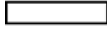
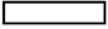
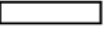













APPENDIX: State Labs

I. Making Connections (aka The Clothespin Lab)

A. Part A1

- | | Bear 1 | Bear 2 | Bear 3 | |
|--|---|---|---|--------|
| 1. What you did: measured how exercise affected pulse rate. |  |  |  | ← well |
| |  |  | | |
| 2. What you learned: exercise increases pulse rate. |  |  |  | |
| |  |  |  | |

B. Part A2

- | | | | |
|--|---|---|---|
| 1. What you did: Squeezed a clothespin for 1 minute, then squeezed it again for another minute |  |  |  |
| 2. What you learned: | | | |
| a. If you squeezed more the second round, it may have been because your finger muscles were <i>warmed up</i> from increased circulation. | | | |
| b. If you squeezed less the second round, it may have been because your finger muscles were fatigued. | | | |

C. Part B

- What you did:** Designed an experiment to test how exercise affects squeezing a clothespin.
- What you learned:** How to design an experiment (see pages 3-5).

II. Relationships and Biodiversity (*Botana curus* lab)

- A. What you did:** Compared 4 species of plants, based on structural (physical) and molecular (chemical and genetic) traits.

B. What you learned

- Species that are related share similar traits.
- Different techniques (such as gel electrophoresis and **paper chromatography**) can be used to determine relationships between organisms.

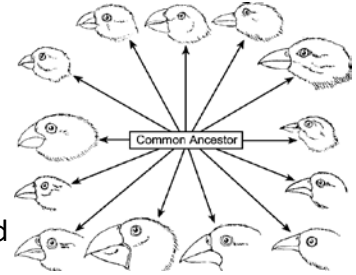
Gel Electrophoresis – A technique used to show how species are related to one another.

Restriction enzymes cut DNA into fragments, which are placed into a well in a gel plate. An **electric current** carries the DNA fragments through the gel, separating them according to size (smaller pieces of DNA are carried farther from the well than larger pieces). Related organisms will show similar banding patterns because of their DNA.

3. Endangered species should be protected because they may offer benefits to humans.

III. Beaks of Finches

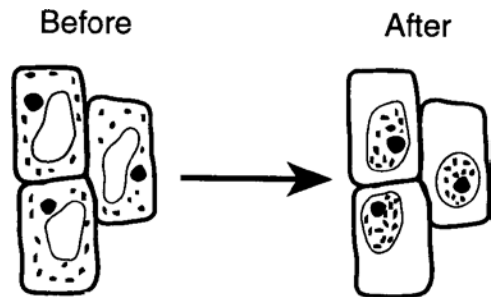
- A. **What you did:** Played different finch species competing for food.
- B. **What you learned:** Different environmental conditions (food) favored different species of finch, allowing some to survive and reproduce, but not others.



IV. Diffusion Through a Membrane

A. Part A

1. **What you did**
 - a. Made a model cell using **dialysis tubing**.
 - b. Put glucose and starch inside your *cell*.
 - c. Put starch indicator (iodine) outside cell.
2. **What you saw**
 - a. Inside of cell turned black because iodine diffused *into* the cell.
 - b. Because outside of the cell was not black, you know the starch did not diffuse through the membrane.
 - c. Used blue glucose indicator (Benedict's solution) to see that glucose did diffuse through the membrane.
3. **What you learned**
 - a. Small molecules (glucose, iodine) can **diffuse** through a membrane on their own.
 - b. Large molecule (starch) cannot diffuse through a membrane on their own.
 - c. You can use indicators to identify the presence of specific substances.



B. Part B

1. **What you did**
 - a. Looked at red onion cells under the microscope.
 - b. Added salt water to the onion cells.
 - c. Added distilled (pure) water to the onion cells.

2. What you saw

- a. Salt water caused the onion cells to shrivel.
- b. Distilled water causes the cells to swell back to normal.

3. What you learned

- a. Salt water causes water to diffuse out of a cell.
- b. In pure water, water will diffuse into a cell.

Adapted from *What You Absolutely Must Know to Pass
the NYS Living Environment/Biology Regents*
www.newyorkscienceteacher.com