

# DIATOMS

## Rulebook NOT FINAL

**H**idden in the water all around us are tiny lifeforms known as "diatoms." These microscopic algae cells come in a variety of exquisite geometric shapes and patterns. Their outer layer is made with silica, giving them a glassy, jewel-like quality.

Here at the Society of Microscopic Arts, we collect these diatoms and delicately arrange them on slides into beautiful mosaics which can only be truly seen and appreciated with a microscope. As part of your induction into the Society, we invite you to create your own microscopic mosaics.

FOUND AN ERROR OR HAVE A SUGGESTION?  
EMAIL [DIATOMS@LUDOLIMINAL.COM](mailto:DIATOMS@LUDOLIMINAL.COM)



LUDOLIMINAL

1-4 Players



Ages 8+



40 min

# DIATOMS

A Game of Microscopic Proportions

In **Diatoms**, you are **Victorian naturalists**, collecting single-cell algae, called diatoms, to arrange into beautiful, microscopic mosaics. As you play, you will **place Water Tiles to form algae samples** and **collect Diatoms to arrange on your Microscope Slide Board**. At the end of the game, everyone's mosaics will be scored and the best-scoring player will win first place.

Diatoms also includes a **solo variant**, called **Diatoms Commissions**. If you would like to learn Commissions, first read the rules for the main game up to the end-of-game scoring, then jump forward to the Commissions section.

## COMPONENTS



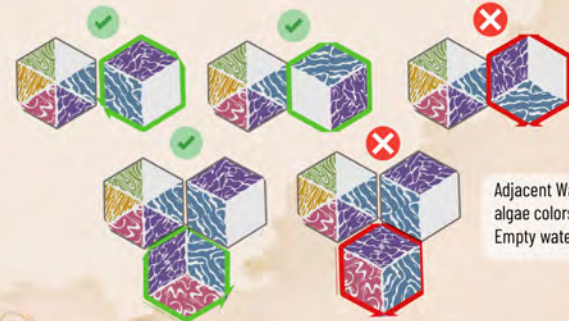
## HOW TO PLAY

### Placing Water Tiles

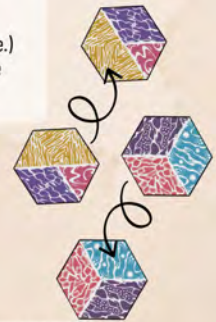
Diatoms is played on a shared central area, representing an algae-filled pond, as well as on individual player **Microscope Slide Boards**. You will be collecting **Diatoms** from the algae pond area by placing **Water Tiles** to create intersections of 3 tiles, called a **Sample Point**.

Adjacent Water Tiles must match algae colors where they touch. There are **5 algae colors**: red, yellow, green, blue, and purple. Some water tiles also have blank spaces representing empty water, which can touch any color of algae. All Water Tiles have 1, 2, or 3 colors of algae (except for the unique **Starting Tile** which has all 5 plus empty water.)

**Every Water Tile is two-sided** (except the Starting tile.) The two sides are mirrors of one-another. You may use either side when placing your Water Tile.



Adjacent Water Tiles must match algae colors where they touch. Empty water can touch any color.







From this sample the player collects 3 diatoms - a yellow circle, red oval, and blue oval.

## Collecting Diatoms

Each **Sample Point** you create will allow you to collect one or more **Diatoms**.

A Sample Point has 6 segments, which are grouped based on adjacent matching algae colors. To determine what diatoms you collect from a sample, you will look at the color and size of these algae groups. (Empty water segments do not give diatoms.)

There are **5 possible diatom shapes** in each algae color: circle, oval, triangle, square, and star.

