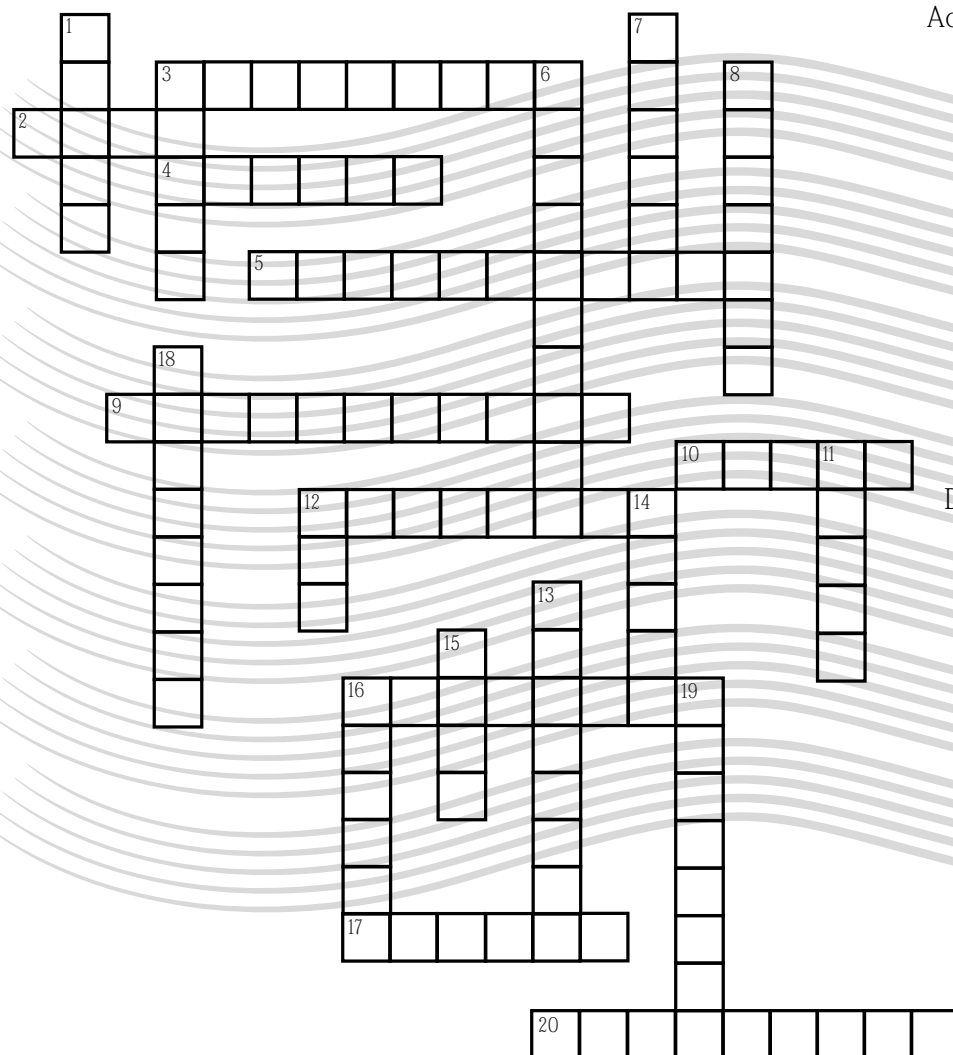


Acoustics and You: Learning About the Science of Sound



- Across
- When the basic sound pressure pattern resembles a _____ function, the wave is often called a pure tone.
 - Whole-number multiples of the fundamental frequency are called _____.
 - Unlike tonal sounds, broadband sounds consist of a sequence of _____ wave patterns that do not repeat.
 - The _____ frequency of a tone determines the pitch.
 - Decibels are measured on a _____ scale.
 - Broadband sounds are usually perceived as _____.
 - The _____ of a sound is related to the amount of energy in the sound.
 - A common waveform not mentioned in #20 is the _____ wave.
 - The smallest or "just noticeable" difference in a sound's _____ is about 3 dB.
 - Some examples of _____ are the sine wave, sawtooth wave, and square wave.
- Down
- A sound with equal energy at all frequencies is called _____ noise.
 - The unit of frequency is _____.
 - Pitch is a _____ descriptor of frequency.
 - Gunshots and explosions are examples of _____ noise sources.
 - A _____ sound is made up of a specially organized collection of pure tones.
 - The harmonic content of a sound determines the _____ of the sound wave.
 - _____ pitched sound sources are typically large in size.
 - The presence of tones in a sound generally makes a sound more _____ than it would otherwise be.
 - High-pitched sound sources are typically _____ in size.
 - Sounds produced by a violin, piccolo, and soprano voice have more _____ frequency content than those produced by a tuba, or double bass, and baritone voice.
 - The shape of a wave has a strong influence on the _____ or characteristic quality of the sound.
 - An octave represents a _____ of frequency.
 - A-weighted sound levels are good predictors of hearing loss associated with unprotected _____ to high sound levels.

