

Baby Boom

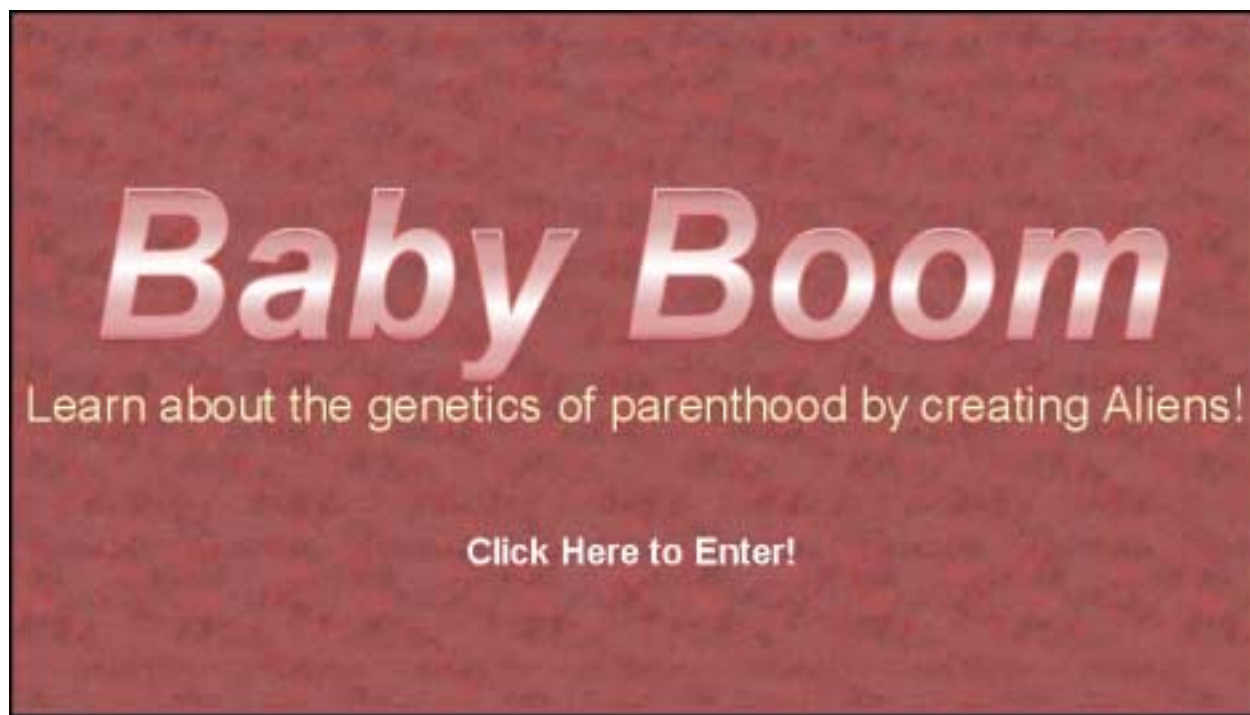
This web lab was adapted from materials from Joan Carlson, Jack Doepke, Judy Jones and Randyll Warehime.

Background

In this web lab, you can explore how much variety in phenotype can be produced by a very limited genotype (only 30 traits). The traits in this web lab show several different inheritance patterns. These inheritance patterns are simplified representations of real inheritance patterns. The traits in the aliens in this web lab show the following inheritance patterns:

- ◆ Dominant—Traits that appear to mask (or hide) other traits.
- ◆ Recessive— Traits that can be hidden in one generation and then appear in the next.
- ◆ Incomplete dominance—Traits in which the heterozygote shows a different phenotype from the homozygous dominant phenotype.
- ◆ Polygenic—Traits in which several genes contribute to the overall phenotype.
- ◆ Epistasis—The interaction of two genes in which one hides the effects of another.

The Web Lab



Introduction



the 100 aliens in the database. You can also choose two of these aliens as parents for your own offspring.

Choose the *Offspring Generator* button to create your own alien offspring by flipping a coin to determine which alleles that offspring will inherit from its parents.

The *Explore the Database* button allows you to explore graphs of the numbers of aliens in the database of 100 aliens by genotype and phenotype.

The *Choose My Own Aliens* button enables you to explore the traits of

Offspring Generator



In this section of the web lab, you flip a coin to determine the traits that your alien offspring will inherit. The alien parents are both heterozygous for all the genes in their facial genotype.

The first coin flip determines whether the offspring inherits an X or a Y chromosome from the father and, thus, determines the offspring's sex.

