PROJECT CALENDAR page 1	
Project: Camp Snoopy Redesign	**Time Frame: 10 days (60 minutes/day)**

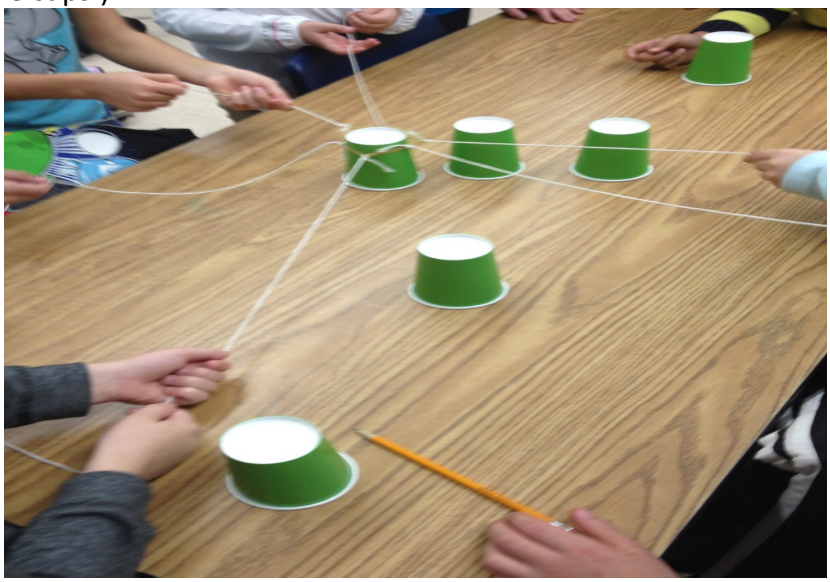
Day 1- Launch Activity

Materials: Design process graphic from CMS PL (Generate, Focus, Ideate, Act) Reflect, Feedback
6 paper cups per group
6 feet of string cut into 1 foot pieces per group
1 rubber band per group
1 piece of chart paper

Key Vocabulary: Design process, generate, focus, ideate, act, reflect, feedback, teamwork

Lesson:

1. Remind students of the design process.
2. Show them the Design Process graphic and walk through each component highlighting what it means in each section-generate, focus, ideate, act.
3. Emphasize the importance of feedback and reflection to move forward and improve.
4. Discuss with students what a valuable teammate looks like, sounds like, feels like.
5. On chart paper write the positive qualities of a teammate as a reminder to them while working through the challenge.
6. Present students with the Cup Stack Challenge to demonstrate how teamwork is essential when completing a challenge.
7. Cup Stack Challenge: In groups of 6, students are tasked with building a pyramid out of the paper cups (3 on the bottom, 2 in the middle, and 1 on the top). Group members cannot touch the cups with their hands or any other part of their bodies, even if a cup falls over on the floor. Each person holds onto one of the strings that are attached to the rubber band and they use this device to pick up the cups and place them on top of each other (by pulling the rubber band apart and then bringing it back together over the cups.)



8. Give students about 20 minutes to complete the challenge.
9. Then, pull them together, and discuss how the design process was used.
10. Debrief using the following questions:
    - Was anyone frustrated at all during the activity? If so how was it handled?
    - What did you learn about yourself or others?
    - Why was teamwork so important for this activity?
    - What is so hard about teamwork?
    - What did you do today to contribute to the teamwork on your team?
    - What are some skills needed to be good at teamwork?
    - Are you ever in a situation where you must use teamwork? Is this always easy for you? Why or why not?
    - How can we use what we learned through this experience in situations outside the game?

Formative Assessment: "What feedback would you give to your team to improve your time in the future?"
All formative assessments in this plan are individual-exit ticket on a post-it and handed to teacher

Day 2- Carowinds Guest Speaker

Materials: Carowinds representative
Design process graphic

Key Vocabulary: design process, ask, imagine, plan, create and test, improve and test

Lesson:
1. Present challenge to students. Why does Planet Snoopy need to be redesigned to accommodate space and sound? Explain to students that they will meet and learn from Carowinds' chief engineer to find out what goes into designing an amusement park space taking into account space and sound.

