

# Photosynthesis Worksheet

## Part 2. Column Chromatography of Plant Pigments Demonstration

### Pre-Demonstration Questions

1. Examine Figure 1. Of the three pigments, which absorbs wavelengths associated with the color red?
2. What colors are not absorbed by chlorophyll a and b?
3. When a color is not absorbed, it is transmitted. What colors are transmitted by carotenoids?
4. What determines the color of an object?
5. Explain the role of the adsorbent in column chromatography.
6. Explain the role of the eluent in column chromatography.

### Table of Observations

Adsorbent	Adsorbent Polarity	Eluent	Eluent Polarity	Color of Pigment Carried	Polarity of Pigment
Aluminum oxide		Hexanes			
Aluminum oxide		50/50 hexanes acetone			
Aluminum oxide		Acetone			

### Modeling

In your group, construct three models that show how the spinach extract interacts with the adsorbent and each of the three solvents. Ensure that you show the intermolecular forces between the pigments in the spinach extract and the adsorbent and eluent.

### Models

Adsorbent	Adsorbent and 50/50 hexanes–acetone mixture	Adsorbent and acetone

## Part 3. Photosynthesis with Sodium Alginate Spheres Guided-Inquiry Activity

### Data Table: Change in pH

Color Before	pH Before	Color After	pH After	Total Time (min)

### Post-Lab Analysis and Calculations

1. What was the change in pH of the sample?
2. What does this change in pH indicate about the productivity of the sample?
3. Explain the role of light in photosynthesis.

**Guided-Inquiry Design** (Use a separate sheet of paper to complete the following steps in the design process)

In your group, design an investigation that uses this method to measure photosynthetic activity and tests a different variable.

1. Record the research question.
2. Define the limitations of the testing methods.
3. Identify the control, independent variable, dependent variable and critical constants.
4. Record the working procedure. If changes must be made to the working procedure, record those changes here.
5. Explain the safety procedures needed to carry out the investigation safely.
6. Carry out the investigation and record relevant data.
7. Display relevant data in a meaningful way to help communicate the results of the investigation.

**Post-Lab Analysis**

1. Using a claims, evidence and reasoning model, explain the results the experiment.
  - a. Propose a claim based in scientific understanding.
  - b. Discuss specific evidence from the experiment.
  - c. Discuss the reasoning for the claim based on connections to the POGIL™ activity, the demonstration and the introductory lab activity.