- If the sample has a **1/6** group, collect a **circle** diatom of that color.
- If the sample has a **2/6** group, collect the **2-pointed oval**
- If the sample has a **3/6** group, collect the **3-sided triangle**
- If the sample has a **4/6** group, collect the **4-sided square**
- If the sample has a **5/6** group, collect the **5-pointed star**
- If your sample is all one color (**6/6**), **split it into any two fractions of that color that equal 1**:
  - two triangles ( $3/6 + 3/6$ )
  - oval and square ( $2/6 + 4/6$ ) or
  - circle and star ( $1/6 + 5/6$ )

When splitting a full color sample, you must select a diatom pair where both diatoms are available, if possible.

Use the **Lens Tool** to help visualize your sample points.



This full blue sample could yield one of 3 pairs: a circle & star, oval & square, **or** two triangles.



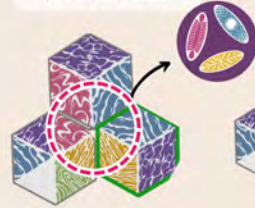
Your Notebook has a visual guide to identifying Diatoms.



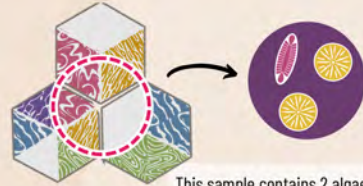
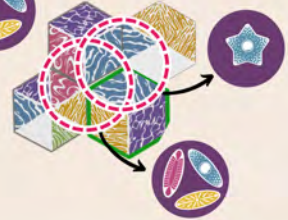
## Multiple Samples

Each intersection of 3 tiles created by your newly placed tile is a **Sample Point**. Look carefully- it is sometimes possible to form more than one sample point in one move. **Collect diatoms from every sample point you form.**

One Sample created, yielding 3 diatoms



Two Samples created, yielding 4 diatoms



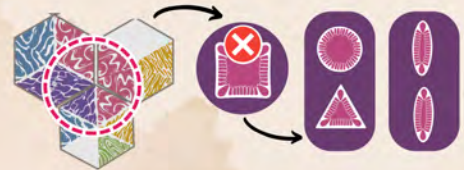
This sample contains 2 algae colors but 3 diatoms - two yellow circles and one red oval.

## Split Algae Groups

If your sample contains two separate groups of the same color algae, collect a separate diatom for each group.

## Running Out of Diatoms

If there are no more of a particular diatom, you must **split** that diatom into any **two** smaller fractions of that color that total the original and that are still available. If you **cannot split** a diatom (because it is a circle or because the split shapes are not available) you simply cannot collect it.



If you would have collected a red square ( $4/6$ ) but there are none left, you may take either a circle ( $1/6$ ) and triangle ( $3/6$ ), or two ovals ( $2/6$  &  $2/6$ ) instead.





## Arranging Your Mosaic

After collecting diatoms, you will choose empty spaces on your own individual **Microscope Slide Board** to arrange your collected **Diatoms**, creating your mosaic. Every space on your Microscope Slide Board can accept only one diatom of 2 possible shapes. Diatoms can be added to your Slide Board in any order. **You will not fill your entire Slide Board during the game.**

Lines between diatom spaces indicate that those spaces are considered **Connected**.

Your mosaic has 3 **Ring Regions**: Outer Ring, Middle Ring, & Center Ring, which includes the center space.

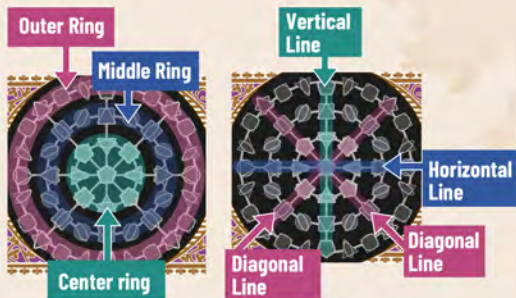
Your mosaic also has 4 **Center Lines**: one Horizontal, one Vertical, & two Diagonal.

Each space on your slide board can accept one of two shapes. For example, the yellowed circled space can take a circle **or** a star, in any color.



## Place. Collect. Arrange. Score.

Place your **Water Tiles** strategically to collect the **Diatoms** you need. Arrange your diatoms thoughtfully on your mosaic to maximize your score for the judging at the end of the game.



