Mixing and Separating Colors

[redacted]

4-23-09

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Teacher Portfolio
Artifact Cover Sheet

ACEI STANDARD #: 2.2 Science

2.2 Science—Candidates know, understand, and use the fundamental concepts in the subject matter of science—including physical, life and earth and space sciences—as well as concepts in science and technology, science in personal and social perspectives, the history and nature of science, the unifying concepts of science and the inquiry processes scientists use in discovery of new knowledge to build a base for scientific and technological literacy.

Element A: Candidates have in-depth understanding of and experience w. abilities needed to do scientific inquiry.

Element B: Candidates understand the concepts in the subject matter of physical, life, earth and space sciences with in-depth knowledge of at least one of these.

Element C: Candidates understand naïve theories and misconceptions about scientific and technological phenomena and help students build understanding to avoid naïve theories and misconceptions.

Element D: Candidates have in-depth understanding of how science influences everyday living, personal health, characteristics and changes in populations, changes in environments, the use of science and technology in local challenges.

Element E: Candidates exhibit a high level of competency in teaching the content and fundamentals of physical, life, earth and space sciences using a variety of strategies.

NAME OF ARTIFACT: Methods Science Project – Lesson Plan

I spoke to my cooperating teacher and we both came up with the three lessons. The first lesson was having the students making their own color wheels using clay to prove that primary colors make secondary colors. The second lesson the students put a black and green ink dot on filter paper to see what pigments make up that color. The students used water droplets to change the pigments. For my third lesson I read My World of Color by Margaret Wise Brown to the students. After the book the students brainstormed their own similes and some from the book to help come up with ideas. Then they wrote their own poems using similes about color.

Brief description of how artifact demonstrates ACEI Standard 2.3:

My lesson demonstrates the standard because the students understand what is needed to fully complete the scientific inquiry. The students understand that not all colors are made by themselves but that other colors are involved in making them. The students understand that things can be changed and manipulated by combing colors together or separating the colors. I now know that teaching is much different from all other subjects. There are more concepts to get across to the students so there are more ways to teach the concepts.

Attached is the assignment that generated this artifact, the lesson plan from within the project, and the artifact assessment rubric completed by a Keene State College instructor.

Introduction of Colors

After discussing with my cooperating teacher about what topic I should teach my second graders, we came to the conclusion that I would finish up the Changes Curriculum with Colors. My lessons consist of color mixing, color separating, and writing a color poem. My school's science curriculum that they are focusing on right now is called Changes.

My lessons on mixing and separating colors fall into the school's science curriculum, Changes, because it is showing students that changes can be made to just about anything. The curriculum describes that changes can be observed with many diverse things such as, sugar, seeds, gases, and colors; these are just a few of the topics that was studied in this curriculum by my second grade students.

My lessons follow the states standards because it states by the end of second grade students should discover that things change in some ways and stay the same in some ways. The state standards also state that different things can change color, size, weight, and movement (Website 1). My second graders are learning how mixing two primary colors together create a secondary color. My students are also discovering that when the color black is diluted with water, it will show all the different colors that black is made of.

My cooperating teacher has been very helpful throughout the process of finding a science topic to teach. We decided colors would be a fun lesson, since their vacation is a week after I teach my lesson. The lessons are very exciting for the students to see right before their eyes how colors can be changed.

During my first lesson my students will be making their own color wheels. They will have three pieces of clay of the primary colors; yellow, red and blue

each, where they will be mixing the clay together to create secondary colors. After seeing what colors are made they will color them on the color wheel and write the name of the color next to it. In the second lesson, my students will discover what happens when water is diluted to the color black and green. The students will learn that those colors are made out of other colors mixing together. This will be done by adding a drop of water to the dot of ink on the filter paper to see the pigments come out of the ink. My final lesson will include reading a book to the students about colors, and having the students writing their own poems with similes of color.

Reference Used:

http://keene.blackboard.com/webapps/portal/frameset.jsp?tab=courses&url=/bin/common/course.pl?course_id=_26330_1 Website 1

Topic Research

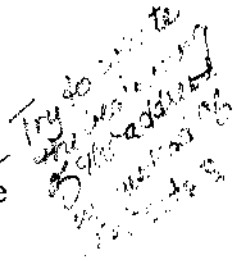
When I was researching for my science project I came across many interesting articles and other ideas how to teach colors to a second grade classroom. My topic was based off of three lessons that all interconnected one another. My first lesson consisted of explaining primary and secondary colors and making a color wheel to prove that primary colors make secondary colors. My second lesson was separating colors, seeing what color pigments make black and green. This was done with a black and green marker and water on chromatography paper. My students loved this experiment the "oh wow" factor was very high that day. My third lesson to tie everything together was writing a simile poem with colors. My second graders enjoy this because they love colors and they love to write poems, so it was a nice touch. For this lesson I used My World of Color by Margaret Wise Brown; this book showed the students similes and had pages filled with vibrant colors and beautiful pictures. My second grade students enjoy listening to read alouds and looking at picture books, so this was a great book to get the students engaged for the writing.

Researching my topic, I found an interesting article where a high school teacher had her students do a project on color wheels. Her students were a bit taken a back and that they did those in grade school. Although her color wheels were more advanced, she had her students complete the lesson. Her lesson included primary, secondary, intermediate, high value (tint) with a border and an illustration in the center (Guhin, 1999). I think it was a great idea for her to insist her students to complete the assignment. It proved to be a harder assignment then the students thought (Guhin, 1999).

I found an article about chromatography where it describes it more in detail and corrects some textbooks with their information. It says that all chromatography techniques are based on the separation and concentration of components through a two-phase system, one is stationary and the other is mobile (Maitland, 2002). It also gives a chart to show what this description is describing.

I found a very interesting article about how word walls that are colorful can be very beneficial to students. The article also goes into detail about how older learners can benefit from word walls to broaden their knowledge and deepen their word capacity (Harmon, 2009). It says when, "introducing the words to the class, each student group selected a color to represent the word and defined the word in at least three different ways" (Harmon, 2009). According to the study having the colors up on the word wall to help define the words, really helped many students to gain the knowledge better.

When I was researching my topic on colors I also came across some great websites with a lot of ideas about chromatography for kids. One website gives ways to describe in student friendly terms so they will be able to understand it better. It says it is a broad range of physical methods to separate colors (Website 3). It describes how it works, what it is, and some other resources for teachers.



Another website I found was a website for students to use all about color wheels. It goes through to describe what primary and secondary colors are. It shows with the actual color what colors make what. It has a game called catch a rainbow science experiment (Website 1). It is very student friendly and very easy to navigate through.

The last website I found was another website about chromatography for kids. It gives background information and has a list for activities for the students to complete. It goes through and gives you each step to go through to do the experiment. It also has questions about what the students are doing, for example, how could you show that washable black ink is a mixture of a number of colors? (Website 2). It also gives some reasoning for chromatography.

Throughout my research I found many helpful articles for my topic. It gave me some ideas I could always go back and use with my students as a follow up activity, or just to give them some more information if they were truly interested in this subject. I tried to focus more on the articles that could be student friendly and help me to explain the terms better and the theories behind everything. I did enjoy reading about how other teachers taught their color wheel lessons and it gave me some of my own ideas.

Annotated Reference Page

Guhin, P. (1999, September 1). Color Wheels Can Be Creative. *Arts & Activities*, *126*(1), 42. (ERIC Document Reproduction Service No. EJ615753) Retrieved April 16, 2009, from ERIC database.

This article was interesting because it gave me another approach to how to teach the color wheel to not only elementary students but high school students. I liked how she made the color wheel more difficult than it normally is for any student. Adding new material to the color wheel gave me more ideas how I could alter it so it would not be so simple.

Harmon, J., Wood, K., Hedrick, W., Vintinner, J., & Willeford, T. (2009, February 1). Interactive Word Walls: More than Just Reading the Writing on the Walls. *Journal of Adolescent & Adult Literacy*, *52*(5), 398-408. (ERIC Document Reproduction Service No. EJ826843) Retrieved April 16, 2009, from ERIC database.

This article was useful for me to teach my lessons because it gave me some ideas what I could do with the color afterwards. It is another way to get the students more involved using color to help them learn literacy.

Maitland, P., & Maitland, D. (2002, December 1). Chromatography: Are We Getting It

Right?. *Journal of Biological Education, 37*(1), 6-8. (ERIC Document Reproduction Service No. EJ658209) Retrieved April 16, 2009, from ERIC database.

This article was about chromatography, but it gave the scientific background knowledge to help teachers understand it better for themselves. It gave examples and proved many of the theories. It helped me gain more knowledge for my students.

Wise Brown, M. (2002). *My World of Color*. New York: Hyperion Books for Children.

This book was used to read to my second grade students, it gave examples of similes. The similes had used colors which was the main idea for the students to write their poems about.

Websites:

http://www.kidzone.ws/science/colorwheel.htm (Website 1)

This website is very kid friendly and a student could navigate through this to find the information they needed. I used this website because I thought it gave me the best ideas what I should tell my students.

http://www.scienceprojectlab.com/thin-layer-chromatography-for-kids.html (Website 2)

This website was very kid friendly also, it gave the theories and the explanation of chromatography so I could explain it to my second graders. It helped me because it gave a thorough description and helped me to decide what I should tell my students.

http://www.rpi.edu/dept/chem-eng/Biotech-Environ/CHROMO/chromintro.html (Website 3)

This website was another kid friendly chromatography website. It gave a lot of information for the students, but it had different information from the first. It had a section with why chromatography is so special. I think that was a helpful add in, so I could explain to my students why it is so special.

Student Outcomes

During my lessons I observed carefully how the students were interacting with the materials and with the experiments. My goal for the first lesson for the students on what I wanted them to learn was about primary and secondary colors. I wanted the students to prove to themselves that if they actually mix yellow, red and blue clay together they will make secondary colors. For the second lesson I wanted to get across to my students that not all colors they see are made just out of one color but many pigments. By having the students using the chromatography method, they were able to see the different pigments of black and green inks. For the third lesson the students were able to use their knowledge about colors to write a poem about similes with colors.

