave the sampling pages unfolded, and to instead 3-hole-punch them and put them in a binder.

Plankton Types Commonly Seen in Southeast Alaska

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www.seator.org 907-966-9650

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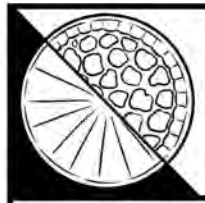
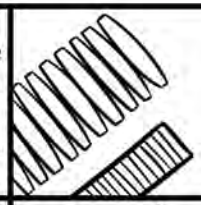
Design, layout, art by Kiven 2017



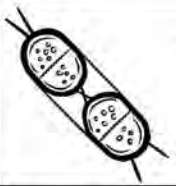
Actinoptychus spp.
Diatom

Ceratium longipes Morphotype
Dinoflagellate



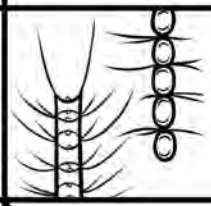
Fragilariopsis spp.
Diatom

Odontella spp.
Diatom



Stephanopyxis spp.
Diatom

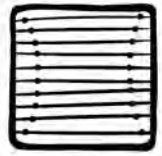
Alexandrium spp.
Dinoflagellate



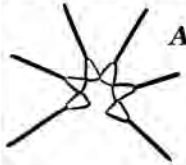
Chaetoceros spp.
Diatom

Guinardia spp.
Diatom

Pleurosigma Morphotype
Diatom

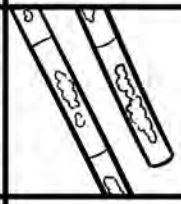


Striatella spp.
Diatom



Asterionellopsis Morphotype
Diatom

Coscinodiscus spp.
Diatom



Leptocylindrus spp.
Diatom

Prorocentrum spp.
Dinoflagellate

Thalassionema spp.
Diatom

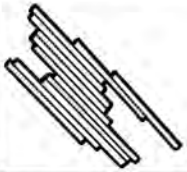
Asteromphalus spp.
Diatom

Dictyocha spp.
Silicoflagellate

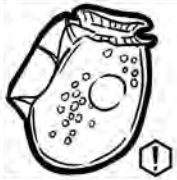
Licmophora spp.
Diatom

Protoperidinium spp.
Dinoflagellate

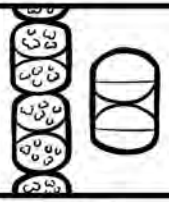
Thalassiosira spp.
Diatom



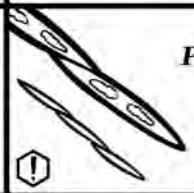
Bacillaria spp.
Diatom



Dinophysis spp.
Dinoflagellate



Melosira spp.
Diatom



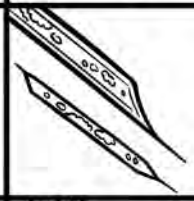
Pseudo-nitzschia spp.
Diatom

Tintinnid
Zooplankton

Ceratium furca Morphotype
Dinoflagellate

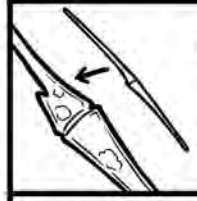
Ditylum spp.
Diatom

Navicula Morphotype
Diatom

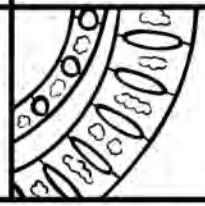


Rhizosolenia spp.
Diatom

Zoea, Copepods, Nauplii
Zooplankton

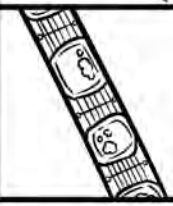


Ceratium fusus Morphotype
Dinoflagellate



Eucampia spp.
Diatom

Noctiluca spp.
Dinoflagellate



Skeletonema spp.
Diatom

This printer-friendly ID sheet, and the accompanying full-color alphabetical ID sheets, are a collaboration between URE BLaST student Raven Shaw and SEATOR's Environmental Specialist Esther Kennedy. For more info, visit **SEATOR.org.**

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Alphabetical List of Plankton

Commonly seen in Southeast Alaska, with informal descriptions for easy ID.

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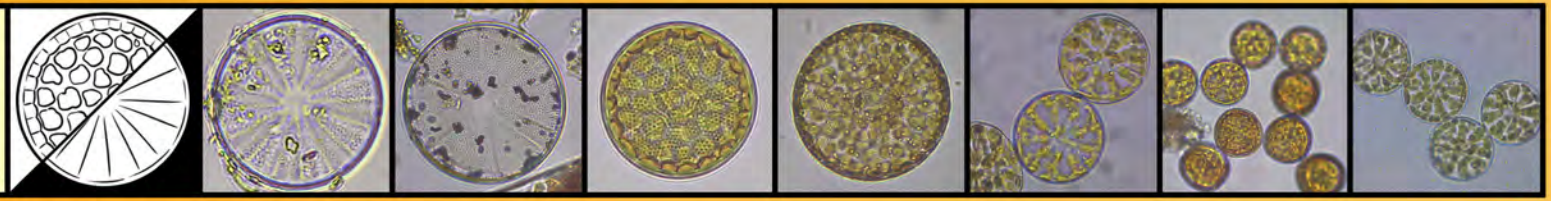
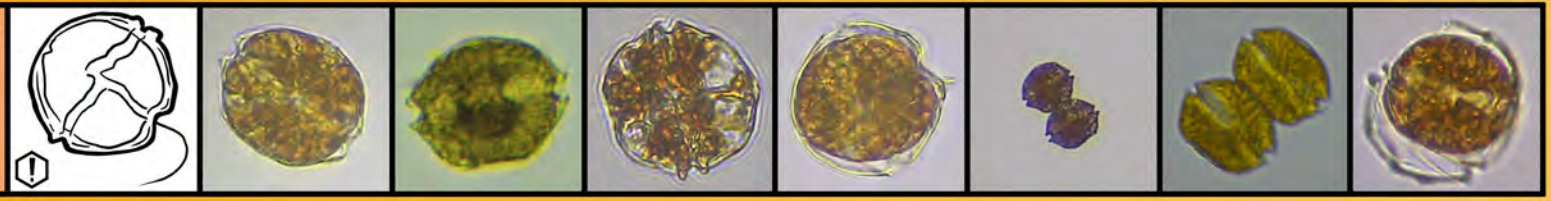
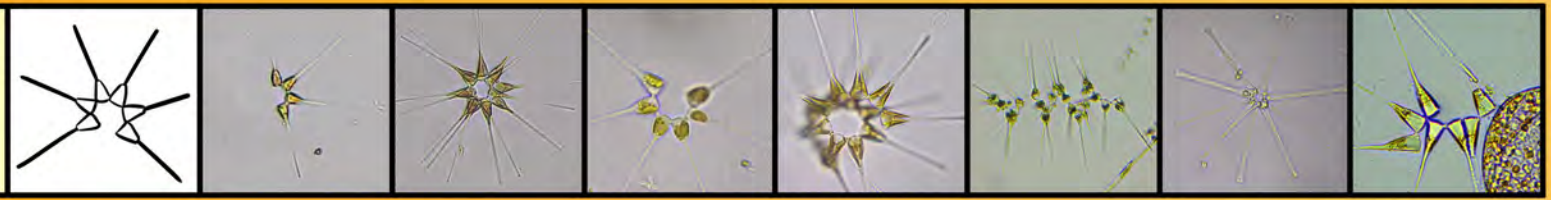
***Actinoptychus* spp.**
When chloroplasts are present, *Actinoptychus* often resembles a pepperoni pizza, complete with crust. When chloroplasts are not present, the diatom resembles a roulette wheel with barely visible raised spokes. Can form chains side by side.



