Circle of Life

2 players | 20-30 minutes, by Nick Bentley

Equipment: Circle of Life board + one set of differently colored stones per player. Here's a picture of the board at the end of a game played with orange and black pieces:

Definitions

- *Critter*: any connected group of same-color stones on the board is a critter. A single stone is also a critter.
- *Circle of Life*: surrounding the board is the Circle of Life, which shows how critters of different species feed. Each species is defined by its shape and can eat one other species, as indicated by arrows – if an arrow points from species A to species B, then A can eat B. All possible species of up to 4 stones are represented on the Circle of Life.

Gameplay

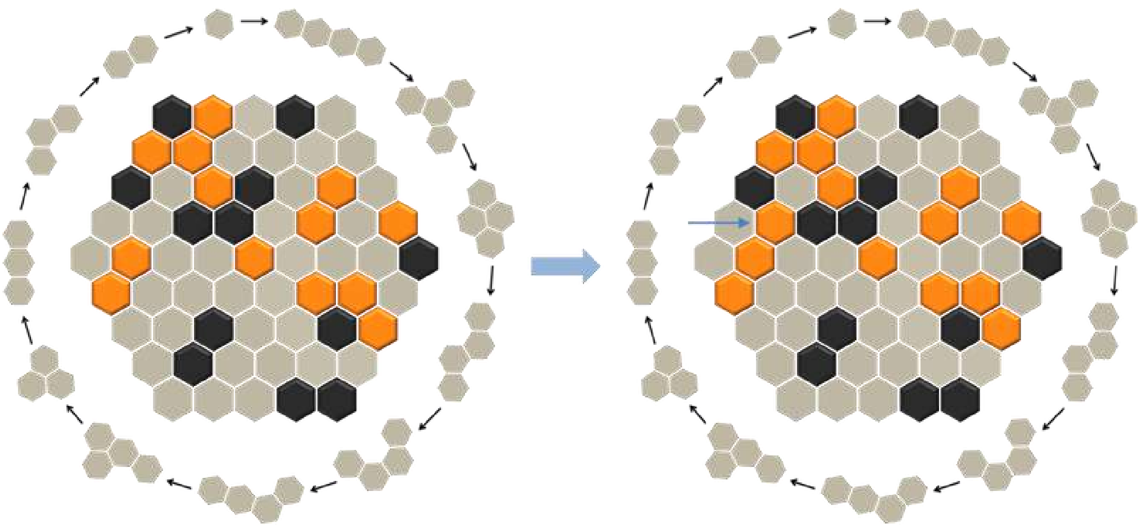
The board begins empty. Players take turns. Each turn has two steps, taken in order:

1. *Evolve*: you must place one stone of your color on any empty space, with one restriction: you may not make a critter containing more than 4 stones.
2. *Feed*: the critter you evolved in step 1 must eat all enemy critters which are adjacent to it and on which it can feed, per the Circle of Life. Remove eaten critters from the board.

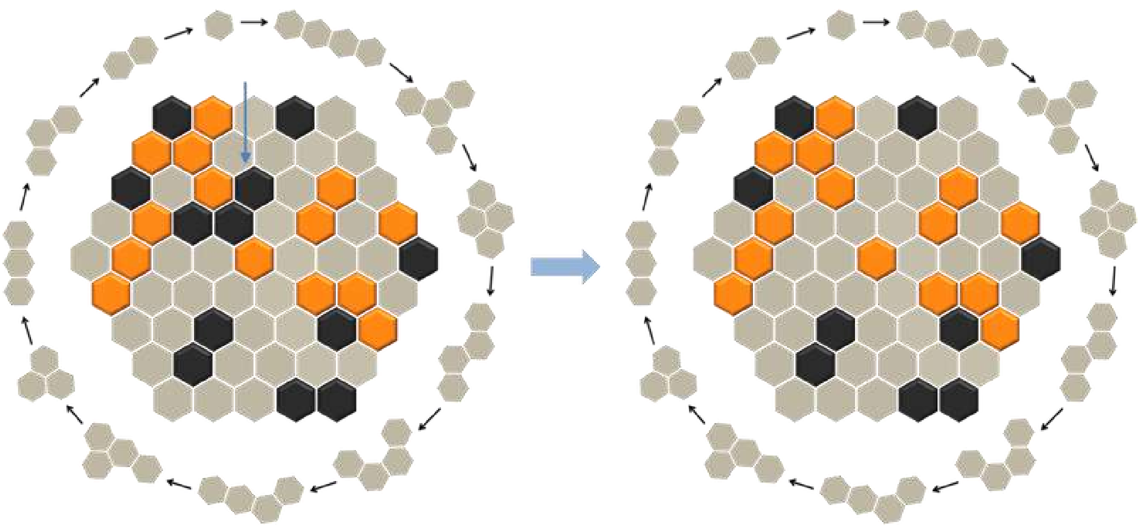
A player wins when she either can't evolve on her turn (meaning she's filled up the ecosystem as much as possible), or has eaten at least 20 stones.

Turn Example

Evolve:



Feed:



In the example above, orange first places a stone to create a 3-stone critter, then eats an enemy critter.