The students were able to use the clay after they mixed the primary colors into secondary colors. The students used the clay in a center a few days after with my cooperating teacher. After the second lesson the students were able to explore with the filter paper and the chromatography method. The students were able to see what would happen if they used more than one dot of the markers or more than two drops of water. For the third lesson the students were able to use their writing techniques and knowledge about colors to write poems.

For the different learning abilities I gave the directions step by step for all students. If some students had some trouble with understanding the directions I would tell the directions in a different way for the students so they would grasp the concepts and be able to complete the experiment.

To integrate the arts into my lesson I had the students color their color wheels, and use clay to mix together. The students were also able to see the

different pigments of the colors. After the students completed the experiment they were able to cut around the color ink circle and glue onto the record sheet. The students were also able to experiment by themselves to discover what colors make what other colors. On the students' poems they were able to draw and use different colors all around the poems.

I was able to observe the students at different levels complete the activities on their own time. I enjoyed teaching to the students the different concepts they would need to know about colors in general. I taught the students some knowledge they already knew but I did teach the students the chromatography method to separate colors, and I received the "Oh wow" response.

Building A Structure : Colors

Teacher Name: **Stacey Polewarczyk**

Student Name: _____

CATEGORY	4	3	2	1
Organization	Gathering materials in a safe manner, putting materials where appropriate on table.	Gathering materials in a safe manner, putting materials where ever they feel.	Gathering materials but being unsafe.	Did not gather materials when asked and did not corporate with others.
Follwing Directions	Followed directions step by step with the teacher.	Followed directions but not doing so with teacher.	Barely following drections, needs reminding of what to do.	Not following directions and trying to do the experiment by themselves.
Information Gathering	Watching their experiment carefully and ready to record data.	Watching their experiment, ready to record after the exoeriment is completely finished.	Watching their experiment occassionally, not sure where to record data.	Not watching their experiment, do not know were to record the data.
Clean up	Carefully puts materials away and cleans up area.	Puts materials away, but needs some reminding where materials go.	Needs reminding to put materials away and to clean area.	Did not put materials away and did not clean up their area.

Date Created: **Apr 22, 2009 11:15 am (CDT)**

Micro Teaching Experience

When I told my fellow peers what I was planning on doing for my second graders, they all liked my ideas. I told my peers I was planning on having the student mixing clay, they told me it might be a smart idea to demonstrate what to do for the mixing of the clay.

My peers also told me it would be a good idea to show the students how to use the dropper correctly. I would show the students how to only drop one droplet of water for the students to see. They also told me that I could tell the students if they do not use one drop the color expanding will not come out correctly. The students will have to do another dot if they drop more than one drop the first time on the filter paper.

My peers were very helpful and enthusiastic about my lessons which made me feel very happy that they liked my lessons. I enjoyed listening to their lessons, as well, so I can have some ideas for myself later on if I was interested in their topics.

Stacey Polewarczyk 4-13-09 2nd Grade
Subject: Science Topic: Color Mixing

Purpose: To give students knowledge about mixing primary colors together to create secondary colors.

Curriculum Standard: SPS2– Unifying Concepts of Science
PATTERNS OF CHANGE (POC)
S:SPS2:2:4.1 Discover that things change in some ways and stay the same in some ways.

S:SPS2:2:4.3 Observe that things can change in different ways, such as in size, weight, color and movement.

http://keene.blackboard.com/webapps/portal/frameset.jsp?tab=courses&url=/bin/common/course.pl?course_id=_26330_1

Objectives:

- Given three pieces of primary color clay, of yellow, red, and blue the students will take one yellow and one red to make orange. Repeat with yellow and blue and blue and red.
- Given the clay that made the secondary colors the students will then color the bottom lines on the color wheel of what colors they see.
- Give the clay the students will see in front of their eyes that by mixing primary colors together, it can make secondary colors.

Materials Needed for Learning Experience:

Teacher: Color wheel chart, color wheel worksheet, 20 cups of clay that contain 3 pieces of blue, 3 pieces of red, and 3 pieces of yellow one for each student, Nate the Great book, crayons, pencils.

Students: Color wheel worksheet, cup of clay that includes 3 red, 3 yellow, 3 blue pieces, crayons, pencil.

Anticipated Length of Learning Experience: first part 20 minutes to read book, second part 40 minutes.

Student Grouping: first part while I am reading book it will be whole group, the second part when students are completing worksheet they will be working individually at their tables.

Prerequisite Knowledge:

Teacher: The teacher needs to know the terms primary and secondary colors, and color wheel. The teacher also needs to know what primary colors make secondary colors.

Students: The students need to know what colors are what. They need to be familiar with the terms primary and secondary colors. The students need to know how to write the names of colors properly.

Procedure:

1. **Introduction:**
    - I will ask the students if they have ever seen a color wheel before.
    - I will show the students the color wheel; I will then tell the students that they will be making their own color wheels.
    - I will ask the students if they have ever made one before, if so when and where?
    - I will ask what the color wheel is used for.
    - If the students do not know what it is used for I will tell them that artists use them to make up colors or mix colors or to decide what colors to use.
2. **Body of Learning Experience:**
    - I will remind the students to be respectful, safe and kind.
    - I will send the students to the meeting area.
    - I will tell the students I will read them a book, called Nate the Great by Marjorie Weinman Sharmet
    - I will start the book; I will stop at appropriate places and ask questions about the book to keep the students engaged.
    - I will keep the students at the meeting area where I begin the instructions.
    - I will keep the color wheel up.
    - I will show the students which colors are the primary colors and give a definition of what a primary color is.
    - A primary color is a set of colors that can be combined to make a useful range of colors.
    - I will then tell the students what a secondary color is and where they are located on the chart.
    - Secondary colors are a color made by mixing two primary colors together.
    - I will ask if there are any questions.
    - I will start by showing the students the worksheet.
    - I will tell the students that they will receive three pieces of blue, yellow, and red each which are the primary colors.
    - When they receive the clay I will tell the students that they will place the three pieces of each on their primary color spot on the worksheet. They will know where to put the clay because the first letters of the colors are on the page.
    - I will tell the students that they will take one yellow piece with one red, one red with blue and one yellow with blue.
    - I will tell the students that they will have one piece of yellow, red, and a blue left over and to keep it next to the letter of that color to show the primary colors we used.
    - I will ask the students why they think they are putting these colors together. I will say if no one says, that they will be making the secondary colors out of the primary colors they have.
    - I will remind the students that they will have to really roll it together and that it may take some longer than others to get the secondary colors. I will

show the students what I mean by rolling the clay and what they should be looking for.

- I will remind the students ~~that don~~'t worry some will have different colors than others, but they should all be noticeably an orange, a green and a purple.
- I will tell the students when they are all done with the rolling of the clay to show a teacher to make sure they have the right colors.
- I will say that once they have approval, they may color the bottom line only under the letter, then write the color word on the top line, with no coloring.
- The color dictionary will be available if needed.
- I will pass out the paper, I will remind the students to put their names on the paper first.
- I will pass out the cups of clay.
- Then after the students have got the clay figured out, I will pass out the crayons.
- I will remind the students it is okay if their clay colors are a little off from the color wheel, not to worry.
- I will let the students work at their tables and they may chat quietly.
- The students will put their papers in the completed workbox and put their clay back into their cup and place it next to the workbox.
- When the students are finished they may take out a silent reading book or work on unfinished work.

3. **Conclusion:**
   - I will remind the students to clean up their areas and materials.
   - I will ask the students if they have any questions.
   - I will ask the students if they enjoyed this activity.
   - I will ask if there are any students who would like to share their experience and what they saw, how it changed, what it looked like, how long it took, etc.
   - I will tell the students on Wednesday we will be doing a color separating activity, since we just did mixing; now we will see how the colors separate.

Assessment:

1. **Formative:** When I let the students work on the worksheets after I give directions I will look to see if the students are following instructions. I will check to see if the students place the three pieces of clay next to the primary colors. I will also look to see if the students are rolling it and watching for the change of the colors. I will also look to see if the students are taking their time with the clay. I will look to see if any students are trying to match the color wheel colors and paying attention to the wheel.
2. **Summative:** I will ask the students what colors they see and what they are expecting. I will look to see if the students' color wheels are carefully completed. ~~That~~ they are trying or tried to make their color wheel similar to

the big color wheel. I will tell the students that on Wednesday we will be doing the opposite, separating colors instead of mixing the colors.

Child Guidance:

Proactive Considerations: If there is any confusion I will go over the directions in another way. I will show the students again with the clay and try to match the color wheel. I will take my clay out and mix it with my fingers again. If a student is not cooperating, on the second time I have to speak with him I will send him to work by himself. If the whole group is not cooperating I will stop them and have them take a break and to try it again in a minute or so. I will have the students stop talking and be completely silent. The students will be working at their tables and will be able to talk to their neighbors quietly, if they can work appropriately. I will ask the students questions and I will choose different students each time. At the end of the activity I will choose different students to share their experiences, not all the same students.

Reactive Considerations: I will only talk to a student once, and then I will send him to work by himself. If students are having trouble paying attention, I will stop and ask some questions and maybe have the students take a break. If there are some students who have some confusion about the directions, I will retell the directions. I will show more while I am giving directions.

Needs for Lesson Participation: Some students may have difficulty rolling the clay together; some may get frustrated that it will not work right away. I will remind those students that it is a real science experiment and that scientists have done this before. That is how they found out about these colors. I will have to convince the students that they are scientists, and that nothing great can happen right away.

Modification Required: I can sit next the student and go through with him what to do and help him, so he does not get frustrated or overwhelmed. The classroom can be quiet, and respectful of others who are working hard. The clay can be soft to make it easier for the students to roll it out into the secondary colors.

Resources Used:

Sharmat, M. W. (1972). *Nate the Great*. New York: Bantam Doubleday Dell Books.

