

MIRROR EXPERIMENTS

Mirror Experiment activities introduce students to a new scientific study that relates to, or “mirrors,” one of the *How Do We Know?* experiments. They often answer the same question as the corresponding *How Do We Know?* experiments, but use different methods or systems. In this way, they help to teach students that scientists often answer the same question in many different ways in order to better understand how life works. These *Mirror Experiments* are followed by a set of questions that help students understand the experiment and results in greater detail, as well as practice quantitative skills.

Mirror Experiment Activity with Figure 1.18

Chapter 1, Section 1.4

Can evolution be demonstrated in the laboratory? Selecting for *E. coli* that can metabolize citrate.

Mirror Experiment Activity with Figure 6.17:

Chapter 6, Section 6.5

Do pancreatic enzymes function by binding to protein substrates? What is the shape of these complexes? Using X-ray crystallography or nuclear magnetic resonance to predict a protein’s three-dimensional shape and substrate.

Mirror Experiment Activity with Figure 9.5:

Chapter 9, Section 9.2

Do cells other than fibroblasts respond to platelet-produced growth factors? Exposing smooth muscle cells to blood serum from clotted blood and other treatments.

Mirror Experiment Activity with Figure 13.1:

Chapter 13, Section 13.1

How are whole genomes sequenced? Comparison of human and chimpanzee genomes to determine the degree of relatedness.

Mirror Experiment Activity with Figure 14.5:

Chapter 14, Section 14.1

Do mutations occur randomly, or are they directed by the environment? The rate of mutation in *E. coli* in the presence or absence of bacteriophage.

Mirror Experiment Activity with Figure 20.2:

Chapter 20, Section 20.1

How do stem cells lose their ability to differentiate into any cell type? Nuclei from differentiated cells can be reprogrammed by insertion into enucleated eggs.

Mirror Experiment Activity with Figure 23.20:

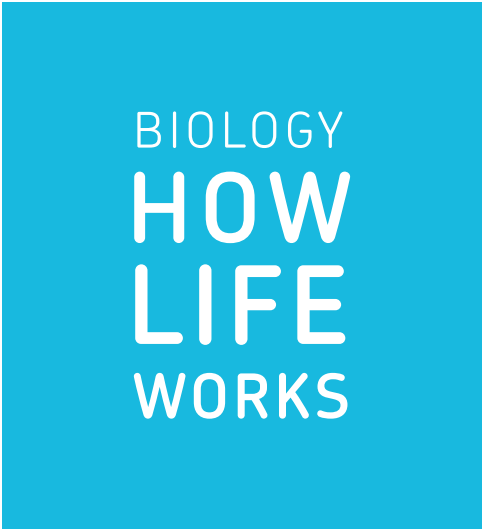
Chapter 23, Section 23.3

Can fossils bridge the evolutionary gap between fish and tetrapod vertebrates? The search for an intermediate between symmetrical and asymmetrical fish.

Mirror Experiment Activity with Figure 27.4:

Chapter 27, Section 27.2

Do all chloroplasts share the same cyanobacterial ancestor? Molecular sequence comparisons of genes from cyanobacteria and algae chloroplasts.



BIOLOGY HOW LIFE WORKS

Mirror Experiment Activity with Figure 30.16:

Chapter 30, Section 30.4

Did pollinator shifts or environmental shifts contribute more to the formation of new columbine species in Europe? Constructing and interpreting phylogenetic trees.

Mirror Experiment Activity with Figure 36.20:

Chapter 36, Section 36.4

How are neurons that respond to touch organized in the somatosensory cortex? Tracking which neurons respond to two types of stimuli.

Mirror Experiment Activity with Figure 45.10:

Chapter 45, Section 45.3

To what extent are insects capable of learning? How quickly members of a bee colony learn to identify a food source.

Mirror Experiment Activity with Figure 47.7:

Chapter 47, Section 47.3

Have aphids and their symbiotic bacteria coevolved? Mutualism among leaf-cutter ants and bacteria.