BIOS:MESOFAUNA

PUPATE, POLLINATE, POPULATE

BOOK I - INTRO GAMES

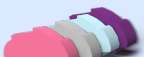
a.

b.

c.

d.

e.



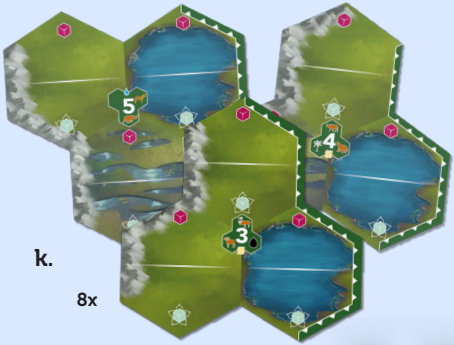
f.

g.

h.

i.

j. 10x 25x 25x 25x 25x



k. 8x

l. 20x

m. 16x

n.

o.

p.

q. 16x

r.

s.

t.

BIOS:MESOFAUNA COMPONENTS

for all the Mesofauna games (Caterpillar, Cocoon, Butterfly, & Combined).

CATERPILLAR COMPONENTS

- **a. Book I Caterpillar/Cocoon Rulebook**. You are reading it
- **b. 24 Species Cards.** 6 Species in 4 different colors.
- **c. 61 Mutation Cards** in 4 colors
- **d. 40 Wooden Creeples.** Shape Archetype: 10 pink, 10 blue, 10 purple, 10 gray
- **e. 36 Wooden Creeples.** Shape Burrower: 9 pink, 9 blue, 9 purple, 9 gray
- **f. 28 Wooden Creeples.** Shape Armored: 7 pink, 7 blue, 7 purple, 7 gray.
- **g. 28 Wooden Creeples.** Shape Swimmer: 7 pink, 7 blue, 7 purple, 7 gray
- **h. 28 Wooden Creeples.** Shape Flyer: 7 pink, 7 blue, 7 purple, 7 gray
- **i. 28 Wooden Creeples.** Shape Parasite: 7 pink, 7 blue, 7 purple, 7 gray
- **j. 110 Organ Cubes** 10mm (25 each of yellow, red, green, blue, 10 of white)
- **k. 8 Double-sided Cratons,** each side has **3 Biomes** (hexes)
- **l. 20 Yellow wooden Floral tokens**
- **m. 16 Fossil Chits**
- **n. 1 Score Card and 4 score counters**
- **o. 9 Player Aid Cards,** (2 per player for regular games and 1 for solitaire)

COCOON ADDITIONAL COMPONENTS

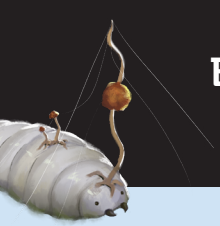
- **p. 5 Cost Chits**
- **q. 16 Venom/Mutualism Chits**. Only the venom side is used in *Cocoon*

BUTTERFLY ADDITIONAL COMPONENTS

- **r. 4 Dice 8-sided** (4d8)
- **s. Book II Butterfly Rulebook**

COMBINED GAME BUTTERFLY ADDITIONAL COMPONENTS

- **t. 20 Species Cards for Megafauna Species.** 5 Species in the 4 Megafauna colors



BOOK I CATERPILLAR & COCOON

Beginner's Games by Jon Manker

INTRODUCTION

Welcome to the Bios series of games! If you are new to the Bios series you have come to the right game, and you are reading the right book.

THE BIOS SERIES

The Bios series portray the evolution of life during different time periods: how life began in *Bios:Genesis*, how life got bigger and conquered the land in *Bios:Mesofauna* and *Bios:Megafauna*, and finally how life got civilized in *Bios:Origins*.

a. The Bios Series are playable either standalone or linked consecutively in a grand campaign, where end-states serve as start-states for the next game. In addition, *High Frontier 4 All* has rules that let you append it to the campaign, as a spacefaring continuation after *Bios:Origins*.

BIOS:MESOFAUNA

"Meso" means "middle", and *Bios:Mesofauna* investigates the "middle earth" of creatures bigger than microbes yet smaller than Megafauna.

a. Start with an Archetype Species and evolve into up to 6 more swimming, flying, burrowing, armored, or parasite species.

b. Build a Portrait of each Species that gives you victory points according to its pheromones and population.

c. Use a Diceless Contest Mechanic to see which carnivore, herbivore, or parasite is the fittest to survive in a particular pollinator, herbivore, or carnivore niche.

CATERPILLAR, COCOON, & BUTTERFLY GAMES

Bios:Mesofauna is divided into 3 stages in order of difficulty: *Caterpillar, Cocoon,* and (in Book II) *Butterfly*. We start with *Caterpillar*, an independent Mesofauna variant for 2 to 4 players.

d. As a Phylum of Bugs, you are able to speciate into up to 6 **Species**. *Caterpillar* will familiarize you with the MUTATE, SPECIATE, and POPULATE, actions that you will later find in all variants of *Bios:Mesofauna* and *Bios:Megafauna*.

HEAVY CARDBOARD TUTORIAL

The link for a well-produced video tutorial by the Youtube channel Heavy Cardboard is in our webshop under **https://cutt.ly/bmes-hc**. Or google *"Bios:Mesofauna Heavy Cardboard"*. This tutorial is for the *Cocoon* Variant.

WINNING CATERPILLAR & COCOON

These games are a race! The winner is the first player to 12 points (*Caterpillar*) or 16 points (*Cocoon*).

TEXT STANDARDS

At the end of this book you will find a glossary, in case you want any of the terms in the game explained in detail. Any terms in the glossary are written using First Letter Capital. Words in **bold** are game terms being defined, and *italics* are game terms defined elsewhere in the rules. You will be taking **actions** when playing Caterpillar. Actions are written using SMALL CAPS.

SPECIES CARD ANATOMY

The two types of cards in the game are *Species Cards* and *Mutations*. Both card types are used to build each player's **Tableaux**, with one Tableau for each Species. You have 6 Species Cards, but only your Archetype Species Card is active from the start and establishes your first Tableau. Each Species Card has these attributes:

a. Shape. Each shape is a different Species: Archetype, burrower, armored, swimmer, Flyer, and Parasite.

b. Player Colors are pink, blue, purple, and gray.

c. Skeletal Number. Used only to determine the first player (highest goes first, then clockwise).

d. Unborns are stored on the icons provided. This may be helpful to show the number of living Creeples on the map during scoring.

MUTATION CARD ANATOMY

Mutations are cards that represent specialized adaptations unique to each Species. Mutation features are:

a. Color. Each Mutation is one of 4 colors: yellow (respiratory), red (sensory), green (digestive), or blue (reproductive).

b. Unpromoted vs. Promoted Side. Each Mutation is double-sided, as shown. In *Caterpillar*, you will only be using the promoted side.

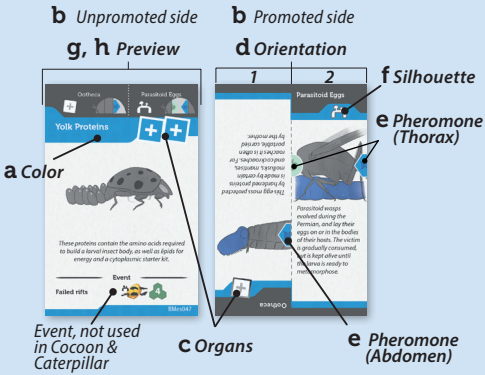
c. Organs. The unpromoted side, and some of the promoted sides, has one or two cube icons with a "**+**". cubes of the correct color are always placed there. These cubes represent **Organs**.

d. Orientation. A card on its promoted side must be in one of its two Orientations as shown. You choose the Orientation, but the side that you do not choose (to the left) will never be used in the game.

e. Body Parts & Pheromone Icons.  Each Mutation Orientation is either a **head** (Pheromone half-icon to the left), **abdomen** (Pheromone half-icon to the right), or **thorax** (Pheromone half-icons to the right and left).

f. Silhouettes. A white silhouette of a Creeple indicates that this Orientation may be used to create a new Species of that shape. If found on a Species Card, it indicates the shape of the Species Creeples.

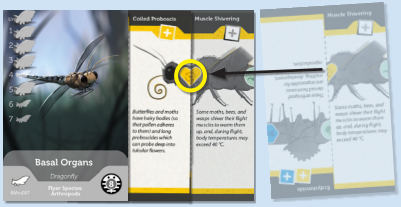
g. Mutation Preview. The icons indicate what Derived Organs, Traits, and Pheromones are available on the promoted side. There are always two promotion options.



h. Mutation's Head, Thorax, & Abdomen. These preview icons indicate the Portrait type (head, thorax, or abdomen) and their pheromone halves.

i. Splay & Portrait. Mutations are **splayed** (arranged) half over an adjoining card to its left as shown below. This forms a **Portrait** of your bug. As a general rule, two cards cannot be adjoined unless their Pheromone icons match in color.

j. Venom , Mutualism , & Monster Icons. Ignore these in *Caterpillar*.



CRATON ANATOMY

The map is represented by **Cratons**, each with 3 hexes called **Biomes**.

a. Sides. Each Craton is double-sided, with a **wet side** and a **dry side** . The wet side has more swamps and lakes. You choose the side during setup.

b. Biome Types. Each Biome (hex) can be 1 of 3 types: **weeds, lakes,** or **swamps.**

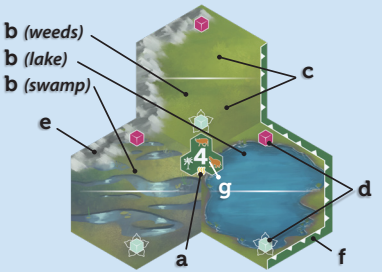
c. Carnivore & Herbivore Trophic Levels. Each Biome of a Craton is divided into upper and lower halves: the upper half reserved for Carnivores, and the lower half for Herbivores.

d. Contest Cube Icon. These determine the winner of contests, as described later.

e. Mountains (not used in Caterpillar or Cocoon) indicate mountainous barriers along a border.

f. Faults (not used in Caterpillar or Cocoon) are segments used during the continental drift event. They do not affect dispersion.

g. Central Icon (not used in Caterpillar or Cocoon). Cratons are numbered from 1 to 8, and are used in Lazarus, airborne dispersals and continental drift. The resource icon(s) are only used in a *Bios:Origins* grand campaign (**J9d**).



CATERPILLAR
Introductory Variant

CATERPILLAR SETUP

a. Choose Sides. Randomly assign each player a color and all components of that color: 6 Species Cards, 1 player aid card, and the 47 Creeples.

b. Starting Tableau. Place all 10 of the Archetype Creeples on the Archetype Species Card placed in front of you. This is your Archetype's Tableau.

c. Inactive Species. You start with your Archetype as your only active Species. Place the other 5 Species Cards aside as inactive.

d. Display Setup (Promoted Faceup). Separate the Mutations into two decks: one with all the red and yellow cards, and the other with all the green and blue cards. The promoted side must be faceup! Shuffle each deck and arrange them one over the other. Draw 4 cards from each deck and arrange them to the left as shown, forming a 2x5 **Display** (all cards are faceup including the top card of the 2 draw decks).

DRAW DECKS

e. Pool Setup. Place all Organ cubes in a common **Pool.**

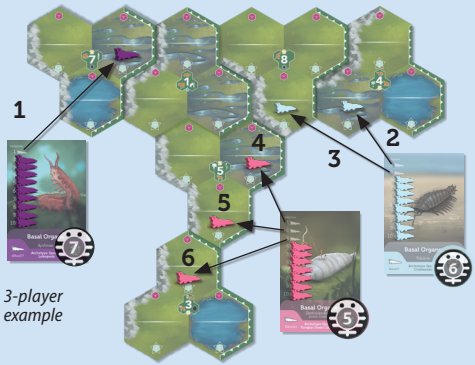
f. Map Setup. Each player takes 2 random Cratons and places them into the play area, oriented with the red contest cube icon on top. Other Cratons will not be used. All Cratons start adjoined into a single **continent**. You can use either the wet side or dry side of the Craton, noting that the wet side has more flooded areas and thus less territory to fight over!

