

## Lesson Plan

### The Northern Lights in a Bowl

**Developed by:**

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**Discipline / Subject:**

Language Arts and Science

**Topic:**

Mixtures and Solutions - Science

**Grade Level:**

4<sup>th</sup> grade – can be modified to any grade K-6

**Resources / References / Materials Teacher Needs:**

1. Northern Lights A to Z by Mindy Dwyer
2. For each group give bowls, food coloring, a cup with dish soap, Q-tips, plastic cups, and the different kinds of milk: whole milk, 2% milk, fat free, heavy cream, buttermilk, and water
3. Scientific method worksheet and KWL worksheet (attached)
4. Snapguide.com:  
<https://snapguide.com/guides/create-the-northern-lights-in-a-bowl/>

**Lesson Summary:**

In this lesson, students will learn about the northern lights by reading the book Northern Lights A to Z by Mindy Dwyer and recreate the lights in a science experiment highlighting the differences between mixtures and solutions.

## **Standards Addressed:**

### **Common Core State Standards - CCSS**

CCSS.ELA-LITERACY.RL.4.7

Make connections between the text of a story or drama and a visual or oral presentation of the text, identifying where each version reflects specific descriptions and directions in the text.

CCSS.ELA-LITERACY.RL.4.8

(RL.4.8 not applicable to literature)

CCSS.ELA-LITERACY.RL.4.9

Compare and contrast the treatment of similar themes and topics (e.g., opposition of good and evil) and patterns of events (e.g., the quest) in stories, myths, and traditional literature from different cultures.

### **Texas State Standards – TEKS**

5. (C) compare and contrast a variety of mixtures and solutions such as rocks in sand, sand in water, or sugar in water.

### **Next Generation Science Standards - NGSS**

PS1.A: Structure and Properties of Matter

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)
- Different properties are suited to different purposes. (2- PS1-2),(2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

PS1.B: Chemical Reactions

- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)
- Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2),(4-PS3-3) ▪ Light also transfers energy from place to place. (4-PS3-2)

**Learning Objectives:**

1. Using Reader's and Writer's Workshop "noticing" techniques, the students will discuss the book Northern Light A to Z by Mindy Dwyer
2. Use a KWL chart to check for prior knowledge, then, chart what students want to learn, and then what they learned after the experiment
3. Complete the scientific method chart before, during, and after the experiment

**Assessment:**

1. Complete the scientific method chart completely and correctly

## Procedural Activities

1. Fill in the “K” portion of the KWL chart first. Ask students, “What do you know about the aurora borealis?” Have them fill in individually what they already know about them. Share as a class. Charts attached.
2. Fill in the “W” portion of the KWL chart, and discuss what else you want to learn about the lights. The sheet will be used for possible future research projects.
3. Read the book, Northern Light A to Z by Mindy Dwyer, and fill in the “L” portion of the KWL chart as a whole group. What did you learn from the book?
4. Put on safety goggles and lab coats.
5. For each group give bowls, food coloring, a cup with dish soap, Q-tips, and the different kinds of milk: whole milk, 2% milk, fat free, heavy cream, buttermilk, and water
6. Hand out the scientific method chart, and have students fill in what they can. Discuss what the hypothesis is. What will happen?
7. Put it to the side during the experiment, and students can fill it in as they work
8. Students or the teacher should pour some of each kind into each bowl. Students will put drops of food coloring into each bowl.
9. Students will touch the surface with a Q-tip swab dipped in dish soap
10. Watch the effects and fill in the chart
11. Students should fill in the rest of the scientific method sheet with the results
12. (Optional) If your students will make the northern lights sun catchers, the teacher will first mix 90% white glue, and 10% water in a big bowl.
13. Pour a tiny, thin layer into the bowl or on a plate
14. Follow the same procedures above
15. Let this sit for a week to dry
16. Pull off the plate or bowl and discard
17. Punch a hole at the top and string ribbon through it, and hang it up in a window

**Materials Students Need:**

1. The Northern Lights A to Z by Mindy Dwyer
2. Milk cartons with various fat levels, food coloring, glue, water, styrofoam or plastic bowls, Q-tip cotton swaps, dish soap, plastic cups
3. Scientific method worksheet and KWL worksheet for each student

**Technology Utilized to Enhance Learning:**

Computer or tablet

Optional web-based programs: [www.Snapguide.com](http://www.Snapguide.com)

<https://snapguide.com/guides/create-the-northern-lights-in-a-bowl/>

**Other Information:**

1. Use lighter colored food coloring to create the best effect
2. I used neon food coloring for effect
3. If you are making the sun catchers, pour a very thin layer of the glue mixture to cut down on drying time

**Modifications for Special Learners/ Enrichment Opportunities:**

**Modified:**

Teachers should have supplies ready for the students

Help fill in the KWL chart and the scientific method chart as a whole group or in small group

**Enrichment:**

Have students create their own procedural text with sequencing to show their learning in their experiment. They can create their own free Snapguide.com online as well.

Students can use their KWL charts and research unanswered questions about the northern lights.

# Experiment:

**Purpose:** *I wonder...*

**Materials:**

**Hypothesis:** *I think...*

**Procedure:**

**Results:**

**Conclusion:** *I learned that...*

Name \_\_\_\_\_ Date \_\_\_\_\_

### KWL Chart

Before you begin your research, list details in the first two columns. Fill in the last column after completing your research.

Topic _____		
What I Know	What I Want to Know	What I Learned