Steve Jackson, the chief engineer from Carowinds, has been invited to come and talk to the students about how Planet Snoopy is being designed, taking into account space and sound. He will talk to the students about how the design process is used in their planning stages.

Formative Assessment: "How is Carowinds using a design process to redesign Planet Snoopy?"
All formative assessments in this plan are individual-exit ticket on a post-it and handed to teacher

Day 3-Vocabulary

Materials: https://nc.discoveryeducation.com/
- Science Techbook
- Interactive glossary

book rings
hole punch
index cards

Key Vocabulary: Use Discovery Ed for the following: volume (sound), pitch, vibration, sound, ear, echo

Lesson:

1. Use Discovery Ed's Interactive Glossary https://app.discoveryeducation.com/glossary to examine key vocabulary: volume (sound), pitch, vibration, sound, ear, echo. *Utilize these features of the glossary: definition, animation, video, illustration.*

2. Between each word give students about 2 minutes to write the vocabulary word on one side of the index card and, on the other side, a way for them to remember what the word means. Model one vocabulary word with them. Connect cards with book rings by punching a single hole in each card.

3. Discuss these words with students and how they relate to what was just viewed on Discovery Ed: tension, sound source, sound receiver, voice, vocal cords, ear drum, instrument, echolocation.

Formative Assessment: "What does sound move through? How is sound made?"
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Day 4-Camp Snoopy Redesign Challenge-Generate

Materials: Sounds All Around, *Let's-Read-And-Find-Out Science* series by Wendy Pfeffer
slinky
small and large size bowl with water
tuning forks
straws
grid paper
white paper

Key Vocabulary: sound, vibration, pitch, volume, columns of air, frequency, force, sound waves

Lesson:

2.P.1.1 - Sound Wave Activities – General understanding of sound waves and infer how sound moves one molecule at a time making a wave and how sound waves travel out from a source and weaken as they spread.

ReadAloud- Sounds All Around by Wendy Pfeffer.

1. Each group gets a Slinky. Stretch out Slinky and explore waves created when it is compressed and stretched.

Discuss how the wave pushes through each coil and makes it vibrate; observe how the coil stops moving after the wave passes. Connect this movement with sound waves. Do we have to be directly in the line of sound to hear it? Discuss how sound waves move from one molecule to the next just like the wave moves from one coil to the next in the Slinky.

2. Next, give each group a small bowl of water and tuning fork. What will happen when an active tuning fork touches the water? Make and record a group hypothesis. *Caution: the resonating (fork) end of the tuning*

fork should only be placed in the water.

Describe how this might be an example of how sound travels in air? Discuss how sound does not only travel in one direction but spreads out. Then have students place the active tuning fork in a large bowl of water. Discuss the rings they see.

3. Ask a student to stand at the back of the room and whisper something to students at the front of the room. Discuss how it is hard to hear them because the sound waves spread out.

4. Connect several drinking straws together and have a student whisper into one end as a partner listens on the other side. Make sure the student does not yell as it could hurt the listener's ear. Discuss that you can hear through the straws because the straws keep the sound waves from spreading out and becoming weaker.

5. Students will work in groups of 3-4 on the Planet Snoopy Redesign challenge.

Today's focus is on the generate piece of the Design Process.

- I have a challenge
- How do I approach it?

Students will brainstorm how they are going to redesign Planet Snoopy taking into account space and sound. Students will record their own ideas on a piece of white paper, giving them the opportunity to draw it out.

Formative Assessment: "Through movement demonstrate how sound waves move from one location to the next."
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Day 5-Camp Snoopy Redesign Challenge-Focus

Materials: Mystery Science "Where do sounds come from?"
https://mysteryscience.com/light/mystery-2/sounds-vibrations/144?r=13685727#slide-id-0

Students should find a partner; each pair should receive (or have access to) the following materials.