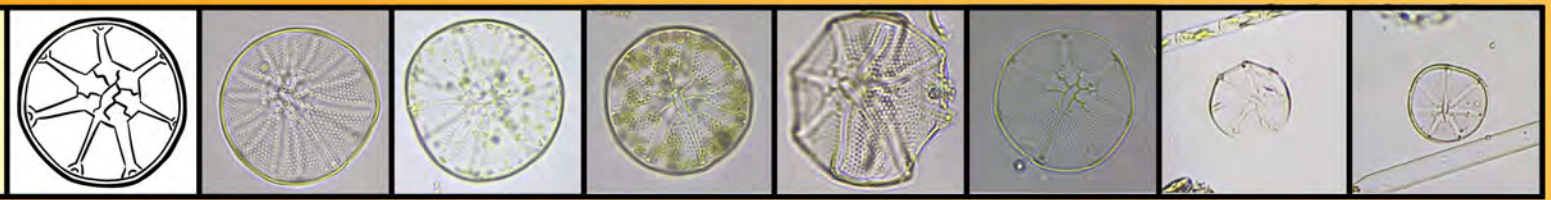
***Alexandrium* spp.** **(HAB)**
Rounded dinoflagellate that looks like a burger. It has an offset cingulum that looks a little cork--screwed. When alive, ***Alex*** is motile, spinning through the water quickly. ***Alex*** can form chains of 2+ or be seen singly.



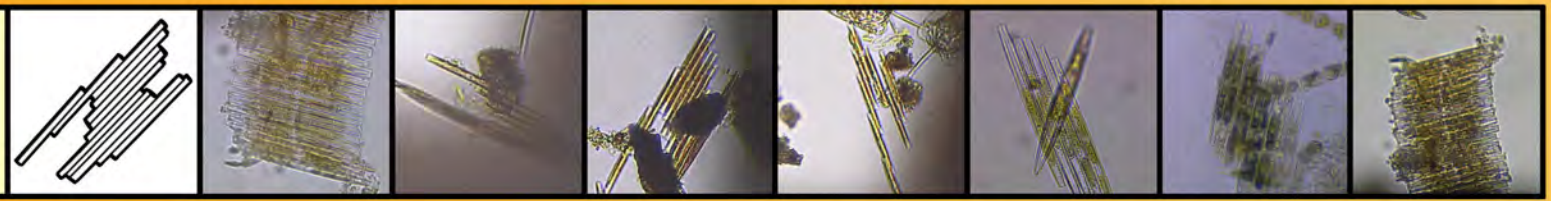
***Asterionellopsis* morphotype**
This diatom is most often seen chained in a spiral pattern. The individual cells look like toilet plungers, or like dandelion seeds without their aerial fluff. ***Asterionellopsis*** sometimes forms long chains that look like spiral staircases.



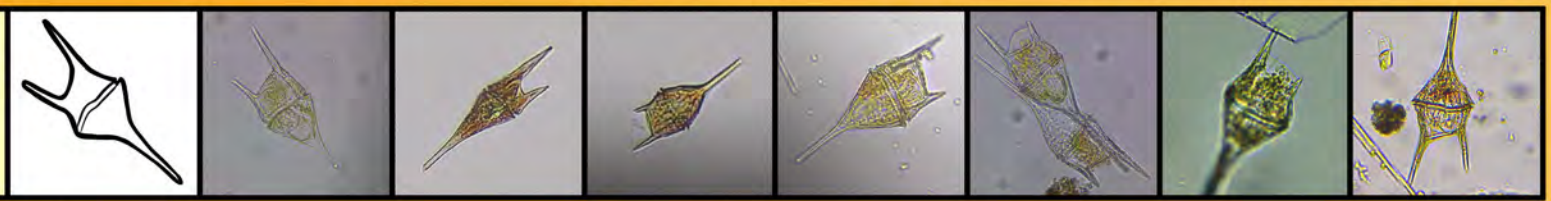
***Asteromphalus* spp.**
A diatom that resembles a sand dollar shell. When there are no chloroplasts present, it is easier to see the spider-like pattern on its surface. Although usually rounded, some can be seen with flattened or inwardly curved edges in between each spoke.



***Bacillaria* spp.**
A motile diatom that forms chains that resemble a shuffling deck of cards. The joined cells move together by sliding back and forth slowly, first stretching out to reach the new location, then pulling forward the trailing "cards."



***Ceratium furca* morphotype**
A motile dinoflagellate that looks like a headless giraffe or a human hand making the "heavy metal" sign. It has three points, and has a cingulum that divides it at the middle.



***Ceratium fusus* morphotype**
A motile dinoflagellate that looks like a javelin with a fat middle. It's related to ***Ceratium furca,*** so if you look closely you can see its third point is sort of like a flattened nose on the middle, near its cingulum. Its flagellum whips from the same area.