Tip: *The icons on the top and bottom of each Biome have the red-yellow-green colors of a stoplight. The red cube in the upper half indicates red is needed to be the apex Carnivore, while the green cube in the lower half indicates green is needed to be the top Herbivore. If Flowers appear, the cube color needed to be the top Herbivore will be yellow instead of green cubes.*

g. Creeple Placement. Start with the player with the highest Skeletal Number (as marked on the Species Card). This player places one of their Archetype Creeples, taken from their Archetype Species Card, into any Biome (hex) on the map. The next player clockwise places two of their Archetype Creeples into any adjacent hexes on the map. The third player (if any) similarly places three Creeples, and finally the fourth player (if any) places four Creeples into adjacent hexes.

h. Upper Vs. Lower Half. If a Biome is unoccupied, you must place the Creeple into the lower half of the hex (the half with the green cube icon). If it is occupied in the lower half, you must place the Creeple into the upper half (with the red cube icon).

i. Creeple Placement Restrictions. Do not place into a lake Biome. You can't plant any Flowers during setup (see POPULATE).



3-player example

SEQUENCE OF PLAY

The player with the highest Skeletal Number (as marked on your Species Card) goes first, by choosing 1 **action**. Then proceed clockwise, with each player taking 1 action, until a player wins.

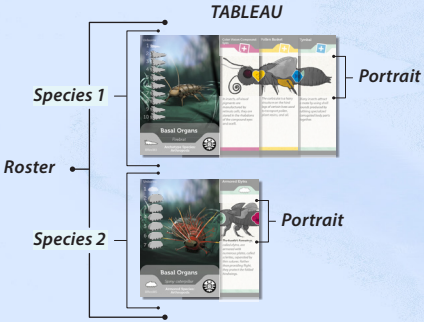
SPECIES

You start with just one Species, called your Archetype. You can create up to 5 more Species, each distinguished on the map by a particular **creeple shape**: burrowers, armored, Swimmers, Flyers, and Parasites.

a. Tableau is the row of cards for each Species that contains its cards and Organ cubes. The Organs and Traits in a Tableau define how well that Species will do in contests.

SPECIES AUTONOMY: A key game concept is that, once created, each of your Species has its own Tableau which isn't shared with your other Species. If one Species purchases a Mutation, another Species can't promote it into its Portrait. One Species of yours can prey upon another Species of yours, but a Species can't prey upon itself (forbidden by the cannibalism taboo).

b. Portrait is a picture of your Species that you assemble using Mutations (cards) acquired by MUTATE actions. The Portrait includes at least 1 card, and will include heads, thoraces, and/or abdomens.



Important: *Pheromones must match to add to a Portrait. It can include multiple thoraces but it can only have one head and one abdomen. However a Portrait does not need to have a head or an abdomen, it is possible to consist of only thoraces.*

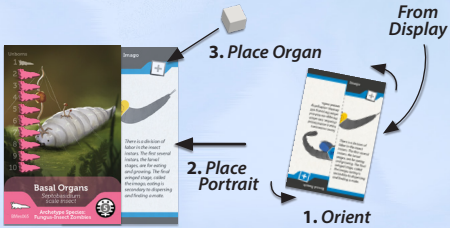
CATERPILLAR ACTIONS

On your turn, perform one **action** choosing either MUTATE, SPECIATE, or POPULATE:

MUTATE - Select a *Mutation* (card) from the 10-card *Display* and place it in the *Portrait* of one of your *Species*, to the right of its Species Card (as shown in the illustration above). Any Species can use any Mutation. Follow these steps:

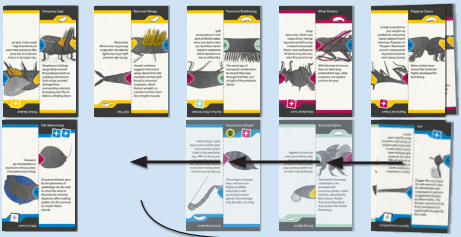
1. **Choose 1 of its 2 Orientations.** If the Orientation chosen contains a white Creeple silhouette, you may optionally instead perform a SPECIATE (next section).
2. **Placement Rules.** If there are already one or more Portrait cards, the new card must be splayed into the existing Portrait but must match the other half of the existing Pheromone icon in color. The new card can exchange (Discarding the old card and cubes) or squeeze between existing cards, as long as both halves of each Pheromone matches in color.
3. **Place Organs.** For each square icon, place an appropriately placed *Organ* (cube) from the Pool where indicated.

Easily Missed (G1c): *Upside-down pheromone icons are not in play.*



Example: 1. *For your first turn, your Archetype Species claims the "Imago" Mutation from the Display.*
2. *You place this card, appropriately oriented, just to the right of your Archetype Species Card.*
3. *You place a white Organ over the card's white cube icon. Pheromone icons are not in play.*

4. **Refresh the Display** by sliding all Mutations in that row to the left and move the top card off the deck to fill the gap as shown on top of next page. This restores the Display to 10 cards.



Example: *In the previous example, you took a card from the blue/green Display row, and so must slide cards and draw a new card from the blue/green deck as shown.*

Then, when it is your turn, you decide to MUTATE *a new card. The card currently in your Portrait is an abdomen card with a yellow half Pheromone to the left. Therefore, you choose the "Muscular Gizzard" Mutation, which is a head card with a yellow Pheromone to the right. This fits splayed to the left of the existing Portrait Card as shown, to complete a green Pheromone. You place 2 green cubes on this head as shown. You refresh the Display to finish your turn.*

Easily Missed: *Event, Venom, and Mutualism icons are ignored in Caterpillar.*

SPECIATE - Take a card with a white silhouette from the 10-card Display and use it to start a new Tableau as the starting Portrait of a new Species, and to place a Creeple of this species shape on the map. The 6 possible Species are Archetype, burrower, armored, Flyer, Swimmer, and Parasite. Follow these steps:

a. Silhouette Restriction. Place the card in one of its two Orientations, which must contain the **silhouette** of the new creeple shape. You must not already have any Creeples of this Species on the map.

b. Setup New Tableau. Find the new Species Card and use it to start a new row beneath your most recent Tableau row. Place the card used to speciate to the right of the Species Card.

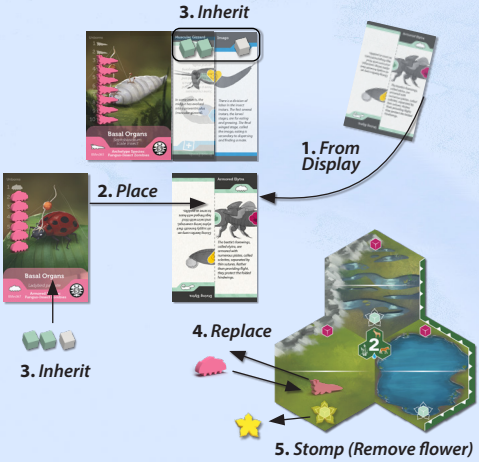
c. Load the Species Card with all the Creeples of the new creeple shape.

d. Inheritance. Duplicate the set of Organ cubes found on the mother species and place them on the new Species Card.

e. Choose a Sacrificial Mother. Replace one of your existing Creeples on the map with one Creeple of the new shape. If the Creeple lost is the last Creeple of a Species, the mother goes Extinct. A new Swimmer can only be speciated from a mother in a swamp.

f. Flower Planting/Stomping. If it is an Herbivore, the new Creeple can plant or stomp Flowers as described in POPULATE.

g. Refresh the Display by sliding all Mutations in that row to the left and move the top card off the deck to fill the gap. This restores the Display to 10 cards.



Example: *Continuing from the previous example, you decide that you need to add a new Species. For your turn, you take the armored elytra/diving elytra Mutation.* ***1.*** *Oriented one way gives you an armored species, and the other way gives you a swimmer species.* ***2.*** *You choose the armored Orientation, place it in your Tableau, and beside it place your armored Species Card with its 7 Creeples.* ***3.*** *The mother species had 3 cubes: 1 white plus 2 green, and these 3 cubes are duplicated and placed on the Species Card of your new armored Species.* ***4.*** *One Creeple of the mother species is replaced with an armored Creeple.* ***5.*** *This Biome has a Flower, and the armored daughter species decides to stomp that Flower.*

Easily Missed: *Parasites have no special rules in Caterpillar, and are treated just as the armored or burrower creeple shape.*

POPULATE - This action places a certain number of **Larvae** (new Creeples) on the map. This number is equal to one plus the number of blue Organs (cubes) of that Species. Thus, if a Species with 2 blue cubes POPULATES, place 3 new Larvae. Each Larva Creeple disperses to a new Biome, moving a number of hexes also equal to one plus the number of blue Organs of that Species. For each Larva follow these steps:

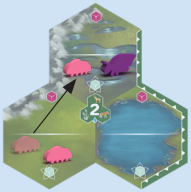
a. Choose Mother. Place each new Larvae in the same Biome as an existing Creeple of that Species on the map. You may pick a different mother for each Larva, and may even pick a newborn Larva that has just dispersed to be a mother. After you place a Larva, disperse it to a new location called the **destination** (next 2 bullets).

b. Dispersal of Newborn Larvae. Each Larva can disperse (move) up to a certain number of Biomes (hexes) on the map. This number is equal to one plus the number of blue Organs of that Species. Thus, if a Creeple with 1 blue cube disperses, it can move up to 2 hexes.

c. Destination Restrictions. Some Species are not allowed to live in certain Biomes. Only a Swimmer Creeple can choose a *lake* biome as a destination. Every Creeple can choose a *swamp* biome as its destination. Every Creeple except for a Swimmer can choose a *weeds* biome as its destination. If a Species already lives in a Biome, a second Creeple of that Species cannot choose it as a destination. Do not place a Creeple with no valid destination.

Easily Missed: *Mountains and Faults are not used in Caterpillar.*

d. Destination Trophic Level. Upon entering your chosen destination, place your Creeple into the lower half of the Biome. If this is occupied by any Creeple, friend or foe, there is an immediate contest (see contest section). Resolve this contest before moving the next Larva.



Example: *You POPULATE with your new armored species of the previous example. There is only one armored Creeple, so this must be chosen as the mother. This Species has no blue cubes, so only one Larva Creeple is born, and it can only disperse one Biome (hex). There are 2 adjacent Biomes, a swamp and a lake, but an armored Species cannot inhabit a lake and so it disperse into the swamp. The swamp is inhabited, so there is an herbivore contest (see next example).*

e. Flower Planting. If a Larva disperses to a Biome that is empty, or if it is occupied by a Creeple but you win the contest, you may plant a flower by placing a Flower chit over the flower outline under the green icon in the bottom of the Biome. This will effect contests. However, you may not plant a flower in a lake or in a Biome that already has a Flower.

Tip: *A Species with a lot of yellow Organs is a good pollinator, and should plant flowers wherever possible*

f. Flower Stomping. If a Larva disperses to a Biome with a Flower that is empty, or if it is occupied but you win the contest, you may remove the Flower.

CIRCLE OF LIFE

Each Biome can support only 2 Creeples: one Herbivore in the lower half, and one Carnivore in the upper half. The Carnivore in the upper half is preying upon the Herbivore in the lower half. But because Carnivores and Herbivores coexist as part of the circle of life, Herbivore Creeples are not killed by being the prey of carnivores in this game. Contests only occur between two Herbivores, or between two Carnivores, and not between a Carnivore and an Herbivore.