Lesson Reflection;

1. **Description:** On Monday April 13th I performed my lesson to my second grade students. I started off in the meeting area where I read Nate the Great. I continued to discuss primary and secondary colors with the students and about color wheels. When we finished discussing the colors, I told the students the instructions which were that we would mix the clay together, step by step. When the students finished mixing the clay we went back to the meeting area where we discussed combining and how we proved that yellow and red make orange, etc. I then sent the sent the students back to their tables to finish coloring and writing the words.

2. **Analysis:** Mixing the clay went particularly well, the students all loved to physically mix the clay. The discussion in the beginning I feel went very well also. I taught my lesson the way I did because I feel the students would understand the combining of the colors the best with physical objects. Yes, the objectives were met; the students understood that primary colors make secondary colors. I know this because many students raised their hands and said that the primary colors make the secondary colors. There were no misconceptions about this lesson that I could see. Some interventions that I used were saying the students name then sending him to work by himself. I feel it worked when I sent him to work by himself, but it did not work for very long. He had an audience when he sat by himself. I feel like I need to work on student behavior while I am giving a lesson.
3. **Planning:** The next time I use this lesson I will use the clay again and have the students make their own color wheels. I feel like they enjoyed this. Next time I would watch my time more and try to condense the lesson so it is more time appropriate. I would have misbehaving students to work by themselves again, but I will make sure it is in a more of an appropriate place. My teaching philosophy changed because I learned to successfully carry out a lesson, make sure to think like a second grader and think what will help the student be successful at the lesson. This changed my values because I need to be ready for everything and be prepared to perform the lesson and watch the students at the same time.

Before Questions

1. Do you know what a color wheel is?
2. What is it used for and who uses it?
3. What do you want to learn about it?
4. Do you know what primary and secondary colors are?

Before Answers

Student 1

1. A color wheel has different colors on it and it has samples of the colors. *Nice job, you're right it does have different colors on it.*
2. No
3. I want to learn who uses it and what it is used for. *We will be learning this today.*
4. Primary colors are colors that people use to make other colors. Secondary colors are colors of other colors that are made. *You are right, primary colors do make other colors, and you are very close about secondary colors, we will go over this later.*

Student 2

1. No
2. Some colors used for drawing or making stuff. I use it, my sister and my two brothers. *You do use it, you're correct!*
3. I want to learn what it really is .
4. I don't know what those colors are. *Don't worry you learn about it.*

After Questions

1. What did you learn about colors that you did not know before?
2. What would you have liked to learn that you did not?
3. What was your favorite part?
4. Did you enjoy using the clay to make the colors? Why?
5. Do you know what primary and secondary colors are now?

Student 1

1. I knew most of it before so it was a review. *Good for you.*
2. I would like to have learned if primary and secondary colors make brown and black. *That's a good question, we will find out on Wednesday.*
3. I liked the clay the best.
4. Yes, it was cool to see how it made the different colors. *It was cool.*
5. Primary colors make the rest of the colors; if we don't have them then we won't have other colors. Secondary colors are the colors that primary colors make. *Nice job, you are right!*

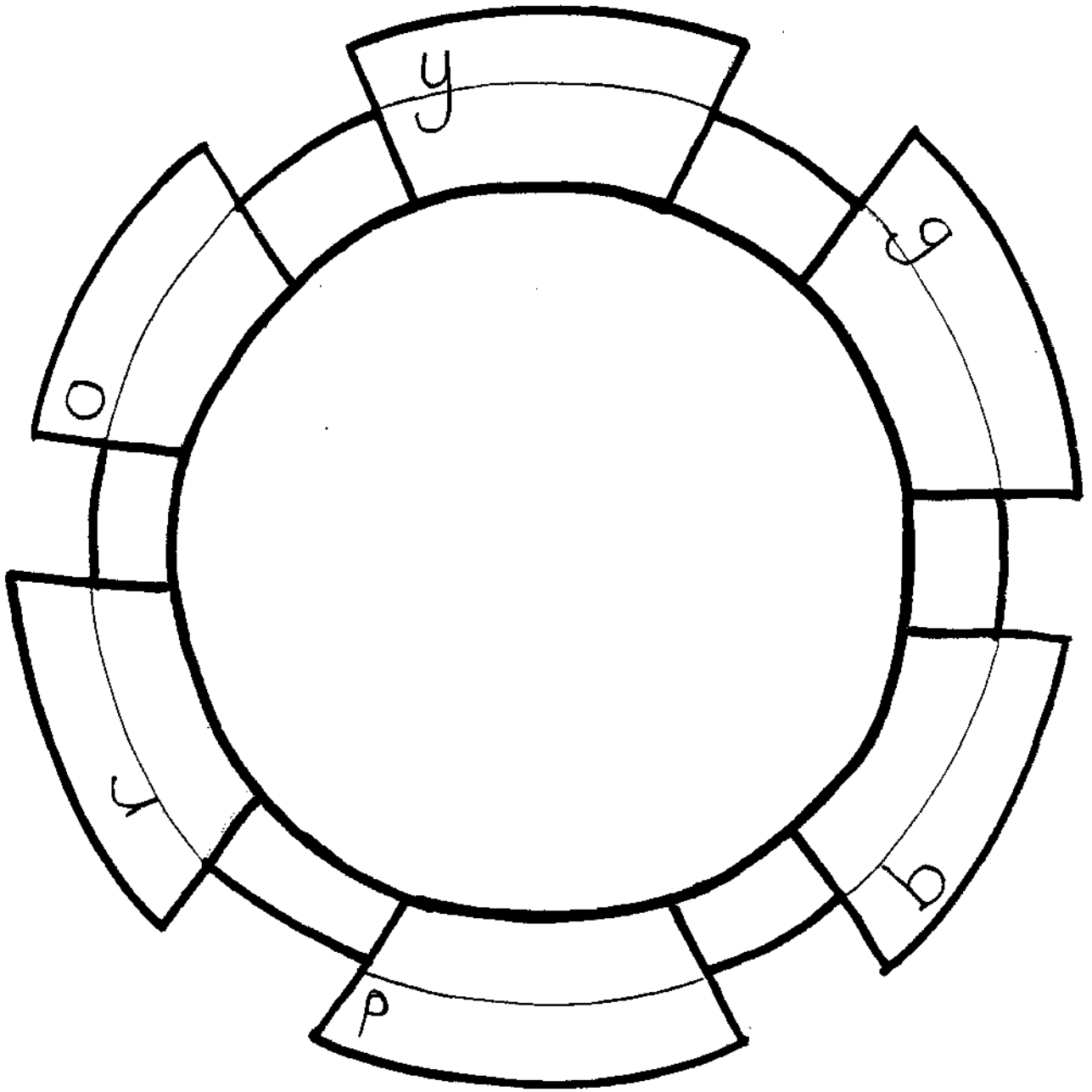
Student 2

1. I learned what a color wheel is. *I'm happy that you learned this.*
2. I don't think there is anything I did not learn.
3. I liked using the clay and coloring.

4. Yes, because I got to see the colors change in front of me. *I like the science word you used.*
5. Primary colors are yellow, red, and blue. Secondary colors are green, purple, and orange. *You're right!*

Name _____ Date_____

Color Wheel

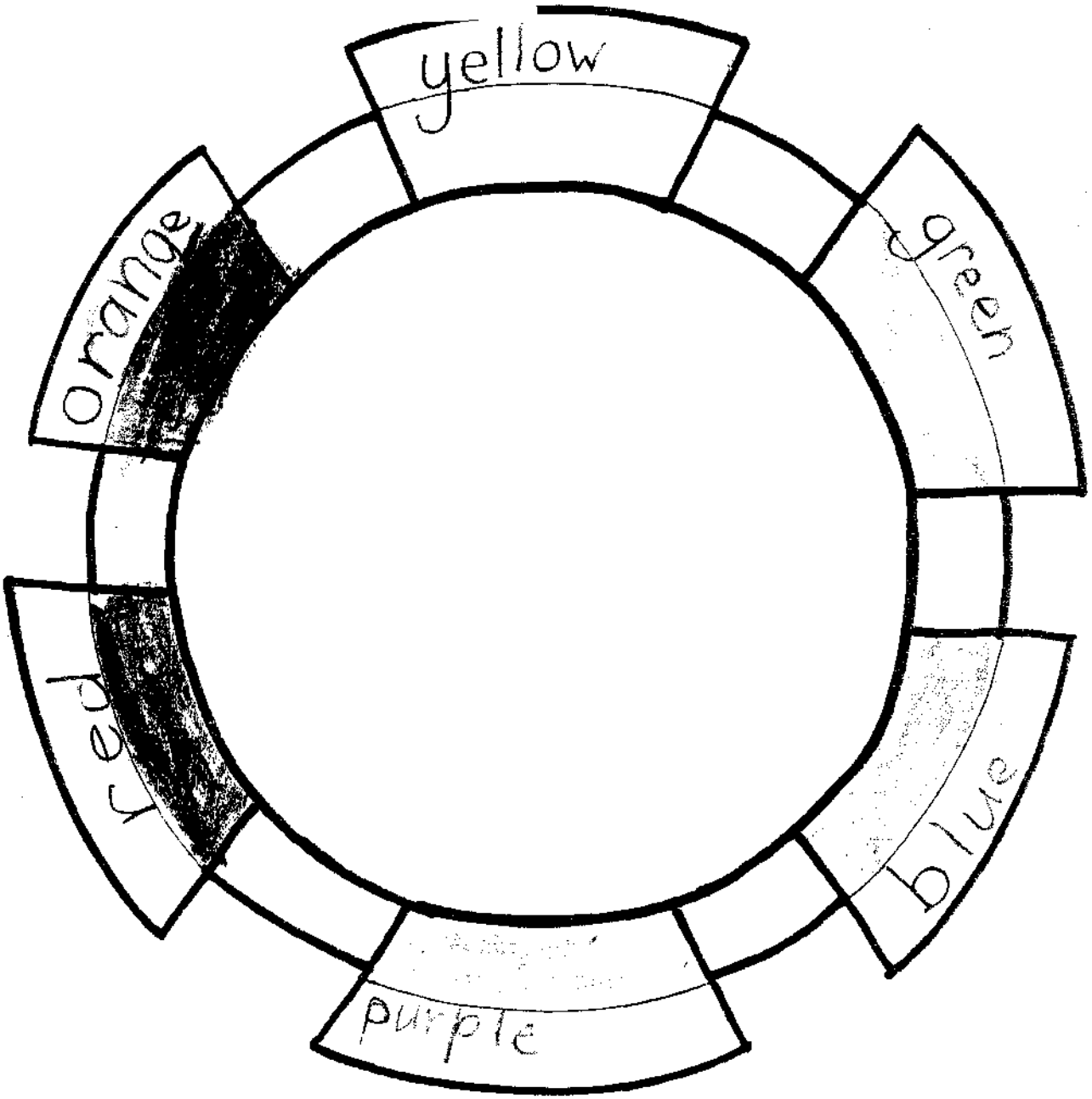


Nice Job writing the color words down. Be careful with the coloring. Nice Second grade handwriting.