Sources of Tonal Sounds

These sources produce sounds with strong tones. Match the scrambled sounds.

- | | |
|-------------|-------------|
| bolerdol | motor |
| leproprel | transformer |
| rohn | siren |
| siwelth | doorbell |
| grape | telephone |
| epebre | voice |
| torom | propeller |
| civoe | whistle |
| serftormarn | pager |
| zubrez | buzzer |
| risen | horn |
| hepoleten | beeper |

The Sounds of Sound

Unscramble these words.

- shis _____
- hewni _____
- raro _____
- gnob _____
- glanc _____
- nigd _____
- duth _____
- blemur _____
- rihw _____
- lirtl _____
- pat _____
- klacrec _____
- pans _____
- mobo _____

Find and circle the words in the list. Each is hidden horizontally, vertically, or diagonally in a straight unbroken line of letters that reads forward or backward.

- | | |
|-----------|-------------|
| SPECTRUM | WEIGHTING |
| VIBRATION | tone |
| BROADBAND | WAVELENGTHS |
| ACOUSTICS | PERIOD |
| AMPLITUDE | PITCH |
| DECIBELS | SQUARE |
| FREQUENCY | PRESSURE |
| LEVEL | SAWTOOTH |
| OCTAVE | INTENSITY |
| SOUND | |

The Physics of Sound

W S Y C N E U Q E R F A D
 E A M P L I T U D E C P B
 I W V D N U O S Q U A R E
 G T E E G H L I Q F M E E
 H O V R L E V E L J U S B
 T O A I B E H K Q A R S F
 I T T I B P N C S E T U K
 N H C O E R P G T G C R O
 G E O R N K A Z T I E E V
 D M I N O E Y T L H P D C
 V O A C O U S T I C S H J
 D U T D N A B D A O R B I
 W X L Y T I S N E T N I C