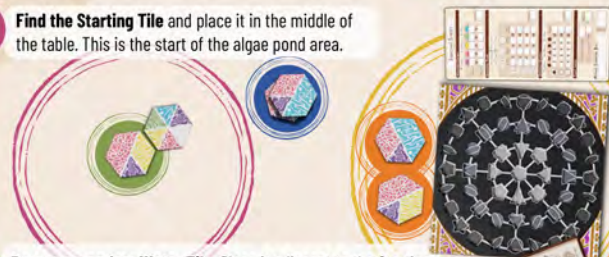
## GAME SETUP

- 1 Place the **Diatoms**, separated by shape (or color), in the 5 petri dishes, within reach of all players.
- 2 Set out the 3 **Base Judge Cards**. The Base Judges provide the base scoring for the game, so all players should have a chance to review these 3 cards and can refer to them at any time during play.

- 3 Give each player a **Slide Board**, **Score Sheet**, and **Notebook**,



- 4 Find the **Starting Tile** and place it in the middle of the table. This is the start of the algae pond area.



- 5 Draw one random **Water Tile**. Place it adjacent to the Starting Tile such that the colors match where the two tiles touch.

- 6 Each player should draw two random **Water Tiles** and place in front of them, visible to all other players.

- 7 For 3 players, remove 8 of the remaining Water Tiles at random and set aside. For 2 players, remove 12 Water Tiles. These removed tiles will not be used. Stack the remaining Water Tiles into 2 equal piles at random. Place within reach of all players.

- 8 (Optional) Choose one **Guest Judge Card** and pick their "Easygoing Mood" or "Pernickety Mood" side. All players should have a chance to review the Guest Judge card and can refer to it at any time during play. \*If this is your first game, do not play with a Guest Judge.

- 9 Choose a first player and give them the **Lens Tool**. The player whose left hand is closest to water (a glass, a faucet, a lake, an ocean) should go first.





## THE GOAL OF THE GAME

Each player is creating their own diatom mosaic and the player with the highest scoring mosaic at the end of the game wins. **You will have 8 turns (10 in a 2-player game)** to place Water Tiles to form Sample Points and collect Diatoms to arrange on your Microscope Slide Board. **Once all the Water Tiles have been played, everyone's mosaics will be scored using the base judging and any guest judge, and the winner declared.**

**In general**, the more diatoms of a particular color you have, the more that color is worth at the end of the game, the more pairs of symmetric diatoms you have on each center line, the more that line is worth at the end of the game, and the more different shapes you have in each ring, the more that ring is worth at the end of the game.



Dear Members:

As you consider the design of your mosaics, our panel of judges wish to remind you of their primary judging criteria, of which there are 3: matching colors, symmetric pairs, and shape diversity.

In addition to our regular panel, we may also invite a visiting Special Guest to evaluate your mosaics. These guest judges will no doubt bring their own unique perspective on what they wish most to see (or *not* see) in your mosaics.

Remember also that Art and Science are their own reward. No matter how the judges score your mosaic, we thank you sincerely for your unique contributions to the Society of Microscopic Arts.

### Guest Judges

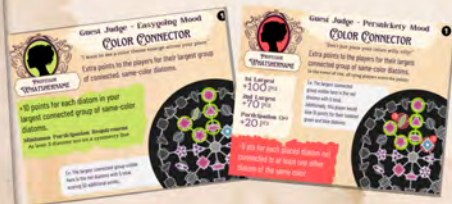
Guest Judges add optional scoring variations and come in two different flavors:

#### Easygoing Mood Guest Judges (Green side)

These guest judges are in a generous mood and award extra points to players who achieve specific mosaic features that they particularly appreciate.

#### Persnickety Mood Guest Judge (Red Side)

These guest judges are in a nit-picky mood. They award extra points only to the players that best achieve their favorite features. They also give penalties to any players whose mosaics include their pet peeves.