Na

Date 4-13-09

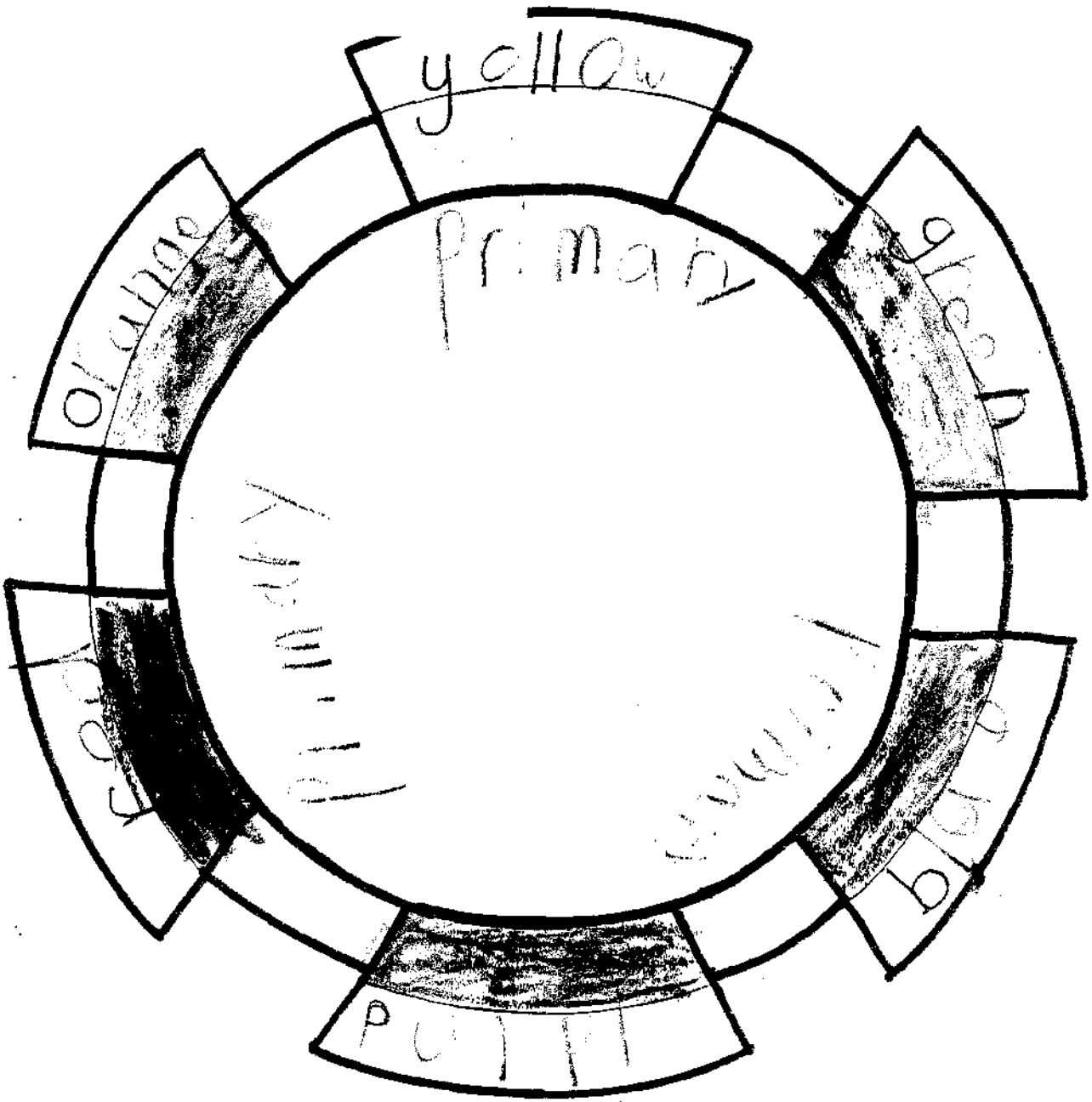
Wheel



Nan Nice Job Coloring and Writing the words. I like how you wrote primary next to the primary colors.

Date 4-13-09

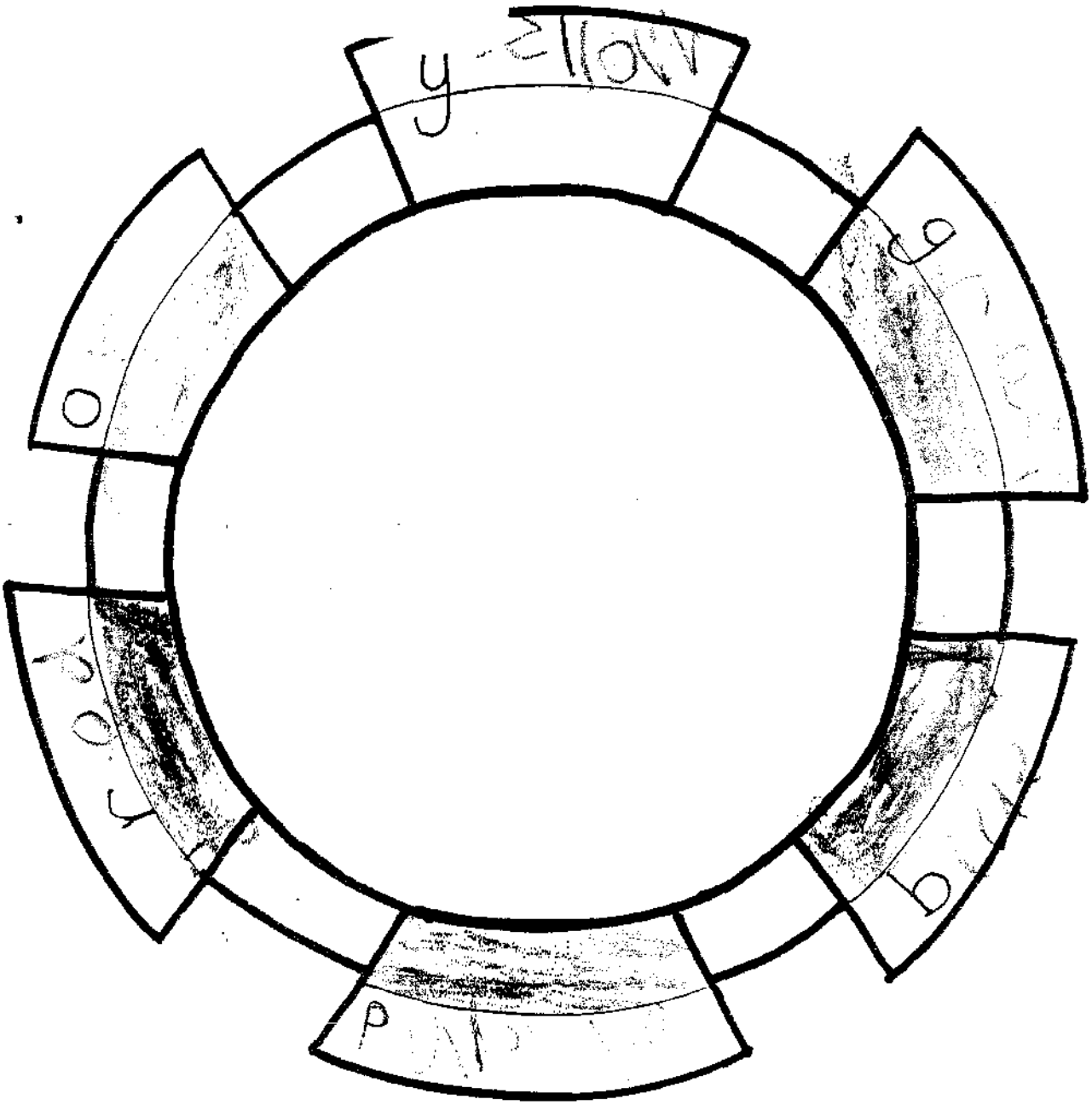
Wheel



Nice Job Try to color inside the lines. Watch how you write words in the boxes. You need to finish writing orange.

Date_____

Wheel



LESSON 10

Separating Mixtures of Color

Overview and Objectives

Students have now mixed solids and liquids and used a filter, a sieve, and the process of evaporation to separate mixtures into their components. In each case, students observed changes. In this lesson, they use a process called chromatography to separate ink into its component colors. As they conduct their investigations, students recognize that some mixtures contain "hidden" substances that are revealed only when the mixture is separated.

- Students brainstorm how colors change when mixed.
- Students use chromatography to separate black and green inks into their component colors.

Background

Many inks, marking pens, paints, food coloring, and even soft drinks are made of colored solids dissolved in a liquid. They often contain several hidden colors. For example, when you write with ink, the liquid part evaporates and leaves the color behind. Some colored inks—such as black, brown, green, and purple—are made up of more than one color. The individual colors are not distinguishable in the ink, but they can be separated by adding either water or alcohol to a sample of the ink on a piece of filter paper.

