Above and Beyond with Carolina's AP® Biology Series: Explore the Options!

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New Orleans, LA

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Questions to Focus Session

- **What is your level of knowledge for AP® Biology?**
- **Do you meet the needs of your students through laboratory investigations?**
- **What topics interest you most in AP® Biology?**

Objectives

- To introduce Carolina's newly revised and improved line of AP® Biology lab kits
- To demonstrate the wide variety of AP® Biology topics offered for laboratory investigation
- To use materials and procedures from 5 different Carolina™ AP® Biology kits

Carolina's AP® Environmental Kits

12 Labs Revised and Improved!

- Diffusion and Osmosis
- Enzyme Catalysis
- Mitosis and Meiosis
- Plant Pigments and Photosynthesis
- Cell Respiration
- Genetics of *Drosophila*
- Population Genetics and Evolution
- Transpiration
- Physiology of the Circulatory System
- Animal Behavior
- Dissolved Oxygen and Aquatic Primary Productivity

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Jigsaw Activities

Group A:
Observing Catalase Reaction

Group B:
Leaf Pigment Chromatography

Group C:
Cell Respiration

Group D:
Sexing *Drosophila* and Examining Phenotypes

Group E:
Heart Rate of *Daphnia*

Safety Issues with Materials

- **Most procedures suggest the use of safety glasses, aprons, and gloves**
  - **Acids, stains in use**

- **Disposal**
  - **Follow instructions in handout for proper disposal procedure for your activity**

Reporting Out: Attendee Ideas

- AP® Biology topics covered
- How materials met needs
- How would use in own classroom
- Value to students
- Need for classroom

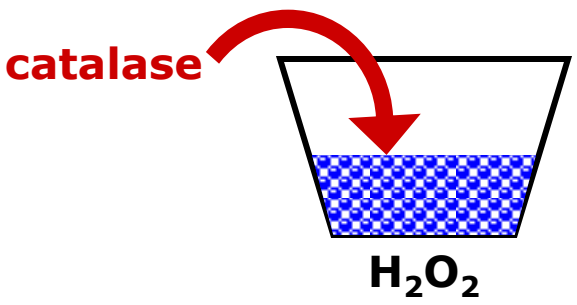
Group A: Observing Catalase

Activity Objective

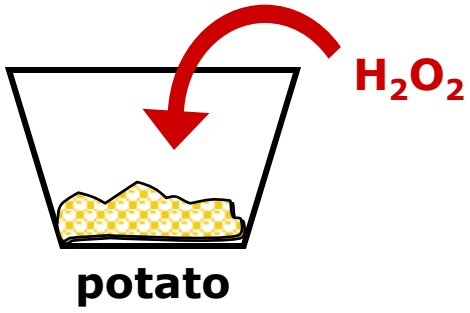
To observe the action of an enzyme and the effects of heat on enzyme activity

