**Middle School STEM Science Lab/Activity Planner**

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| Name of Lab/Activity:Chloroplast Blast | Grade:7  |
| California Science Standard(s): (please copy and paste standards taught during this lesson) Students know that mitochondria liberate energy for the work that cells do and that chloroplasts capture sunlight energy for photosynthesis. |
| Common Core Science Reading and/or Writing Standard(s): (please copy and paste standards taught during this lesson) Determine the meaning of words and phrases as they are used in a text, including technical meaning. |
| Learning Objective/Goal:Students will learn that different plants use different pigments to absorb energy including chlorophyll in the process of photosynthesis. |
| Language Objective/Goal: (based on California Common Core Standards)Include multimedia components and visual displays in presentations  |
| Next Generation Science Standards – ): (please copy and paste any of the 8 Science and Engineering standards taught during this lesson, as well as any Cross Cutting Concepts that apply) |
| Materials & Resources: chromatography paper, chromatography solvent, pencil, ruler, wooden splint, 250 ml beakers, aluminum foil, spinach leaves, other leaves, penny, UV light source. |
| Procedure: Using a microscope and a doc camera, show different types of leafs and ask students to journal thoughts about why the leaves are green. Have students perform activity. Have students cut a strip of chromatography paper into a strip 1 in. wide and long enough to extend from the mouth of the beaker to the bottom. Draw pencil line 1 cm from the free end of the strip. Place spinach over the line and rub penny over the line creating a green pigment line. Have students hypothesize what will happen when they place the strip in the solvent. Place strip in beaker making sure it hangs freely and staple to splint. Remove strip and pour enough solvent to cover bottom, when you hang the strip it should touch the solvent but the solvent shouldn’t cover the pigment line. Carefully place strip back in beaker. Allow solvent to move up strip. When the solvent reaches near the top but not to the splint, remove it and make a pencil mark at the top of the solvent. Students can also draw a pencil mark between the bands. Let the strip dry. Have students record the distance the pigments traveled and color. Have students observe with a UV light. Students can also repeat process with different types of leaves. Have students create data tables with the colors present for each leaf. Students can create a graph(s) to best represent their data. Have them explain what information their graph represents and why they chose the graph they did. Post activity conversation: Have students generate questions the activity has raised. Possible questions: What causes the colors? Why might there be different colors? Why is the pigment important? Students can research the answers (recording research using Cornell notes, mind map, etc.) to their questions and use their data and findings to create their movie on goanimate. | Teaching Notes: (include timing)If you include leaves that turn colors in the fall, pigments other than green will show. |
| Math Connection (Including CCSS Math Practice(s):Students create graph to represent data and explain why the graph they chose best demonstrates the conclusions they have drawn. Extension: Students can calculate the retardation factor. | Teaching Notes:Students can compare graphs with each other for a math conversation to explain their thinking regarding the findings they concluded. |
| Technology Used to Extend Learning: Students can use excel to create graphs. Students use goanimate to present their findings.  | Teaching Notes: |
| Formative Assessment: (please attach a copy) Students use goanimate to explain their findings and what they have learned. | Teaching Notes: |
| Strategies for EL & Special Needs Students (ELD CCSS:Sentence frames for questions. Frontloading vocabulary. | Vocabulary: pigment, chlorophyll, chloroplasts, photosynthesis |
| Alignment in science unit: (Brief description of lessons taught **prior to & after** this lab/activity)Before: basic cell structure including organelles. After: additional organelle function |
| Brief description of lessons taught **after** this lab/activity:Students continue to learn about the other organelles of plant cells and how they function. |
| Lab/Activity adapted from: (website, textbook, etc.)NBClearn.com | Formative Assessment adapted from:  |
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| This lesson was developed by: |
| Teacher’s Name | Currently Teaching at: (School & District) |
| Mimi Lawler | Indigo Program/ Oak Grove School District |
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