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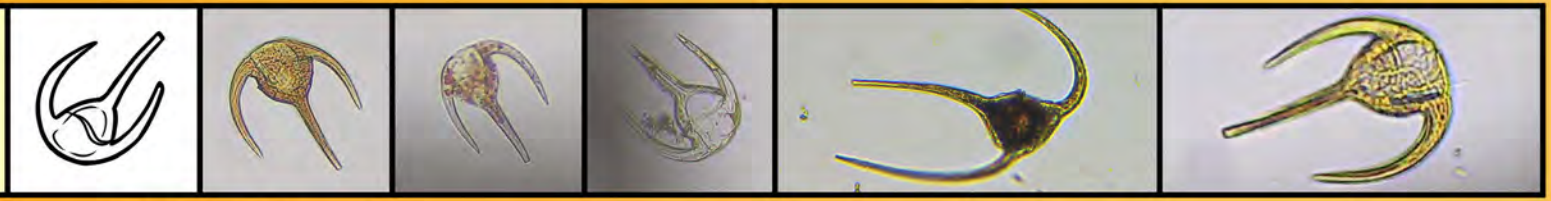
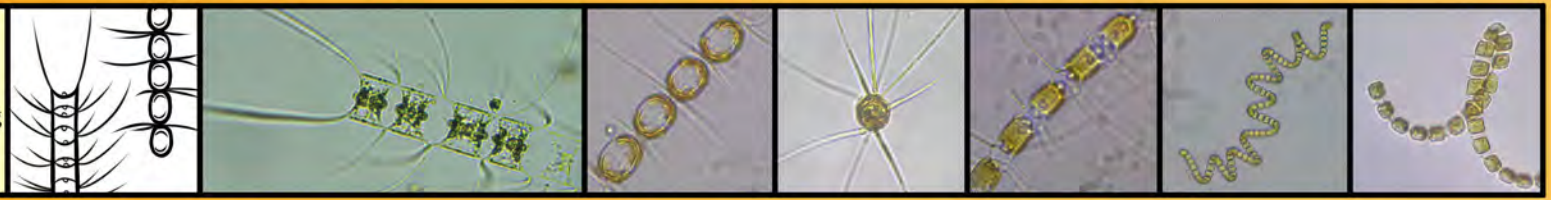
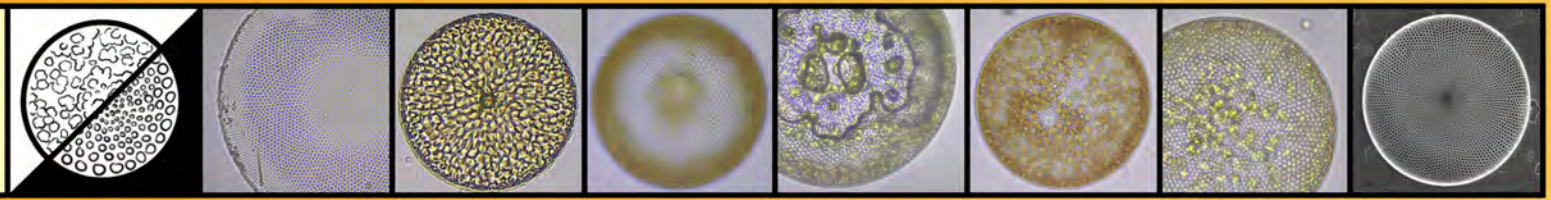
***Ceratium longipes* morphotype**
A motile dinoflagellate, ***longipes*** is related to ***Ceratium fusus*** and ***furca***. Like them, it has three points and a belt-like cingulum. With all three points directed upward, it looks like it's a trident or someone excitedly raising their arms.



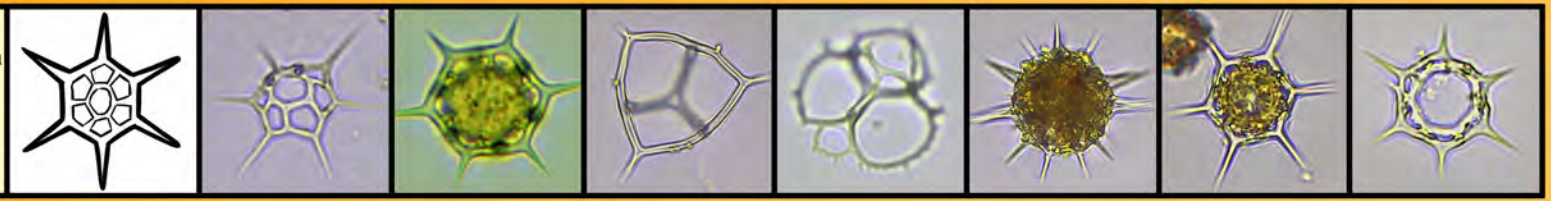
***Chaetoceros* spp.**
This diatom is most often seen in chains of many single cells linking up to look like a centipede or a jeweled bracelet. The cell shapes vary, depending on species, but all species have four "whiskers" protruding from each cell.



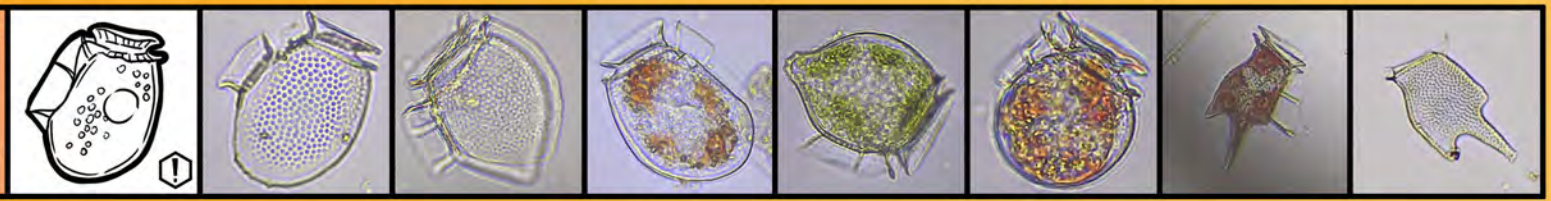
***Coscinodiscus* spp.**
This genus of diatom contains a lot of species, all shaped like cylindrical drums. You will usually see them as **very large** circles with honeycomb-like patterns radiating from the center. They are easy to mistake for ***Actinoptychus*** or ***Thalassiosira.***



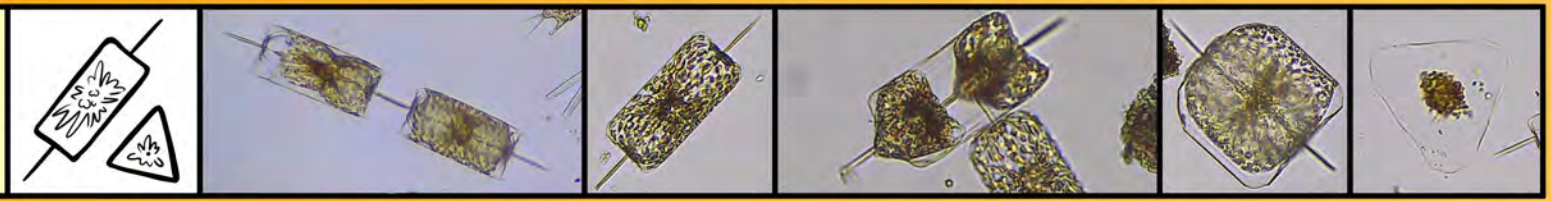
***Dictyocha* spp.**
These are usually shaped like 3-D snowflakes, often easiest to identify when they have no chloroplasts. Its spiky skeleton forms a basket in the center, where it can have 1+ chloroplasts, and a barely visible wing-shaped flagellum. Silicoflagellate.



