

## LIST OF PRACTICAL ACTIVITIES IN THE LIVING EARTH

### IS 1: ECOSYSTEM INTERACTIONS AND ENERGY

ACTIVITY 6 (page 19):

ELABORATE: Logistic growth can be described mathematically (spreadsheet model).

ACTIVITY 7 (page 20):

ELABORATE: Computer simulations can be used to model population growth (computer simulation).

ACTIVITY 11 (page 35):

ELABORATE: Use a model to show the effect of competition between two species (computer simulation).

ACTIVITY 17 (page 61):

EXPLORE: Modeling the many-wrongs principle (physical modeling).

### IS 2: HISTORY OF THE EARTH'S ATMOSPHERE: PHOTOSYNTHESIS AND RESPIRATION

ACTIVITY 23 (pages 83–85): Three tasks employing second-hand data, which could be repeated as practicals.

EXPLORE: Photosynthesis and carbon dioxide, photosynthesis and light, the product of photosynthesis.

ACTIVITY 24:

EXPLORE (page 90): Oxygen and respiration provides second-hand data but can be repeated as a practical.

ELABORATE (page 94): Aerobic and anaerobic pathways for ATP production could be repeated as a practical using yeast and sugar.

ACTIVITY 25 (pages 95–97):

PAPER PRACTICAL: Modeling photosynthesis and respiration (physical modeling of processes).

ACTIVITY 27 (page 102):

EXPLORE: Modeling half-lives (modeling half-lives using M&M's).

ACTIVITY 31 (page 118):

ENGAGE: Acids and bases (modify so that students can explore the pH of common substances themselves).

EXPLORE: CO<sub>2</sub> and water (students could investigate changing the pH of a solution themselves).

### IS3: EVIDENCE OF COMMON ANCESTRY AND DIVERSITY

ACTIVITY 37:

EXPLORE (page 135): Modeling the effect of water on the landscape

EVALUATE (page 141): Surface area affects weathering. Students could repeat this investigation themselves.

EVALUATE (page 144–145): Students modeling design solutions to coastal erosion.

ACTIVITY 40:

ENGAGE (page 158): Variability in populations (collection and analysis of phenotypic data from the class).

EXPLORE (page 162): Selection in M and M's (modeling natural selection).

EVALUATE (page 168): Paper practical to model natural selection.

ACTIVITY 43 (page 180):

EXPLORE: Antibiotic resistance (spreadsheet modeling activity).

ACTIVITY 45:

ENGAGE (page 194): Paper practical to model continental drift and interpret results.

EXPLORE (page 197): Paper practical to explore evidence for continental drift.

#### **IS 4: INHERITANCE OF TRAITS**

ACTIVITY 50 (page 215):

EXPLORE: Building physical models to help understand the structure of DNA (creating a 2D DNA model to understand the base pairing rule).

ACTIVITY 53 (page 228):

ENGAGE: Individuals within a population vary: Currently utilizes second-hand data but students can gather their own data and create a tally chart and plot their own results.

ACTIVITY 54 (page 234):

EXPLORE: Use a model to understand how meiosis produces variation (modeling crossing over and inheritance).

ACTIVITY 56:

EXPLORE (page 244): ACHOO syndrome (gather and analyze data related to a phenotypic trait).

ELABORATE (page 255): Computer simulations can be used to predict inheritance patterns.

NOTE: The website suggested in the book is no longer functional, but an alternative simulation is available through BIOZONE's Resource Hub (Classical Genetics Simulator [cgslab.com](http://cgslab.com))

#### **ISS: STRUCTURE, FUNCTION, AND GROWTH**

ACTIVITY 68 (page 302):

ENGAGE: Osmosis. Students could repeat this dialysis experiment themselves.

ACTIVITY 72:

EXPLORE (page 320): Stages of the cell cycle. Students could repeat the analysis from their own observations of dividing onion cells

EXPLAIN (page 324): Modeling mitosis. Students use pipe cleaners and yarn to model mitosis.

ACTIVITY 73:

ENGAGE (page 326): Changes during exercise. Students investigate influences on heart and breathing rates.

ELABORATE (page 333): Investigating the effect of body shape on temperature. Students use aluminum foil of different shapes to measure temperature gain in the lab.

#### **IS6: ECOSYSTEM STABILITY AND THE RESPONSE TO CLIMATE CHANGE**

ACTIVITY 79 (page 355):

EXPLORE: The greenhouse effect. Students investigate how atmosphere can influence temperature.

ACTIVITY 80 (page 361):

EXPLORE: Modeling ice sheet melting. Students investigate the effect of albedo on ice melting.

ACTIVITY 81 (page 367):

EXPLAIN: How are climate models used to predict distribution changes. Students use the Cal-adapt website to model predicted temperature changes in the US and then predict likely effects on pika distribution.

ACTIVITY 83 (page 379):

ELABORATE: Climate change and disease. Students use a spreadsheet model to investigate pathogen generation time.