PHYTOPLANKTON FLASH

A card game for children of all ages

Phytoplankton means "plant wanderer". These single-celled plants live in the sea and produce over half of the world's oxygen. We could not survive without them.

Some phytoplankton produce poisons that can be concentrated in shellfish that eat them. When people eat these toxic shellfish, they can get sick or die. Scientists call poisonous phytoplankton "harmful algal blooms".

With this game, children and adults will be immersed into the oceans of the world where they will be surrounded by the gorgeous microscopic creatures important to us all.

SEATTLE AQUARIUM

FUN FACTS ABOUT PHYTOPLANKTON

- Phytoplankton are single-celled marine plants that drift in the ocean.
- Phytoplankton are eaten by zooplankton (small marine animals), filter-feeding shellfish and fish.
- Phytoplankton need sunlight, a key ingredient to the process of photosynthesis.
- Phytoplankton are responsible for producing over half of the oxygen present in the Earth's atmosphere.
- Without phytoplankton, people would die.
- Phytoplankton need nutrients (food) such as nitrate, phosphate or silica. Sometimes nutrients added to the oceans by pollution or natural events can influence the types of phytoplankton that live in that part of the ocean.
- Poisonous phytoplankton that form "harmful algal blooms" can kill people, fish, and marine animals.
- People can change the types of phytoplankton in the oceans and may cause certain types of harmful algal blooms by polluting parts of the ocean.

FUN FACTS ABOUT PHYTOPLANKTON (cont.)

- Types of phytoplankton include diatoms (have a silica cell wall) and dinoflagellates (have whip-like tails or flagella)
- Some phytoplankton can eat other phytoplankton. These are called mixotrophs. An example of a mixotroph (can get food either through photosynthesis or by eating other phytoplankton) is the dinoflagellate Noctiluca
- Phytoplankton have pigments or colors that are the same as the colors seen in land plants. These pigments are needed for photosynthesis.
- Currents can transport phytoplankton to the coast where they are eaten by shellfish and zooplankton (small marine animals)
- There may be as many as 100,000 species of marine phytoplankton.
- Some biofuels made from phytoplankton show promise as a new source of fuel for our cars, planes and homes.

KEY TO CARD COLORS

Diatoms
Coscinodiscus, Ditylum, Thalassiosira, Rhizosolenia, Thalassionema

Toxin-producing harmful algae
Alexandrium, Pseudo-nitzschia

Fish-killing harmful algae
Chaetoceros, Heterosigma

Flagellates
Ceratium, Noctiluca, Protoperidinium, Dictyocha

HOW TO PLAY

FIRST GRADE & YOUNGER

Ages 2-3 INVENT A GAME
Arrange cards face up on the floor and have your child place them into matching piles. Or select three or four pairs of cards, mix them up, then turn them upside down. Take turns turning over pairs of cards (young players can turn over 3) to find the matching pairs, a simplified version of Memory.

Age 4-5 GO FISH
Deal five cards to each player. Collect matching sets of phytoplankton by asking a fellow player if he or she has a card you want. No luck? If your opponent says GO FISH, "cast your net" for phytoplankton from the center of the pile. The player with the most sets wins.

Ages 6 & up FLASH
Deal all the cards. Players stack their cards face down and take turns flipping their top card and tossing it onto the center pile. (Don't look at your card as you flip it over - it's only fair if everyone sees the card at the same time.) Slap the center pile when you spot two of the same cards in a row. The first person to slap the matching pair gets to keep the pile underneath. The first player to collect all the cards wins the game.

HOW TO PLAY

SECOND GRADE & OLDER

Age 8 & up PHYTO
Deal each player seven cards and place the remaining cards face down in the middle of the table. This is the draw pile. Turn the top card of the draw pile over to form the discard pile. Take turns beginning with the player to the dealer's left and go clockwise around the table. Place one of your cards on the discard pile when it's your turn. Your card must have the same color or wording as the top card of the discard pile. Draw a card if you cannot discard. If you can't play the drawn card, it's the next person's turn. Say "PHYTO" when you have one card left in your hand. If you forget to say PHYTO and another player catches you, you must draw two cards. The first player to get rid of all cards wins.

All ages ECOSYSTEM EFFECTS
On the blank cards, draw a sun, zooplankton predators, shellfish, global warming, or your own idea. What happens to the phytoplankton? See "fun facts" card to help you make up your own game.