***Dinophysis* spp.** **(HAB)**
Dinoflagellate shaped like a pitcher, most often seen with a rounded bottom, but some species a bottom with points. Fish-fin-shaped protrusion on one side, and a top like a double-brimmed hat. Pores visible when chloroplasts are absent.



***Ditylum* spp.**
A diatom that looks like a wrapped candy on a skewer from the side. From the front or bottom, it will look like a slightly rounded triangle. Their multiple chloroplasts are usually most dense in the center. When dividing, they look like kabobs.



***Eucampia* spp.**
Chaining diatom that can look like a strand of "I"s or old movie ticket stubs. They usually curve, and can form descending spirals when they have enough cells attached.

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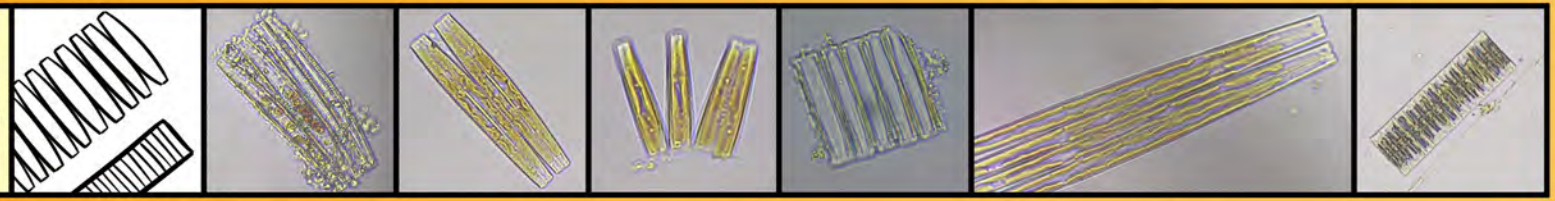
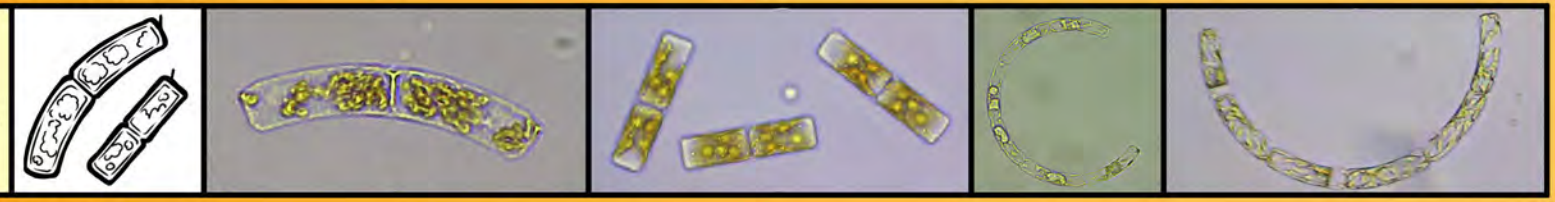
***Fragilariopsis* spp.**
These single diatoms like to stack up next to each other like slices of bread. Some species will be slightly rounded on the sides and others will stack seamlessly with their neighbors. Chains can be as short as a few cells or very long and ribbonlike.

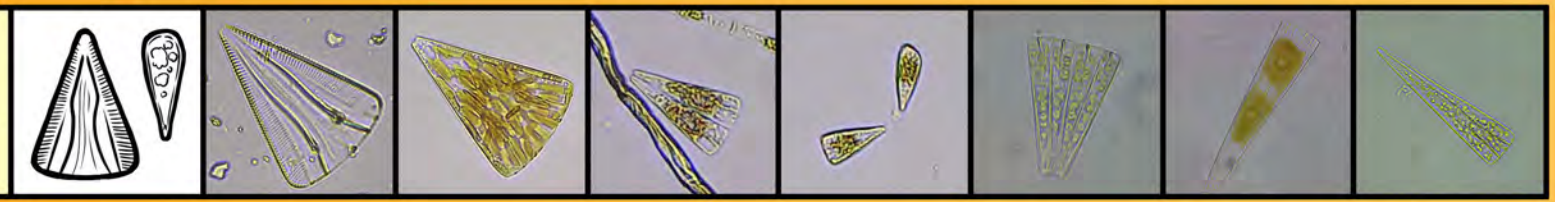


***Guinardia* spp.**
Usually seen as straight or softly curved. This chaining diatom has sides that are generally not perfectly smooth, and a single short spine sticking out from the ends.

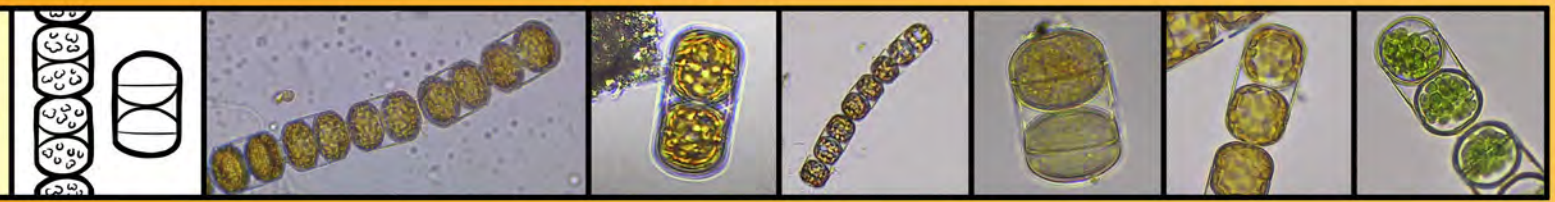


***Leptocylindrus* spp.**
Diatom that can be mistaken easily for ***Guinardia***, but ***Leptocylindrus*** tends to have very smooth sides, and have no small spine at the ends. Also, their width/length ratio makes this diatom look much more slender in comparison.

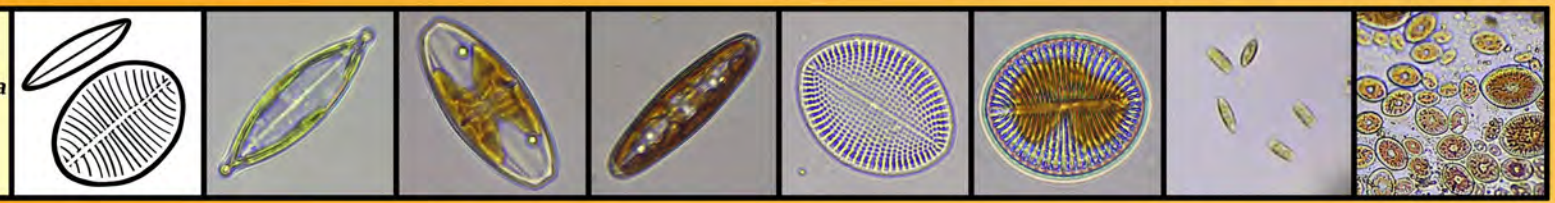
***Licmophora* spp.**
This diatom looks like a slice of pizza or a wedge of cheese from the top. From the side it looks similar, but has a more rounded back. Sometimes you can see them chained side by side, usually branching off a twiglike structure.