## ON YOUR TURN

### Choose, Place, Collect, Arrange.



**Choose** and draw into your hand the top Water Tile from ONE of the two water tile draw stacks. If either stack is empty, draw from the other. If both stacks are empty, you do not draw a tile.



**Place** one of the Water Tiles from your hand so that it touches at least **one** already-placed water tile in the algae pond area. Remember that **adjacent Water Tiles must match algae colors on all touching sides and Empty water can touch any color.**



**Collect** diatoms from your samples from the Petri dishes following the guide in your Notebook. You may use the Lens Tool to help visualize each sample as you collect. Remember that Empty water spaces in a sample do not give diatoms.



Pass the Lens Tool clockwise to the next player, who may begin their turn. Meanwhile, you have until the start of your next turn to **arrange** your collected diatom tiles onto your Microscope Slide Board.

- Once you have placed a diatom, you cannot move it.
- A diatom may go in any open space that matches its shape.
- You must place each diatom you collect if there is an open space for it.
- If you don't have an open space for a diatom, you cannot place it. Return it to the petri dishes.

You must arrange diatoms from your previous turn before starting your next turn. If play returns to you before you arrange every diatom, finish placing your diatoms before selecting and placing your next water tile. There is no penalty, excepting the impatience of your fellow players.



#### Final Turn Etiquette

On the final turn, a player after you may insist you complete your final diatom placement, as courtesy to them, before they begin their turn.





## END-OF-GAME SCORING

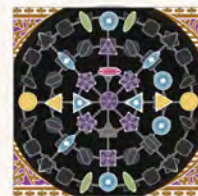
When all the water tiles have been placed, your mosaics are complete! It is time to see how they stand up to the judging. Use your score sheet to score your mosaic.

**Base Judge Scoring metrics are the same in each game:** set of matching colors, symmetry along the 4 center lines, and the distribution of different shapes in the 3 rings. **Guest Judge scoring varies from game to game** based on the guest judge card selected (if any) at the start of the game. **Refer to the Judge cards themselves for an illustrative example of each scoring metric.**



## Awarding the Winner's Ribbon

All players should tally their total score and compare. The highest scoring mosaic is declared the Exhibition's First Place Winner! In the event of a tie, the tied player with the fewest diatoms in total on their board wins. If players are still tied, they share the victory.



Share your mosaic photos!  
#DiatomsTheGame

## SCORING EXAMPLE

**Base Judges**  
**MATCHING COLORS ANYWHERE**

Count the number of diatoms of each color throughout your mosaic. Shape and location does not matter.

For each color, score points based on the total count:

- 2 or more of same color = 5pts
- 3 or more = 20pts
- 4 or more = 40 points

Example:

- 1 teal tile = 5pts
- 2 teal tiles = 20pts
- 3 teal tiles = 40pts
- 4 teal tiles = 80pts

**Base Judges**  
**SYMMETRIC PAIRS ON LINES**

Evaluate the symmetry of diatom pairs on each ring along each central line.

For each pair of shapes on each ring along each center line, collect points as follows:

- Both symmetrical = 8 pts (touching both color AND shape)
- Partially symmetrical (touching either color OR shape) = 4pts
- Not symmetrical (touching neither color nor shape) = 0pts (the corner pieces on the board does not count for pair scoring)

Example:

- Vertical Line, Center Ring (A, B, C): 3 shape match only, 5pts
- Vertical Line, Outer Ring (A, B, C): 2 color match only, 5pts
- Diagonal Line, Outer Ring (D, E): 0 color AND shape match, 0pts

Total: 5pts

**Base Judges**  
**DIFFERENT SHAPES IN RINGS**

Count how many different shapes you've placed in each of the three ring regions of your mosaic. Color does not matter.

