
GENELAB
PLAY GOD FOR A DAY!

GeneLab

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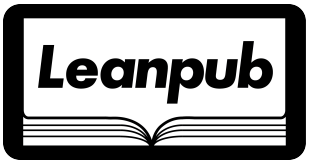

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GeneLab

Discover the ideas behind evolution the fun way!

What is GeneLab?

You are **the master** of a tiny universe. You have total control on life and death of a bunch of little creatures.

You start with a universe of 10 organisms. These will develop as you feed or shoot them.

- When you "*feed*" an organism, it will survive and possibly have children. Its survival score will increase to indicate it fits your plan.
- When you "*kill*" an organism, it will be removed from the universe. Each time an organism is killed, a new one is born.

New organisms are born

New organisms are formed this way:

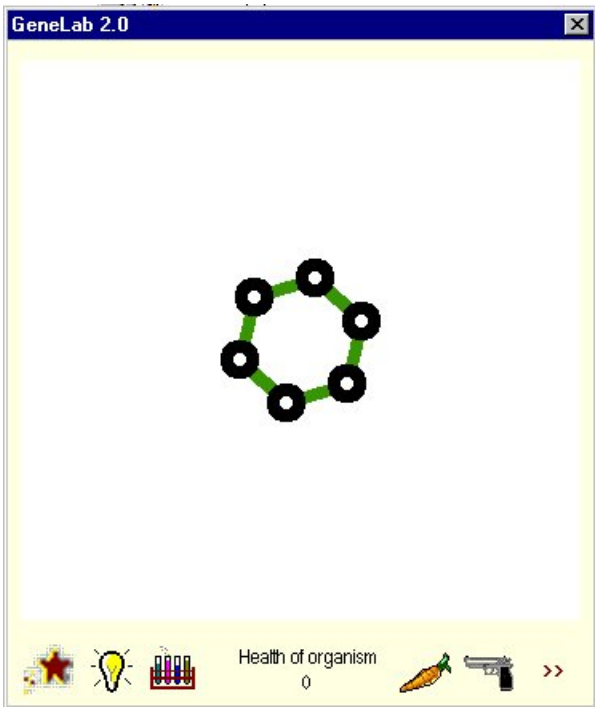
- First, two parents are chosen at random from the gene pool of organisms.
- Then, the parent's genes are mixed. This process is called "crossover" in genetic terms. A piece of the genetic material of parent 1 is combined with a piece of genetic material of parent 2.
- After the crossover, mutations can occur in the genetic material of the child. This depends on the amount of creativity you allow in your universe. One or a few genes will be changed at random.
- At last, in very rare occasions, strange errors can happen: deletion of a gene, insertion of a gene, or inversion of a string of genes.

These new organisms can differ significantly from their parents. Crossover recombines existing genetic material, and mutations cause genetic renewal and genetic drift.

Genelab Manual

Play God for a day!

Screenshot of the interface in simple mode:



screenshot

-  Start with a totally new set of organisms. All current organisms die and are replaced by a new universe.
-  Get an idea for a new organism. Genelab will propose an organism you must try to develop.
-  Ideas for experiments with Genelab. These experiments help you to discover the idea behind evolutionary theory.
-  Feed the current organism. Its health score increases and it may give birth to children.
-  Kill this organism. The organism is removed from the gene pool and replaced by a new one.

- `>>` Switch to advanced mode. Opens up the second part of the screen.

`In advanced mode, you can select organisms, open/save gene pools, export to excel, and change settings (amount of creativity, survival bonus, and the number of organisms to start with).`

Download GeneLab

Download at http://www.aboriginemundi.com[1]

Directlink: http://www.aboriginemundi.com/index.php/2012/01/genelab-play-god-for-a-day/[2]

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[2] http://www.aboriginemundi.com/index.php/2012/01/genelab-play-god-for-a-day/

Genelab Experiments

Genelab is a fun application that shows you some principles of Darwinian evolution in a visual way.

First, you should play around with the tool a bit to discover how it works.

You can do that the easy way by pressing the light bulb button ("idea"). Then, try to develop an organism by pressing the "food" button or the "shoot" button, depending on how well the current organism fits your order.

For example, if you need to create a green circle, you press the "shoot" button when a red line is presented, but you might press the "food" button when you see a blue circle, hoping that it will mutate into a green one.

Experiment 1: Size matters.

When you start with a small population, it will drift far more easy than does a larger population. In a large population, it takes more time for new standards to break through.

For this experiment, you should perform the same task twice, but with a different population setting. In each case, count the number of clicks (feed and shoot) it takes before the population is stable.

First, set the start population count at 10. Press the "new" button to start with a fresh population, and develop an organism as described by the idea button. Keep clicking "feed" and "shoot" until your population developes an organism as described by the idea button.

Second, do the same with a population count of 50. You will see that it takes longer to develop the same organism in the second case.

Experiment 2: Creativity counts.

The effect of high creativity during evolution can be shown with a simple experiment with three populations (count=20) with different creativity settings (5%, 20% and 50%).

In the first case, the population will develop new mutations slowly. This is a positive effect when the population does not need to change.

With very high creativity settings, children will differ from their parents in a radical way (for example, a blue circle and a black line can give birth to a red triangle). This is positive when the population needs to change to survive.

Experiment 3: Large populations support more genetic diversity.

In this experiment, you will try to develop two organisms at the same time in the same population. You perform this tast twice, once with a small population (count=10), once with a larger population (count=30).

In the small population, you will see it is very difficult not to undo the effects of one positive evolution while concentrating on the second. The population will drift between the two aims.

In the larger population, it will take a while to develop two different organisms but there will be a steady growth towards both aims.

Experiment 4: Add constraints, add time.

The more constraints you have, the more difficult it will be to develop an organism that fits these.

Perform five conditions, each one starting with a new population. Each experiment adds a constraint (shape, color, line size, type of line, rotation, presence of spokes,...).

Write down the number of clicks it takes to develop an organism that fits all constraints. You will notice that the number of clicks needed will rise.

Experiment 5: The influence of God.

You are the God of the Genelab universe. In this experiment, there are two conditions. In one condition, you are very strict about which organisms you tolerate (say, for example, you shoot all non-green and feed all green organisms). In the other case, you occasionally let a "misser" slip through an kill a "hitter".

Notice the effect on your population after a hundred clicks in each case.

After a hundred clicks, press the "idea" button and follow the instruction. Count the number of clicks it takes before a fitting organism developes. This will be substantially smaller in the "loose" condition than in the "strict" condition. The influence of God, or fate if you want.

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