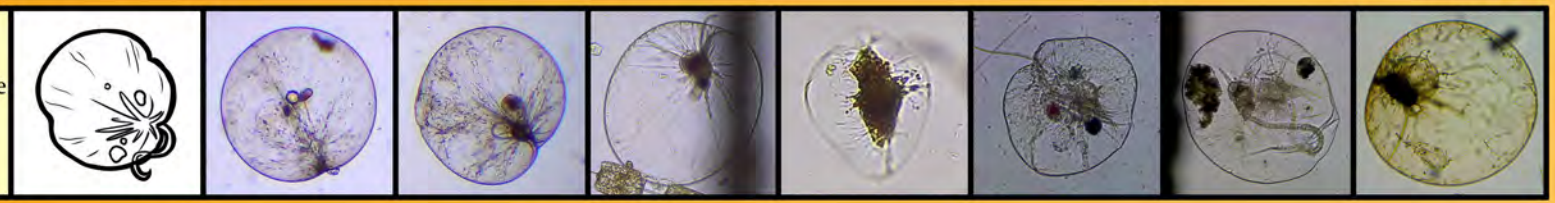
***Melosira* spp.**
A chaining diatom that looks like a row of pills, with each "capsule" containing two globes full of chloroplasts. Color of chloroplasts and size/shape of globes can vary by species. They can be seen singularly or in short/long chains.



***Navicula* morphotype**
The name might remind you of "navigate," which is very accurate for these motile diatoms. ***Navicula*** is a class of shapes: usually longer than wide, and shaped like a kayak or canoe.



***Noctiluca* spp.**
Dinoflagellates that look like partly deflated balloons. They are usually larger than anything else on your slide, round with a central nucleus. They have a flagellum, and a more noticeable tentacle for capturing food.



Alphabetical List of Plankton

Commonly seen in Southeast Alaska, with informal descriptions for easy ID.

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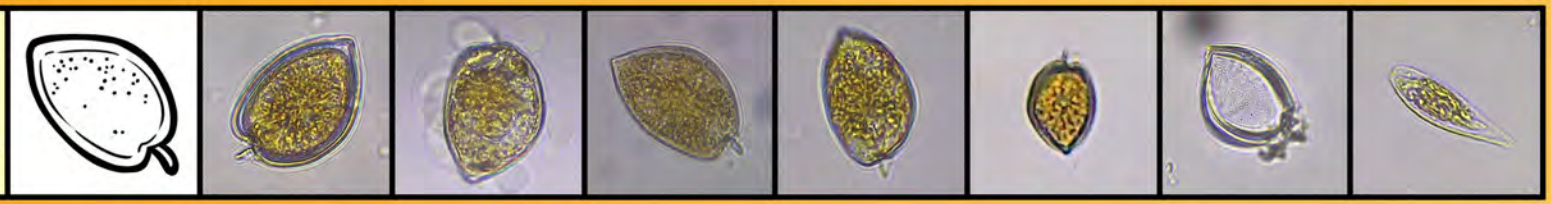
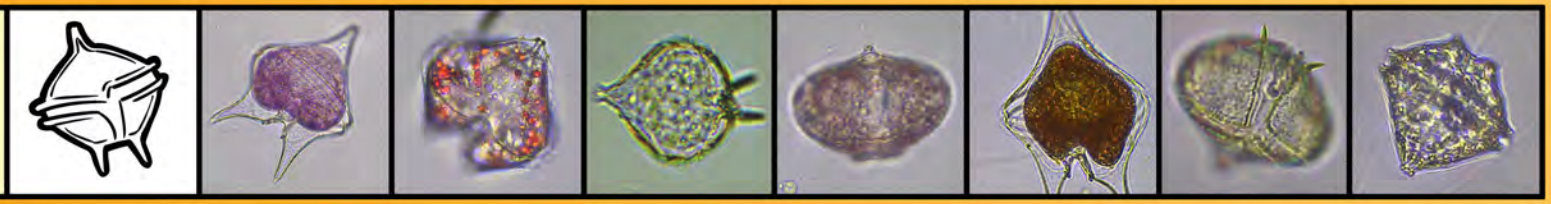
***Odontella* spp.**
There are several forms of this chaining diatom. Some can be seen flush against each other with criss-crossing spines, and some are more compact and meet only at the corners. All tend to be very beautiful, resembling jewelry.

***Pleurosigma* morphotype**
Diatom shaped like a ***Navicula***, but with a slight S-shape curve. Motile, generally large. When empty of chloroplasts, a central line can be seen running the length of its cell. This morphotype includes both ***Pleurosigma*** and ***Gyrosigma*** genera.

***Prorocentrum* spp.**
Dinoflagellate that's a quick swimmer, with a little "horn" on its front. When it moves it resembles a fat narwhal. It may also look like a seed, or pip from a citrus fruit. Contains two large chloroplasts, but they will look like one from the side.

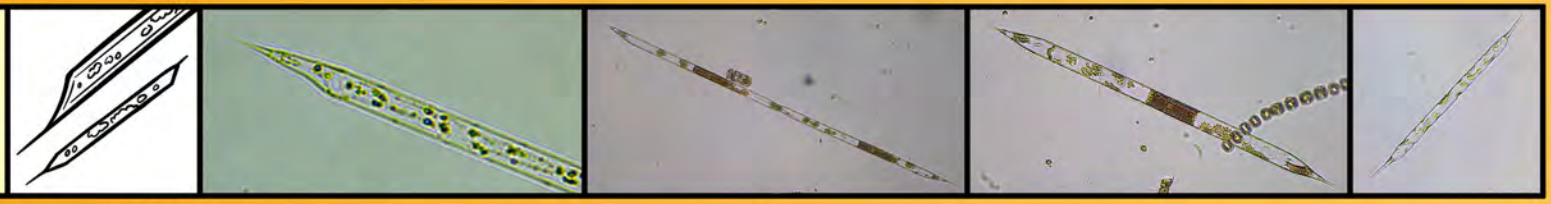


***Protoperidinium* spp.**
Motile dinoflagellate that resembles a "spaceship ballerina pig." Generally shaped like a teardrop with two legs on the bottom, and has a beltlike cingulum around its middle. It can appear very graceful as it quickly spins across your slide.