For each ring region, collect points based on your shape count:

- 2 or more different shapes = 5pts
- 4 shapes = 20pts
- 5 shapes = 40pts

(The center piece is part of the center ring region)

Example:

- Center Ring: 2 different shapes, 10pts
- Outer Ring: 4 different shapes, 20pts
- Inner Ring: 1 different shape, 5pts

Total: 35pts

### Base Judges: Matching Colors

Count how many diatoms of each color you've placed on your mosaic. Shape and location do not matter.

### Base Judges: Symmetric Pairs

Evaluate the symmetry of pairs of diatoms on the 4 center lines on your mosaic.

### Base Judges: Different Shapes

Count how many different shapes you have in each of the three ring zones of your mosaic. Color does not matter.

### Guest Judges

Compare everyone's mosaics with that guest judge card's scoring rubric. Award points and mark penalties as indicated. For **Persnickety** judges, in the event of a tie, all tied players are awarded the points from the judge for that place and remaining players fill in the lower place(s).

### Tie Example: Color Connector - Persnickety Guest Judge:

If two players tie for largest connected group, both players would receive the 100 points for largest group, and a 3rd player, if there is one with a connected group of at least 3 diatoms, would score 70 points. A 4th qualifying player would score 20 points.

**Guest Judge - Persnickety Mood**  
**COLOR CONNECTOR**

Award points to the players for their largest connected group of same color diatoms. Deductions of 20 points are given for ties.

For the largest connected group of same color diatoms:

- At Least 3 = 100 pts
- 2 = 70 pts
- 1 = 20 pts

Penalty: -20 pts

If you tie for the largest connected group of same color diatoms, you will receive the points for that group and the remaining players will receive the points for the next largest group.

Example: 100 pts for largest group, 70 pts for 2nd largest group, 20 pts for 3rd largest group.

### JUDGING SHEET

**MATCHING COLORS**

Count: 4 1 7 12 5  
Points: 5 0 20 0 40 = 65

**SYMMETRIC PAIRS**

Center: 5 + 5 + 0 = 10  
Outer: 5 + 5 + 0 = 10  
Total: 15 + 15 + 0 = 30  
Symmetry Score: 5 + 0 + 0 = 5 = 55

**DIFFERENT SHAPES**

Center: 20  
Outer: 20  
Inner: 5  
Total: 45

**GUEST JUDGING**

Points: 70  
Deductions: -25  
Guest Judge Score: 45

TOTAL 210

For **Matching Colors**, first count and record the number of diatoms of each color, then convert to points.

For **Symmetric Pairs**, each row on the score sheet scores one line center line. For each line, look at the pair of shapes on the center ring first, then the pair on the middle ring, then the pair on the outer ring. Record points as appropriate for the symmetry status of each pair.

For **Different Shapes**, count and record the number of shapes in each ring, then convert to points. **Start with the center ring**, then middle, then outer.

If playing with a **Guest Judge**, determine awarded points based on the judge criteria. If the judge is "persnickety", deduct points as indicated. This example player had the 2nd largest group with 7 connected yellow diatoms, earning 70 points, and also 5 diatoms not touching others of the same color, earning -25 in deductions.

Tally your subtotals and record your final score.



Get More Score Sheets



## COMMISSIONS (SOLO VARIANT)



Dear Members,

From time to time, wealthy collectors reach out to the Society to commission mosaic slides for their curio cabinet collections. These commissions offer opportunities for prestige and monetary reward.

Accordingly, the Society invites all members to try their hand at these commissions. If you can meet the particular requirements for each piece (and limit the castoff diatoms you squander), you may well make a name for yourself as a premier diatomaceous artist.

COMMISSION NO. 1



In Diatoms **Commissions**, your goal is to complete a mosaic that fulfills the requirements of a specific commissioned design. You must also be mindful of any diatoms you waste—collect too many extra “castoff” diatoms, and you will fail the commission.

Read the rules of the main game before playing **Commissions**, particularly pages 2-4, as the core gameplay around placing water tiles and collecting diatoms is the same.