CONTESTS

Any time a Creeple is placed in the half of a Biome where there is another Creeple, there is an immediate contest. If it occurs in the lower half it is an **herbivore contest** and if in the upper half it is a **carnivore contest** that prey upon the Creeples in the lower half.

a. Invader vs. Defender. Contests are always between two Creeples in the same half of a Biome: the **invader** and the **defender.**

b. Organ Majority Rule. To win a contest, the invader must have more Organs (cubes) of the specified color (next bullet) than the defender. If tied, the defender wins!

Easily Missed: *A contest is always between 2 Herbivores, or 2 Carnivores, never between an Herbivore and a Carnivore.*

c. Contest Cube Icon is the square icon in the uppermost and lowermost corners of each Biome. Its color determines the winner of the contest in that half of the Biome. A contest cube icon covered by a Flower in the Biome's lower half is considered to be yellow in color.

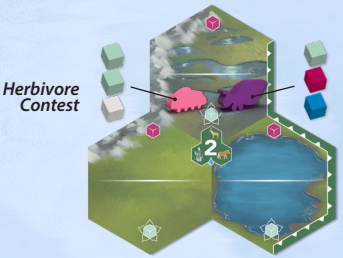
d. Herbivore & Carnivore Contests. To win a contest, a Creeple moving into the lower or upper half of a Biome must have more Organs of the color indicated by the *contest cube icon* than the defending Creeple. If it does, it kills the defender. If it is tied, or has less, than the invader is killed. All killed Creeples are placed upon their Species card as Unborn Creeples.

e. Chameleon Cubes. In a contest, a white Organ is considered to change its color, depending on the contest it is involved in. In a carnivore contest (upper half of a Biome), each white Organ counts as a red cube. In an herbivore contest (lower half of a Biome), each white Organ counts as a yellow cube if in Flowers, and a green cube otherwise.

f. Flower Planting/Stomping. If you win a contest in the lower half of a non-lake Biome, you may plant (add) or stomp (remove) a Flower there.

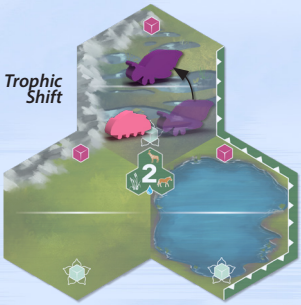
g. Same Color Contests. If both Creeples in a contest are the same color, its owner decides who wins and who loses.

h. Herbivore Losers Become Carnivores. If a Creeple loses a contest in the lower half of a Biome, move it to the upper half (this move is called a **Trophic Shift**). If this half is occupied, it wins the contest if it has more red Organs than the defending Carnivore.



Example: *The armored Creeple of the previous example has dispersed into a flowerless swamp inhabited by an enemy Flyer. There is an herbivore contest, but you have more green (digestive) Organs (3, including the chameleon cube) and win the contest.*

i. Cannibalism Is Taboo. A Creeple is never allowed to prey upon another Creeple of the exact same color and shape.



Example: *The enemy Flyer of the previous example has lost the herbivore contest, and thus becomes a Carnivore feasting upon the armored Herbivore. It made the Trophic Shift even though it was not its turn.*

EXTINCTIONS If the last Creeple of a Species on the map is moved back to its Species Card, it has gone **Extinct**. Return its Species Card with all the Creeples to your supply and discard all Mutation cards and cubes that were in its Tableau.

a. Respeciation. You may now SPECIATE into that creeple shape again since it is in your supply.

b. Elimination. If all of your Species become Extinct, you lose the game.

GAME END & SCORING

The game is a race to 12 points. At the end of your turn, you should total your points to see if you have enough to win. Once someone reaches 12 points, the game ends immediately.

a. Endgame Points. Each Creeple of your color on the map counts as one point, and each completed (right + left half) Pheromone in your Portrait(s) counts as one point.

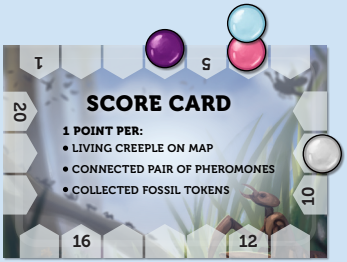
b. Lone Survivor Victory. You can also win if all other players are Extinct.

c. Deck Exhaustion. If one of the two draw decks runs out of cards, end the game immediately and count scores to determine the winner. If tied, the contestants share victory.

SCORE CARD

Using the scorecard is optional, and has no effect on gameplay. Consider it an aid to keep track of the game state during mainly *Cocoon* and *Caterpillar*, since these variants are races to 12 or 16 points.

Simply place the card reachable by all players and move the respective score markers when a player gains or loses points. If you want a game with more hidden information simply ignore the score card.



COCOON

Intermediate Game by Jon Manker

COCOON INTRODUCTION

Cocoon uses all the rules found in the *Caterpillar* variant, except it adds the following concepts:

- **Promote (New Action).** Both sides of a Mutation Card is now used. It is purchased on its unpromoted side, and it takes an action to PROMOTE it to its promoted side. This new action, called PROMOTE, means you now have 5 actions to choose from.
- **Spending Allowance (Modified MUTATE).** Mutations are now purchased. Each column of the Display starts with a chit indicating its **cost**. Each Species cannot purchase any Mutation which has a cost greater than the number of its Unborn Creeples.
- **Half Cost Purchases (Modified MUTATE).** Pheromones allow you to halve your cost when purchasing a Mutation of a particular color during MUTATE.
- **Inheritance (Modified SPECIATE).** Organs on the Species Cards are now called **Basal Organs**. New Species inherit only Basal Organs, not all Organs.
- **Shape Requirements (Modified Contests).** Carnivores now have Shape Requirements when choosing their prey. For instance, if an Herbivore is a Flyer, a Carnivore must also be a Flyer to catch it. During an herbivore contest, Herbivores inedible to a Carnivore in the Biome have the huge advantage that they will win regardless of what Organs they have.

Parasites now have special rules, and no longer can be Herbivores or Carnivores. Furthermore, if an Herbivore has a Parasite, its Carnivore no longer needs to follow the Shape Requirement (previous bullet).

Venom. If a Carnivore has this Trait, it ignores Shape Requirements.

- **Endgame Points** have been increased from 12 to 16.

COCOON SETUP

The setup for *Cocoon* is identical to that for *Caterpillar*, with three exceptions:

1. **Facedown Mutations.** During *display setup*, all cards have their promoted side facedown, not faceup.
2. **Cost Chits.** Each of the 5 columns of the Display are marked with a cost chit as shown on top of next page.
3. **Venom Chits.** Add these to the Pool for possible use later.

COCOON ACTIONS

(modified from Caterpillar)

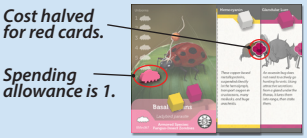
MUTATE ACTION - This action is similar to *Caterpillar*, in that you select a card from the 10-card *Display* and place it into the Tableau of one of your Species. But instead of placing your new card as promoted to the right of the Species Card, place it as unpromoted to the left. Another change is that each Species is restricted as to which display cards it can afford to purchase. The fewer Unborn remaining on its Species Card, the more restricted it is. However, if a Species has a Pheromone, this makes cards of this color cheaper. Follow these steps:

a. Mutation Costs. Each Mutation has a **cost**, as marked by the cost chit (from 0 to 8) set in the top of its column in the Display.

b. Spending Allowance. The number of Unborns of a Species is the maximum cost of Mutation that you can purchase for the turn. Think of this number as your allowance each turn in which to buy a card. But since there are no savings, you cannot save any unused allowance for use for the next turn.

c. Mutation Cost Halved. Consider the mutation cost of a Mutation to be half when purchasing a card of a particular color if the Species has one or more Pheromones of that color.

Example: *Your armored Species has 1 Unborn Creeple on its Species Card, and it has one complete red Pheromone in its Portrait. On its turn, it could not MUTATE a green card from the cost 2 column, but it could MUTATE a red card in that column.*



d. Place Unpromoted Mutation. The card purchased goes on its unpromoted side immediately to the left of the Species Portrait which purchased it. See illustration below.

e. Place Derived Organ(s). After placing the Mutation, put the Organ(s) of the color specified on the Mutation card over the cube icon(s).

Easily Missed: *The Organs on the unpromoted card are part of the Tableau for that Species and its Organs count in contests.*

f. Refresh Display in the same way as *Caterpillar*.

PROMOTE ACTION *(new action)*

On your turn, you have one extra action to choose from. This action flips a Mutation Card in one of your Tableaux, and sets it as part of the Portrait. The promoted card is placed **splayed**, meaning it half-covers earlier cards. It is also placed so that the Pheromones match in color, following this process:

a. Is the Card Promotable? The uppermost strip of an unpromoted card contains its **previews**, i.e. icons showing what is on its promoted side, so that you do not have to flip the card over to know what is there. This is important especially for Pheromones because you cannot promote a card unless the promoted Pheromones fit into the Species Portrait (see below). There are two previews, one for each Orientation.

b. Create Basal Organs. Move the PROMOTED card's Organ cubes to its Species Card. Organ cubes on a Species Card are called **Basal Organs**. Exceptionally, for a Parasite, discard any Basal Organs other than blue.

c. Choose Orientation. After flipping the card over to its promoted side, choose 1 of its 2 Orientations and place it splayed to either start or add to the Portrait.

d. Adding To An Existing Portrait. If the Portrait already has one or more existing cards, the new card must fit into the existing Portrait based on the color of the Pheromone icons at the long edges of the card. The new card may go to the right or left of the Portrait, or squeeze in between, or even replace one or more existing Portrait Cards. But regardless both halves of the Pheromone icons must be the same color.

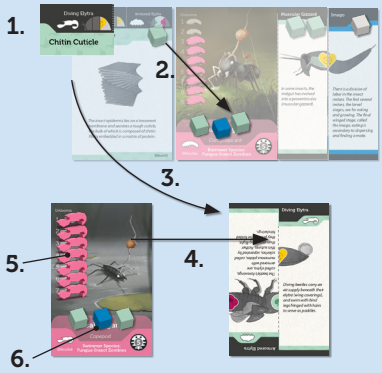
Example: 1. *Your Portrait has a samurai caste head, with the front half of a yellow Pheromone. You PROMOTE a tail spine to its springtail abdomen Orientation, so that its back half of a yellow Pheromone fits to the head. Its red (sensory) organ becomes a Basal Organ on the Species Card.*
2. *On a later turn, you PROMOTE a halteres thorax, which has a yellow front half and a yellow rear half, to squeeze between the head and abdomen as shown.*

5. **Add Portrait Organs.** Put new Organ Cubes (if any) on the promoted Mutation of the indicated color(s).
6. **Venom Icon.** If there is a  icon on the PROMOTED side, add a Venom chit (unless there is one already)under each Carnivore Creeple of that Species on the map.
7. **Mutualism Icon.** Ignore the  icon in *Caterpillar* and *Cocoon*.

Tip: *Note the Pheromones on the preview to see if the card can be promoted into an existing Portrait or not. The Pheromones must match, which implies that a Portrait can have only one head and 1 abdomen.*

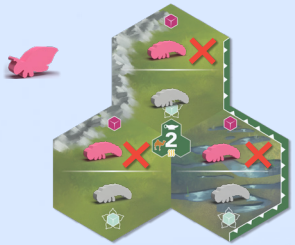
SPECIATE ACTION - In *Caterpillar* this action selected a card from the Display, but in *Cocoon* the SPECIATE action flips an unpromoted Mutation Card in one of your Tableaux and uses it to start a new Tableau as the starting Portrait of a new Species. The original Species doing the promotion is called the **mother species** and the new Species is called the **daughter species**. One mother Creeple is converted into that of the daughter species. Follow these steps:

1. **Silhouette Restriction.** You may not perform this action unless the Orientation chosen contains the silhouette of the new creeple shape, and you do not already have any Creeples of this Species on the map.
2. **Increase Mom's Basal Organs.** Move the cube (sometimes 2 cubes) on the unpromoted card to its Species Card. Although the mother species will lose the card, she keeps its Organs as Basal Organs and so her ability to win contests is increased by taking the SPECIATE action.
3. **Promote the Card** by flipping it over and choosing an Orientation that depicts the new Species being created.
4. **Setup the Daughter's Tableau.** Find the Species Card for the daughter species and use it to start a new row beneath your most recent Tableau row. Place the card used to speciate to the right of the Species Card.
5. **Load the Species Card** with all the Creeples of the new creeple shape.
6. **Inheritance.** Duplicate the set of Basal Organs found on the mother species to her daughter's Species Card (including the Organ cube(s) you just placed there), so that the daughter's Basal Organs are an exact copy of her mother's. However, if the daughter species is a Parasite, it only inherits blue Organs, and not Organs of the other colors.