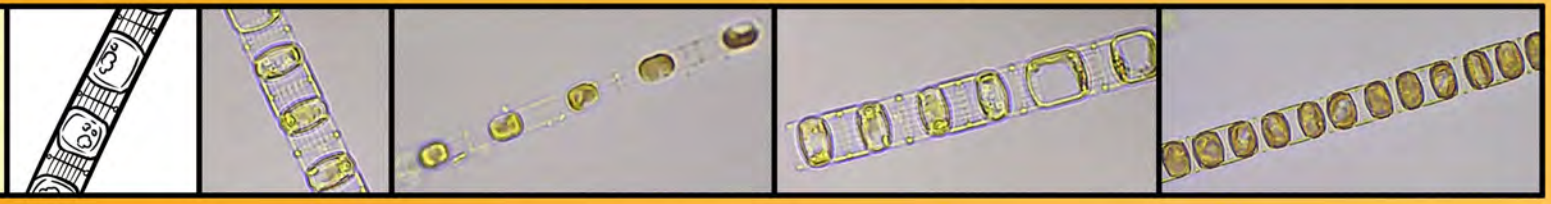


***Pseudo-nitzschia* spp.** **(HAB)**
Diatom that can be easily mistaken for ***Navicula,*** but is narrower and more pointy. Can be seen individually, or chained. Individual cells chain together like stairsteps, the edge of one cell overlaps another. Motile.

***Rhizosolenia* spp.**
Diatom that looks like a drinking straw that's cut at an angle on both ends. Some will have a sharp looking needle at either end, but that is often broken. Cells can form chains, and when empty of chloroplasts a faint spiral pattern can be seen.



***Skeletonema* spp.**
Chaining diatom that links together with multiple thread-like structures, making it resemble beads on strapping tape. What look like two small bright dots are visible between cells where the threads meet.



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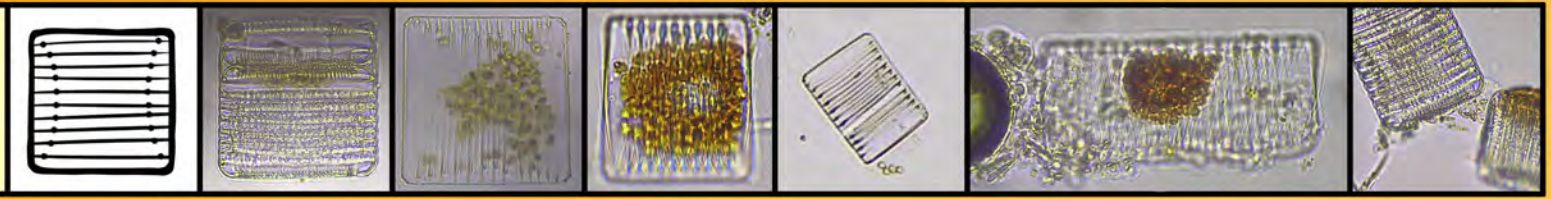
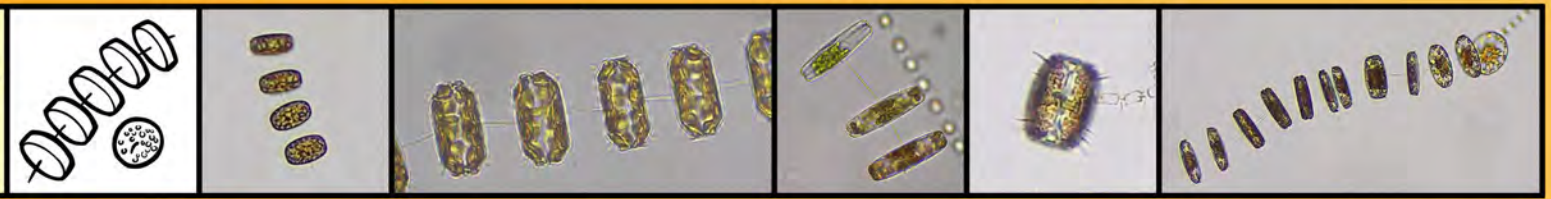
***Stephanopyxis* spp.**
A chaining diatom that connects with criss-crossed spines, like some species of ***Odontella***. As single cells, they might remind you of Google's Android logo, an oblong-shaped robot. They also resemble pills and will tend to split perfectly when crushed.

***Striatella* spp.**
A diatom that looks like a computer chip. It has regularly spaced lines across its entire surface that make it resemble a washboard. It can be mistaken for ***Fragilaria*** or ***Bacillaria***.



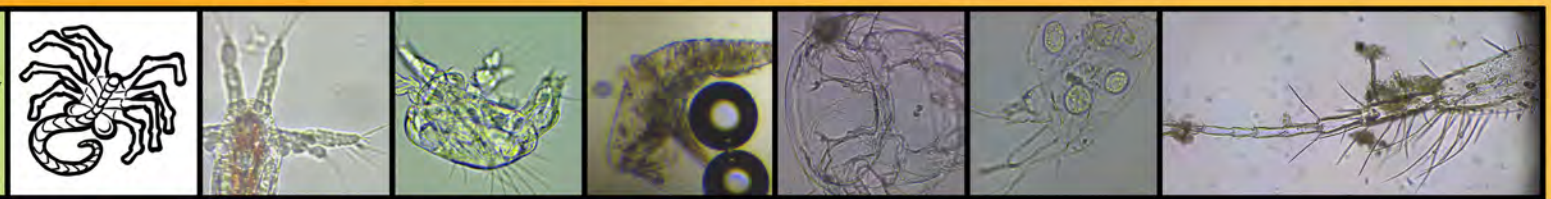
***Thalassionema* spp.**
Diatom that chains in star-like patterns. Lone cells can be hard to identify, but chains are pretty easy, with the exception of potentially mistaking them for ***Asterionellopsis***. Chains can form inclosed stars, zigzags, or radiate like daisy petals.

***Thalassiosira* spp.**
Diatom that forms chains that look like a string of beads. Individual cells are linked by a thin "string," which is usually visible. In some species, the cells have multiple radiating spines which are faintly visible, but are useful for identifying single cells.

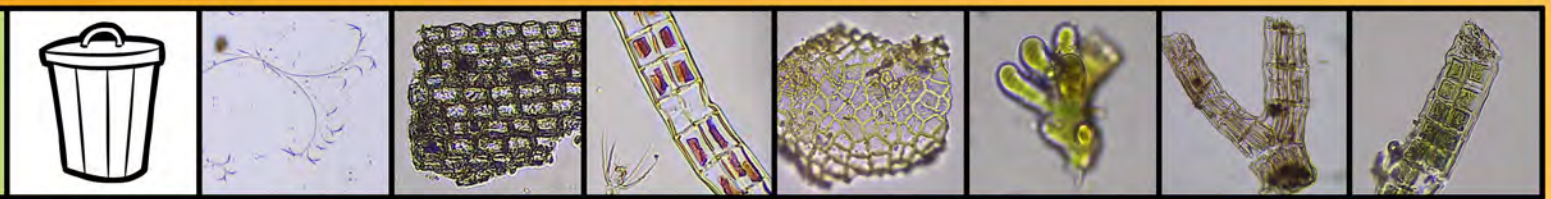


Tintinnids
A type of zooplankton. They can be small or large, and have many different length/width ratios. They look like rigid, translucent rockets with cilia at the bottom that propel them rapidly across your slide. When resting, you can see their organs working.