Adapted from Lab 2: *EnzymeCatalysis*

1. Observe the reactions of catalase on H_2O_2



2. Does living tissue contain H_2O_2?



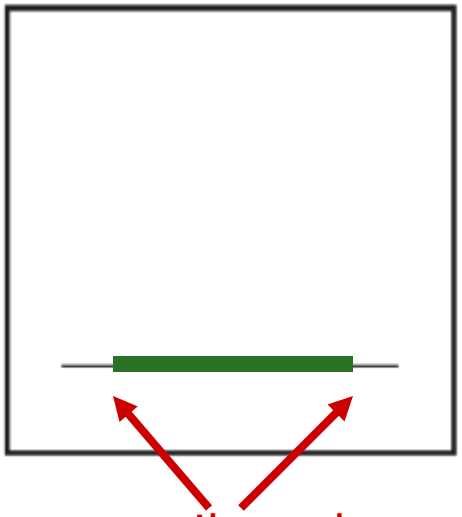
Group B: Leaf Pigment Chromatography

Activity Objective

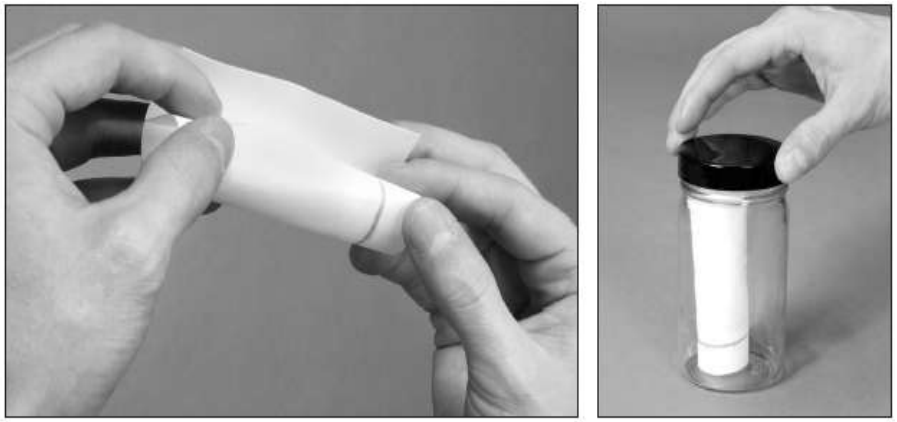
To separate plant pigments using paper chromatography and calculate R_f values from data.

Adapted from Lab 4: *Plant Pigments and Photosynthesis*

1. Prepare pigment origin



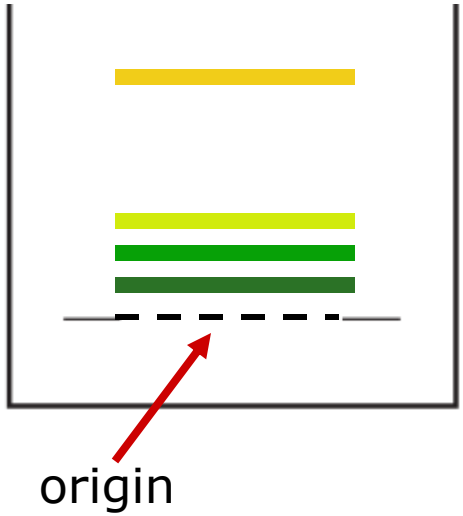
2. Place paper in solvent jar



Group B: Leaf Pigment Chromatography

3. Measure migration distances and calculate R_f values

Sample chromatogram



Sample data table

	Distance from origin (mm)		
Solvent Front	68		
Band #		Band Color/Identification	R_f Value
1	8	*dark green*	.12
2	13	*green*	.19
3	20	*yellow*	.29
4	65	*yellow-orange*	.96

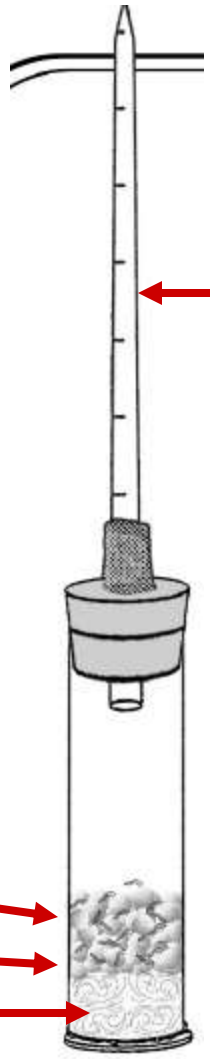
$$R_f = \frac{\text{distance of pigment from origin}}{\text{distance of solvent front from origin}}$$

Group C: Cell Respiration

Activity Objective

To set up a respirometer to measure the consumption of oxygen by germinating peas