3ft long string
Unpainted metal clothes hanger
String
Scissors
Optional: Cooling or baking rack, metal salad tongs
Popsicle stick or craft stick
Two cap erasers (erasers that slip onto the end of a pencil, available anywhere stationery supplies are sold)
Index card
Scissors
Stapler strong enough to staple the index card to the craft stick
String
A wide rubber band (such as a 1/4-inch #64) long enough to stretch lengthwise around the craft stick

Key Vocabulary: sound, vibration, instrument

Lesson:

1. Use read aloud "The Secret of Sounds-A Read Along Mystery" by Ruth Tepper Brown and Alex Kalomeris https://mysteryscience.com/light/mystery-2/sounds-vibrations/144?r=13685727#slide-id-3199 Stop and talk where indicated on read aloud

2. Find vibration in these simple sound experiments. Students will have choice in which one they carry out with a partner of their choice. Make sure at least each of the experiments are conducted. Then students will share out their experience with rest of class.

Head Harp

Learn a little string theory.

Wrap a string around your head and pluck it to play music.

To Do and Notice

Place the middle of the string behind your head, pull the string across your ears, and hold the two free ends together in front of your face. The string should cross over the opening in each ear. Pluck the string, and listen to the tone it makes. You can hear your string, but the sounds are so quiet you will not disturb other people even if they are close to you.

How can you change the sound? Pull the string tighter, or make it looser, and listen to the change in pitch. Change the length of the string by sliding your hand along the string while keeping the tension as constant as possible. Then listen to the change in pitch.

What's Going On?

In this activity, you can actually hear how a string's frequency of vibration depends on its tension and length. When you pull the string tighter, you increase the tension in the string, so the pitch of the sound you hear increases. When you keep the tension constant and decrease the length of the string, the pitch also increases.

You're hearing the resonant frequencies of the string. The frequency is inversely proportional to the length of the string, and proportional to the square root of the tension in the string. The different pitches you hear are produced by the different frequencies of the vibrating string. High-pitched sounds are produced by higher frequency vibrations, and low-pitched sounds are produced by lower frequencies.

Going Further

Many city bus services do not allow people to play loud music on buses. We find that if you wrap a string around your head and play music, not only will you abide by city laws, but you'll find yourself with more room as others move away from you.

Secret Bells

Create your own personal sound system with a coat hanger and string.

Create your own personal sound system with a coat hanger and a string, producing musical sounds that only you can hear.

Assembly

1. Cut two lengths of string, each about two feet (0.6 m) long.

2. Tie one end of each string to a different side of the metal hanger, as pictured above.
3. Wind the free end of one string around your index finger a few times. Wind the other string around the index finger on your other hand.
4. Allow your assembly to swing freely from your two fingers.

To Do and Notice

Place your index fingers (with hanger assembly attached) gently on the small flap of skin just in front of your ears, closing off the ear canal without putting your fingers into your ears. Swing the hanger so that it bangs lightly against something hard, like the edge of a desk or a door frame, and then let the hanger hang free. As the hanger vibrates, you should hear the resulting sound ring through the strings like chimes.

To go further, try using different materials and see how well they work. Instead of using a metal hanger, for instance, try a cooling/baking rack or a pair of metal salad tongs.

What's Going On?

Although most of the sounds we hear are transmitted through the air, air is not the only carrier of sound waves—nor is it the best. A ticking clock can be heard through the air if you're close enough, but put your ear to the table with the clock on it and the ticking will sound much louder.

When something vibrates, the strength of the vibration and the length of time the vibrations continue can vary quite a bit, depending on the materials involved. Hit a piece of wood with a stick and the sound lasts for just an instant. Hit a metal gong with the same stick, and the sound may continue for many seconds. Water is another good transmitter of sound.

Why the difference? In some materials, the molecules are tightly packed together; in other materials, the molecules are more loosely arranged. How close the molecules are to one another can affect how easily they can bump into each other to start a vibration moving along.

When you hit the coat hanger against another object, it starts vibrating. The vibrations in the metal travel through the string and into your fingers. The vibration is transferred to your head through solid objects, not air. Compare the sound of the coat hanger swinging into a chair or desk without holding the string against your ears. The sound is much duller. This demonstrates how the same vibration sounds differently when it travels through different materials.

