Alison Grojean
2/5/09
TE 804 Science

Assignment 2: Learning Goals

Unit Title: Adventures in Sound— **P.EN.E.3** Sound- Vibrating objects produce sound. The pitch of sound varies by changing the rate of vibration.

The Main Idea:

The unit addresses the understanding of sound and how it is produced. It also covers characteristics of sound such as pitch and volume. We also discuss how sound travels through states of matter. It is important for students to understand these concepts because it links how the world works to their everyday lives and how a part of their body works.

Central Problem/Question: "How do we hear different sounds?" "Why do we hear different sounds?"

Example Response: We hear sound when something vibrates. The vibration goes into our ears. We hear different sounds when there is more space in something. This makes a lower pitch. When there's less space in something, we hear a higher pitch. When we hit something harder, the sound is louder. When we hit something softer, the sound is quieter.

Scientific Practices—Students will be able to:

- demonstrate and explain how sound is produced by a vibration
- define "pitch" in terms of how high and low a sound is and how that relates to the vibration of the sound waves
- change the pitch of an object that makes noise through demonstration and their own exploration
- identify and classify sounds as loud or quiet
- vary volume of sounds and write sentences on how to vary volume
- demonstrate how sound travels from one point to another by tracing the path of sound vibrations from the source of the vibration to their partner's ear
- apply the knowledge they have learned about sound to make their own musical instruments
- sort their instruments by type (percussion, string, or wind) and pitch
- demonstrate and/or explain how they can change the pitch and volume of their instruments

All of these objectives follow along with the GLCEs and MCF Benchmarks covered in this unit:

GLCEs:

P.EN.03.11 Identify light and sound as forms of energy. (Only sound in this unit)

P.EN.E.3 Sound- Vibrating objects produce sound. The pitch of sound varies by changing the rate of vibration.

P.EN.03.31 Relate sounds to their sources of vibrations (for example: a musical note produced by a vibrating guitar string, the sounds of a drum made by the vibrating drum head).

P.EN.03.32 Distinguish the effect of fast or slow vibrations as pitch.

Benchmarks (from MCF):

IV.4.E.2 Explain how sounds are made.

IV.4.E.1 Describe sounds in terms of pitch and volume.

II.1.E.2 Show how sound can be made into music through creative expression.

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EPE Chart for *Adventures in Sound*

Experiences	Patterns*	Explanations*
a. Observing, recording, and demonstrating descriptions of sounds and what was moving (vibrating) when the sound was made b. Observing, exploring, and recording how to make a sound higher or lower c. Discussing, exploring, and recording how to change the volume of a sound d. Exploring and recording how sound travels using a string telephone e. Creating an instrument and sorting it by type, pitch, and volume f. Playing an instrument and exploring and demonstrating how to change the pitch and volume	a. "We can only hear a sound if something is moving/vibrating." **P.EN.03.31, IV.4.E.2** b. "Something shorter or smaller has a higher pitch, and something longer or bigger has a lower pitch." **P.EN.E.3, P.EN.03.32** c. "When we hit or pluck something harder, it sounds louder." **IV.4.E.1** d. "When I talk quietly into the string telephone, my partner can hear me on the other end, even if I'm far away." **P.EN.03.11** e. "We can sort our instruments into groups by how high or low they sound, how loud or quiet they sound, and if you have to hit it, pluck it, or blow into it." **P.EN.03.32, IV.4.E.1, II.1.E.2** f. "I can change the pitch of my instrument by making it bigger or smaller, and I can change the volume of my instrument by hitting/plucking/blowing into it harder." **P.EN.03.32, IV.4.E.1, II.1.E.2**	a. Sound comes from vibrations of objects and travels in waves to our ears, which causes our eardrums to vibrate and hear the sounds. **P.EN.03.31, IV.4.E.2** b. Pitch is caused by the frequency of the vibration. Pitch changes based on the frequency, that is, the rate of vibration of the sound wave. Changing the amount of space in which the sound wave has room to vibrate either increases or decreases the rate of vibration. A smaller space results in a higher pitch; a larger space results in a lower pitch. **P.EN.E.3, P.EN.03.32** c. We can change the volume of a sound by putting more force (louder) or less force (quieter) on the object that is vibrating. **IV.4.E.1** d. Sound travels through all states of matter. It travels fastest through solids, which allows us to hear a sound through a string telephone before the compression of the sound waves decompresses. **P.EN.03.11** e. Instruments, depending on their size and type have different characteristics. We group instruments into three groups: percussion (must hit it), strings (must pluck it), and wind (must blow into it). **P.EN.03.32, IV.4.E.1, II.1.E.2** f. Changing the size of the instrument changes the frequency, or the rate, of the vibration; a sound wave vibrating at a faster rate causes a higher pitch and vice-versa. **P.EN.03.32, IV.4.E.1, II.1.E.2**
Inquiry →		← **Application**

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Sound

Sound Waves & Vibrations

- Sound waves travel to our ears when an object vibrates.
- Our eardrums vibrate and we hear a sound.

Pitch

- High: The less space in which a sound wave has to vibrate, the higher the pitch.
- Low: The more space in which a sound wave has to vibrate, the lower the pitch.

Volume

- Loud: Adding more energy/force (hit, pluck, blow into harder)
- Quiet: Less energy/force (hit, pluck, blow into more softly)

Sound Travels

- Sound can travel through all states of matter from the original source to our ears.

Making Music

- Sound can be made into music through creative expression.