WHAT ARE WE GOING TO STUDY THE WEEK OF JANUARY 3  TO JANUARY 27, 2017

SCIENCE:​  STUDENTS WILL DEMONSTRATE HOW SOUND IS PRODUCED BY VIBRATING OBJECTS AND HOW SOUND CAN BE VARIED BY CHANGING THE RATE OF VIBRATION. A.INVESTIGATE HOW SOUND IS PRODUCED. B.RECOGNIZE THE CONDITIONS THAT CAUSE PITCH TO VARY.

SOUND IS ENERGY.  LIGHT IS ENERGY.  SOUND TRAVELS IN WAVES – LIKE LIGHT.  IT TRAVELS AWAY FROM THE SOURCE IN ALL DIRECTIONS – THINK OF RIPPLES IN A POND CAUSED BY A ROCK FALLING INTO THE WATER.  SOUND CAN BE REFLECTED – THINK OF ECHOES, ABSORBED – SOUND PROOFING, AND SEPARATED – THINK OF DIFFERENT MUSICIANS PLAYING DIFFERENT INSTRUMENTS ALL IN ONE SONG.  SOUND AND LIGHT HAVE MANY SIMILAR PROPERTIES.

SOUND TRAVELS THE FARTHEST, FASTER AND AT HIGHER VOLUME THROUGH A SOLID.  IT TRAVELS WELL THROUGH A LIQUID AS WELL – NOT AS WELL AS THROUGH A SOLID BUT BETTER THAN THROUGH A GAS.  SOUND TRAVELS THE SLOWEST AND LEAST DISTANCE THROUGH A GAS.
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**ESSENTIAL QUESTIONS** How do different organisms and objects vibrate in order to produce sound? What is the relationship between the speed at which an object vibrates and the pitch of the sound that is produced?

​**What is sound and what causes it?**
Sound is a form of energy. Energy is needed to start an object vibrating to make sound.  Vibrations are back and forth motions started by some form of energy.

**What do sound waves look like?**
A sound wave is usually represented on a graph by a wavy, horizontal line.  The upper part of the wave is the crest.  This indicates a compression, when air molecules are pushed close together.  The lower part, or trough, indicates a rarefaction. Rarefaction is when the air molecules are pulled apart.

 **How are sound waves measured?**
Sound waves can be measured by their wavelength, frequency and amplitude.  When a wave is created, the distance from one crest to the next crest is the wavelength.  The wavelength can also be measured from one trough to the next consecutive trough. Additionally, sound waves can be measured by their frequency.  Frequency is the rate of vibrations per second.  On a graph, the frequency would be measured as the number of complete waves.  Amplitude is another way in which sound waves can be measured.  Amplitude is the amount of energy the sound carries.  The amplitude is measured by the height of the wave.

**What is frequency?**
Frequency is the number of vibrations per second and are measured in Hertz.  Sounds are generally audible to the human ear if their frequency lies between 20 and 20,000 vibrations (Hertz), but the range varies from person to person. Sound waves with frequencies less than those of audible waves are called subsonic; those with frequencies above the audible range are called ultrasonic.

**What is pitch?**
Pitch describes how high or low a sound is and depends on how rapid the vibration is. A rapid vibration makes high frequency waves with a high pitch.  Slow vibrations cause low frequency waves with a low pitch.  The apparent change in the pitch of a sound as a source gets closer or moves farther away from a person is described by the Doppler effect.

 **How does sound travel?**
Sound travels in waves away from the source in all directions; like the ripples in a pond caused by a rock falling into the water.  The speed of sound is not always the same.  It varies, depending on the type of matter and the temperature of the matter.  Sound travels more slowly in gases than in liquids, and more slowly in liquids than in solids. Since the ability to conduct sound is dependent on the density of the material, solids are better conductors than liquids; liquids are better conductors than gases.  Also, sound will travel faster in warmer temperatures.

**What is the relationship between amplitude and intensity?**
Amplitude is the distance a vibrating particle has been displaced from a resting point.  It is how much energy the sound carries.  A high amplitude wave carries a large amount of energy; a low amplitude wave carries a small amount of energy. Amplitude determines the intensity of a sound.  The average amount of energy passing through a unit area per unit of time in a specified direction is called the intensity of the wave. As the amplitude of the sound wave increases, the intensity of the sound increases. Sounds with higher intensities are perceived to be louder.  Intensity is measured in units called decibels. A whisper would be about 20 decibels while a normal conversation would be about 60 decibels.  A jet plane takeoff would be about 120 decibels.

**How do different objects and organisms vibrate in order to produce sounds?**
Sound is produced by vibrating objects. As an object vibrates, it produces sound waves that travel through the air (and other substances). The faster an object vibrates the more sound waves it produces per second and the higher the pitch of the sound. Most sounds that living things make have a meaning. Animals use sounds to communicate and survive. A dog uses vocal cords to bark or growl, and the rattlesnake shakes its tail rattle to give a warning. Grasshoppers and crayfish have no vocal cords. They rub one part of their body against another part to make sounds.

