**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.

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**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.

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**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

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**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.) Snap the center pile when you spot two of the same cards in a row. The first person to snap the matching pair gets to keep the pile underneath. The first player to collect all the cards wins the game.

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**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 ECO SYSTEM 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 your own game.
Thalassiosira (Thal ass ee oh CY ra)
- wheels on an axle

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

Ditylum (DIT ill um)
- cells triangular when viewed from the ends; look like wrapped candy

Thalassionema (Thal ass ee oh KNEE ma)
- star-shaped or zig-zag chains

Ecosystem Effects
Ceratium (Sir A she um)
- Ceratium fusus
- Ceratium lineatum
- Ceratium tripos
- 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
**Alexandrium**
*(Aleks AN dre um)*
sometimes called red tide; produces saxitoxins, causes Paralytic Shellfish Poisoning

**Pseudo-nitzschia**
*(Su doe NITZSH ee a)*
cells ends overlap to form stepped chains; produces the poison, domoic acid

**ACKNOWLEDGMENTS**

Phytoplankton Flash was funded by a grant to Dr. Vera Trainer at NOAA’s Northwest Fisheries Science Center (www.nwfsc.noaa.gov/hab).

We thank Dr. Rita Horner (University of Washington) and Sheryl Day (NOAA) for the card design; Kathleen K. Newell (University of Washington), Brian Bill (NOAA) for the phytoplankton photographs, and Catie Bursch for the illustrations.