

Integrating Literacy and Science Practice Skills via Investigating the Effect of Salt Phenomenon in *Dr. Rosie Helps the Animals* (K, 1, 2)
Teacher Lesson Plan

Lesson Summary

This two-day lesson is based on the book *Dr. Rosie Helps the Animals*. The first day consists of reading and processing the story, focusing on the various remedies Rosie uses. On the second day, students employ science practice skills while investigating the effect of salt phenomena. This experience gives students a foundational understanding of osmosis.

Day 1: Literacy Skills (Common Core)

Kindergarten: CCSS.ELA-Literacy.SLK.1 Participate in collaborative conversations with diverse partners about *kindergarten topics and texts* with peers and adults in small and larger groups.

Grade 1: CCSS.ELA-Literacy.SL.1.1 Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.

Grade 2: CCSS.ELA-Literacy.SL.2.1 Participate in collaborative conversations with diverse partners about *grade 2 topics and texts* with peers and adults in small and larger groups.

Grades 1– 2 R.I.1.1. Ask and answer questions about key details in a text. (1-LS1-2), (1-LS3-1)

Day 1: Cultural and Linguistic Practices

Note: *Dr. Rosie's* story provides several examples of natural remedies. This provides an authentic opportunity for students to share remedies they have learned about or experienced from their culture.

From: [Cultural and Linguistic Practices](#)

- ★ Connect the book's content to your students' cultural and linguistic backgrounds.
- ★ Ask students to connect to the remedies in the story by relating them to their cultural experiences.
- ★ Ask relevant and inclusive questions that connect to all students from various backgrounds

Day 2: Standards-Aligned Science Practice Skills

Kindergarten

Analyzing and Interpreting Data

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1)

First Grade

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions

Second Grade
Developing and Using Models

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

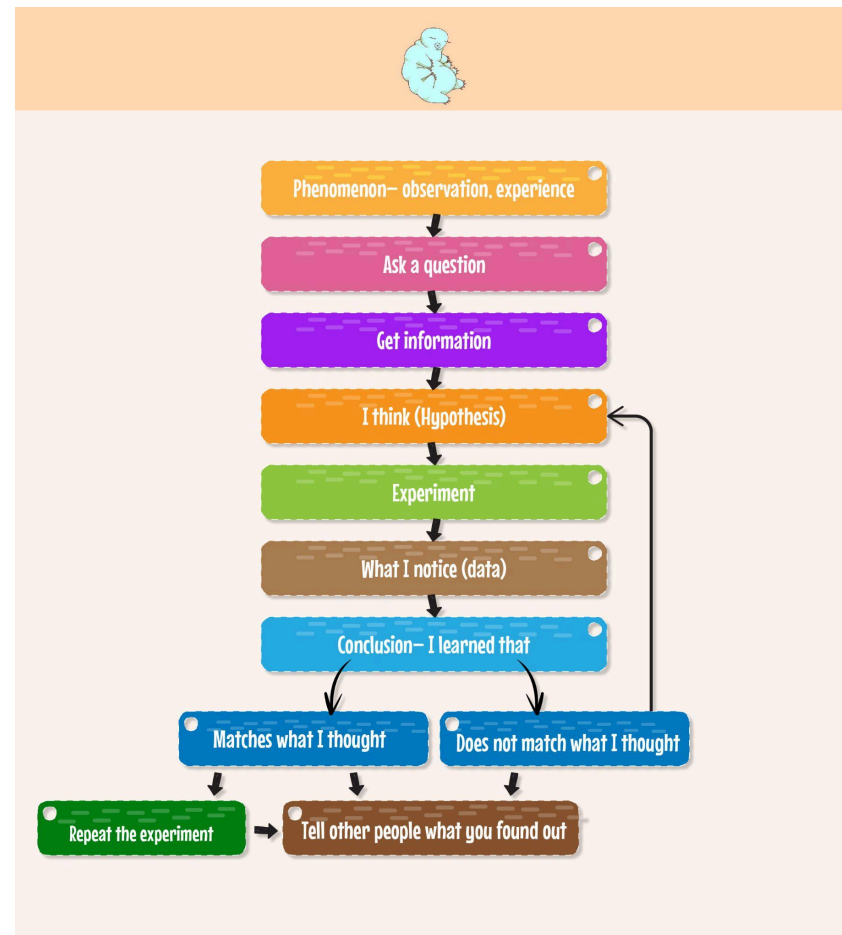
- Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1)

Phenomenon-based learning employs Science Practice Skills Included in The Next Generation Science Standards (NGSS) and The Massachusetts Science, Technology, and Engineering Frameworks



Day 1: Read and Process

Grade Levels: K-2

Topic: *Dr. Rosie Helps the Animals* (Read and process)

Materials

- *Dr. Rosie Helps the Animals* Book or [Reading by Rozillia](#)
- Remedies Pupil Page: salt

Lesson Objectives/Learning Goals:

- ★ Students will be introduced to veterinary medicine as a STEM profession through an engaging informational fiction story
- ★ Students will be able to identify the remedies Rosie used for each affliction.
- ★ Students will be able to compare and contrast Rosie's remedies with their own experiences.