National Aeronautics and Space Administration

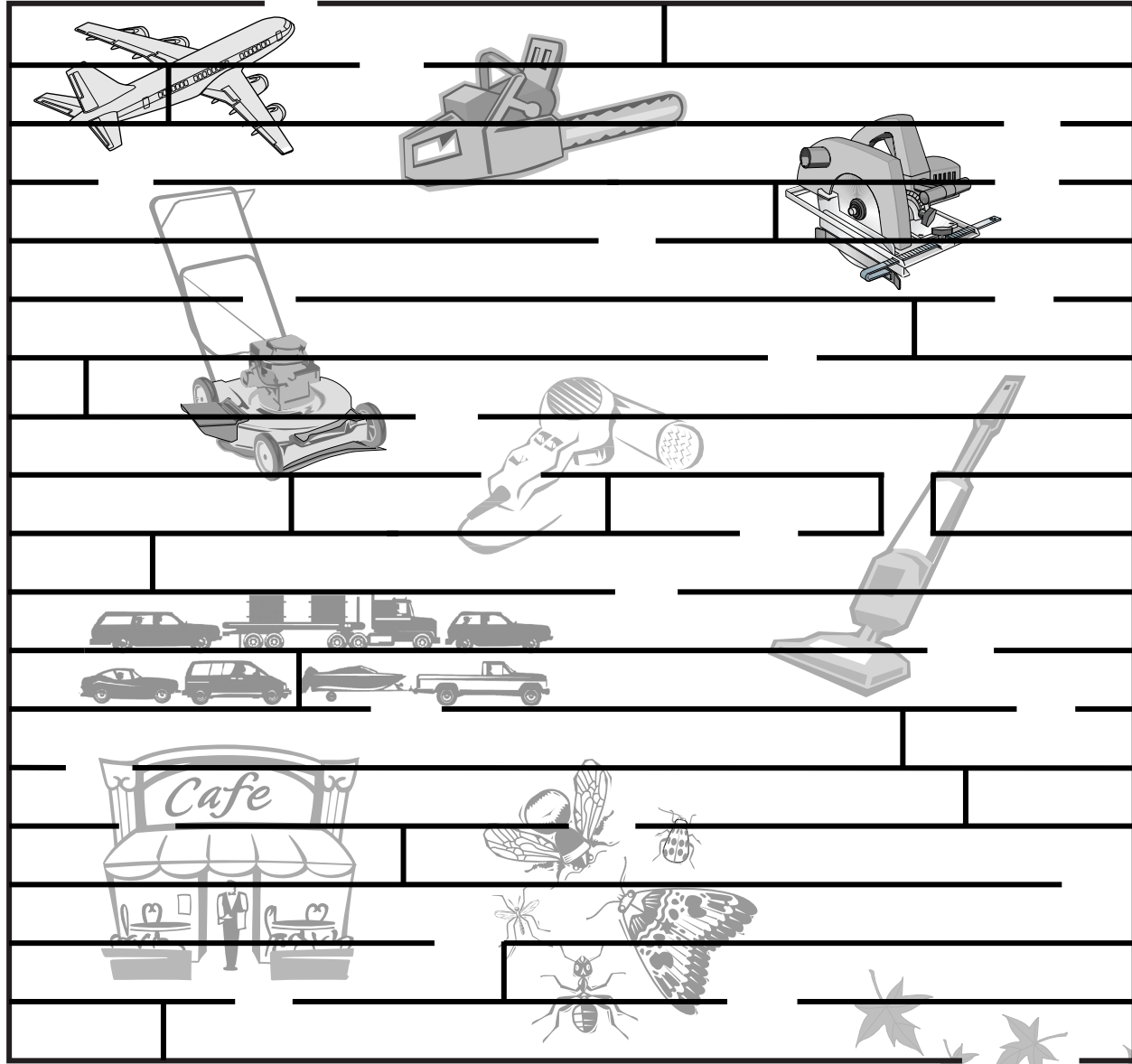
Acoustical Testing Laboratory

Beth Cooper
 216-433-3950
 E-mail: Beth.A.Cooper@grc.nasa.gov

Find Your Way Out of the Noise

Start here 

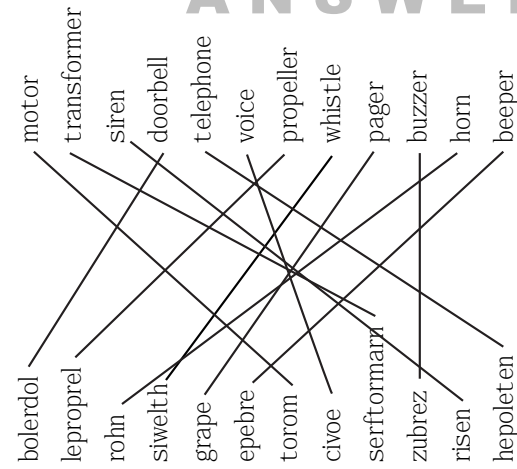
Be ear-rational! Find your way through the maze, going from loudest to the quietest sound.



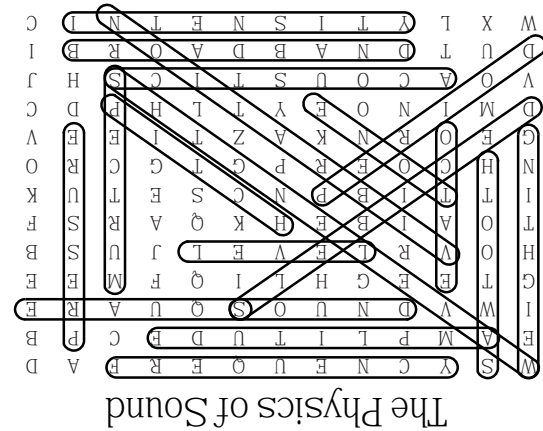
Find the Right Word

F 1
I 2
K 3
A 4
G 5
J 6
B 7
D 8
E 9
H 10
L 11
C 12

Sources of Tonal Sounds



ANSWERS



The Physics of Sound

1. spectrum
2. vibration
3. broadband
4. acoustics
5. amplitude
6. decibels
7. octave
8. tone
9. wavelengths
10. A-weighting
11. period
12. pitch