Zoea, Copepods, Nauplii
If it takes up a large chunk of your slide, and looks like a whiskered translucent crab/bug, it's probably a **zoea, copepod**, or **nauplius**. These are large zooplankton, often in larval stage. Crab, shrimp, and barnacle larvae are examples that you may see.



Ocean Trash/Debris
It's beautiful, intriguing, multicellular trash that's distracting you from what you're really trying to find. In short, this is not the plankton you're looking for. It takes some practice to be able to identify debris, but you'll get there!



A few other Plankton and some interesting "happenings" you may see in S.E. Alaska

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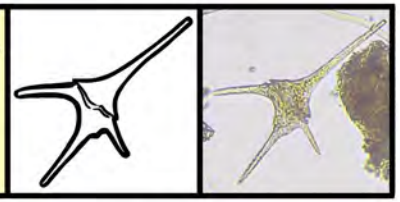
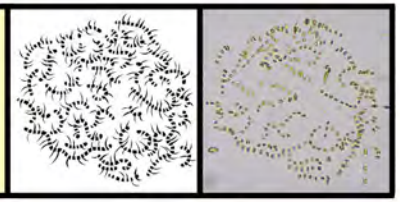
***Akashiwo* spp.**
A motile dinoflagellate that looks a little like a roast chicken. Its offset cingulum creates two "drumsticks." *Akashiwo* is a hard one to get a photo of, it's often moving so fast you'll have to try several times.

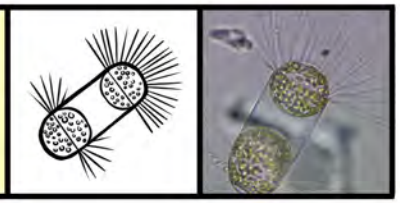
***Ceratium hirundinella* sp.**
This species of *Ceratium* breaks the "three points" rule. It has four points, three of which form a tripod below the cingulum. It looks like the Eiffel Tower. Motile dinoflagellate.



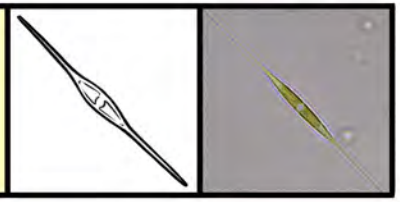
***Chaetoceros socialis* sp.**
Unlike other species of *Chaetoceros,* this type hangs out in groups. It can be mistaken for *Phaeocistis globosa,* so zoom in close to check for spines and to see that the cloud is made up of chained cells.



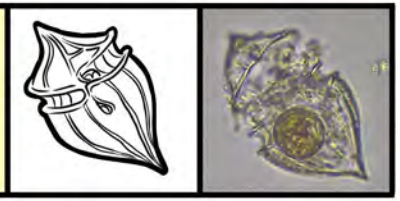
***Corethron* spp.**
A diatom that looks like a Twinky having a crazy hair day. It will have two spheres of chloroplasts encapsulated on opposite sides of a pill-shaped shell. Both ends can have many fine spines radiating outward, like eyelashes.



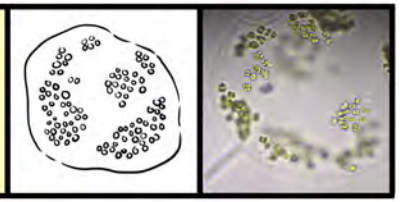
***Nitzschia* spp.**
A diatom that looks similar to *Pseudo-nitzschia,* but it has longer tips that can extend outward much longer than the length of the fat middle. Motile.