1. Respirometer setup



Adapted from Lab 5: *Cell Respiration*

Group C: Cell Respiration

2. Place respirometer in water bath

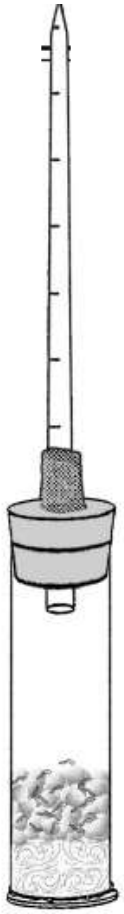
glass beads only

dry peas + glass beads

germinating peas

Group C: Cell Respiration

3. As oxygen is consumed by seeds, water enters the pipet. Measure decrease in oxygen volume over time.



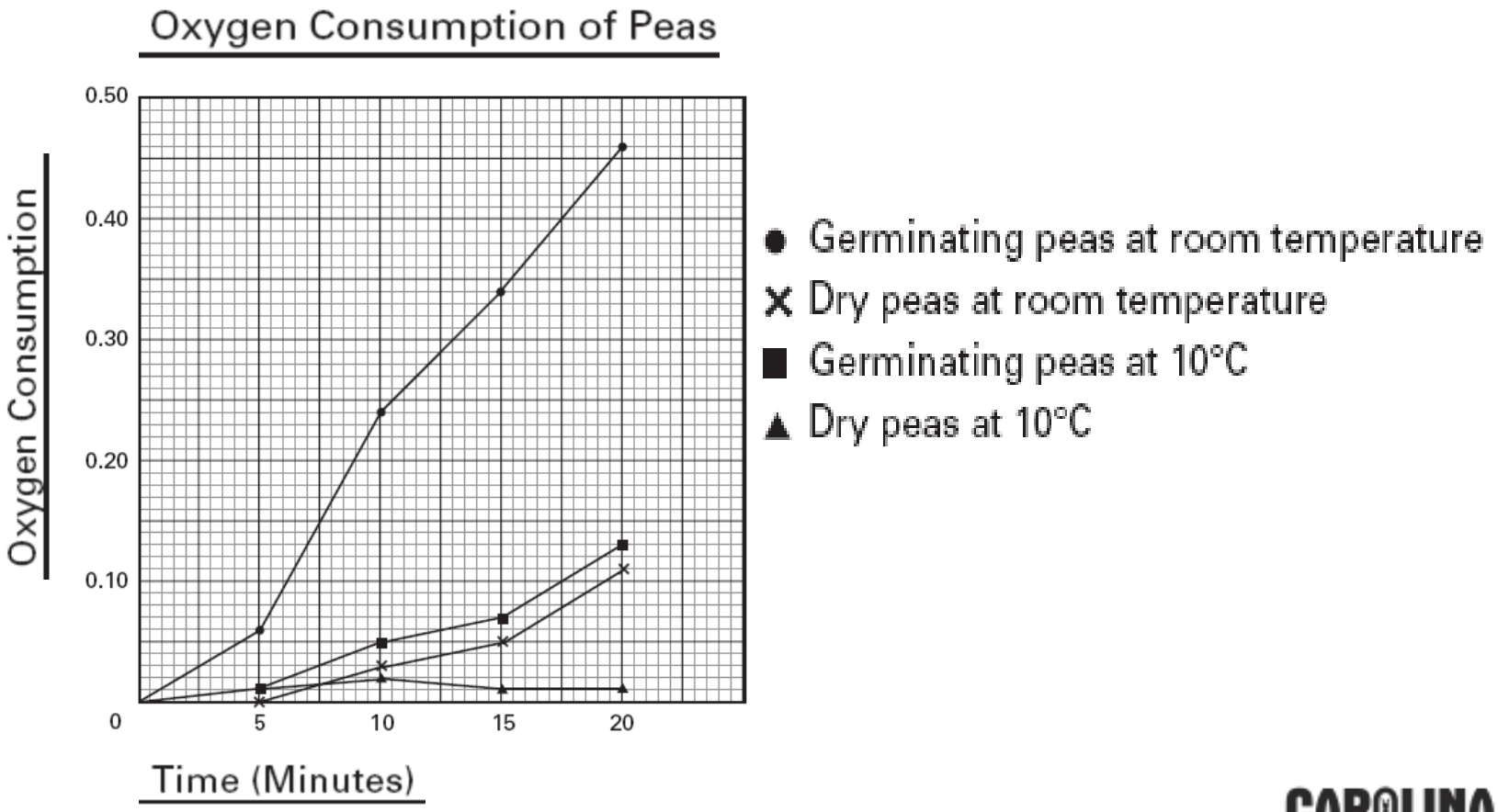
Sample Table 1: Respiration of Peas at Room Temperature

		Respirometer 1 Germinating Peas			Respirometer 2 Dry Peas + Beads			Respirometer 3 Beads Only	
°C	Time (Min)	V of Pipet	ΔV	Corrected ΔV	V of Pipet	ΔV	Corrected ΔV	V of Pipet	ΔV
24	0	0.69	–	–	0.72	–	–	0.74	–
24	5	0.60	0.09	0.06	0.71	0.02	0.00	0.72	0.02
24	10	0.41	0.28	0.24	0.69	0.07	0.03	0.70	0.04
24	15	0.30	0.39	0.34	0.67	0.10	0.05	0.69	0.05
23	20	0.18	0.51	0.46	0.65	0.16	0.11	0.69	0.05

ΔV = V at Time 0 – V at time of current reading
Corrected ΔV = ΔV (for Respirometer 1 or Respirometer 2) – ΔV of Respirometer 3