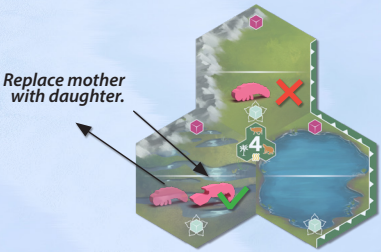
Example: 1. *You decide to promote the unpromoted Mutation "chitin cuticle" in the Tableau of your burrower Species Card.*
2. *You set its green cube on top of the burrower Species Card.*
3. *Flip it over, choosing the diving elytra Orientation to SPECIATE a new swimming species. (You could have chosen the armored elytra Orientation to SPECIATE a new armored species.)*
4. *You start the Tableau for the new Swimmers by making a new row with the Swimmer Species card and the promoted diving elytra.*
5. *Set all the Swimmer Creeples on this Species card.*
6. *The burrower has 3 Basal Organs, including the green one transferred earlier, and all 3 are duplicated as Basal Organs for the new swimming species.*

7. **Choose Sacrificial Mother.** Replace one existing creeple of the mother species with one of the new creeple shape. If this is the last Creeple of the mother species, she goes Extinct. Exceptionally, if the daughter species is a Parasite, her mother is not replaced (see the Parasite section).
8. **Mother Choice Limits for Carnivores.** If the mother is a Carnivore, her daughter must meet the *Shape Requirement* (see next section) for the prey.



Example: *Your burrower wishes to SPECIATE a Flyer. However, all of your burrowers on the map are Carnivores, preying upon other burrowers. Because a Flyer daughter species from any of these cannot catch burrowers due to the Shape Requirement, SPECIATE is not allowed.*

9. **Endangered Carnivore.** If the daughter is an Herbivore, and there is a Carnivore present, check to see if the Carnivore is Killed due to the Shape Requirement (next section).
10. **Flower Planting/Stomping.** If the new Creeple is an Herbivore, it can plant or stomp Flowers as described in POPULATE.



Example: *In the previous example, a new swimming species was created from a mother burrower Species. You have 2 burrowers on the map, one in weeds and the other in a swamp. Because the daughter needs water, only the burrower in the swamp can be chosen as the mother.*

11. **Bombardier Venom.** If the daughter has the Trait, place a Venom chit under the daughter Creeple. However, if the mother has Venom, the daughter does not inherit it.

1. ***Replace mother with daughter.*** **2.** ***With no edible prey, Carnivore is Killed.***

Example: 1. *Your Archetype Creeple is preyed upon by your own Flyer. You choose to SPECIATE the Archetype Creeple into an armored Creeple.*
2. *Since your Flyer Creeple cannot prey upon an armored Creeple, it is Killed.*

SHAPE REQUIREMENT

(new rule for Cocoon)

This rule, not found in *Caterpillar*, more realistically simulates the predator-prey relationship. The concept is simple: a Carnivore can only prey upon an Herbivore that it can actually catch. If the Herbivore burrows, swims, flies, or is armored, so must the Carnivore to catch it. This means that a Carnivore is instantly Killed anytime its prey is (or SPECIATES into) a different shape, with 3 exceptions:

a. Archetypes. Any shape Carnivore may eat an Archetype Herbivore.

b. Hosts. Any shape Carnivore may eat an Herbivore with a Parasite. But a Parasite itself can never be prey.

c. Predator Venom. A Carnivore with the  Trait can eat any shape of Herbivore.

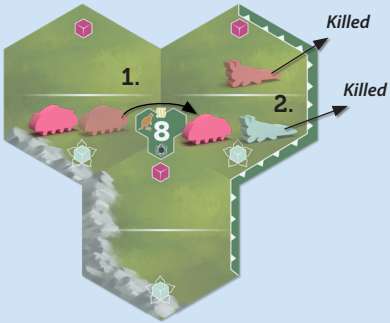
The Shape Requirement impacts herbivore contests if (and only if) there is a Carnivore:

d. Edibility in an Herbivore Contest. If a Carnivore is present in a Biome during an herbivore contest, an Herbivore that is inedible due to the Shape Requirement will win a competition against an Herbivore that is edible.

PARASITES *(new Species Attributes for Cocoon)*

In *Caterpillar*, a Parasite Species is treated as any other Species. But in *Cocoon*, it uses special rules:

a. Host. A Parasite is never a Carnivore or Herbivore. Instead, it creates a new Trophic Level with its Creeple straddled on top of an opponent's Creeple called the **Host**. A Parasite never inhabits the map except on top of its Host. The Host can be in any Biome, including lakes.



Example: 1. *A blue Archetype is happily munching on weeds, being preyed upon by your pink Archetype. You invade with a pink armored Creeple.*
2. *You automatically win the Herbivore contest, because the local Carnivore cannot eat an armored Creeple but can eat the Archetype. So the blue Archetype is Killed, but unfortunately your Carnivore also dies, not having any edible prey.*

Tip. *In Hollywood movies, the apex predator is lionized (have they made a movie called "Herbivore" yet?). You had best discard your predator biases for this game. Carnivores are nothing more than glorified parasites, and as such are ecologically fragile. If given a choice of lifestyles, Herbivore or Carnivore, better take the Herbivore.*

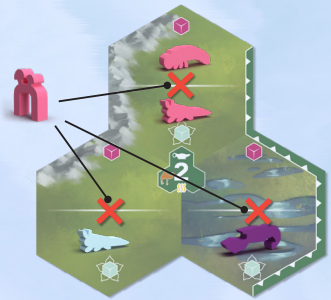
b. Speciation. Upon SPECIATION of a new Parasite, the daughter Creeple starts immediately upon its Host, which must be in the same Biome (hex) as her mother. Thus the mother of a Parasite is not replaced, instead her Parasite daughter is placed upon the Host, which must be an opponent's Creeple that is either the predator or the prey of the mother. The color of the first Host of a Parasite sets its Color Requirement. Future Hosts can be any shape, but are restricted to this color.

c. Parasite Destination. During the dispersal after a POPULATE action, a Parasite Creeple may only choose a destination containing a Host of the same color as it populated from (regardless of shape). See Color Requirement (glossary).

d. Parasite Contest. Perform this if your Parasite disperses to a Host that already has a Parasite. You win if you have more blue cubes than the defender, and place your Creeple on top of the Host. See the next bullet to determine the fate of the contest loser.

e. Parasite Trophic Shift. If a Parasite loses its Host, either because it lost a Parasite contest, or because its Host is Killed, it is allowed to shift to a new Host in the same Biome. This new Host must meet the Color Requirement.

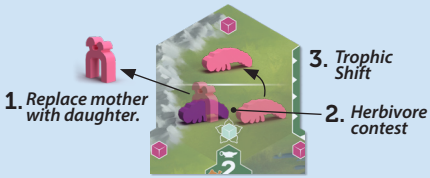
If there is no suitable new Host, the Parasite is Killed by returning its Creeple to its Species Card.



Example: *Your Archetype wishes to SPECIATE a new Parasite daughter Species. However, nowhere on the map does your Archetype share a hex with a Creeple of another player. Without a suitable Host, SPECIATE is not possible.*

f. If Mother Has a Parasite, then her daughter species during SPECIATE will have the Parasite as well. But her daughters during POPULATE will not have the Parasite. In other words, a Parasite remains if its Host does a SPECIATE or makes a Trophic Shift, yet Larva dispersing from a parasitized mother are parasite-free.

g. If Mother Is a Parasite, then her daughter species replaces her Creeple as a non-parasite. This puts the daughter Creeple into a contest with the former Host Creeple.



Example: 1. *Your Parasite Species performs a* SPECIATE*, creating a burrower species. You choose the mother to be a Parasite that has your opponent's herbivorous burrower as its Host.*
2. *You replace the Parasite with a burrower, but this puts 2 Herbivores in competition.*
3. *You lose the contest, and make a Trophic Shift to become a Carnivore preying upon the burrower Herbivore.*

h. Monochrome Basal. A Parasite immediately discards all Basal Organs other than blue.

Example: *Your Parasite* PROMOTES *a hemimetabolism card into metamorphosis. The card's unpromoted Organ is discarded, because it is green and a Parasite can only accept blue as a Basal Organ. The Promoted side gives two cubes, yellow and blue, and both become Portrait Organs for the Parasite.*

VENOM *(new Trait for Cocoon)*

If you PROMOTE a card to a Portrait with the *black widow icon* , all Carnivore Creeples of that Species should have a venom chit placed under them. It is unnecessary to place a chit under Herbivores, because Venom is useful only to Carnivores (think spiders, scorpions, and centipedes).

i. Effects. Venom allows all Carnivores of that Species to ignore Shape Requirements.

j. SPECIATE Inheritance. A new daughter Species does <u>not</u> inherit Venom from the mother Species.

Example: 1. *For your armored species, you* PROMOTE *your labium into a crinotoxic labium.*
2. *This is possible because it fits to the tympanal organs abdomen already in your Portrait.*
3. *You have 3 armored creeples on the map, and 2 of them are Carnivores, so you place a venom chit under both of them.*

GAME END & SCORING

Same as *Caterpillar* except play to 16 points instead of 12.

(J). BUTTERFLY COMBINED GAME

The Combined Game combines *Bios:Mesofauna* with *Bios:Megafauna*, so you can have dinosaurs competing with bugs. It uses all the rules of *Butterfly*, with exceptions noted in this section. In order to play the Combined Game, you need to use components (but not rules) from *Bios:Megafauna*.[48] The 4 Species (and their Creeples) from *Bios:Mesofauna* are called **Mesofauna**, and those from *Bios:Megafauna* are called **Megafauna**.

a. Overarching Rule 1. When combining the two games, use Mesofauna rules except per below:

b. Components From Megafauna. You will need the Megafauna Creeples, Mutation Cards, Tool Cards, Monster chits, and Player Aid Cards. You will not use the Megafauna Cratons, Event Cards, and Organ cubes.

c. Mesofauna Advantages. Many of your Species have more than 7 Creeples. Your Holometabolans (see glossary) can perform *airborne dispersal*. Eusocial confers mutagen shielding. Parasites often have a lot of Hosts for expansion, which can add 7 to your final score.

d. Megafauna Advantages. They can get big, and so have advantages in contests and dispersal. Monsters and tools can be formidable. Endotherms are strong in contests. You can use language to end the game.

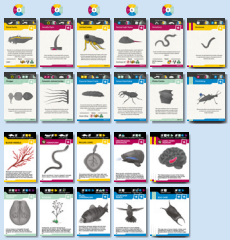
e. Terminology Changes. The Megafauna rules and game use terms that are equivalent to differently-named concepts for Mesofauna rules. Thus, plus organs are equivalent to Derived Organs, emotions = Pheromones, personality = Portrait, newborn = Larva, endotherms = Holometabolans, and language is somewhat similar to Eusocial.

J1. Combined Game Setup

The game plays from 2 to 7 players. The number of Mesofauna players should be either 2 or 3, otherwise the event frequency will be too high or too low. It is best to have more than 1 Megafauna player, otherwise there will be little incentive to grow in Size, other than monsters and dispersion bonus, and no competition in the Megafauna Display.

a. Four Mutation Row Display. The Display is composed of four rows of Mutations: two using Mesofauna Mutations, and two using Megafauna Mutations. All four are set up as described in Mesofauna Display Setup (**C3c,d,e**).