Time	Activity	Teacher Actions	Student Actions
_____ minutes	Introduction to the <i>Dr. Rosie</i> story	Questions: <i>Have you ever been sick? What helped you get better?</i> Today, you'll meet a young person who helps animals get better! Listen to discover who <i>Dr. Rosie</i> meets and how she helps each animal.	Reply to the questions
_____ minutes	Story Reading and Scaffolded note-taking (Remedies Phenomena Pupil Page)	Give each student a copy of the Remedies Pupil Page. As you read the story, pause with each remedy. Ask kids if they have had that affliction and what remedies they have used at home. Ask students to match the affliction and remedy on the pupil page.	Listen to the story and match the animal with the remedy

Day 2:
The effect of salt phenomenon-based guided-inquiry science lesson

Grades levels: K-2

Topic: Effect of Salt Phenomenon

Materials:

- (per group or as a demo) a piece of plastic, a small cup with salt in it, a gummy bear from the bag, a gummy bear that has been in water for about 3 hours before the lesson
- Why is Saltwater Used to Unstuff Noses? Pupil Page

Lesson Objectives/Learning Goals

- Students will use science practice skills while investigating the effect of salt on an object swollen with water.
- Students will make connections between how salt affects the size of a swollen gummy bear and how salt drops (nasal spray) affect a stuffy nose.

To the teacher: *This lesson provides a foundational understanding of osmosis, a higher-grade NGSS content standard. Content that is general and specific to this guided inquiry is provided below.*

Science Content Background for this Lesson

If someone sprays perfume on one side of a room, eventually, a person on the other side of the room will smell it. If you put a drop of food coloring in water, the particles will spread out over time until they are evenly distributed. These are two examples of **diffusion**. Diffusion is the movement of a substance from an area of **high concentration** to an area of **lower concentration**.

- Diffusion occurs in liquids and gases (whose particles can freely move) when their **particles** collide randomly and spread out.
- Diffusion is an essential process for living things – it is one way **substances** move in and out of cells.

Osmosis is a special kind of diffusion. It is specifically the movement of **water molecules across a selectively permeable membrane** from a region of high water concentration (low solute, fresher water) to a region of low water concentration (high solute). Solute is the name of what is mixed into the water. In the case of salt water, salt is the solute, and water is the solvent. A **selectively permeable membrane** allows some substances to move through it but not others. A cell membrane is an example of a selectively permeable membrane. It allows water to move through it, but not all substances. **Osmosis** helps control the flow of **water** into and out of cells, which is crucial to their survival. If too much water moves into a cell, it might burst. If too much water leaves a cell, it will die.

Osmosis is the reason why water flows into a plant when you water the roots in the soil.

Science Content Directly Related to this Investigation

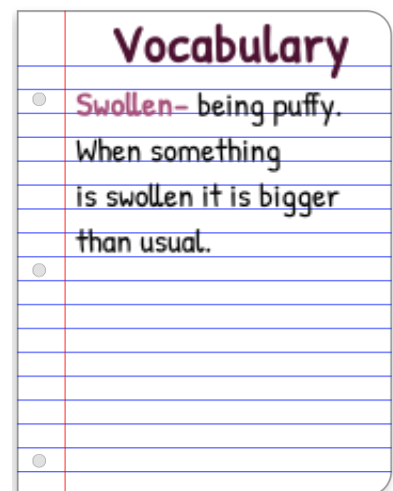
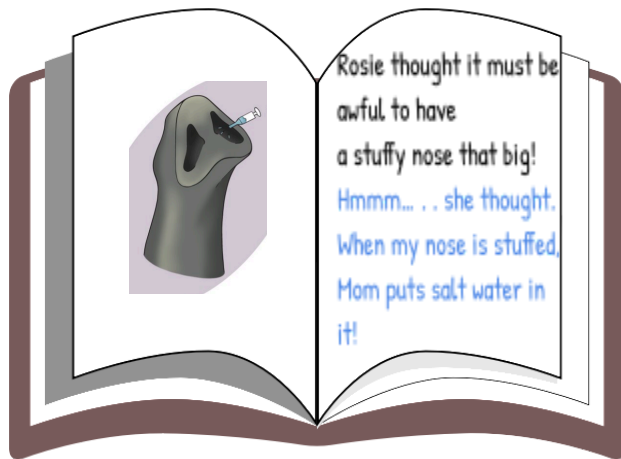
When you put a gummy bear in water, there is a higher concentration of water (more pure water, less dissolved substances) on the outside of the gummy bear than on the inside. Thus, water moves into the gummy bear, causing it to swell. Then, when you take the swollen gummy bear and put salt on it, there is a higher concentration of water inside than outside, so water moves out, causing it to shrink.