### Guide to Commission Requirements

-  Darkened spaces are not use. Diatoms can not be placed there.
-  Light grey spaces are filled as normal with any color of the 2 shapes accepted in that space.
-  Full color spaces with white outlines must be filled with the specified color of diatom in either shape.
-  Spaces with a white shape and black outline must be filled with that specific shape, in any color.
-  Spaces with a colored shape and black outline must be filled with that specific color and shape.
-  Spaces marked with numbers must be filled with the same shape as every other space with the same number.
-  Spaces marked with letters must be filled with the same color as every other space with the same letter.

## COMMISSIONS SETUP

- 1 Place the Diatoms, separated by shape (or color), in the 5 petri dishes, within reach.

- 3 Take a Slide Board, Notebook, and Lens Tool and place in front of you.



- 3 Find the Starting Tile and place it in the middle of the table. This is the start of the algae pond area.



- 4 Choose a Commission card to complete and place it within easy sight for reference. If this is your first game, start with #1.

- 5 Split the Water Tiles into two stacks and place near your slide board.

- 6 Draw two tiles from the top of the stacks and place them nearby as your hand.

- 7 Look at the number of Cast-off Dishes shown on the Commission puzzle. Take that many Petri dish lids and place by your slide board. These are your Castoffs Dishes.



## PLAYING COMMISSIONS

### Choose, Place, Collect, Arrange.

- 1 Choose** one of the four available Water Tiles, the two in your hand or the top tile of either of the stacks and **place** it in the algae pond, following the rules from the main game. Except for the first Water Tile you place, you must create at least one Sample Point (an intersection of 3 tiles) when placing a Water Tile.
- 2 Collect** diatoms from your samples from the Petri dishes following the guide in your Notebook and the main game rules.
- 3 Arrange** the diatoms on your Slide Board, following the requirements on the Commission card. As in the main game, once you have placed a diatom on your mosaic, you can not move it.
  - **If you can not fit a diatom you collected** you must place it into one of the Castoffs Dishes.
  - Each Castoffs dish can hold 1 full sample points' worth of diatoms (eg: six circles OR 3 ovals OR 2 triangles, or an oval and a square, or a star and a circle, and so on.)
  - If a diatom is too big to fit in a Castoff dish, you must place it in another dish. If it does not fit in any of your dishes nor on your mosaic, you have failed the commission.
- 4 Repeat.** Before choosing your next Water Tile, be sure to refill your hand to two tiles if needed.

### Completing Commissions & Star Ratings

If you fully complete the mosaic- filling every spot correctly according to the commission prompt- you have successfully completed the commission. Completed Commissions are scored with a star rating. To determine your star rating for a commission, look at your Castoff dishes. For each Castoff dish that can still fit a star-shaped diatoms (5/6), your mosaic earns one star.



This player has completed this commission successfully. They have one Petri dish that can still fit a star diatom, so they earn 1 star for this mosaic.

## DISCOVER A LOST VICTORIAN ARTFORM

### The True Story of Microscopic Diatom Mosaics

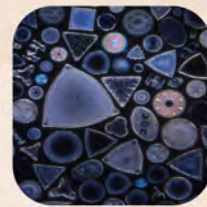
The creation of tiny mosaics of diatoms (single-cell algae) was a practice of scientific art that peaked during the Victorian era of the late 1800s. Individuals would create these miniature arrangements and sometimes sell the slides and photographs to wealthy collectors. Diatoms are so tiny that an entire mosaic would fit on a dot the size of a period.



Diatom arrangement by J. D. Moller, c. 1880s.



Example Slides from 1800s.



Collection of Diatoms.

"Few objects are more beautiful than the minute siliceous cases of the diatomaceae: were these created that they might be examined and admired under the high powers of the microscope?"

-Charles Darwin  
On the Origin of Species

© 2023 Ludoliminal, LLC  
Diatoms is a trademark of Ludoliminal, LLC  
DiatomsTheGame.com  
Ludoliminal.com