[48] FOREVER SMALL. Unlike in vertebrates, arthropod blood does not significantly transport respiratory gasses. Although some hemoglobin may be found in the tracheal system and some ancestral and functional hemocyanin has been found in the hemolymph, the open circulatory system of arthropods means that most oxygen is supplied by diffusion from the outside air. This design decision limits the size of arthropods to be very small, even in high oxygen atmospheres.



b. Megafauna Species Card & Size Dice. Find the Archetype Species Card for each Megafauna in the game, and place on it a Size Dice (see glossary) set at the "1" pip.

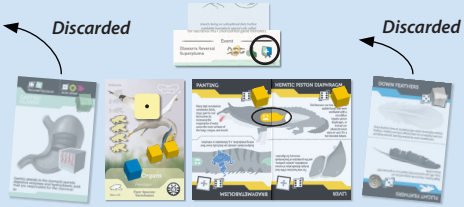
c. Tools. Place the 4 tool cards from *Bios:Megafauna* into a public deck.

J2. Combined Game Events

Because Megafauna event cards are not used, Events are only generated by only revealing Mesofauna cards.

a. 4-Player Dodged Bullet. Ignore this icon; in the Combined Game all events are played.

b. Radiation Events. This is the same as Mesofauna (**H3**), except that it additionally discards promoted Megafauna Mutations that are not part of a Portrait (see **J3d**). Emotions shield just as Pheromones do (**H3a**).



Example J2B. *Your dinosaur has the Portrait shown, as well as the unpromoted gastric glands (green) and the promoted down feathers (blue), when darwinian radiation hits. The Portrait cards are safe, but the gastric glands and the feathers are lost.*

c. Mutagen Events. Megafauna cannot become Eusocial, and thus cannot attain an eusocial shield (**H7e**).[49] To count Organs for the organ limit in a monster, see **J7d**.

J3. Combined Game Actions

In the Combined Game, both Mesofauna and Megafauna have 1 action for each Species per **A1**. Some of the actions have additional features, and there is one new action:

a. SPECIATE Action & Size Dice Inheritance. Each new Megafauna Species is given a *Size Dice* (**J1c**) set at the same Size as its mother. Set it on the Species Card where indicated. You are not allowed to create a new Species if its inherited Size is outside the size range of the promoted Mutation used to start the Species.

b. SPECIATE Action. If you PROMOTE a Megafauna card to its creeple silhouette

[49] EUSOCIAL VERTEBRATES. Although eusocial mating strategies are almost exclusively found among insects, there are two known eusocial vertebrates among rodents: the naked mole-rat and the Damaraland mole-rat. These live in hive-like tunnels in which one female (the queen) and one to three males reproduce, while the rest of the members of the colony function as sterile workers.

Orientation, you must SPECIATE to that shape. This is unlike Mesofauna, in which creation of a new Species is optional (**D2b**).

c. **MUTATE Action.** Players with Megafauna Archetypes can only select from the two Megafauna rows, and players with Mesofauna Archetypes can only select from the two Mesofauna rows in the Display.

d. **PROMOTE Action (easily missed!).** If the promoted Orientation depicts half-emoticons, it must become a Portrait card that must match emotions (Pheromones) to any existing Portrait cards. But if it does not depict any emoticons, it does not go into the Portrait and instead is placed to the right of the Portrait (if any).

Example J3d. *Your flying dinosaur has 2 promoted cards: jumping legs and songs. Because the songs card has half emotions, it is a Portrait card. If it wishes to promote its endocrine gland, and chooses the pancreas Orientation, it must discard the songs, because the emotions do not match. But if it chooses the insulin orientation, place this next to the songs because it has no emoticons and thus cannot go into the Portrait.*

e. **PROMOTE Action (monster).** If the PROMOTION sets a monster icon into the species, place a monster chit of the designated color (**J7**) on the Species Card.

f. **POPULATE Action.** The number of dispersion points (DPs) of a Megafauna is equal to its number of blue cubes plus Size (instead of the number of blue cubes plus 1 per **D4a**). However, white Organs do not enable a Megafauna to airborne disperse (**E2**), and Flyers are the only Megafauna that can airborne disperse.

Example J3f. *Your Size 2 Flyer has 1 blue Organ and thus during POPULATE it can disperse with 3 DPs as shown. Because it is a Flyer, it ignores Mountains during dispersal. Three of the dispersing Flyers choose to make a dispersal roll (**E2b**).*

g. **RESIZE Action (new).** This new action is only available for Megafauna and monster bugs (**J7a**). This action changes the Size Dice for one Species by one step (up or down). This can affect contests (**J4**).

h. **Mutation Maximum Size.** If the Size Dice of a Species goes beyond the maximum listed by the dice icon in the upper right corner on any

promoted Mutation, discard that card and its Organ(s) if any. This can cause it to become a flightless *weta* (**H7f**).[50]

Example J3h. *Your turtle uses RESIZE to grow from Size 2 to Size 3. It has 2 Mutations in its Tableau with the maximum Size of 2, and both are discarded.*

J4. Contests & Size

Except per **J7a**, Mesofauna are alway limited to Size 1.[51] Contests in the Combined Game use Mesofauna rules, modified for Size per the below:

a. Herbivore or Carnivore Contest. If neither contestant has an advantage in edibility or Organs, the larger Species is the winner. If tied, the defender wins. See **J5a** for herbivore contests in Flowers.

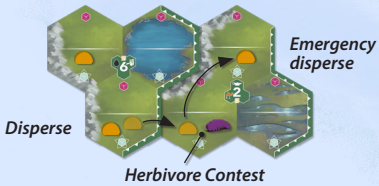
b. Parasite Contest. If there is a Size difference between two contestants who are tied in the number of blue Organs in a Parasite contest, the larger Parasite is the winner. If tied, the defender wins. An Herbivore (of any Size) with a Parasite can be preyed upon by any shape of Carnivore, see Shape Requirement.

c. Endotherm Emergency Disperse. If an endotherm Megafauna loses a contest with an opponent's Creeple, and assuming it cannot survive with a Trophic Shift, once per phase it may disperse using its dispersion points (DPs) to an empty and habitable Trophic Level.

[50] RATITES. The megafaunal equivalent of the flightless weta are ratites, the general group of great flightless birds such as the ostrich. These birds were once able to fly, and used their wings to disperse to islands and island continents, before evolving into their flightless forms.

[51] SIZE is on a log scale as follows:
Size 1 = 200 grams - rats, largest spiders & extinct insects, living amphibians.
Size 2 = 2 kg - largest land arthropods (coconut crabs, extinct scorpions & millipedes), largest living snails & giant earthworms, largest extinct frogs.
Size 3 = 20 kg - beavers, velociraptors, largest lagomorphs (extinct rabbits), largest living burrowing armadillos, badgers & tortoises, largest flying birds & pterosaurs.
Size 4 = 200 kg - Dimetrodon, largest burrowers (extinct armadillos), largest living ratites (ostriches), deer (reindeer & moose), primates (gorillas), and felines (tigers).
Size 5 = 2 tonnes - largest foregut digesters (giraffe, cattle & extinct deer), largest riverine mammals (hippos), largest carnivora (bears & seals), largest living crocodiles, largest armored turtles, ammonites, glyptodonts, and thyreophorans (stegosaurs & ankylosaurs).
Size 6 = 20 tonnes - largest land carnivores (theropods such as tyrannosaurs), largest marine predators (sperm whales), largest hindgut digesters (straight-tusked elephants, Indricotherium, ornithopods, & typical sauropods).

[52] LARGE INSECTIVORES. Although animals that specialize in eating invertebrates are generally small, bugs are so plentiful that there are some exceptions, including baleen whales and sloth bears. Insects are an important contribution to many omnivores, such as black bears.



Example J4c. *On your turn, you disperse a newborn Megafauna Herbivore Archetype of Size one with one white Organ and one green Organ to a weeds Biome with an opponent's burrower with 3 green Organs. You lost the contest, and a Trophic Shift to carnivory is impossible because of the Shape Requirement, so you disperse (with 1 DP) to an adjacent uninhabited Biome.*

J5. Flowers

Flowers can be placed or removed per Mesofauna rules (**E4** or **F3**) by any Size Species, either Meso- or Mega-.

a. Frugivore.[53] Both Mesofauna and Megafauna Herbivores can use yellow Organs during an herbivore contest (**F1b**), with the larger Species winning in case of ties (**J4a**).

J6. Mutualism, Venom, Recession, Horror Plant, Haustorium, (Megafauna)

In the Combined Game, there are icons that can appear after a PROMOTION that have special effects.

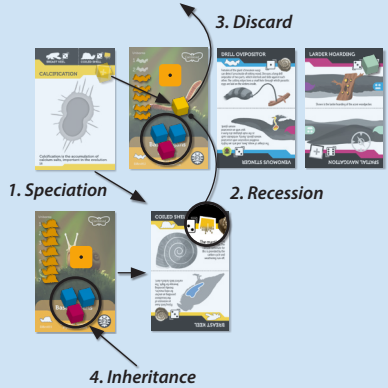
a. Mutualism & Venom Icons. These two icons are treated exactly as their counterparts in Mesofauna (**G3**, **G4**).

b. Recession Icon. If, upon PROMOTION, this icon appears, the Species must discard all Basal Cubes of that color, if it has any. It has no subsequent effect.

c. Horror Plant Icon. Even though it is a Mesofauna, Player Pink is allowed to purchase Megafauna Mutations with *the horror plant icon* zzz.[54]

d. Haustorium Icon. This icon allows a Megafauna Species to purchase Mesofauna Mutations.[55]

[53] FRUGIVORE is an animal that feeds primarily on the fruit that is commonly produced in flowering shrubs and hardwood forests. Frugivores such as chimpanzees or fruit bats provide seed-dispersing services to flowering trees and shrubs in return for a sugary salary. This service, and its reward, is similar to pollination, but pollination is assisted sex, as if the plant was hiring a guided missile lover. Frugivores are generally larger than pollinators, and they do not need to be as discriminating to perform their duties.



Example J6b. *Your burrower with 2 blue and 1 red Basal Organs promotes its calcification to a "coiled shell". This adds its yellow Derived Organ to become a new Basal Organ, only to become immediately discarded by the card's yellow recession icon. The card has an armored creeple silhouette, and thus speciates a new armored Species inheriting 2 blue and 1 red from its burrowing mom. You can imagine the lost yellow cube as representing the reduction of the metabolic rate of the Species due to its use of armor.*

J7. Monsters(Megafauna)

A monster is a Trait that places a monster chit on the Mutation. This chit is considered to be multiple Derived Organ cubes, as many cubes as the Size Dice of the Species (up to the max Size (**J3g**) indicated). This monster chit, of the specified color, is placed during PROMOTE (**J3e**) to a monster.

Easily Missed. *A monster needs an action to resize, just as any other Species.*

a. Monster Bugs. If after a PROMOTION a Mesofauna has a card with a monster icon (this can happen with a horror plant or a promotion to one of the 3 Mesofauna Mutations with the green monster icon), place on the Species Card both the green monster chit and a Size Dice (**J3a**) set to 1 pip. It now has the capacity to change its Size using RESIZE, but still must purchase only from the Mesofauna Display. All Mesofauna Mutations are considered to have a maximum Size of 6.[56]

b. Sorry Mothra. Mesofauna Flyers that grow larger than Size 1 become flightless wetas (**H7f**).