Most students at this level have had some experience with mixing colors. However, this may be the first time they have reversed the procedure and separated a colored mixture into its components. What colors are in black ink? Students can separate black ink into its component colors by using chromatography. **Chromatography** is a process in which a liquid or gas "carries" a mixture along on special paper and separates it into its components.

After marking the center of a coffee filter with black ink, students put one drop of water on the ink mark at a time. The filter paper absorbs the water, which creeps outward, dissolving and carrying the ink and separating it into its various colors—yellow, red, and blue. The ink mark on the filter paper "explodes" into rings of color (see Figure 10-1, on pg. 111, for an example). Each color moves to a different place on the filter paper. This happens because the water can carry the smaller, lighter particles faster and farther than it can carry the bigger, heavier ones. Blue dye travels the farthest, while the slower-moving colors—red and yellow (which sometimes appear together as orange)—are left behind in rings around the center mark. Students will use the same process with green ink, which separates into yellow and blue.

LESSON 10

Materials

For every two students

1 copy of **Record Sheet 10-A: Separating Mixtures of Colors**
1 paper tray, 18 × 24 cm (7 × 9½ in)
1 large clear plastic cup, 270 ml (9 oz)
1 dropper bottle, 7 ml (¼ oz), filled with water
1 cone-shaped coffee filter, No. 4 (cut into two flat pieces)
Scissors
Glue

For the class

8 water-soluble black markers
8 water-soluble green markers
1 sheet of newsprint
Assorted colored markers
Masking tape
Cleanup supplies

Preparation

1. Make one copy of **Record Sheet 10-A: Separating Mixtures of Colors** (pg. 114) for each pair of students.
2. Title the newsprint "What We Know about Mixing Color." Date and hang the sheet.
3. For each pair of students, prepare the following materials:
   - Cut a coffee filter into two identical, flat sections. (Figure 10-1 on pg. 111 includes an illustration of the cut filter paper.) Each student pair gets two pieces of cut filter paper.
   - Pour water into the dropper bottle. Cap each bottle.
4. Arrange the materials at the distribution center.

Procedure

1. Ask students to think about times when they mixed paints, blended colors in a drawing, or mixed drops of food coloring. How did the colors change when they were mixed? Record students' ideas on the newsprint.
2. Let students know that in this lesson, they will use filter paper to separate ink into its hidden colors. Encourage students to add to the list any questions they may have about separating colors.
3. Distribute and review **Record Sheet 10-A: Separating Mixtures of Colors.**
4. Have students collect their materials from the distribution center.
5. Show students a dropper bottle. Have them practice releasing onto the cardboard tray one drop of water at a time.

Management Tip: Students will need to take turns using the black and green markers during the investigation. Decide how you will have them share the markers.

6. Guide students as they complete the following steps (see Figure 10-1).
   - Place the tip of the *black* marker on the center of one of the filter papers. Do not move the marker. Hold it there for four seconds (count "One-1,000; two-1,000," and so on). Blow on the ink mark to help it dry.

- Place the tip of the *green* marker on the center of the other sheet of filter paper. Hold the marker in place for four seconds. Then set the filter paper aside to let the ink dry.
- Place the filter paper with the *black* ink mark over the large cup so it lies flat. Center the black mark over the cup.
- Using the dropper bottle, place *one drop* of water on the ink mark. Squeeze the bottle very gently.
- Wait three to four seconds. Discuss with your partner the changes you see.
- Now place another drop of water on the ink mark. Remember to use only one drop. Wait three to four seconds. Observe. Discuss your observations. Do this two or more times until there is no more change.
- Record your observations on the record sheet.

re 10-1

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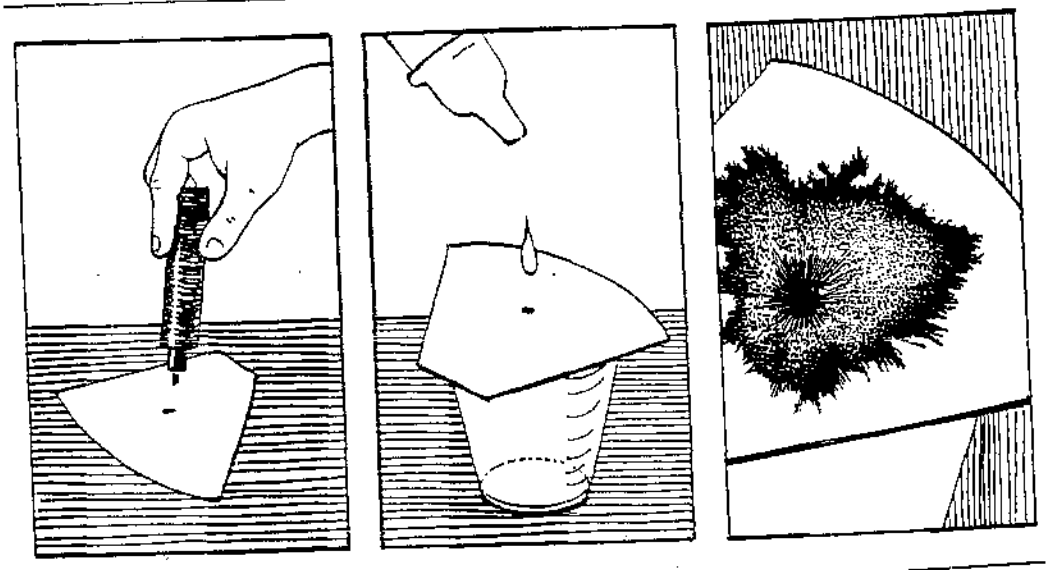
matography
stigation



7. Have students repeat the investigation with green ink using the following procedure:
   - Remove the filter paper that you used to separate the black ink. With a pencil (not a marker), write "Black" near an outer edge of the filter paper. Set the filter paper aside to dry.
   - Place the filter paper with the *green* ink mark on the cup so it lies flat across the top. Center the ink mark over the cup.
   - Place *one drop* of water on the green mark. Wait. Observe the changes. Discuss them with your partner.
   - Place another drop of water on the green mark. Again, wait to observe the changes. Repeat this two or three more times. Write the changes on your record sheet.
   - Remove the filter paper. With a pencil, write "Green" near an edge of the filter paper. Set the filter paper aside to dry.
8. Have students clean up. They should keep the two filter papers on their work spaces. They will trim and glue the filter papers to their record sheets at the close of the lesson.

: / Changes

Final Activities

1. Have students discuss their observations. Ask questions such as the following:
   - How did the black ink change?
   - How did the green ink change?
   - From what you observed, what colors were mixed to make black ink? What colors were mixed to make green ink?
   - Did anything surprise you? If so, what?
   - Were you able to answer any of your own questions recorded on the newsprint?
2. Challenge students to think of possible explanations for the changes they observed. Help them recognize that the dried ink mark is a mixture of dyes and that the water on the filter paper helped separate the ink into its colors.
3. After the filter papers are dry, have students cut each one into a circle of "separated colors." They can use a very small amount of glue along the edges to attach the circles to **Record Sheet 10-A: Separating Mixtures of Colors.**
4. Let students know that in the next lesson, they will use what they have learned in Lessons 1 through 10 to separate and identify substances in a mystery mixture.

Extensions

ART

1. Have students make a drawing on white construction paper, manila paper, or other absorbent paper. They should use a black marker (or a green, brown, or purple marker) and then paint the drawing with water. Watch the colors spread!

SCIENCE

2. With adult supervision, students can repeat this lesson's investigation with other inks, food colorings, or berry juices. They can also try using a liquid other than water (such as rubbing alcohol or white vinegar) to separate the colors of each mixture. What colors do they see when they separate the mixture with alcohol? What colors do they see when they use vinegar? Do the colors "explode" in different patterns with each liquid?

ART

3. Students can create rainbow circles using a circular coffee filter, colored markers, and water. Have students use markers of various colors to draw several lines or designs in the center of the coffee filter. Then fold the filter in half and again into fourths, so it is shaped like a cone. Dip the point of the cone (where the drawing is hidden) into a large cup that is half full of water. Keep the filter folded and allow it to dry for a few hours. Open the filter. What a surprise!

SCIENCE

4. Divide the class into four groups. Give each group a different kind of black marking pen. Ask each group to write an anonymous note. Have the class use the chromatography activity from this lesson to identify the team that wrote each note.

SOCIAL STUDIES

5. Invite a criminologist or police officer to your classroom to discuss how chromatography is used in solving crimes.

LANGUAGE ARTS

6. What does the exploding pattern of colors from this lesson look like? Have students use their imaginations to write a story about one of the exploding circles of color glued to their record sheet.

Stacey Polewarczyk 4-15-09 2nd Grade
Subject: Science Topic: Color Separating

Purpose: To give students knowledge that there are different colors that makes up one color.

Curriculum Standard: – Unifying Concepts of Science
S: SPS2:2:4.1 discover that things change in some ways and stay the same in some ways.

S: SPS2:2:4.2 understand that people can keep track of some things by seeing where they come from and where they go.

S: SPS2:2:4.3 Observe that things can change in different ways, such as in size, weight, color and movement.

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Objectives:

- Given the filter paper the students will be able to place a dot of black ink to discover what makes that color.
- Given the filter paper the students will be able to place a dot of green ink to discover what makes that color.

Materials Needed for Learning Experience:

Teacher: filter paper, droppers with water, black and green markers, cups, trays, record sheets, pencil, more filter paper to use as a follow up activity.

Students: two filter paper each, a black and green marker, two cups, one dropper with water, one tray, one record sheet, pencil, filter paper for follow up activity.

Anticipated Length of Learning Experience: about 30 minutes

Student Grouping: Whole group when I am giving directions, individual when working on experiment.

Prerequisite Knowledge:

Teacher: The teacher needs to know how to do the experiment and how to facilitate to the students. The teacher needs to know the different terms used when describing the experiment.

Students: The students need to know about the different colors, such as primary and secondary.

Purpose:

1. **Introduction**
    - I will ask the students what we did on Monday.
    - I will ask the students if they remember what we found out and learned from the activity.

