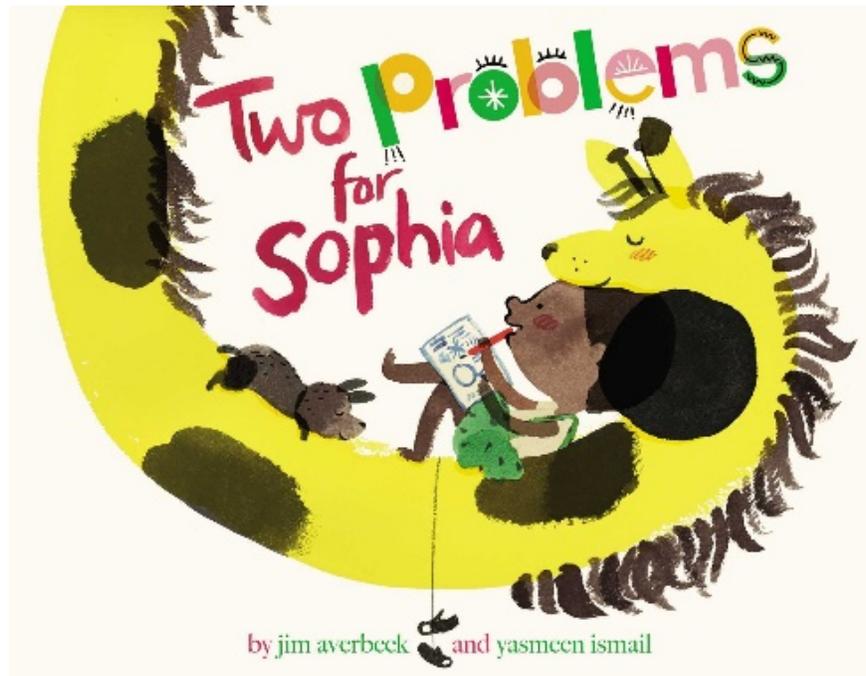


# Noodles a Roar, Stop that Snore

Jocelyn Ruffin<sup>1</sup>

<sup>1</sup>Journal of Conceptual and Applied STEM Education

May 22, 2020



Noodles a Roar, Stop that Snore!

**Objective** : Students will understand the effects of acoustics, which includes how sound is measured (decibels) and how sound travels. After reading *Two Problems for Sophia*, by Jim Averbeck and Yasmeeen Ismail, students will create and design a device that decreases the volume of noise heard on a speaker.

Grade Level(s): Kindergarten – Second Grade

Group/Team Size: 3 per team

Time Required: 45 -60 minutes

Educational Standards:

From the North Carolina Essential Science Standards: (<http://www.ncpublicschools.org/docs/acre/standards/new-standards/science/k-2.pdf>)

- Students develop simple skills of observation, measurement and number sense as they actively participate in simple investigations. During investigations, students must have opportunity to use tools such

as magnifiers, thermometers, rulers, or balances to gather data and extend their senses. They must have ample time to talk about their observations and compare their observations with those of others. They should be encouraged to employ oral language, drawings and models to communicate results and explanations of investigations and experiment

- 2.P.1 Understand the relationship between sound and vibrating objects.

From the Common Core Math Standards: (<http://www.corestandards.org/Math/Content/2/MD/>)

- NC.K.MD.1: Describe measurable attributes of objects; and describe several different measurable attributes of a single object.
- NC.K.MD.2: Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference
- NC.1.MD.4: Organize, represent, and interpret data with up to three categories.
- 1.MD.D.10: Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories.
- NC.2.MD.10: Organize, represent, and interpret data with up to four categories

From STEM Connected Through Engineering (K-2):

- EG K-2 H 1: Infer that engineering has a way of thinking and solving problems that includes: systems thinking; communication; collaboration; optimism; creativity and ethical considerations
- EG K-2 D 1: Use the engineering design process of ASK-IMAGINE-PLAN-CREATE-IMPROVE
- EG K-2 P 2: Use critical thinking to suggest solutions to problems

STEM Learning Objectives:

- To represent and interpret data using a bar graph.
- To analyze the relationship between sound and objects that vibrate as a result of sound produced.
- To utilize the engineering design process.

Materials: Each group of students will need at least the following materials.

2 ft of Ribbon

1 Roll of Duct tape

1 Fabric Scrap

1 Cardboard Square 6” x 6” Square

1 Styrofoam Cup

1 Balloon

Play-dough

*Safety Precaution: Remind students to be careful cutting and hot gluing their device.*

**Activating Knowledge :** After reading the book, “Two problems for Sophia” explain to students that Noodle is still snoring too loud! It’s their job to find a way to keep Noodle quiet overnight. You’ve found additional resources that will help keep Noodle quiet. But will need students to construct a prototype that keeps Noodle’s snores quiet and lets their family sleep!

**Setup/Preparation:**

1. Install the decibel measuring app, “Decibel: dB sound level meter,” on your phone or use the google science journal app. Pre-create a sound file of snoring (make it fun) and download it.
2. Have all materials readily accessible for groups of students.

**Activity:**

1. Introduce the activity activating background knowledge.
2. Provide students with the materials they will need to use.
3. Allow students 20 minutes to use whiteboards and dry erase markers to plan and discuss prototypes.
4. Students begin creating and designing within their group.

**Testing (requiring teacher support):**

1. Open the decibel measurement app and stop button at the bottom of the screen by pressing the white square.
3. When ready to test the sound of the prototype, play the saved recording at your choice of volume (just be consistent for all groups), and press the record button (the white circle) at the same time. Once finished, press the stop button again.
4. Next, hit the save button to the right of the record button.
5. Finally, analyze the graph to find the loudest sound recorded. Do so by pressing the saved graph list to the left of the record button (on the opposite side of the save button). The recording at the bottom of the list will be the most recent (helpful to know if you have multiple recordings saved).
6. Choose the recording in the saved list and use the decibel number for the tallest peak (the white peaks) on the graph as each group's score.
7. Using chart paper, add each group's score using a bar graph for visual representation.
8. The group with the quietest sound (the shortest peak in decibel) is the winner of this challenge activity.

**Assessment & Reflection:**

- Venn Diagram of designs, identifying the similarities and differences among the designs created.
- Why did the most effective design work better? What qualities did it have to make it effective?
- What can you do to further improve your design?
- What is the difference between your design and Sophia's design for Noodle's roaring snore?