Osmosis rap: <https://www.youtube.com/watch?v=HqKLLm2Mjkl>

How does this relate to saltwater unstuffing a stuffy nose? A stuffy nose is caused by congestion (build-up of fluid) in the cells (tissues) inside the nose. Various things like illnesses or allergies cause fluid to build up, which causes nose tissues to swell. Adding saltwater drops causes the fluid to drain from the tissues (due to osmosis), thereby reducing swelling or the feeling of stuffiness. Salt drops can also help moisturize the lining of the nose because salt draws water out of cells.

Rosie says, "When my nose is stuffed, Mom puts salt water in it." This is a guided inquiry lesson to test the effect of salt on a gummy bear (or raisin, or Orbeez) and a shell-less egg that are swollen due to water being in them. This is a model for using saline drops to unstuff a stuffy nose.

Pedagogy Style: Guided Inquiry of a Phenomena Excerpt from Dr. Rosie Helps the Animals



Experiment 1:

The effect of salt on the size of a gummy bear (the same procedure can be done with raisins and Orbeez, but it takes longer, and the results are not as pronounced),

Note to the teacher: Before starting the experiment, here are some possible questions to ask students:

1. What do you think will happen to the size of a gummy bear if it is put in water for a while? Will it stay the same? Will it get larger? Will it get smaller?
2. What do you think will happen to a swollen gummy bear when salt is put on it? (The gummy bear is swollen because it is filled with water.) Will it stay the same? Will it get larger? Will it get smaller?

Materials for the Experiment:

- Gummy bears (2x the number of students or student groups)
- Water
- Salt
- Spoon
- Pieces of plastic (plastic wrap or sandwich bags are fine)
- Why is Saltwater Used to Unstuff Noses? Pupil Page

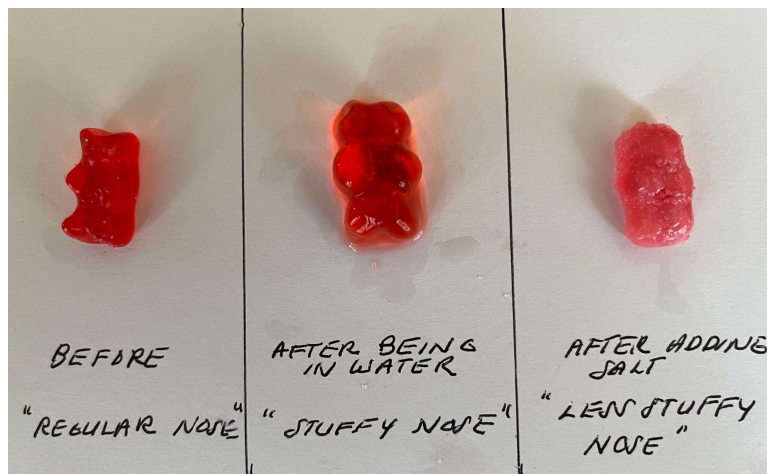


Note the teacher: You must do some prep before this experiment.

1. Get a large bowl. Add water.
2. Put as many gummy bears (preferably red and green (because they are generally easier to see) in the water as there are students, student pairs, or table groups. The bowl should have ample water, and the gummy bears should be completely submerged.
3. Leave the gummy bears in the water between 3 and 5 hours before starting the experiment with the kids. If you leave them in for a long time (over 7 hours), they become GIANT (really cool but mushy) and cannot be used.
4. Give each student (pair, group) a regular gummy bear (out of the bag). Have the students put it on a piece of plastic.
5. Check first to make sure the gummy bears in the water are swollen enough that kids can notice a difference in size. Then, go around to each student (pair, group) and, using a spoon,

gently take out one of the gummy bears that has been in the water. Carefully pour off any excess water in the spoon and put the swollen gummy bear on the student's piece of plastic near the one from the bag. Do not have any water on the plastic before placing salt on the gummy bear. This way, students can see that the water on the plastic must have come from the gummy bear.