[54] HORROR PLANT is a plant-fungus hybrid that basks green in the sunlight, lazily breathing CO_2 and making sugar like any plant, but at night switches to high metabolism oxygen and supplements its diet with plants or flesh. Just like animals, all plants have aerobic symbiotic mitochondria, and accordingly breathe oxygen, especially at night. Although horror plants are largely fictional, real-life plant-fungus hybrids include lichens and extinct prototaxites, in which the plant breathes carbon and the fungus breathes oxygen.

[55] HAUSTORIUM is a rootlike structure found in fungi or plant parasites like mistletoe that penetrates a host to draw nutrients.

[56] SIZE CONSIDERATIONS FOR EXOSKELETALS. How big can an exoskeletal creature such as an insect get, assuming it has evolved lungs and oxygen-transport blood containing hemoglobin? An exoskeleton is better than an endoskeleton for large things. For many large man-made vessels, such as Zeppelins, Jumbo-Jets, and supertankers, the great majority of the engineering loads are efficiently taken in the skin. Even in humans, considerable portions of our weight is supported by our skin, not by our bones. The problem is that Zeppelins, Jumbo-Jets, and supertankers don't have to grow from larva to adult by periodically shedding their skin. This complication is a serious one for a brontosaurus-sized exoskeletal. In spite of this "ecdysis problem", tremendous sizes can be attained by crabs, eurypterids, and millipedes, limited not by skeletal stresses, but by how much oxygen can be percolated or diffused to their body tissues using an open circulatory system living during an era of high oxygen levels.

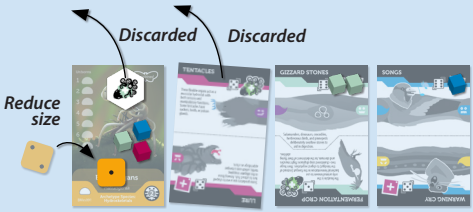
c. Monstrous Endotherm Growth Spurt.[57] A Monster starting a phase with at least one white Organ is called an **endothermic monster**, and has a growth advantage in contests, regardless if it is the Phasing Species or not, or regardless if it loses its white Organ in the contest or not. If an endothermic monster Creeple would lose a contest (regardless combatting a Species of another player or one of your own), it must instantly grow in Size if this allows it to win the contest. The growth must be just enough to allow victory, and forces it to shed Size-restricted Mutations per **J3h**.

Example (2) J7c *(fermentation crop monster). This is the same as the previous example, but instead of a long-neck, your green monster is the fermentation crop Mutation, with a Size limit of 3. Because you can't grow big enough to survive without discarding the monster card, you do not grow at all, You either make an endotherm emergency dispersal (**J4c**), or are killed outright.*

Example (1) J7c *(long-necked monster). Your long-necked Size one green monster, with two green and one white cube, is invaded by a grasshopper Creeple with 6 green cubes. As the defender in an herbivore contest, you must employ a growth spurt to increase your green from 2 to 6 in order to win the contest. However, your proventriculus has a maximum Size of 4, and must be discarded, along with its green cube. Therefore, to beat the grasshoppers, you must grow to Size 6, gaining 6 Derived Organs with your long-neck monster chit. In your growth spurt, you lose hemocyanin and its white cube, making future growth spurts impossible.*

[57] COPE'S RULE postulates that population lineages tend to increase in body size over evolutionary time. Larger body size is associated with increased fitness for contest and migration reasons suggested by these rules. On the other hand, larger size species are more vulnerable in mass extinction events.

d. Mutagen Event. If a mutagen event removes cubes, the species Size is reduced instead, until the required equivalent number of Organs is lost, or the Size is reduced to 1, whereupon the monster chit is lost.



Example J7d. *Your Size 2 Species has a tentacled head, which is a green monster conferring 2 effective green Derived Organs. During a mutagen event the Organ limit is 6, but your Species has 8 Organs counting the Monster. You decide to remove one Organ by reducing Size to 1, and the second Organ by removal of the monster chit. This discards the tentacles card.*

J8. Tools (Megafauna)

Some Megafauna have purple Pheromones called the **curiosity emotion**. For every purple Pheromone acquired in its Portrait, you may immediately choose one of the unclaimed *tool public cards* (**J1c**).[58] You may choose either side of the double-sided card, and place that side faceup to the left of the Species Card. Each tool is a predator weapon allowing it to hunt the Shape shown on the card. It can also be used by Herbivores per **J8d**.

a. Diving Bells. The diving bell tool allows you to inhabit as a Carnivore any Biome with swimming prey. This allows the Carnivore to inhabit lakes (exception to **E3a**) and ignore the Shape Requirement for swimming prey. However, the Diving Bell does not allow an Herbivore to inhabit lakes.

b. Tool-Using Carnivores. A tool-user meets the Shape Requirement to prey either upon Creeples of the shape shown on the tool card, or on its Mesofauna equivalent (e.g. a net can prey upon either Megafauna or Mesofauna Swimmers).

[58] CURIOSITY, the purple emoticon in Bios:Megafauna, is associated with experimentation and learning, otherwise known as intelligence. It is associated with the cerebral cortex in mammals and the corpora striata in birds. These structures of the nervous system allow expectations based upon generalities, a type of percept formation and subconscious induction. However, associative learning is a universal adaptive mechanism shared by plants and animals, as proven, for example, by experiments with pea seedlings in a Y-maze. The psychologist Julian Jaynes argues that intelligence has nothing to do with consciousness, the strange ability to review a collection of past experiences in a mental re-enactment. This distinguishes tools, and tool-use, from technology, i.e. a tool whose function can be visualized even before it is made.

Example J8b. *Your burrower disperses to a lake, to prey upon a Mesofauna Swimmer. Normally a burrower cannot inhabit a lake, but is allowed in this instance since it has a diving bell and is able to eat the Swimmer. Note that the diving bell does not allow it to survive as an Herbivore in the lake.*

c. Tool-Using Herbivores. A tool-user cannot be preyed upon by Carnivores of the shape shown on the tool card (except tool-using Carnivores per the previous bullet). Thus, an Herbivore acquiring a tool can kill its Carnivore instantly.

d. Tool Scoring. Each tool is the equal of 1 Fossil during final scoring.

e. Language. If one of your Megafauna Species gets 3 total Emotions consisting of two or more colors, you acquire language[59] and are allowed to end the game with scoring on your turn.

[59] LANGUAGE has nothing to do with communication. The two have very different functions, and creatures can have one without the other. Only in the genus Homo are the two so intimately intertwined as to be inseparable. As modeled in Bios:Genesis, communication can be between cells or individuals, using a variety of chemical or sensory means. Most animal communications are variations of "come hither!", "stay away!", or "take cover everyone!". Language, on the other hand, is a tool of cognition. Its function is to organize the kaleidoscopic succession of sensory material, the "blooming, buzzing confusion" as William James calls it, and integrate them into cognitive units called concepts. Language is useful, even essential, for a man alone on a desert island. These ideas are developed further in the third game of the Bios trilogy: Bios:Origins.

K. THE BIOS EARTH CAMPAIGN

This trilogy covers the entirety of life on Earth begins with *Bios:Genesis* - how life began. It continues with either *Bios:Megafauna* and/or *Bios:Mesofauna* - how life got terrestrial. The grand finale is *Bios:Origins* - how life got conscious. You can even add *High Frontier* and make it 4 games: see **K3**. Each game plays well independently, but also can be played as a grand trilogy, whereby protolife becomes multicellular and invades the land, and then starts inventing stuff.

a. Dinos Stomping Cockroaches. If you can be flexible when assigning roles in the Meso/Mega game, there should be at least 2 Mesofauna players. Otherwise the event frequency will be low (and no events at all if there are no Mesofauna players). It is not necessary, but a Combined Game with at least one Megafauna player would offer the hope of a non-hive future humanity.

K1. Setup (Transition of Genesis to Mesofauna/Megafauna)

To continue a game of *Bios:Genesis* leading into a game of *Bios:Mesofauna* or *Bios:Megafauna*, you must translate your fittest Genesis Macroorganism into the Meso/Mega game:

a. Your Fittest Genesis Macroorganism. If you achieved a Macroorganism in the Genesis game, you start with bonuses as listed below. If you started with multiple Macroorganisms, choose one to start with. If you are feeling magnanimous, you can donate an unused Macroorganism to a suitably pathetic player.

b. Players Starting As Megafauna. If you achieved a: Seaweed/Mosses, Flatworm/Earthworm, Lamp Shell/Snail, or SeaStar/Amphibian Macroorganism in Genesis, you start as a Megafauna!

- **Seaweed/Mosses** = Player Green (cytoskeletal plants),
- **Flatworm/Earthworm or Lamp Shell/Snail** = Player Orange (hydroskeletal megafauna),[60]
- **SeaStar/Amphibian** = Player White (endoskeletal amphibians).

c. Players Starting As Mesofauna. The other four macroscopic creatures transfer to Mesofauna:

- **Dickinsonia/Mushrooms** = Player Pink (insects assimilated by the *Cordyceps* fungus),
- **Opabinia/Velvet Worms** = Player Purple (hydroskeletal lobopods),
- **Trilobites/Insects** = Player Gray (exoskeletal arthropods),

[60] GIANT SNAILS. Having giant snails is not as big a stretch as it first seems, pulmonary land snails are the only invertebrate to have developed lungs and thus have no theoretical respiratory limit on their size.

- **Arrow Worms/Eurypterids** = Player Blue (exoskeletal crustaceans) or (optionally) Player **Black** in Megafauna (exoskeletal arthropods).[61]

d. Players Starting As Parasites. Players who failed to achieve a Macroorganism (or new entry players) start as a lowly Parasite, placed upon the Creeple of their choice, with the highest scoring player placing first.

e. Endosymbionts. For each Bionт on your Genesis Macroorganism, not including the Trophic Bionт, deal one random unpromoted Mutation of the matching color into the Archetype's tableau and place its Plus Organ(s) on it. If your macroorganism had endosymbiont bionts owned by another player, your Archetype is considered to have the *mutualism* Ability (**G3**).

Tip. *A player starting as a Parasite should resurrect their Archetype as soon as practical (**D3n**).*

f. Bonus Starting Organs. If you achieved a macroscopic terrestrial animal in Genesis, you get a bonus: you start with up to as many Basal Organs as Organ cubes on your Genesis Macroorganism. The Organs chosen should match in color as well. Macroscopic marine animals start without bonus cubes (since all animals start on land, they were late crawling ashore).

g. Setup is per (**C**), except for color selection and that Parasite players must start on a Host per **K1d**.

h. First Meso/Mega Turn Penalty. Start with the highest Skeletal Number per (**A**). Players suffer a penalty that for their first turn they are limited to purchases in the 0 cost column (**D1a**). The Genesis game winner(s), players with Bionts on the game winner Macroorganism, and Parasites are exempt from this penalty.

K2. Setup (Transition of Mesofauna/Megafauna to Origins)

These rules supercede the rules in *Bios:Megafauna* 2nd edition.

a. Craton Substitution to Bios:Origins Hexes. Duplicate the ending Craton arrangement in *Bios:Mesofauna* by substituting the 26 hex chits supplied in *Bios:Origins*. It is recommended that the resource icons (see Craton anatomy) be used as a guide for selecting which hex chits to use.

- **Icons used on multiple hexes** (e.g. the biofuel, the auroch cow). You can choose among them.
- **Place unused hex chits** either as an archipelago or as a western "New World" continent. If a Biome is blank, any may use any hex chit without a plant, animal, oil, or uranium icon.
- **The player who is ahead in victory points** is allowed to choose variables not otherwise specified (e.g. latitude, distance between Cratons, and if two substitutions need the same hex chit).