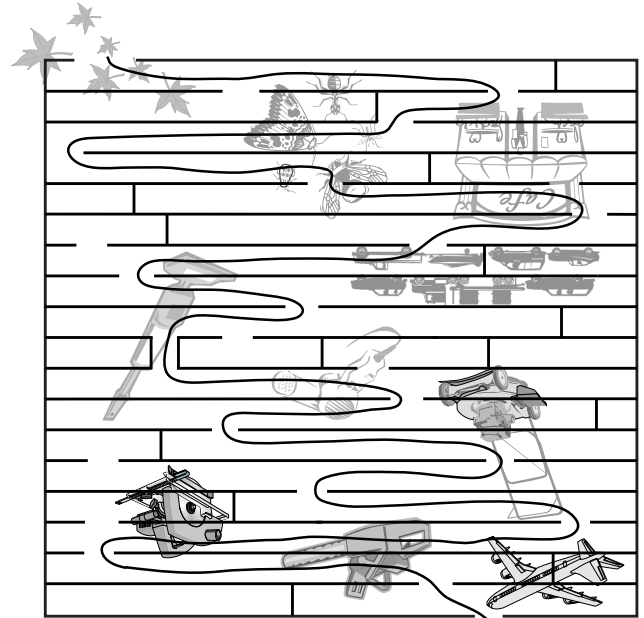
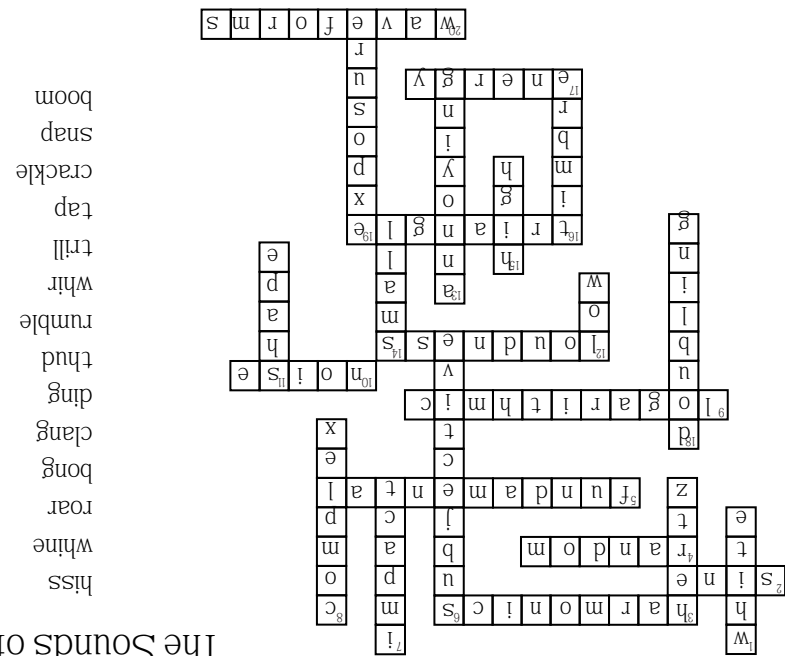
The Sounds of Sound

Find the Right Word

Match these words with their definition.

- A. The science of sound.
- B. Dividing the audible frequency range into sections of this size helps us analyze a broadband sound, much like splitting white light into a rainbow of colors.
- C. A subjective perception of the frequency of a sound.
- D. What we perceive when a sound pressure wave repeats itself many times per second.
- E. This attribute of a sound wave is shorter for high frequency sounds than for low frequency sounds.
- F. Used to describe the magnitude of sound energy at many frequencies.
- G. One of the three dimensions of sound, along with frequency and time variations.
- H. This filter approximates the sensitivity of the human ear to low sound levels.
- I. How sound is produced in an elastic medium such as air, water, or building materials.
- J. Units for expressing sound energy.
- K. Fans, blowers and compressed air hoses all produce sounds of this type.
- L. The time required for one complete cycle of vibration.

ANSWERS



Design and layout by Kelly Shankland