6. Ask students what they notice about the size of the gummy bear in the water. (It is bigger.) Then, ask them how they think it happened. (It is filled with water, or water goes inside.)
7. Have students (or you) put salt on the top of the gummy bear. Then, put some salt on the plastic itself and slide the gummy bear on top of the salt so there is some underneath it.
8. Leave the set-up alone.
9. Observe what happens to the salted gummy bear over time.
10. Students can start working on the Why is Saltwater Used to Unstuff Noses? Pupil page



Making Connections- Questions for Students

1. What happens to the size of a swollen gummy bear (filled with water) when salt is put on it?
 2. Pretend that a swollen gummy bear is like a stuffy nose. Why is salt used to try to unstuff a stuffy nose?
 3. How is a gummy bear like a stuffy nose? How is it different from a stuffy nose?
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Experiment 2:

The effect of salt on the size of a shell-less swollen egg

Note to the teacher: Before starting the experiment, here are some possible questions to ask students:

1. What do you think will happen to the size of a shell-less swollen egg when salt is put on it? Will it stay the same? Will it get larger? Will it get smaller?

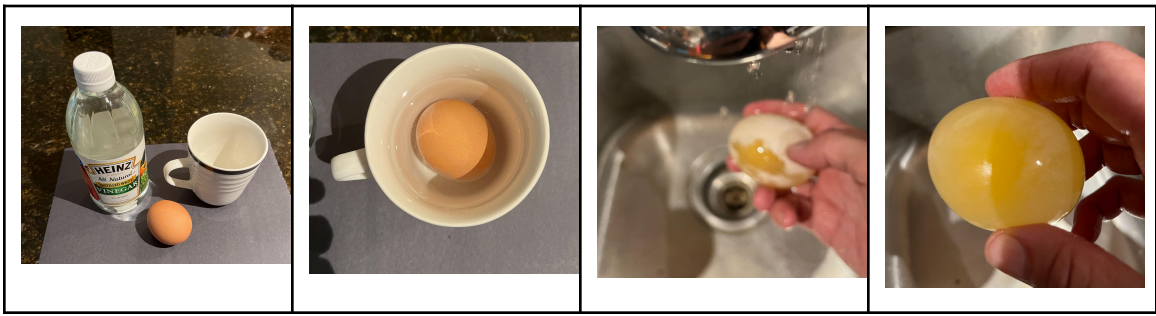
Materials for the Experiment:

- One raw egg (if this is done as a demonstration) **OR** several raw eggs (if kids, lab groups, etc. each get one)
- Vinegar
- Bowl
- Salt,
- Paper towel
- Pieces of plastic (plastic wrap or sandwich bags are fine)



Note the teacher: You will need to do some prep before this experiment.

1. Put vinegar in a bowl. Put an entire raw egg in it. Let it stand for two days. The vinegar and calcium carbonate in the shell react with each other (creating calcium acetate), so the shell seems to disappear.
2. If, after two days, some shell is still on the egg, carefully rub it under running water until the shell comes off completely and exposes only the egg membrane.



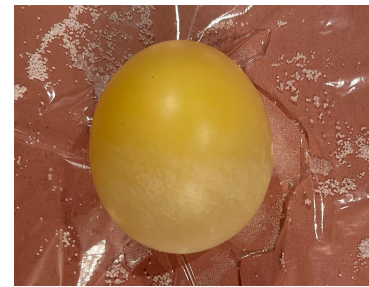
3. You will notice that a shell-less egg is a lot larger than when it has a shell. This is because vinegar is mostly water—(4–7% acetic acid and 93–96% water) so through osmosis, water moves into the egg once the shell is off.
4. Dry off the shell-less egg with a paper towel, then put it on plastic wrap.
5. Have students (or you) put salt on the top of the egg and some underneath if you can manage it.
6. Let the set-up alone. Observe what happens over time.



The shell-less egg on the right is swollen because water moved into it through the process of osmosis



The swollen shell-less egg should be carefully dried off before salt is put on it. This way, any water that appears on the outside is due to water moving out of the egg.



Over time, there will be water on the plastic. This is the water that moved out of the egg due to osmosis. The egg is also smaller due to the water loss.

Making Connections:

1. What happens to the size of a swollen egg when salt is put on it? Why?
2. A stuffy nose is like a swollen egg. If your nose is stuffed, it means that the inside of your nose is swollen because your body sends water with germ fighters to your nose to help fight off germs or things you are allergic to. If the swollen egg is like a stuffy nose, why is salt used to unstuff people's noses?
3. Challenge: Just like the inside of your nose, the gummy bear and the egg both got smaller when salt was put on them. Which is more like the inside of your nose, the gummy bear or the egg? Explain.

Challenge Connection Questions for Students: Living things, even germs, need water to live.

1. What do you think happens to the water inside a germ when salt is put on it?
2. Does the water move into or outside of the germ?
3. Like you, germs need water to live. If water moves out of a germ so it does not have water, what might happen to the germ?
4. Salt water can be used to kill germs. Can you explain why?

Safety Concerns: There are no unique safety concerns related to this activity.