- I will tell the students that they are scientists during this experiment so they need to follow directions.
- I will remind the students to be safe, respectful and kind when we are performing this experiment.

2. **Body of Learning:**
   - I will ask the students to get the needed materials for the experiment but not to touch anything yet.
   - I will tell the students that they may need to share the markers, that there are not enough for all the students to have their own.
   - I will keep the students at their tables while I am giving instructions.
   - I will tell the students that they will be separating colors that not all colors are exactly what they look like.
   - So we will be finding out what colors go into making black and green.
   - I will tell the students that they need to be exact with everything. Otherwise they may not get the finished product.
   - I will tell the students that when it is time to use the dropper they must only do one drop. I will show the students.
   - I will have the students all at the same time release only one drop.
   - I will tell the students if they put too much water on the ink then the color will not show its true colors.
   - I will tell the students to take their black marker place it on the center of the filter paper and hold it there for 4 seconds, and count out loud one 1,000, two 1,000, etc.
   - After let the marker release blow on the ink to help it dry.
   - Place the paper on the cup so it is flat.
   - Repeat with the green marker.
   - I will tell the students now that the paper with the black ink is over the cup, to take their dropper and be VERY CAREFUL, and place one droplet in the center of the dot.
   - I will tell the students to wait three to four seconds then place another droplet of water very carefully over the center again.
   - I will have the students get a teacher to approve and if needed, they may receive another drop to make the colors come out.
   - After the students have gotten their approval they may record what colors they see on the record sheet. They use the color dictionary again to help with spelling.
   - Repeat with green ink.
   - I will ask if there are any questions.
   - I will tell the students when they are all done to carefully cut around their ink circle and glue it onto the record sheet.
   - I will pass out the record sheets.
   - I will let the students begin, but Mrs. Blackburn and I will be walking around to assist any students who may need help.
   - While the students are working I will pass out the extra filter paper, so the students can explore the markers and droppers a bit more.

- The students can decide if they want to make design if they wish.
- After they are finished the students can put their finished record labs in the completed workbox.

3. **Conclusion:**
   - The students can put their materials away and clean up their areas.
   - I will send the students to the meeting area where we will discuss what they saw, did, if they enjoyed the activity, etc.
   - I will ask the students if they enjoyed this and if they would like to do this again.
   - I will tell the students that later on, since we just did two experiments about color, we will be writing about color later in the day.

Assessment:

1. **Formative:** When I let the students work on the worksheets after I give directions I will look to see if the students are following instructions. I will check to see if the students are placing one drop of water at a time over the color dot. I will also look to see if the students are taking their time and really observing the changes. If the students are not understanding the directions I will stop what they are doing and I will have a student demonstrate for the rest of the class.
2. **Summative:** I will ask the students what colors they see and what they are expecting. I will tell the students that since we just did two activities on color later we will be writing a poem on color.

Child Guidance:

Proactive Considerations: If there is any confusion I will go over the directions in another way. I will show the students how to use the dropper and the filter paper again if need be. If a student is not cooperating, on the second time I have to speak with him I will send him to work by himself. If the whole group is not cooperating I will stop them and have them take a break and to try it again in a minute or so. I will have the students stop talking and be completely silent. The students will be working at their tables and will be able to talk to their neighbors quietly, if they can work appropriately. I will ask the students questions and I will choose different students each time. At the end of the activity I will choose different students to share their experiences, not all the same students.

Reactive Considerations: I will only talk to a student once, and then I will send him to work by himself. If students are having trouble paying attention, I will stop and ask some questions and maybe have the students take a break. If there are some students who have some confusion about the directions, I will retell the directions. I will show more while I am giving directions.

Needs for Lesson Participation: Some students may have difficulty dropping one drop of water into the color dot. Some students may get frustrated that they cannot get one drop of water right away. I will remind those students that it is a real science experiment and that scientists have done this before. That is how they found out about these colors. I

will have to convince the students that they are scientists, and that nothing great can happen right away.

Modification Required: I can sit next the student and go through with him what to do and help him, so he does not get frustrated or overwhelmed. The classroom can be quiet, and respectful of others who are working hard. If any students any need any assistance I will work with them step by step so they complete the lesson correctly.

Resources Used: Please see attached original procedure

Lesson Reflection:

1. **Description:** This lesson took place on Wednesday April 15, 2009. I started the lesson at the meeting area where I started to discuss with the students what we did on Monday. When we were done talking about that, I started to give the students an introduction to the new experiment. I sent the students to their tables, where the experiment took place. The students did every step together, that way they would all get the "Oh Wow" effect at the same way. When the students were done with the experiment they wrote on their record sheets. At the end the students were free to experiment by themselves and see what would happen if we added more water or more dots to the filter paper.
2. **Analysis:** I think the "Oh Wow" effects went well when the students were completing the steps at the same time. All the students completed the record sheet the correct way, which makes it easier to read. I taught the lesson the why I did so the students could experience everything at the same time. Yes, the objectives were achieved by all students because the students put the dot and saw it expand with color. There were no misconceptions that I could see. The positive impact I made on the students was I made science more fun and exciting just using simple every day things.
3. **Planning:** If I were to do this again I would use the same materials and I would have the students do the steps at the same time again. Next time I might be more careful with how the students experiment by themselves, some students used too much water which made a mess. I would use the intervention to have the distracting student to work by themselves, so they do not bother the ones around them and themselves. The children impacted my teaching philosophy by making me realize I need to have a more authoritative voice and take control. My values changed because I now know how much planning not only goes into the getting the project ready but the clean up also.

Before Questions

1. Have you ever separated colors before? If so when, how?
2. What do you want to learn about separating colors?

Student 1

1. No
2. When I separate colors I want to learn if it will show the colors that make it. *We will find out.*

Student 2

1. No
2. What colors are made out of. *We will find out.*

After Questions

1. Did you enjoy this activity?
2. What didn't you learn about color separating that you wanted?
3. Do you know what chromatography is?
4. What was your favorite part?
5. Do you think you could do this by yourself?

Student 1

1. Yes, it was fun. *I'm glad you enjoyed this.*
2. I did learn when you separate colors it shows the colors it makes.
3. No, I forget. *That's okay it is when colors separate.*
4. Separating the black colors, because it had cool colors. *It did have some cool colors.*
5. Yes I think so. *I think you could too.*

Student 2

1. Yes, I didn't know there were hidden colors in other colors. *That's a good* way to put it.
2. What other colors make. *Maybe at another time.*
3. It is separation of colors. *Nice job.*
4. I liked the experimenting part. *I'm glad you liked that, you did a nice job.*
5. Yes. *I think so too.*

Record Sheet 10–A

Names: _____

_____

Date: _____

Separating Mixtures of Colors

Color	What I see
Black	
Green	

My separated colors:

Black Ink

Glue here

Green Ink

Glue here

LESSON 10

Record Sheet 10–A

Names: _____

Date: _____

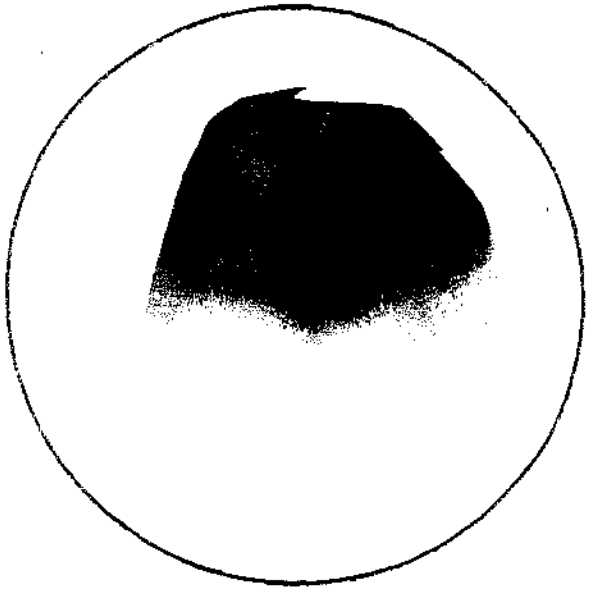
Nice Job writing the colors down. But next time use the Spell check your Spelling. Are those all the colors you see?

Separating M

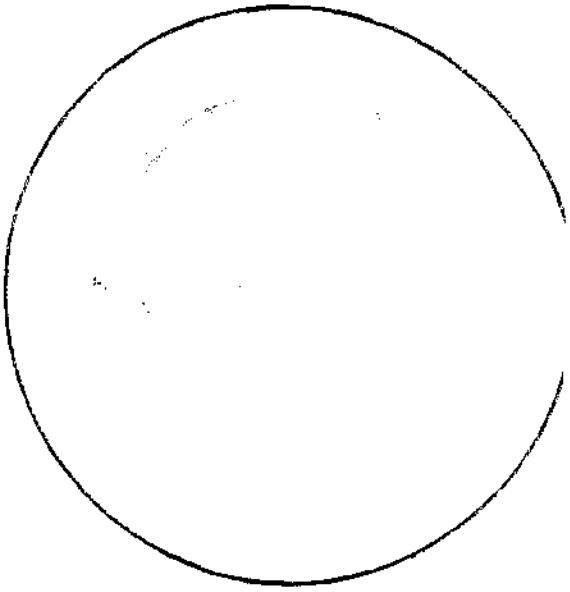
Color	[illegible]
Black	[illegible]
Green	[illegible]

My separated colors:

Black Ink



Green Ink



Record Sheet 10–A

Names: Nice Job writing the colors that you see down. Be careful with spelling, you can use the spell check next time. You saw a lot of colors!