[61] EURYPTERIDS, sometimes called sea scorpions, include the largest known arthropods ever to have lived. The largest, *Jaekelopterus*, reached 2.5 meters (8.2 ft) in length. Some inhabited freshwater and may have even been terrestrial.

b. Megafauna Color Choice. Megafauna players should use their same color and should use their 7 Megafauna Creeples in place of the 12 Migrant figures, which means you will have 5 Migrants less than in the non-campaign game.

c. Species Transfer to Bios:Origins. Beginning with the winning player, players may choose their starting player color and place one figure into each of the continents they occupied at the end of *Bios:Mesofauna/ Megafauna*, as close to a Biome they occupied as possible observing Footprint limitations. For merfolk or newly introduced players, start as close to their starting spot (the spot on the map of their color) as possible.[62] Players with multiple surviving Species must choose a Species that is Eusocial or has Language, if possible.

d. Swimmers & Flyers. Swimmer Species are known as merfolk in *Bios:Origins*, and there is a *merfolk variant* (entirely marine, see *Bios:Origins* setup **C3**) and a *Yrr variant* (landfolk vs. merfolk, see *Bios:Origins* setup **C4**). Flyer Species have their choice to end up as merfolk or landfolk, but note that *Bios:Origins* plays better if all the players are either on land or in the sea.[63]

e. First Dispersal. For a realistic campaign, it is recommended to use the *first dispersal long game* (see *Bios:Origins setup* **C1**)

K3. Campaign Scoring

The campaign can be played either as *Bios:Earth* (Genesis, Meso/Mega, Origins), or *Bios:Solar System* (Genesis, Meso/Mega, Origins, High Frontier).

a. Campaign Fossil Points. With the exception of the last game played (which scores normally, see next bullet), the end of each of the 3 games (Genesis, Meso/Mega, Origins), each player gains one fossil chit (or other marker) for each opponent who has fewer VP in that game. These campaign fossil points are added to your final game scoring (next bullet).

b. Final Game Scoring. First calcula te your victory points for the final game that you played, and divide this in half. Then add your campaign fossils from previous games to achieve your final score to determine the winner.

c. Ties. Winning players share victory if tied.

[62] LIFE IN THE HIVE. *Bios:Origins* is the story of how life became subjectively conscious of abstractions such as technology, religion, and politics. An insect counterpart to consciousness is the eusocial hive mind, in which various castes of workers, soldiers, queens, and drones cooperate with a joint goal to preserve the DNA of relatives. Such a mind, communicating with pheromones instead of language, may imagine printing presses, vehicles, and atomic power, and find them useful for the spread of both genes and memes.

[63] IDENTITY. In the game of Darwinism, each genetic sequence struggles for existence and identity, using collectives such as bodies, societies, and species as expendable vehicles to copy more selfish genes. Within each collective, selfish genes are hostile with each other, but maintain an uneasy truce because the maintenance of the collective is useful for each gene to spread more of itself. Scratch the surface of any species, society, or corporation, and you see a bunch of selfish members. A human being and an ant colony share another attribute: the individual is composed of multiple sets of DNA, and each of these seemingly faithful servants have their own secret agenda. You would not survive even a moment without your mitochondria and gut bacteria, and although it is fortunate that their livelihood depends on yours, sometimes your DNA comes in conflict with that of your symbionts. In an ant colony, it has been demonstrated that even though a worker and queen are closely related, the workers sometimes make decisions that further their copy of the germline at the expense of the queen's copy. The seemingly united hive identity is seething with rebellion under the surface.

L. BUTTERFLY SOLITAIRE

Robin Spathon Ek

This solitaire variant pits you against an opponent called **Queen Bee** (abbreviated QB). This variant plays the same as the *Butterfly game* with the exceptions noted here:

a. On Your Turn, you perform 1 action per Species (**L2h**).

b. Ties. If there is a choice in the QB's options, you may choose the option performed if not otherwise specified.

c. Terms in *Italics*, unless otherwise referenced, are defined in the *QB glossary* (**L9**).

L1. Solitaire Setup

Setup as a normal 2 player game per *Butterfly* (**C**), with the following additions:

a. Starting Cratons. Select 4 Cratons. The other 4 Cratons will not be used.

b. Starting Continent. Place the 4 Cratons in an adjoined continent of your choice. The Cratons are double-sided, and you may select either side.

c. Starting Creeples. QB starts with an Archetype placed into the non-lake Biome with the lowest *elevation*. See **L9c** in the *QB glossary* for the definition of *elevation*. Then QB places another Creeple on an adjacent habitable Biome, favoring going on to another Craton, if tied QB favors lowest *elevation*. You may now choose 2 non-lake Biomes as your starting Biomes for your 2 Archetypes.

d. QB Action Card and Dice. Place the QB Solitaire Aid cards and an 1D8 dice by the QB's supply.

e. Fossil Formation. Place  of a stack of 8 Fossils. One these will be removed after every Fossil is awarded during *fossil awards* (**H1**). The *game ends* (**L8**) when the last Fossil is removed.

f. Recommended Ticket Setting is *merry-go-round* (4 dice, **C1a**).

g. QB First Turn (MUTATE, PROMOTE, POPULATE). QB starts her Portrait by choosing the cheapest thorax from the Display, if any. If tied, use the *stingy rule* (**L9f**). After she MUTATES this choice, she immediately PROMOTES it per **L3f**. Refresh the Display but ignore any Event that may appear. Then POPULATE by creating a number of Larvae equal to the number of her blue cubes plus 1. Disperse them by choosing a *dispersal destination* per **L6**. If QB PROMOTED a yellow mutation she will place flowers during this dispersal due to her *Phasing Species* having the most yellow cubes.

h. Your First Turn. Then continue the game by performing 1 action for your Archetype (**L2h**).

L2. Solitaire Sequence Of Play

QB starts by performing one of her 3 actions, either *primary*, *secondary,* or *tertiary*. She performs her primary action (QB speciation roll) if she can, and going to the secondary (QB Portrait) if the primary fails, and going to the tertiary (QB POPULATE) if the secondary fails. To finish her turn, refresh the Display, remembering to perform any Events that appear. Then you perform 1 action per Species, refreshing the Display after each one, and performing any Events that appear. Then continue with the QB turn again, etc.

a. Determine QB Phasing Species. In each QB turn, only a single Species (plus her daughter species, see **L3j**) performs actions: the **Phasing Species.** This is her Species with the most Unborn of her color (do not count any Zombies). If two QB Species are tied in Unborn, consider the one lower in the Roster to have more Unborn.

b. QB Speciation Roll (primary action) (skip during the first turn L1g). QB starts by rolling a 1D8 dice to see if she will attempt to make a new Species per **L3**.

c. QB Portrait (secondary action). Assuming QB was unable to Speciate, she will attempt to enlarge the Portrait of her Phasing Species per **L4**. If she cannot, then skip to the next bullet.

d. QB POPULATE (tertiary action). Assuming QB was unable to enlarge her Portrait, she attempts to POPULATE (**L5**) with the Phasing Species. Any of her Creeples Killed during the attempt become Zombies (**D6**).

e. QB Refresh Display per **A3a**.

f. QB Perform Revealed Event(s) per **H** and **L7**.

g. QB Deplete Event Counter. If either you or QB gained a Fossil during a fossil award event (**H1**), take it from the Fossil Formation (**L1e**). If it runs out of Fossils, the game ends with final scoring (**L8c**).

h. Now It's Your Turn. Choose 1 action for the top Species in your Roster, or pass.

i. Your Next Species. Perform 1 action for the next Species down in your Roster, if you have any. Continue until all your Species have performed an action, or passed.

j. Refresh Display and perform the revealed Event(s). Again, this can deplete the Fossil Formation and end the game.

k. Final Scoring is triggered the moment the Fossil Formation is depleted, see **L8c**.

L3. QB Speciation Roll Primary Action

First make a QB speciation roll to see if QB has an insufficient number of Species. If so, the *QB Phasing Species* (**L2a**) grabs a card from the Display that she flips to the promoted side to form a new Species. She then makes Larvae and disperses from this new Species.

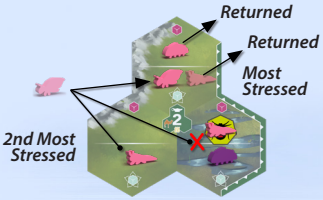
a. Inviable. If the Phasing Species is a Parasite, Swimmer, or has only a single Creeple on the map, skip the primary action and go to the *secondary action* (**L4**).

b. Make QB Speciation Roll. QB starts by making a QB speciation roll: roll a 1D8 dice

and see if the number of QB Species is less than the result shown. If it is, QB has too few Species and her Phasing Species attempts to create a new Species per **L3**. But if the number of Species is greater than or equal to the roll, or if for any reason she can't create a new Species, then skip to the next bullet.

Example L3b. *The QB roll is a 3, but QB already has 3 Species. Therefore, QB skips the rest of her primary action and attempts her secondary action.*

c. Determine Mother Creeple of the Phasing Species by seeing which one has the most stress, but avoids *stillborn* (the daughter is immediately Killed due to *habitability* (**E3**), Shape Requirement, or Color Requirement).

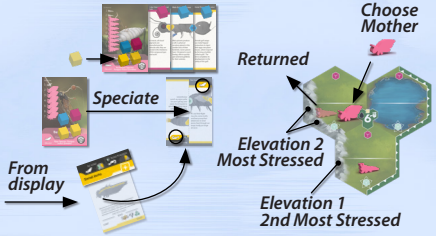


Example L3c. *The QB Venomous Archetype speciates a Flyer. There are 3 possible Archetype mothers as shown. The Carnivore is not possible, because its prey is armored and the daughter does not inherit the Venom and would be stillborn. There are two Archetype Herbivores, and the one with a Carnivore is under the most stress due to agoraphobia and is chosen as the mother. Note that the Carnivore, which is a QB armored species, goes extinct as a result of this mother choice.*

d. Determine Card to be Purchased. Use the *stingy rule* to select a Mutation from the Display that has a promoted new Species shape that the QB does not yet have. However, skip the Parasite and Swimmer shapes unless the Phasing Species inhabits a Biome with a Host or a swamp/lake respectively.

e. Scrooge McDuck Rule. During both the *primary* and *secondary action*, the QB Phasing Species has an infinite *spending allowance* (**D1b**), so that it can MUTATE any card in the Display. However, see the *stingy rule*.

f. Instant Promotion. QB always PROMOTES cards it buys immediately per **D2**. Do not forget to turn the unpromoted Derived Organ(s) into Basal Organ(s) per **D2c**. Therefore, QB will never have any unpromoted Mutations.



Example L3f. *The QB speciation roll is an 8, and the cheapest is a dorsal aorta, with a preview depicting a Flyer in one Orientation, and a Swimmer in the other. The Swimmer cannot be chosen because the QB Phasing Species has only two Creeples, both in the weeds where a Swimmer daughter would be stillborn. Therefore, the Flyer Orientation is chosen, which QB does not yet have.*

g. **MUTATE & SPECIATE** this card oriented to form a new Species using the standard rules (**D1, D3**), including placing a Creeple of the new Species on the map, using the mother selection of the previous bullet.

h. **Orientation Choice.** If both Orientations have qualified Species, you choose which one becomes active.

i. **Speciate Failure.** If no mother can be found that would have a surviving daughter, then skip the *primary* and go to the *secondary action* (**L4**).

j. **POPULATE** the new Species per **L5**.

k. **Refresh the Display** per **A3a**. If there are new Event(s), perform them per **L2g** and deplete the Fossil Formation per **L2h**.

L4. QB Portrait Secondary Action

Follow this procedure with the QB Phasing Species:

a. **Skip Eusocial.** If the Phasing Species is Eusocial, proceed to the *tertiary action* (**L5**).

