

Musical Instruments

Musical instruments produce sounds. Most musical instruments make music by varying the pitch. Although there are some similarities among instruments because the same laws of physics determine the pitch of each of them, there are differences as well. Even when playing the same note, different types of musical instruments have unique sounds because of the way they produce and amplify sounds. The main categories of musical instruments are strings, percussion, and horns including woodwinds and brass.

Stringed instruments such as the guitar or violin produce sound from vibrating strings. Strings can be made to vibrate by being plucked, struck, or having a bow drawn across them. The pitch of the note produced depends on the length, diameter, and tension of the string. Strings that are narrower, shorter, or tighter produce a higher pitch. Sound produced by vibrating strings is usually soft. Stringed instruments have a hollow chamber filled with air that acts as a resonator to amplify sound. **Percussion instruments**, such as the

drums and xylophone, are struck to produce sound. Striking the top surface of the drum or the drumhead causes it to vibrate. The drumhead is attached to a chamber that resonates and amplifies the sound. Many have a fixed pitch, but some can be tuned by tightening the drumhead. The xylophone has wood or metal bars of varying lengths. Longer bars produce lower notes. Brass and woodwinds both consist of pipes of varying lengths that produce sound with a vibrating column of air. With brass, such as a trumpet, trombone, tuba, or French horn, the air column vibrates when the musician makes his/her lips vibrate while blowing into the mouth piece. Blowing harder or softer causes air to resonate at different natural frequencies. Pressing valves changes the length of the tube. With woodwinds, such as a clarinet, saxophone, oboe, or flute, the air column vibrates when the musician makes one or two reeds vibrate by blowing into the mouth piece, or, in the case of a flute, by blowing across a narrow opening. Covering holes changes the length of the tube.



Lack of harmony among musical instruments

Answer the questions below based on the reading above and on your knowledge of physics.

1. How is raising the pitch similar among all the types of musical instruments? _____

2. A piano makes sound when a felt hammer strikes the strings of a harp. Why can a piano be classified as both stringed and percussion? _____

(CONTINUED ON THE NEXT PAGE)

3. The term “horn” for a musical instrument comes from the fact that people used to blow on real animal horns before making them from metal. How are brass and woodwinds horns? _____
- _____
- _____
4. What type of instrument is a violin? How does it produce sound? _____
- _____
- _____
5. What type of instrument is a cymbal? How does it produce sound? _____
- _____
- _____
6. How are brass and woodwinds similar? How are they different? _____
- _____
- _____
7. Draw arrows to the picture of the harp to the right labeling the lowest pitched and highest pitched strings. Explain why this is so. _____
- _____
- _____
- _____
8. Harps and guitars are similar in that the strings are attached to pegs that can be turned. What is the purpose of the pegs? _____
- _____
- _____
9. What is the purpose of the hollow areas in musical instruments? _____
- _____
- _____