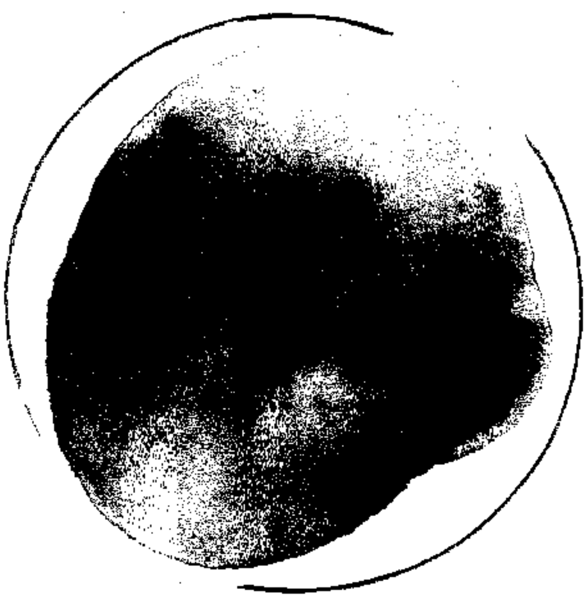
Date: 4-15-97

Separating Mix

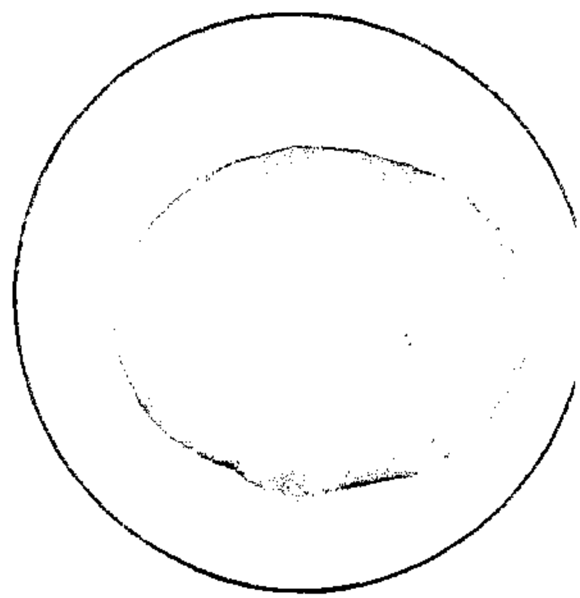
Color	
Black	I see blue [illegible] p[illegible] [illegible] with [illegible]
Green	blue [illegible] [illegible] white [illegible]

My separated colors:

Black Ink



Green Ink



Record Sheet 10–A

Names: ______________________

Great Job writing the colors down. Nice Spelling! You saw many colors in the color dots.

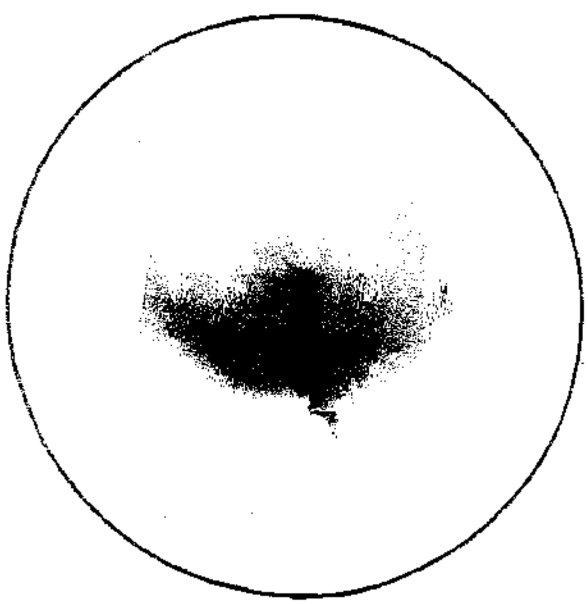
Date: 4-15-06

Separating Mi

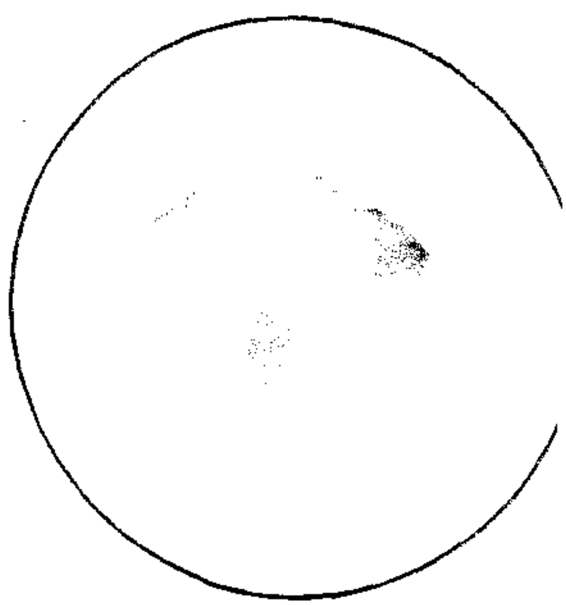
Color	
Black	purple, [illegible] orange.
Green	[illegible]

My separated colors:

Black Ink



Green Ink



Stacey Polewarczyk 4-15-09 2nd Grade
Subject: Writing Topic: Color Poems

Purpose: To get the students thinking about what colors and writing similes about colors.

Curriculum Standard: Child Guidance:
Informational Writing
Reports, Procedures, or Persuasive Writing – Using Elaboration Strategies (IW:3)
W: IW: 2:3.1: Including details/information relevant to topic and/or focus (Local)

W: IW: 2:3.2: Using sufficient details/pictures to illustrate facts (Local)

http://keene.blackboard.com/webapps/portal/frameset.jsp?tab=courses&url=/bin/common/course.pl?course_id=_26330_1

Objectives:
- Given different colors the students will be able to write a four line poem that includes what the color resembles.
- Given the colors the students will be writing similes that involve that color plus three more.

Materials Needed for Learning Experience:
Teacher: The teacher needs the template paper for the students to write on, the book My World of Color, by Margaret Wise Brown, pencils, crayons, stencils, whiteboard, whiteboard markers.
Students: The students need the template paper, pencil, crayons, and stencils if some wish.

Anticipated Length of Learning Experience: about 45 minutes

Student Grouping: When I give directions it will be whole group, but when students are working on their writing it will be individual.

Prerequisite Knowledge:
Teacher: The teacher needs to know if the students know their colors. The teacher also needs to know if the students know about similes.
Students: The students need to know about colors. They also need to know about similes and how to write them using color.

Procedure:
1. **Introduction:**
   - I will tell the students since we just did two experiments on color; I thought it would be a fun idea to write about color.
   - I will tell the students that they will be writing a four lined poem that include similes about colors.
   - I will ask the students what similes are.

- I will have a student explain to the rest, or I will explain if no one knows what it is.

2. **Body of Learning Experience:**
   - I will send the students to the meeting area.
   - I will remind the students to be safe, respectful, and kind.
   - I will introduce the book I am reading to the students, My World of Color by Margaret Wise Brown.
   - I will ask the students to think while I am reading the book of all the similes that they hear and to listen about what the author is comparing to the different colors.
   - I will begin to read the book.
   - I will stop when needed to ask questions to keep the students engaged.
   - When I am finished reading the book I will ask the students to think of all the different colors that they saw and what they were being described as.
   - I will ask the students to think of the similes that they heard.
   - I will tell the students to think for two minutes and after they are done thinking we will brainstorm on the board some ideas for their poems.
   - When I have given the students two minutes to think I will ask the students to raise their hands and tell me some ideas.
   - I will have the students tell me their ideas and I will write the ideas on the white board in big words so all the students can see.
   - I will take some ideas from all of the students.
   - If the students are having hard time thinking, I will put some ideas on the board to help them.
   - When the students are done brainstorming, I will give directions about their poems.
   - I will tell the students that they will be writing a four lined poem, and that all four lines must include similes about color.
   - When they are finished writing, they may begin to color their poems with the colors and the objects they use to describe.
   - I will tell the students that when everyone is finished, they will share their poems to their friends.
   - I will pass out the papers at the meeting area to the students who can show me that they are ready to begin writing.
   - I will remind the students that the first thing they must do is put their name at the top of the page.
   - When the students are finished they may take out a silent reading book.
   - When everyone is finished I will send the students back to the meeting area so we can do our sharing.
   - I will encourage students to share their poems.
   - I will share my poem that I wrote to show the students that it is okay to share their writings to the class.
   - I will encourage the students to clap for one another after they have finished reading.

3. **Conclusion:**

- I will ask the students what they thought of this activity.
- I will ask the students if they enjoyed writing about this topic.
- When the students are finished sharing I will have them clean up their tables and their materials.

Assessment:

1. **Formative:** When I let the students start writing their poems, I will look to see if the students are using similes. I will check to see if the students are thinking about what colors remind them of and if they are using the ideas on the board or even using some of their own ideas. If the students are not understanding the directions I will stop what they are doing and I will have a student give another example for the rest of the class.
2. **Summative:** I will ask the students what colors they like and what it reminds them of. I will tell the students that they saw many different colors over the past two days and have learned about mixing and separating colors, so now their task is to write a poem that will describe the colors they like best.

Child Guidance:

Proactive Considerations: If there is any confusion I will go over the directions in another way. I will give the students some more examples of similes. If some students get frustrated about coloring or writing I will help him come up with some ideas. I will let some students use a stencil to help draw what they are writing about. If a student is not cooperating, on the second time I have to speak with him I will send him to work by himself. If the whole group is not cooperating I will stop them and have them take a break and to try it again in a minute or so. I will have the students stop talking and be completely silent, so they can get their work done. The students will be working at their tables and will be able to talk to their neighbors quietly, if they can work appropriately. I will ask the students questions and I will choose different students each time. At the end of the activity I will encourage different students to share their poems.

Reactive Considerations: I will only talk to a student once, and then I will send him to work by himself. If students are having trouble paying attention, I will stop and ask some questions and maybe have the students take a break. If there are some students who have some confusion about the directions, I will retell the directions. I will give more examples, while I am giving directions.

Needs for Lesson Participation: Some students may have difficulty coming up with ideas about what to write about. I will encourage that student to use the ideas on the board if they get stuck. Some students may get frustrated that they cannot draw as well as others, and in that case I will let those students use stencils to help draw. I will try to remind the students to think things through. I will try to tell the students to think of their favorite colors and what they think of when they see those colors.