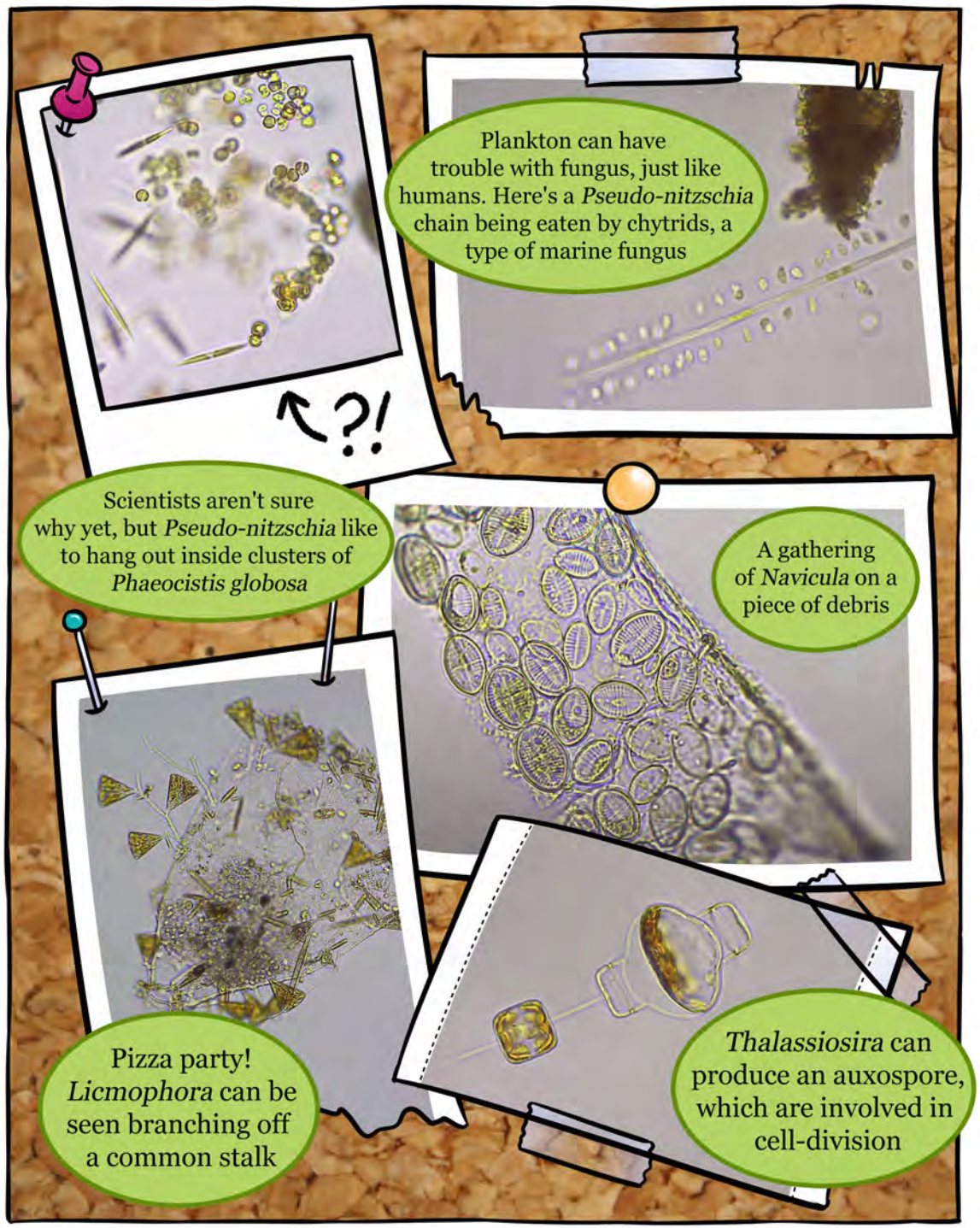


***Oxytoxum* spp.**
A beautiful dinoflagellate that resembles a fancy vase, or a stylish lantern. The photo here shows a cell that's been broken, with its cap popped off to spill its chloroplasts.



***Phaeocistis globosa* sp.**
A haptophyte that can be mistaken for *Chaetoceros socialis,* but zoom in to see that there are no spines, and that the cells are arranged randomly rather than in connected chains.





Genus:	Species:	Cell Count or Abundance (none, present, common, bloom):
Actinoptychus		
Asterionellopsis		
Asteromphalus		
Bacillaria		
Ceratium	*furca*	
Ceratium	*fusus*	
Ceratium	*longipes*	
Chaetoceros		
Coscinodiscus		
Dictyocha		
Ditylum		
Eucampia		
Fragilariopsis		
Guinardia		
Leptocylindrus		
Licmophora		
Melosira		
Navicula		
Noctiluca		
Odontella		
Pleurosigma		
Prorocentrum		
Protoperidinium		
Rhizosolenia		
Skeletonema		
Stephanopyxis		
Striatella		
Thalassionema		
Thalassiosira		
Tintinnid		
Zoea, Copopod, Nauplii		

Date and time of microscopy: **Data entered by:**

SEATOR Data Entry Log

Sample Location:	
Collection Date and Time:	
Field Data Collected by:	
Data Entered by:	

Weather and Water					
Circle 1 or more:	Sunny	Partly Cloudy	Mostly Cloudy	Cloudy	Raining
Wind:	None	Light	Moderate	Strong	
Tide:	Incoming	Outgoing	High	Low	
Air (°C):	**Water (°C):**		**Salinity (ppm):**		

HAB Genus:	Species:	Cell Count or Abundance (none, present, common, bloom):
Alexandrium		
Dinophysis		
Pseudo-nitzschia		

Thoughts and Observations:

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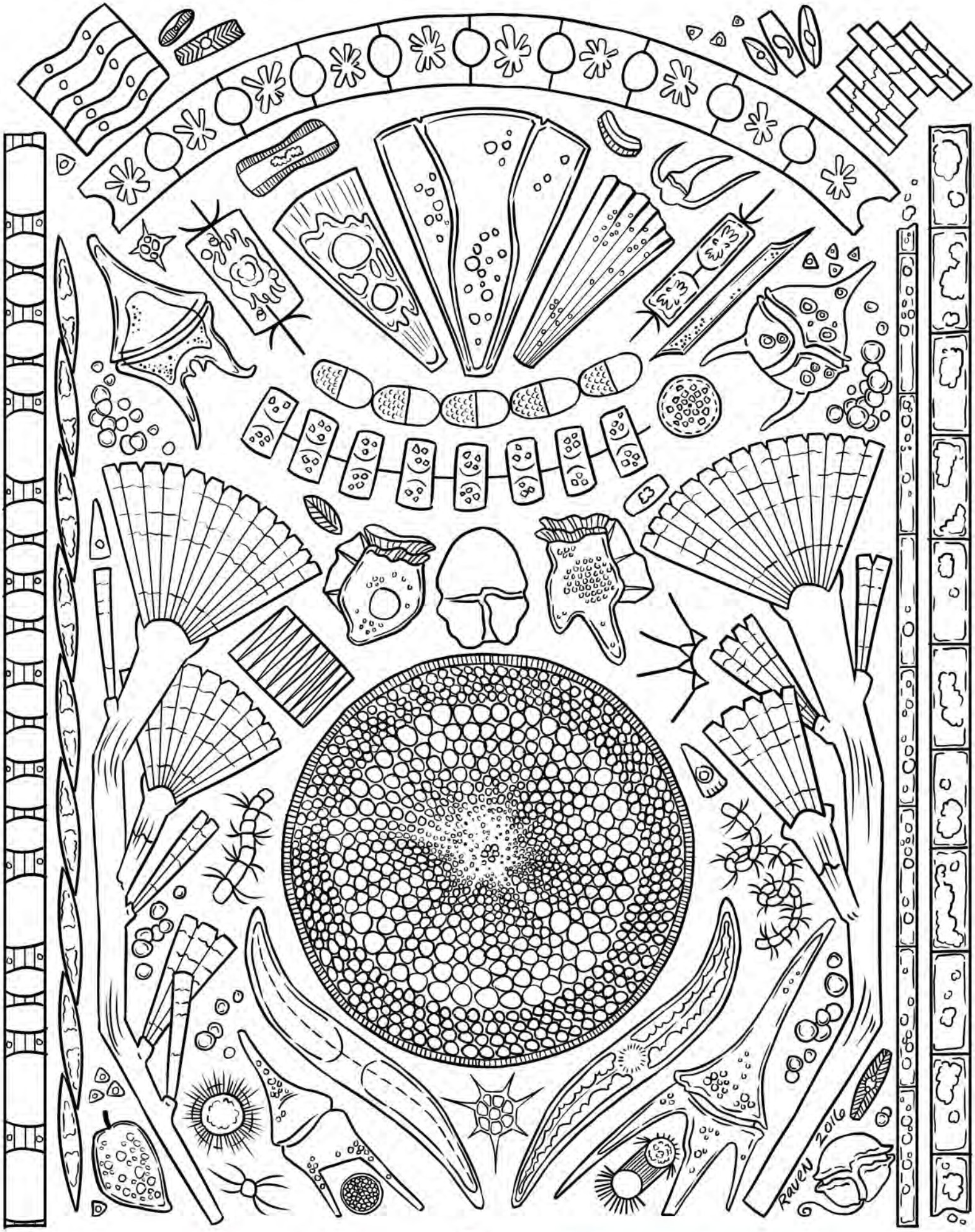
This printer-friendly sampling log is a collaboration between URE BLaST student Raven Shaw and SEATOR's Environmental Specialist Esther Kennedy. **www.SEATOR.org.**



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