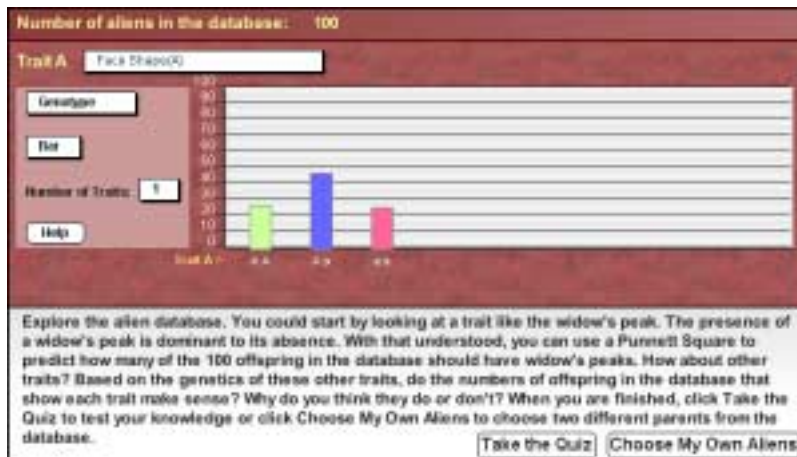
After you establish the sex of your offspring, you will then determine

the thirty traits in the facial phenotype by flipping a coin for each allele inherited from the parents. Some of the traits are polygenic, so more than thirty flips are required to complete the offspring. As you progress through, the picture of the alien face will be filled in. After a trait is determined by coin flips, the *Show Trait/Hide Trait* button appears below the picture of the offspring. If you miss the appearance of a trait, you can hide the trait, then show it again to see how the alien face changes. Sometimes the face doesn't change because the trait expressed is the default trait. For example, if you flip the chin shape trait and the offspring has a round chin, the picture won't change because it already has a round chin.

After flipping the coin to determine the traits of one alien offspring, you may want to use the *Finish Alien* >> button to complete subsequent offspring. The *Finish Alien* >> button randomly determines the alleles contributed by each parent.

After you complete your alien offspring, you can print out the image and the genotype. Then, compare your alien offspring with the offspring made by your classmates and get a feel for the variety that can be produced by just 30 separate traits.

Explore the Database



In this section of the web lab, you can explore the database of 100 alien offspring to see what traits appear and how frequently they appear.

Using this graphing application, you can see the number of aliens in the database with certain phenotypes or genotypes. You can display one or two traits at a time. You can see the numerical values for each bar in a bar graph by positioning the cursor over a bar.

For a single trait

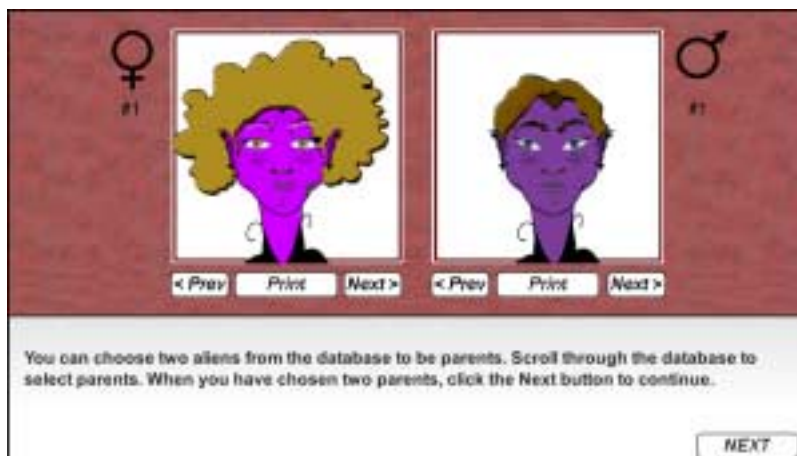
First, select which trait you want to

see displayed on the graph using the pulldown menu labeled Trait A. Then, choose whether you want the graph to present genotypes or phenotypes and whether you want a bar or a pie chart.

For two traits

If you choose to display two traits, you can only examine phenotypes. Select the first trait you want to see displayed on the graph using the pulldown menu labeled Trait A, then select the second trait using the pulldown menu labeled Trait B. Then, choose whether you want a bar or a pie chart.

Choose My Own Aliens



In this section of the web lab, you can choose two aliens from the database to act as new parents. You can explore the offspring of alien parents with genotypes that you choose.

The < *Prev* button moves backward through the database, while the *Next* > button moves forward. The *Print* button allows you to print out the genotype and phenotype of each alien. After you select two new parents, click the *Next* button to begin to create an alien offspring

with the chosen aliens as parents.

Each alien in the database is numbered, so that you can choose the same aliens repeatedly or you and your friends can choose the same alien parents.

Take the Quiz

In this quiz, you use the graphs to explore the database. By examining the numbers of alien offspring that exhibit certain phenotypes/genotypes, you try to determine the inheritance patterns of particular traits. Click the *Check* button to check each answer. When you have finished the quiz, you can print out your answers.

Glossary

Epistasis

The suppression of a gene by the effect of an unrelated (epistatic) gene.

Heterozygous

Having two different alleles for a given trait.

Homozygous

Having the same alleles for a given trait.

Genotype

The particular genetic pattern seen in the DNA of an individual.

Traits

Distinguishing characteristics.