**How is sound produced?**
Sound is produced by the vibrations, or back and forth movement, of an object.  The vibrating object sets the air around it into motion.

**Why is sound a form of energy?**
Energy is the ability to do work, or cause change, and the waves created by sound can cause change.  This change is usually very small, but if the sound is loud enough, it can cause physical pain and lead to hearing impairments.

**What is the relationship between the speed at which an object vibrates and the pitch of the sound that is produced?**
A rapid vibration makes high frequency waves with a high pitch.  Slow vibrations cause low frequency waves with a low pitch.  The pitch can be changed when the rate of the vibration is altered.

**How does sound travel through different types of materials?**
Sound travels more slowly in gases than in liquids, and more slowly in liquids than in solids.  It also travels slower when the temperature of the material is lower.

**How are light and sound alike?**
Sound and light both travel in waves. Also, sound has some of the same properties of light.  Sound can be reflected (when there is an echo) and it can absorbed (walls between classrooms).

**​HOMEWORK: DUE FRIDAY, JANUARY 27, 2017.**

​***Expository Writing Prompt***
**Situation:**You have been given the task of inventing a new musical instrument.

**Directions:** Write a report about your instrument. In your report:
• include the materials you used
• explain how you made your instrument
• describe how your instrument changes pitch

***Persuasive Writing Prompt***
**Situation:** A famous xylophone player was on her way to a concert and her xylophone was stolen.  She didn’t want to disappoint her audience, but she didn’t know what to do.

**Directions:** Write a letter to the famous xylophone player persuading her to use water filled glasses.  Explain the procedure the xylophone player would have to follow and why using water filled glasses would be similar to a xylophone.

[studyjams.scholastic.com/studyjams/jams/science/energy-light-sound/sound.htm](http://studyjams.scholastic.com/studyjams/jams/science/energy-light-sound/sound.htm)

[gpb.pbslearningmedia.org/resource/phy03.sci.phys.mfe.zxylophone/experimenting-with-a-glass-xylophone/](http://gpb.pbslearningmedia.org/resource/phy03.sci.phys.mfe.zxylophone/experimenting-with-a-glass-xylophone/)

[https://quizlet.com/947263/sound-4th-grade-science-flash-cards/​](https://quizlet.com/947263/sound-4th-grade-science-flash-cards/%E2%80%8B)

[youtu.be/nQcjcMl2d94](https://youtu.be/nQcjcMl2d94)

MATH:  ​

**Understand the relationship between fractions and decimals**

* ***23.NF.5****express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100 (e.g., express 3/10 as 30/100 and add 3/10 + 4/100 = 34/100)*
* ***24.NF.6****use decimal notation for fractions with denominators 10 or 100 (e.g., rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram)*

* *I know that decimals can be written as fractions.*
* *I know that fractions with a denominator 10 or 100 are called decimal fractions.*
* *I can generate equivalent decimal fractions.*
* *I can name fractions (e.g., 7/10 is "seven tenths").*
* *I can add fractions with like denominators.*
* *I can add decimal fractions.*

**ESSENTIAL QUESTION:** How are fractions and decimals related?
What is the relationship between a fraction with a denominator of 10 to another fraction with a denominator of 100?

A fraction can be written as a decimal and a decimal can be written as a fraction. Understanding the meaning of fractions as decimals extends your understanding of the place value system.

Here is the number *"forty-five and six-tenths"* written as a decimal number:

The decimal point goes between Ones and Tenths.
**45.6** has 4 Tens, 5 Ones and 6 Tenths
​
**Finish the equations to make true statements. Write one number in each space.**

1. 1 tenth + 4 hundredths = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ hundredths
2. 4 hundredths + 1 tenth = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ hundredths
3. 5 tenths + 2 hundredths = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ hundredths
4. 5 hundredths + 2 tenths = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ hundredths
5. 14 hundredths = \_\_\_\_\_\_\_\_\_\_ hundredths + 4 hundredths
6. 14 hundredths = \_\_\_\_\_\_\_\_\_\_ tenths + 4 hundredths
7. 14 hundredths = 1 tenth + 3 hundredths + \_\_\_\_\_\_\_\_\_\_ hundredths
8. 80 hundredths = \_\_\_\_\_\_\_\_\_\_ tenths

[www.khanacademy.org/math/arithmetic/arith-decimals/arith-review-decimals-to-fractions/v/converting-decimals-to-fractions-1-ex-1](https://www.khanacademy.org/math/cc-fourth-grade-math/cc-4th-fractions-topic/cc-4th-fractions-unlike-denom/v/adding-fractions-with-10-and-100-as-denominators)

[www.khanacademy.org/math/cc-fourth-grade-math/cc-4th-fractions-topic/cc-4th-fractions-unlike-denom/v/adding-fractions-with-10-and-100-as-denominators](https://www.khanacademy.org/math/cc-fourth-grade-math/cc-4th-fractions-topic/cc-4th-fractions-unlike-denom/v/adding-fractions-with-10-and-100-as-denominators)

​[youtu.be/Mst8iZjIpFE](https://youtu.be/Mst8iZjIpFE)