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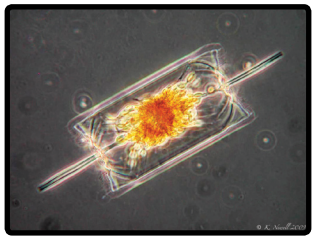
Ditylum

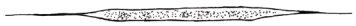
(DIT ill um)

cells triangular when viewed from the ends; look like wrapped candy

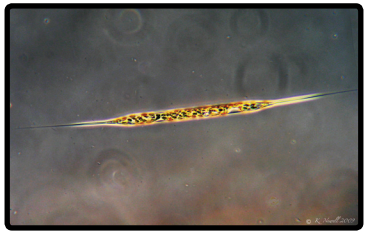


Rhizosolenia

(Ryz oh so LEEN ee a)

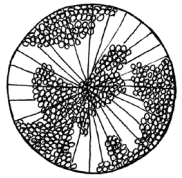


long cells with one needle-like spine on each end

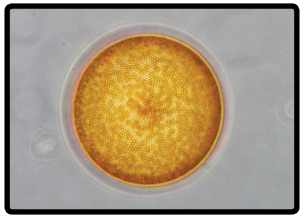


Coscinodiscus

(KOS sin oh dis kus)

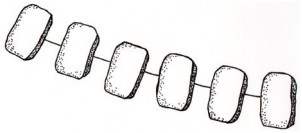


large, round flat plates



Thalassiosira

(Thal ass ee oh CY ra)

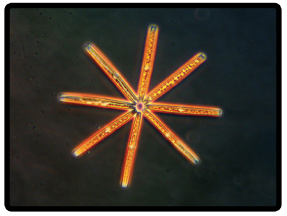


wheels on an axle

Thalassionema

(Thal ass ee oh KNEE ma)

star-shaped or zig-zag chains



Ecosystem Effects

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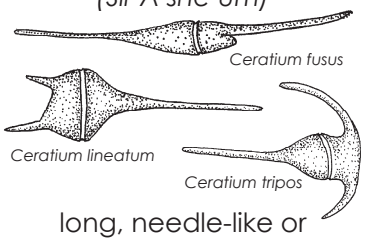
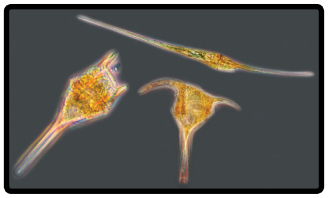
Ceratium

(Sir A she um)

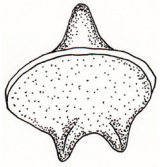


long, needle-like or shaped like anchors

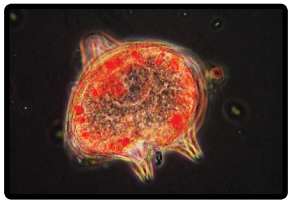


Protoperidinium

(Pro toe pear a DIN ee um)



may produce bioluminescence



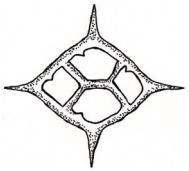
Noctiluca

(Nock tee LU ka)

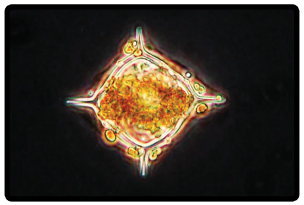
can produce large blooms of "tomato soup" water; not harmful to people

Dictyocha

(Dik tee OH ka)



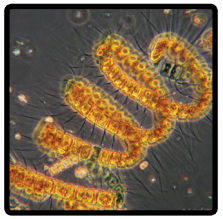
has external silica skeleton; star shapes



Chaetoceros

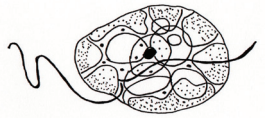
(Key TOSS er us)

spiny cells in chains; sometimes kills fish

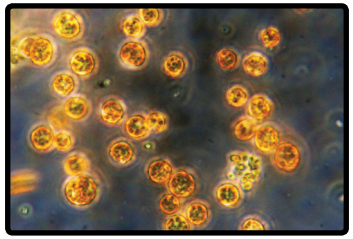


Heterosigma

(Het er oh SIG ma)



swimming cornflakes; sometimes kills fish



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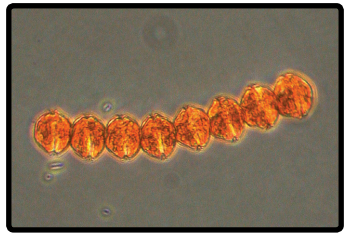
Alexandrium

(Aleks AN dre um)

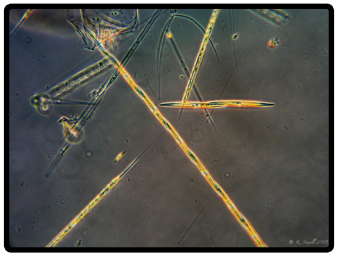
sometimes called red tide; produces saxitoxins, causes Paralytic Shellfish Poisoning



Pseudo-nitzschia

(Sue doe NITZSH ee a)

cells ends overlap to form stepped chains; produces the poison, domoic acid



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