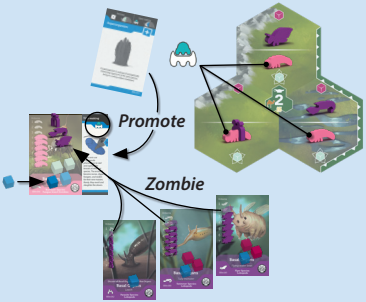
b. **Determine Card to be Purchased.** Use the *stingy rule* to select a Mutation from the Display that can be promoted to legally add to the Portrait of the Phasing Species. But QB can't *replace* a Mutation (**D2d**) to add a Portrait Card.

c. **Three Thorax Limit.** The Phasing Species cannot purchase a thorax if it already has 3 thoraces. If at the limit, search only for heads or abdomens.

d. **MUTATE & PROMOTE** this card oriented to add to the Portrait per **L3f**.

e. **Orientation.** If both Orientations add to the Portrait, choose the one with a Trait, or if still tied you decide.

f. **QB Mutualism.** If an Orientation with Mutualism is chosen, the Phasing Species takes one Zombie Creeple from each of your Species that is colocated with the Phasing Species on the map. This is a one-time ZOMBIE action; QB will not use this card's mutualism icon again.



Example L4f. *QB purchases and promotes the slave-making card for her burrowers. This gives them the mutualism Trait. These burrowers are colocated with some of your Parasites, Flyers, and Swimmers, and she takes one of each of these shapes from Unborn as slaves.*

g. **Portrait Failure.** If no Portrait card can be added, proceed to the *tertiary action* (**L5**).

h. **Refresh the Display** per **A3a**. If there are new Event(s), perform them per **L2g** and deplete the Fossil Formation per **L2h**.

L5. QB POPULATE Tertiary Action

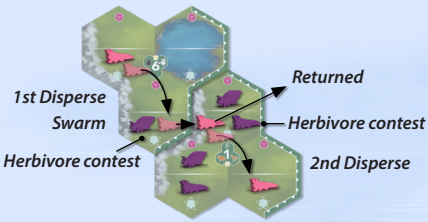
Follow this procedure with the QB Phasing Species:

a. Determine the First Mom by seeing which Creeple of the Phasing Species has the most stress.

b. Number of Larvae. QB disperses Creeples of the Phasing Species equal to the number of blue cubes plus 1.

c. Daisy-Chain Subsequent Moms. In the case in which multiple Larvae are being dispersed, the first mother is determined from the previous bullet, and the Larvae dispersed from that mother becomes the new mother for the next Larva.

d. Determine Destination. Start each Larva in the same Biome as its mother, and determine its destination per **L6**.



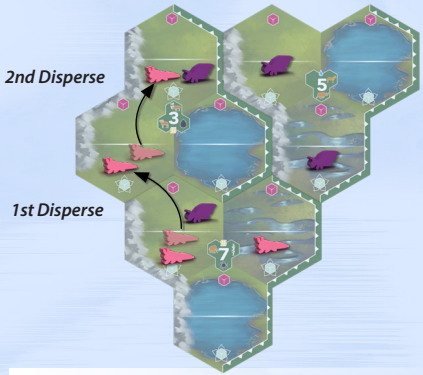
Example L5d. *QB does the tertiary action (POPULATE) with 2 Larvae from the most stressed mother of her Phasing Species. The first Larva disperses to an adjacent Biome, but loses the contest and swarms to another adjacent Biome. It loses this contest as well and is Killed, and yet the second Larva uses the corpse of its dead mother as the starting point for its dispersal.*

L6. QB Dispersal Destination

During dispersal, a QB Creeple will never enter a Biome that is not *habitable* (**E3**) for it, and will never enter a Carnivore Trophic Level that violates the Shape Requirement, or a Parasite Trophic Level that violates the Color Requirement.

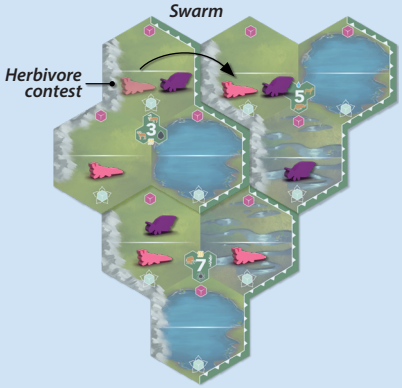
a. Determine Adjacent Destination. The Larva disperses to an adjacent Biome, making the choice using *habitability* (**E3**), *hive loyalty* (**L9d**), *agoraphobia* (**L9a**), and finally *acrophobia* (**L9b**). If it is a Parasite, it will choose a non-parasitized Herbivore Host before a Carnivore one.

b. Dispersal Points. During *larval dispersals* (**E1**), QB Creeples are always assumed to have enough DPs to reach an adjacent Biome.



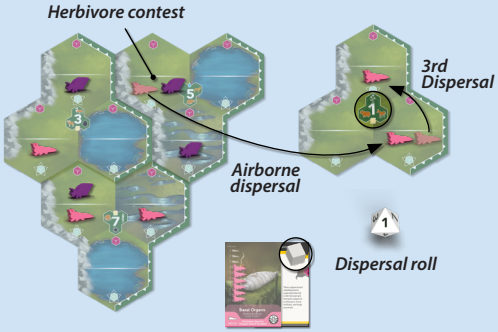
Example L6b. *The first of 3 Larva disperses to an adjacent hex, ignoring the lake (uninhabitable) and the swamp (already filled with its own color). Therefore it must disperse to the weeds. The second Larva disperse to an adjacent weeds Biome.*

c. Carnivore Contests. If the destination Trophic Level is inhabited by one of your Creeples, there is a contest. If the QB loses a Carnivore Contest, and has not yet swarmed, she is allowed to escape by a swarm. If it has already swarmed this phase, it can do an *airborne dispersal* (**E2**) if it has at least 1 white cube or is a Flyer, and has not already used airborne dispersal this phase.



Example L6c. *The Larva of the previous example loses its Herbivore contest and can't enter as a Carnivore so it swarms to a Biome further along.*

d. Airborne Dispersal. If a QB Creeple has swarmed, and yet still not found a destination in which she can survive, she may make an *airborne dispersal* (**E2**). This option is available only to either a Flyer or a Creeple with at least 1 white Organ. Choose the landing Biome using *habitability* (**E3**), *hive loyalty*, *agoraphobia*, and finally *acrophobia*. If it lands and loses a Carnivore contest, it can swarm assuming it has not previously swarmed this phase.



Example L6d. *The Larva of the previous example loses its second contest, and is not allowed to swarm further. But it has a white cube, and attempts an airborne dispersal. The dispersal roll is a 1, and it lands as shown. The third Larva disperses using the Larva in Craton 1 as its mother.*

e. Dead Become Undead. Every QB Creeple that is Killed during dispersal or contests is allowed to swarm. If it has already swarmed this phase, and cannot airborne disperse, instead of being Killed it becomes a Zombie Creeple on one of your Species Cards (of your choice). This increases your spending allowance and the Zombie Creeple only returns if the enslaver goes Extinct.

Example L6e. *QB inhabits a continent composed of a single Craton, fully populated with her own kind, including the Phasing Species. Her primary action fails because no mom can be found with surviving children. Her secondary action fails because the Phasing Species is Eusocial. Her tertiary action fails because all the children find no place to live on the small continent. Assuming she has 3 children, all three become Zombies, placed upon the Species Card(s) of your choice.*

f. QB Flower Planting/Stomping. If the Phasing Species has more yellow Organs than any of your Species, she will always plant Flowers in any empty Biome dispersed to, and in any victorious herbivore contest. If QB has fewer yellow Organs then she will instead remove Flowers in the same manner.

L7. QB Events

a. Crowd Disease (**H4**). If a QB Species is the most populous during this Event, QB removes half of its Creeples rounded down. starting with the most *stressed*.

b. Mutagen (**H7**). If a QB loses Organs during a mutagen, she removes cards (along with the cubes on them) starting with the hind end of her Portrait, and going forward.

L8. Endgame & Scoring

The moment the last Fossil is removed from the *Fossil Formation* (**L1e**), the game ends with *final scoring* (**L8c**).

a. Fossil Scoring. Before certain events there is a scoring, the player with most points (Living Creeples plus Pheromones) at this time gains 1 Fossil chit. You are also awarded a Fossil for each of your Species that goes Extinct.

b. Extinction Victory. If QB ever goes Extinct, you win.

c. Final Scoring. Both you and QB count the number of your Fossil chits, Living Creeples, plus Pheromones, and the higher number wins the game.

d. Zombie Creeples of either color do not count during final scoring for either player.

e. If tied: most Fossil tokens wins, second tiebreaker most Eusocial Species.

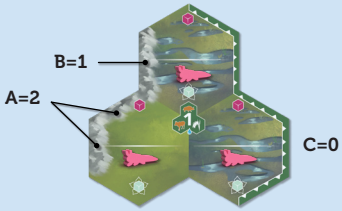
L9. QB Glossary

Italicized terms in the QB solitaire game, unless otherwise referenced, are found here:

a. Acrophobia (Destination). A QB Creeple has a fear of heights. During POPULATE or Swarm, a QB Creeple selects the Biome with the lowest *elevation*.

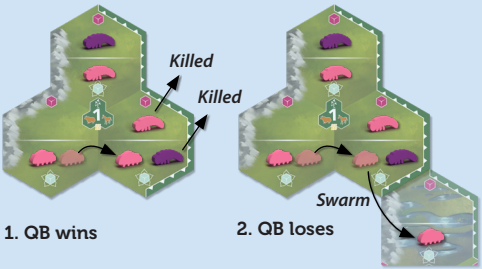
b. Agoraphobia (Destination). A QB Creeple has a fear of crowds. During POPULATE or Swarm, a QB Creeple selects a destination Biome that contains the fewest number of total Creeples, and never selects a Biome that already has a QB Herbivore and a QB Carnivore. If a destination has just one QB Creeple, the QB will exhibit *hive loyalty*.

c. Elevation (Biome). Each of the three Biomes of a Craton has an **elevation** depending on how many Mountain segments the hex contains, which are elevation = 0, 1, or 2. If two Biomes have the same number of Mountain segments, the one with the highest Craton number is higher. This is significant because the QB has *acrophobia* during either crowd disease or Biome choice within a Craton.



***Example L9c**. For the 3 QB Archetypes shown, A has the highest elevation, and C has the lowest elevation.*

d. Hive Loyalty (Destination). QB are loyal to her own, she does not enter a contest with her own. A QB Creeple will make a contest with another QB Creeple only in one case: if a QB Archetype Creeple invades where a QB non-archetype Creeple is an Herbivore. In this case, the Archetype becomes the Herbivore, and the non-archetype makes a Trophic Shift to carnivory. If it selects a destination with just a QB Herbivore, and the Carnivore Trophic Level is either empty or has your Carnivore, the QB enters as a Carnivore. If a QB Creeple is forced to make a Trophic Shift to where a QB is a Carnivore, it instead makes a *swarm*, or it dies.



***Example L9d.** The QB Phasing Species is armored, which disperses into a Biome with your Herbivore preyed upon by a QB Carnivore. This does not violate hive loyalty, because the herbivore contest is between you and the QB armored creeple. **1.** If QB wins the contest, the QB Carnivore is Killed. **2.** If QB loses the contest, it may not make a Trophic Shift to carnivory, because this would violate hive loyalty. Instead the armored creeple either dies, swarms, or (if qualified) goes airborne.*

e. QB. Short for Queen Bee, the automated opponent in the solitaire game.

f. Stingy Rule (MUTATE). When given a choice of cards to MUTATE in the Display, QB will select the cheaper one, and if tied will select the one with Traits (such as Venom or Mutualism). If still tied, choose from the upper R/Y row rather than the lower B/G row. QB do not choose cards from the draw piles.

g. Stress (mother). Choosing among the Creeples of the Phasing Species, the most stressed is the one with the most *agoraphobia*, or the most *acrophobia* if tied. If still tied, you choose.

h. Swarm (Destination). A QB Creeple that loses a Carnivore Contest uses this Ability to disperse to an adjacent habitable Biome, using *hive loyalty*, and then *agoraphobia*, or *acrophobia*. However, if the Creeple has already swarmed on its turn, or if it has no other option, it becomes a Zombie Creeple placed upon one of your Species.

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