Going Further

Sound is an organized motion. Heat is a random motion. Some materials, including lead, rapidly turn sound into heat. Others, such as quartz crystal, very slowly turn sound into heat.

Bee Hummer

Make a stick, rubber band, and index card sound like a swarm of bees.

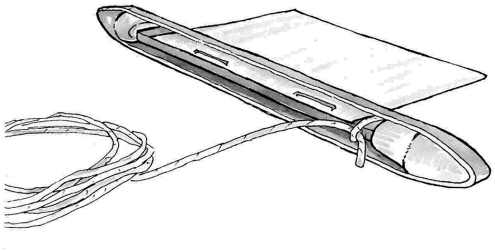
When you spin it around, this toy sounds like a swarm of buzzing bees.

Assembly

1. Put a cap eraser on each end of the craft stick.
2. Trim an index card so it fits in the space between the two erasers on the stick.
3. Staple the card to the craft stick. It should stick out about 2 inches (5 centimeters) from one side

of the stick.

4. Cut enough string (about 2 feet [60 cm]) to safely swing the Bee Hummer. Then tie the string next to one of the erasers, making several knots so it's secure.
5. Once the string is tied to your Bee Hummer, stretch the rubber band around the craft stick from one eraser to the other, and make sure it's snugly in place.



To Do and Notice

Make sure the area is clear. Then hold the end of the string and swing your Bee Hummer in a circle. You should hear a sound like bees buzzing.

What's Going On?

When you spin your Bee Hummer, moving air makes the rubber band vibrate. The air flowing over the rubber band makes it vibrate the same way that wind blowing over a flag makes it wave.

Sound is produced by those vibrations, in the same way that vibrating strings on a guitar or violin produce sound. The index card amplifies the sound.

If your Bee Hummer doesn't seem to be working, check to be sure that the rubber band isn't twisted, and that the string isn't touching the rubber band. Either of these things could stop the sound.

Going Further

Experiment by changing how the Bee Hummer is made and used. What happens when the index card is slit, curved, or folded? How does the sound change if you change the size of the rubber band? If you spin your Bee Hummer faster or slower? Use a longer or shorter length of string? You can also modify the materials: Try using balls of clay on each end instead of erasers, or several thin rubber bands instead of one thick one.

3. Students will work in their group of 3-4 on the Planet Snoopy Redesign challenge.

They will focus on the focus piece.

- I uncover something.
- How do I make sense of it?

Students will collaborate with one another on their Planet Snoopy Redesign ideas, and they will begin mapping out their work on paper.

Formative Assessment: "How do we hear?"

All formative assessments in this plan are individual-exit ticket on a post-it and handed to teacher

Day 6-Camp Snoopy Redesign Challenge-Focus

Materials:
copy paper
grid paper
"Sound All Around" by Penny Atcheson (readinga-z.com)
http://www.philtulga.com/MSSActivities.html Use to research sound.

Key Vocabulary: communicate, pitch, pleasant, pluck, sensitive, sound waves, vibrates, vocal cords, volume

Lesson:
1. Discuss cause and effect relationships. Cause: makes something happen; effect: what happens because of, or as a result of, the action or event.

2. In their challenge groups students will read "Sound All Around" by Penny Atcheson (readinga-z.com) Level M, looking for cause and effect relationships.

3. Students will work in their group of 3-4 on the Planet Snoopy Redesign challenge.
They will focus on the focus piece.

- I uncover something.
- How do I make sense of it?

Students will collaborate with one another on their Planet Snoopy Redesign ideas, and they will continue mapping out their work on paper.

4. Students will be given opportunity to email engineer to get his feedback.

Formative Assessment: "Provide a real life example of a cause and effect relationship related to sound."
All formative assessments in this plan are individual-exit ticket on a post-it and handed to teacher

Day 7-Camp Snoopy Redesign Challenge-Ideate

Materials:
grid paper
copy paper
Discovery Ed videos: "I Want to Know Sound" 7:23
materials of student choice: craft sticks, pipe cleaners, rice, lids

- Cardboard
- Scissors
- Balls of different sizes
- Straws
- Thread spools
- Paper plates
- Pencils
- Tape
- Paper fasteners
- Other materials that can be used to build simple and compound machines: MakeyMakey

Key Vocabulary: sound, vibration, pitch, volume, columns of air, frequency, sound waves

Lesson:

1. Students will view Discovery Ed video.
https://app.discoveryeducation.com/learn/videos/fed581f7-6df7-4ae2-b44c-69c79786b743?hasLocalHost=true

2. Students will work in their group of 3-4 on the Planet Snoopy Redesign challenge.
They will focus on the ideate piece.