Group C: Cell Respiration

4. Graph of sample data



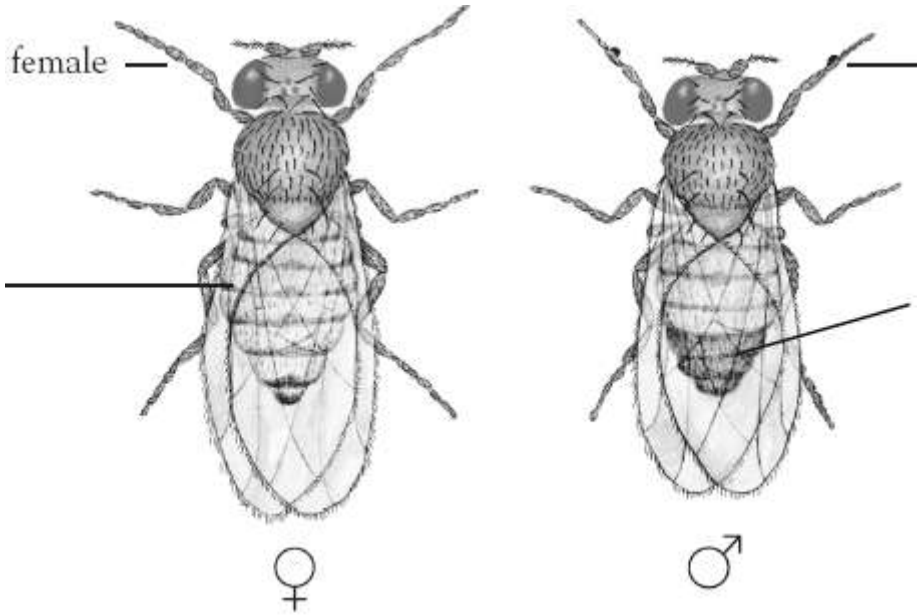
Group D: Examining *Drosophila*

Activity Objective

To determine the sex of fruit flies and observe contrasting phenotypes

Adapted from Lab 5:
Genetics of Drosophila

1. Distinguish males from females



Group D: Examining *Drosophila*

2. Observe contrasting phenotypes

wild type

A. sepia

B. white

C. vestigial

Phenotype		Phenotype	
Wild Type:	red eyes	Mutant A:	brown eyes
Wild Type:	red eyes	Mutant B:	white eyes
Wild Type:	normal wings	Mutant C:	short wings