Beginner Strategy Tips

- Don't eat opponent critters when unnecessary. It's almost always better to delay eating to the last moment. When you eat your opponent's critter, you also give your opponent more flexibility.
- If a critter of yours is sure to be eaten, try to exploit the situation by eating the critter that threatens to eat yours, or set yourself up to eat it after it eats yours.
- Size-4 critters can't evolve, which means if they can be eaten, they will be. Be aware of all the possible ways your opponent can eat a size-4 critter you might make and (usually) don't make it if they can eat it.
- Be aware of the balance between stones played and stones captured as you grow each critter. For example, let's say you have a 2-stone critter that eats an enemy's 1-stone critter, then grows into a 3-stone critter that eats 3 of the opponent's 2-stone critters. That's 3 friendly stones added to the board, for 7 enemy stones removed. Even if your opponent eats your size-3 critter, you'll be ahead after the exchange.
- Try to minimize the number of moves you have left to play and maximize your opponent's. In the late stage if there is no tactical advantage to be gained, fill the cells that only you can fill before the ones that both you and your opponent can fill.

The game recreates key aspects of real ecosystems, with minimal rules

- It starts with simple species, which evolve to become more diverse and complex.
- Species get more complex as you go up the food chain.
- Simple species reproduce, die, and evolve at higher rates than more complex ones.
- When a species' population is high, another species often evolves to eat it.
- As in real ecosystems, intransitive competition enables biodiversity.
- When a critter at the top of the food chain dies, it feeds back into the bottom, to complete the Circle of Life.

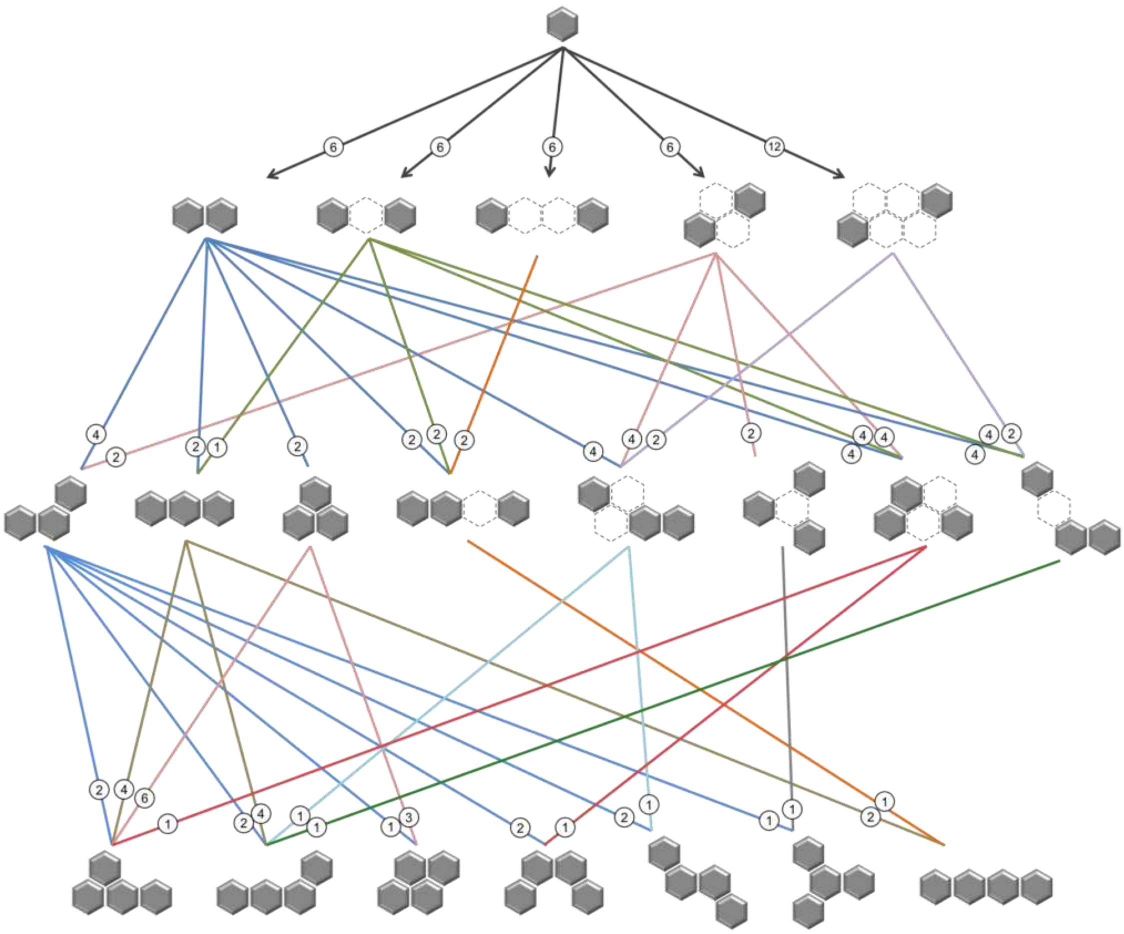
Design Story

I helped design or develop most of North Star Games' Evolution games, all of which are ecosystem simulations. While doing so, I posed myself the following challenge: make the simplest possible ecosystem game that exhibits key properties of real ecosystems. Circle of Life is the result.

The idea is to represent species with shapes, with rules about which can eat which. The Circle of Life around the board contains those rules: 12 predator-prey relationships at the heart of the game.

The hardest part was arranging the species on the circle so they'd get more complex (and therefore harder to evolve) as you go up the food chain.

I had to figure out how to measure species' complexity, and I did it in two ways. First, I built a path diagram for the construction of all the shapes:



From this diagram I could calculate a measure of species' complexity.

Second, Scott Olesen, then a postdoctoral fellow at Harvard in computational biology, helped confirm my calculations through numerical simulations

(I haven't given enough information here to reproduce my calculations, for brevity).