- I see a possibility.
- What do I create?

Students will collaborate with one another on their Planet Snoopy Redesign ideas, and they will use their written ideas to continue constructing their Planet Snoopy area with materials of their choice. Students can brainstorm other ideas they might need to construct their 3D model. Students may use MakeyMakey to incorporate true sound.

Formative Assessment: "Draw a picture to show how sound travels through a column of air and explain in your own words how the sound is traveling."
All formative assessments in this plan are individual-exit ticket on a post-it and handed to teacher

Day 8-Camp Snoopy Redesign Challenge-Act

Materials:
grid paper
paper
materials of student choice: craft sticks, pipe cleaners, rice, lids

- Cardboard
- Scissors
- Balls of different sizes
- Straws
- Thread spools
- Paper plates
- Pencils
- Tape
- Paper fasteners
- Other materials that can be used to build simple and compound machines (e.g. MakeyMakey)

Key Vocabulary: sound, vibration, pitch, volume, columns of air, frequency, sound waves

Lesson:

1. Students will work in their group of 3-4 on the Planet Snoopy Redesign challenge.
They will focus on the act piece.

- I try it out.
- Is it working based on feedback?

Students will share their Planet Snoopy Redesign project with another group. They will gain feedback from another group.

Feedback should be in the way of 3-2-1:

- 3 things they really like about the project.
- 2 things they can recommend to improve it.
- 1 question that still remains.

Refer back to the Cup Challenge to relate.

2. Students may also Skype or Facetime with engineer for feedback. Use MakeyMakey so the test is conducted.

Formative Assessment: "Draw a picture to show how sound is produced by vibration and explain in your own words how sound is made."
All formative assessments in this plan are individual-exit ticket on a post-it and handed to teacher

Day 9-Camp Snoopy Redesign Challenge-Test and Improve

Materials:
grid paper
paper
materials of student choice: craft sticks, pipe cleaners, rice, lids

- Cardboard
- Scissors
- Balls of different sizes
- Straws
- Thread spools
- Paper plates
- Pencils
- Tape
- Paper fasteners
- Other materials that can be used to build simple and compound machines

Key Vocabulary: sound, vibration, pitch, volume, columns of air, frequency, sound waves

Lesson:
1. Students will work in their group of 3-4 on the Planet Snoopy Redesign challenge.
They will focus on the 'test and improve' piece.

2. Students will reflect on their 3-2-1 charts from day before, and they will go back to the drawing table to improve their idea based on feedback and self-reflection.

3. Students may tweak sound using MakeyMakey.

Formative Assessment: "What did you reflect on that was similar to the feedback you received, and what did you reflect on that was different from the feedback you received?"
All formative assessments in this plan are individual-exit ticket on a post-it and handed to teacher

Day 10-Camp Snoopy Redesign Challenge-Present

Materials:
grid paper
paper
materials of student choice: craft sticks, pipe cleaners, rice, lids

- Cardboard
- Scissors
- Balls of different sizes
- Straws
- Thread spools
- Paper plates
- Pencils
- Tape
- Paper fasteners
- Other materials that can be used to build simple and compound machines (e.g. MakeyMakey)

Key Vocabulary: sound, vibration, pitch, volume, columns of air, frequency, sound waves

Lesson:
1. Students will present to Carowinds staff on the Planet Snoopy Redesign challenge. They will explain how they used the design process each step of the way. In addition, they will implement sound using MakeyMakey

2. Carowinds staff will provide feedback.

Formative Assessment: "What feedback did Carowinds staff provide that was new and you had not considered?"
All formative assessments in this plan are individual-exit ticket on a post-it and handed to teacher