SUBJECT: Science

GRADE: 6

DATE: September 2019

DURATION: 60 minutes

TOPIC: Investigating properties of sound
Sub-topic: Sound and pitch

ATTAINMENT TARGET:

- Recognise the importance of energy to life processes, everyday life, and the relationship between energy and matter.
- Gain an understanding of and apply the engineering design process.
- Begin to appreciate the influence and limitations of science.

BENCHMARKS:

- Explore the properties of sound, and how different materials affect their behaviour.
- Use prior experiences and scientific knowledge to formulate and test hypotheses, and interpret results.
- Display curiosity, objectivity and perseverance in their approach to activities.

SPECIFIC OBJECTIVES:

- Investigate some properties of sound
- Formulate hypotheses when conducting investigations into the properties of sound
- Describe sounds using appropriate scientific language
- Show curiosity in investigating the property of sounds

KEY SKILLS: predict, manipulate, measure, observe, compare, infer, draw conclusions, create, communicate, collaborate,

KEY VOCABULARY: sound, properties, pitch (high, low), volume, vibration, vibrating medium

MATERIALS/RESOURCES: straws, scissors, ruler, tape, elastic bands, music recording, musical instrument,

CONTENT OUTLINE:

- Sound travels in all directions from a source
- The pitch of a sound is dependent on the length of the vibrating medium
- High pitch is made when things vibrate quickly, low pitch is made when things vibrate slowly
- String instruments such as guitars make sounds when the strings vibrate. Thickness, length or tightness of the string can change the pitch
- Wind instruments make sounds when the air column in them vibrates. Changing the length of the column of vibrating air changes the pitch.

PRIOR LEARNING: Check that students can:

- Recall how sounds are made
- Recall how sounds travel

LEARNING OUTCOME: Students who demonstrate understanding can:

- Carry out activities to show the properties of sound
- Explain some everyday observations in terms of the behaviour of sound
- Identify the relationship between the pitch and length (width) of a vibrating medium

ASSESSMENT CRITERIA:

- Acceptable explanations offered for their observations.
- Relationship between length of the straw and pitch of sound, and length of the straw and speed of vibrations, correctly identified.
- Conclusions drawn consistent with data.
- 3-5 sounds matched correctly with musical scale

PROCEDURES/ACTIVITIES

Engage - *How can I get students interested in this?* Use of an interesting picture. (5 min)

- A musical performance using a recorder or guitar producing sounds at different pitches will be demonstrated. Students will discuss what sounds they heard and will suggest how the different sounds were made. Use of words louder, softer, finer or deeper will be noted by the teacher. *Teacher will then provide instructions for the next activity for students to find out how the sounds were made.*

Explore - *What tasks/questions can I offer to help students puzzle through this?* Use of a simple investigation. (10 min)

- In groups, students will carry out instructions on Activity Sheet 1 to make a panpipe by cutting off different lengths of straws (1 cm, 2 cm, 3 cm etc.) and tape them together. Students will investigate how to make different sounds with the straws.
  Teacher will assess students' use of the ruler using a checklist and provide guidance as needed.

Explain - *How can I help students make sense of their observations?* Class presentation and discussions. (10 min)

- Students will discuss whether all the straws made the same sound, how the different sounds were made and what caused these differences. Students will present their findings to the class.
- Advanced group – Students will use their observations to suggest the relationship between the length of the straw and the pitch.
  Teacher will introduce the terms vibrations, pitch, vibrating medium and note students' deductions and misconceptions and offer clarifications

Elaborate - *How can my students apply their new knowledge to other situations?* Application of what they learned. (10 min)

- Students will use the different pitches of the panpipe to create a melody (tune) to a popular nursery rhyme or song.
  Whole Class: Match at least 5 sounds to the musical scale.
  Students with challenges: Match 3 or more sounds to scale.
- Using rounds, the tune will then be performed to create harmony.
  Students will determine which musical performance (using the panpipe) matched the scale used in the nursery rhyme or song chosen.
  Teacher will assess the performance using a rubric.

Evaluate - *How can I help my students self-evaluate and reflect on the teaching and learning, and how can I evaluate the students learning of concepts and skills.* Assessment (10 min)

- Students will complete the questions on the Activity Sheet and determine the relationship between the pitch of a sound and the length of the straw.
- Teacher and students will assess the musical performance using the panpipe.
- Teacher will use a rubric to assess the skill of measuring using a ruler.

EXTENDED LEARNING:

Research how the sounds made by different animals such as elephants, bats and dolphins help them to survive.

LINKS TO OTHER SUBJECTS:

- Music, Mathematics, Resource and Technology

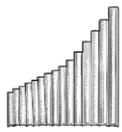
POST-LESSON REFLECTION:

_____

_____

_____

Activity: Making a Panpipe



Unit: Light and Sound

Aim: To investigate some properties of sound

Skills: measuring, manipulating, analysing, communicating, drawing conclusions

You will need: 10 straws, ruler, scissors, tape

Before You Start: Do you know what a panpipe is? Check the internet or a book for the meaning (or picture) of a panpipe.

Carry out the following steps:

1. Mark of 1 cm off the end of a straw using a ruler. Cut the straw at the 1cm mark.
2. Repeat this step with other straws each time cutting off 2 cm, 3 cm, 4 cm, 5 cm, 6 cm, 7cm, 8 cm, 9 cm from each straw.
3. Arrange the straws, including one that is not cut, from longest to shortest.
4. Tape straws together to make a panpipe.

Question: Write a question that could represent this investigation.

Prediction: What do you think will happen?

5. Test your panpipe by blowing across the hole in the straws.

Answer these questions:

What causes the sound made in the panpipe? How does the sound travel?

_____

_____

Which straw makes the sound with the lowest pitch?

_____

Which straw makes the sound with the highest pitch?

_____

What is the relationship between the pitch and the length of the straw?

_____

_____

_____