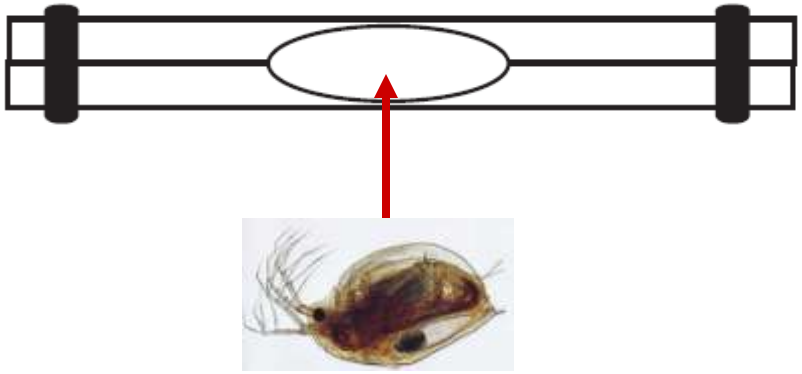
Group E: Heart Rate of *Daphnia*

Activity Objective

To use *Daphnia* to study the effect of environmental temperature on heart rate

Adapted from Lab 10: *Physiology of the Circulatory System*

Double concave slide assembly



Group E: Heart Rate of *Daphnia*

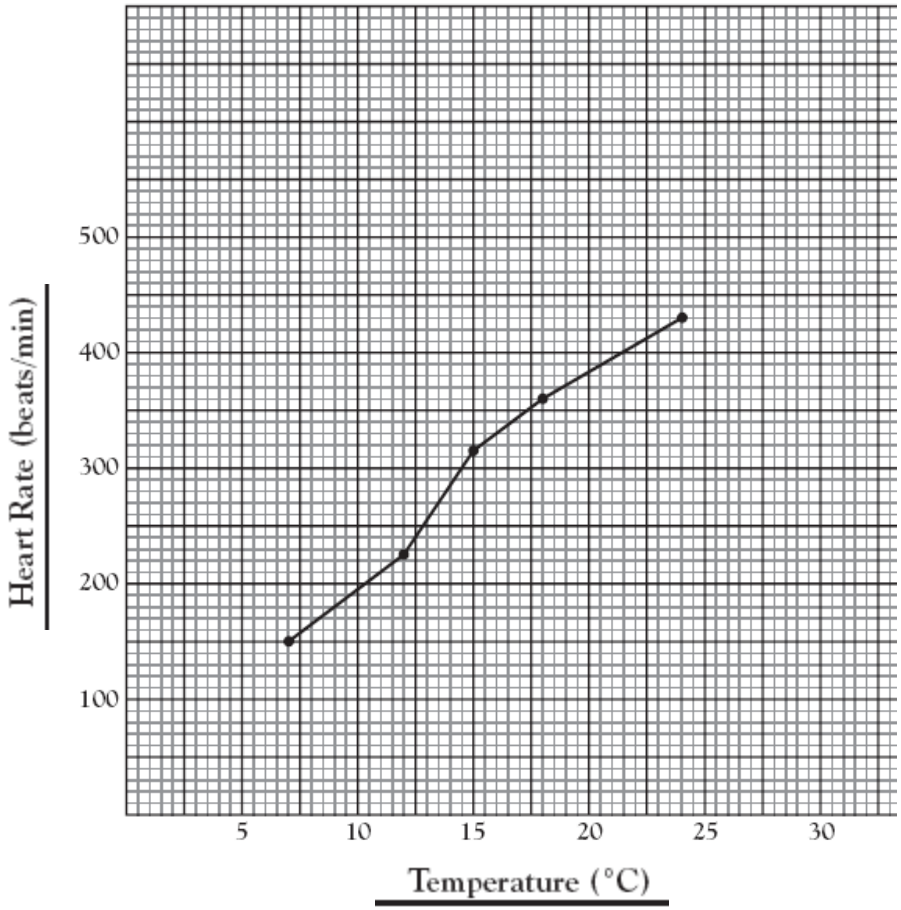
Sample Data Table

Temperature °C	Heartbeats/10 sec	Heart rate in beats/min (Heartbeats/10 sec × 6)
7	25	150
12	38	228
15	53	318
18	61	366
24	72	432

Group E: Heart Rate of *Daphnia*

Sample Graph

Daphnia Heart Rate at Different Temperatures



What Kits Have You Seen Today?

- **Enzyme Catalysis**
- **Plant Pigments and Photosynthesis**
- **Cell Respiration**
- **Genetics of *Drosophila***
- **Physiology of the Circulatory System**

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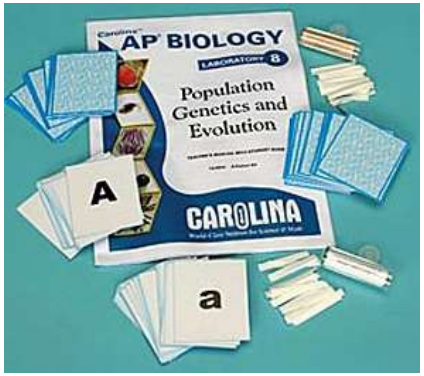
Other Quality AP® Bio Kits Available



- Diffusion and Osmosis
- Mitosis and Meiosis
- Molecular Biology
- Population Genetics and Evolution
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- Animal Behavior
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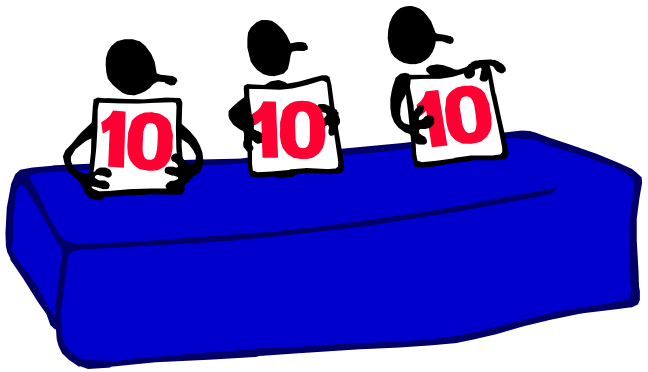
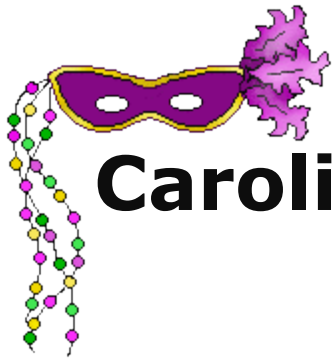
Summary

- **Carolina's kits offer a wide variety of AP® Biology topics**
- **Newly revised kits provide inquiry-based learning method**
- **Materials are great quality and easy to use**
- **?????**

Evaluations: Share Your Thoughts!

- **<u>Scale = 1 to 10</u>**
- **10 = Outstanding**
- **9 = Above Average**
- **8, 7 = Average**
- **6, 5, 4 = Below Average**
- **3, 2, 1 = Well Below Average**
- **Please provide comments!**





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Enjoy the rest of the conference!

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