Modification Required: I can sit next the student and go through with him what to do and help him, so he does not get frustrated or overwhelmed. The classroom can be quiet, and respectful of others who are working hard. If any students any need any assistance I will work with them step by step so they complete the lesson correctly.

Resources Used:

Wise Brown, M. (2002). *My World of Color*. New York: Hyperion Books for Children.

Lesson Reflection:

1. **Description:** I completed my lesson on Wednesday April 15, 2009. I started my lesson at the meeting area where I concluded my first science experience and tied into the color poems. While I read the book, I had the students think about all the different similes that they heard and think of some of their own. After I read the book, the students brainstormed some ideas that I wrote on the chart paper. I explained the poem and what the students would be doing for their poems, so they would have a better idea off what I expected.
2. **Analysis:** The brainstorming went very well all the students were excited to share their ideas and thoughts. I taught the lesson the way I did so the students would understand that I was trying to connect the first two experiments together with the poems. Yes, the objectives were achieved by all students. The students all understood that they needed to write similes about color. A common misconception that some students had was if they could write a simile about anything. I had to clarify this and explain that it was just on colors. The positive impact I had on the students was how to write a simile poem.
3. **Planning:** I will try to connect the first lessons into the poems so the students understand that they all go together. I do not think I would do anything differently next time. I like the way I taught this so the students can really grasp the similes in the book and with colors. The students changed my teaching philosophy because I learned it is a good idea to re teach and re go over things to help remind the students of the present topic.

? work samples?

Questions

1. What are similes?
2. Did you like writing about colors?
3. What was your favorite part?
4. Did you like the book?
5. Did you have any trouble with this?
6. What do you think you did well with?

Student 1

1. When you compare things. *Correct.*
2. Yes I love colors, so it was fun to write about them. *I like colors too, it is fun.*
3. The class brainstorming part. *Every one had some great ideas.*
4. Yes, I liked the colors in the book. *They were beautiful colors.*
5. No I think I did a good job. *You did.*
6. I think I came up with some good similes. *I think so.*

Student 2

1. When you use, as, when comparing two things. *Yes, you are right.*
2. Yes.
3. I liked when I started to write about ideas. *That's good.*
4. Yes, I liked the pictures. *The book had some nice pictures.*
5. I think I had trouble coming up with some ideas. *You did fine once you started.*
6. Drawing pictures. *Your pictures are coming out awesome.*

Final Reflection

My overall thought on the lesson is that I think it went very well. I enjoyed teaching the students about colors. The lessons were three fun activities for the students to really learn some new concepts and still take pleasure in about completing the experiments.

If I were to change some things to enhance the students' learning I would research more deeply into the topic. I had a little girl say something that I did not know. I tried to play it off like I was very interested and that I learned something new, which is true, but I felt embarrassed. It made me realize that when I research I need to be more thorough with it so I can be the one to teach my students. Another thing I could have done differently was let the students explore a bit more with the experiment. I was a little too strict with them, but it is a learning experience so now I know what to be careful of. My cooperating teacher and I discussed this and it made me realize that I am trying a bit too hard to do well. I need to just let it flow more, which will come with experience.

During this project I have learned a lot. I learned that science is much different from literacy; even though literacy is involved it is not taught the same way. When I was performing my first lesson, I taught it more as an art lesson rather than a science lesson. My cooperating teacher and I discussed that next time I need to focus on the subject being taught, I need to use science words with the students and never be afraid to repeat important concepts. At this stage in a child's life it is very important for students to hear the major ideas and concepts repeated to help them fully grasp them.

I have realized during this experience I need to try not to worry as much if I am doing it right, but try to relax and just let teaching flow. I need to think like a second grader, so I will know what words, terms, and concepts I need to change or work with. If I think like a second grader it will help me explain the lessons better so they understand better. I have never taught science before, but I do like it a lot. I enjoy watching the students get the "Oh Wow!" moments! That makes the job that much better to see the expression on their faces when they learn something new and find out something exciting.

When it came time to figure out a plan of action for my science topic I went straight to my cooperating teacher and we discussed what I should do. It was a toss up with the colors or gases. I choose to do colors because we thought it would be more fun for the students to do something light before their break. When I was researching the topic I came across many interesting articles that helped me figure out what I would facilitate and write about in my research paper.

In my lesson plan formats I put a lot of thought into it and really thought about what I did and how I could improve. When I taught my lesson to my peers I received a lot of helpful responses to give me more confidence with my lessons. I did change some areas on my lesson plans where my peers told me something that would work better and it did.

I taught three lessons with three work samples from each lesson. I wrote on each work sample and gave the correct responses to each. When I created the rubric I kept the goals in mind of what I wanted the students to learn and achieve. I added a table of contents to help the reader figure out what goes were

and to make it easier to look up things. After I taught my lessons and I went back to think about what I had learned as a teacher and as a student I realized I had grown but did have some ways to go as far as what I needed to learn to become a better teacher. I enjoyed this project very much and I enjoyed teaching something other than literacy to my students.

[redacted]

Points Earned:			
B. Teach your lessons and collect work samples. **Points earned:** 9	Student met minimal requirements for teaching lessons and little, if any, evidence of students' emerging scientific literacy. Fewer than 3 work samples collected and comments about student's work product attached to sample with sticky note. Rubric not applied to all three samples. **0-6 points**	Some of the requirements for teaching lessons and some evidence of students' emerging scientific literacy met. Fewer than 3 work samples collected and/or comments about student's work product attached to sample with sticky note are missing. Rubric may not be applied to all three samples to determine students' learning. **7-9 points** 9	Required lessons taught, with evidence of students' emerging scientific literacy. Three or more work samples collected. Comments about students' work product attached to sample with sticky note. Rubric applied to all three samples to determine students' learning. **10-11 points** (9)
C. Rubric **Points earned:** 10	Rubric developed is not appropriate to age group and does not match lesson objectives. Provides a poor assessment of students' learning. No evidence of before/after interview w/one student to assess learning. **0-6 points**	Rubric developed may not be appropriate to age group and/or match lesson objectives. Provides a fair assessment of students' learning. Before/after interview w/one student to assess learning is minimal. **7-9 points**	Rubric developed is appropriate to age group and matches lesson objectives. Provides a good assessment of students' learning. A before/after interview w/one student to assess learning. **10-11 points** (8)
STEP III. PROFESSIONAL CONSIDERATIONS **A. Presentation and self-assessment rubric completed.** **Points earned:** 10	Did not meet project expectations and requirements. Project needed editorial work. Poorly organized. Scoring rubric not completed. **0-6 points**	Met most project expectations and requirements. Several editorial issues. May not be well organized. Self-scoring rubric may not be completed. **7-9 points**	Met and/or exceeded project expectations and requirements. Few editorial errors. Well organized with table of contents and tabs. Self-scoring rubric completed. **10-11 points**
B. Final Reflection **Points earned:** 10	Discussion of the value of the Science Project experience is minimal and does not include comments on the effect of the lessons on student and/or candidate growth. **0-6 points**	Includes analysis of effectiveness of the development and teaching of the lessons in light of student learning. Analysis of candidate's own growth as a science educator examined. **7-9 points**	Includes in depth analysis of the development and teaching of the science lessons in light of student learning. Reflection of candidate's own growth as a science educator fully explored. **10-11 points** (10)

Points earned: 88 /100 ____/20 **Grade =** ____

87/100 B

[redacted] - This is very well done. Your grammar issues are much fewer & you thoroughly covered many areas.

Stacy

EDUC 322 - Science Project Rubric

	Needs Improvement	Slightly Below Expectation	Meets or Exceeds Expectations
STEP I. PLANNING AND PREPARATION **A. Select the topic.** **Points earned:** 10	More than one part missing or not covered fully: explanation of topic including review of meeting with cooperating teacher and alignment with state standards, general description of project includes content and organization, description of how it fits with science program. **0-6 points**	Some required parts may be brief or missing: explanation of topic including review of meeting with cooperating teacher and alignment with state standards, general description of project includes content and organization, description of how it fits with science program. **7-9 points**	Thorough explanation of topic including review of meeting with cooperating teacher and alignment with state standards. General description of project includes content and organization. Description of how it fits with science program. **10-11 points** 11
B. Research the topic. **Points Earned:** 9	Summary shows minimal new learning. Content is lacking in depth. **0-6 points**	Summary articulates some new understandings. Content not as in depth or may not include material above and below grade level. **7-9 points**	Summary articulates new understandings in depth. Content contains material above and below grade level researched. Research paper shows thorough knowledge of subject. **10-11 points** 10
C. Annotated References **Points Earned:** 10	References are minimal and are not completed in correct APA style. Did not use all the required resources. **0-6 points**	Used fewer than: 3 teacher resources (not from the Internet), 1 children's book, and/or 3 web sites. Web sites have little connection to project development. References may have errors in APA or in annotations. **7-9 points**	Used: 3 teacher resources (not from the Internet), 1 children's book, and 3 web sites. Evidence that web sites contribute to project development. References completed in correct APA style with annotations. **10-11 points** 9
D. Developing lesson plans. **Points earned:** 11	Some components of the Lesson Plan format missing and little detail included. Scientific method of inquiry is weak. May not include good reflection. **0-6 points**	Most components of the Lesson Plan format addressed, using a scientific method of inquiry. Includes reflection. **7-9 points**	All components of the Lesson Plan format addressed using a scientific method of inquiry. Includes thoughtful reflection. **10-12 points** 11
STEP II. INSTRUCTION **A. Micro-teach your lesson to your peers.** 9	Micro-taught a lesson to peers. Summary is lacking in depth and does not show evidence of reflection. May not have included peer feedback forms. **0-6 points**	Micro-taught a lesson to peers. Wrote a brief summary of this experience, may not have included adjustments made based on peer feedback. Included peer feedback forms. **7-9 points**	Micro-taught a lesson to peers. Wrote a thoughtful, in- depth summary of this experience, including adjustments made based on peer feedback. Included peer feedback forms. **10-11 points** 9