

## Lesson 4

# What is Sound?

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In today's world, where so much is changing and information is so freely available, I just want to outline your rights and mine with regard to this booklet, which is part of my home study course 'Read & Play Music'.

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<b>Part 1</b>	<b>Pitch</b>
<b>Lesson 4</b>	<b>What is Sound?</b>

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## LESSON 4:

# WHAT IS SOUND?

And now for something completely different . . .

I want to share with you something really interesting and fundamental about music.

At its most basic, any piece of music is a series of sounds. But they are not just any sounds. They have a special quality that makes them musical.

What is this special quality? To understand this, we first have to know a bit about a special kind of motion that occurs in nature.

## Back-and-forth motions

There are various situations in nature where something moves repeatedly back and forth.

Have you ever seen a tree swaying in the wind? If it's a big tree, it can take several seconds for each back-and-forth movement.

In the same wind, a small plant could move back and forth two times per second. It moves back and forth faster than the tree because it is smaller and lighter.

These are examples of things that move back and forth fairly slowly. They move slowly enough that you can see the movements.

## Rapid back-and-forth motions

Now we're going to discover what happens when something moves back and forth more rapidly.

In this next video, I'm going to show you an experiment. If you'd like to do the experiment for yourself, you can follow along with the video or read the instructions in the appendix at the end of this lesson. You'll need an 18-inch steel ruler.



Click the blue box above,  
or find the video on your Book 1 Course Materials page at  
[www.dempstermusic.com](http://www.dempstermusic.com)

### Summary of video

Here's what happened in the video:

- As I made the bouncing part of the ruler shorter, it bounced faster.
- Eventually it was so fast that it looked like a blur.
- And then, with only 4 inches free to bounce, it started to make a sound.



With only 4 inches free to bounce up and down, the ruler started to make a sound.

Here is what we have shown:

**Sound is created by something moving back and forth rapidly.**

A motion like that is called a ‘vibration’.

**Definition:** a **vibration** is a rapid back-and-forth motion.

Sound is created by something vibrating.

## How we hear sound

We’ve seen that when only a short part of the ruler was free to move, it vibrated rapidly back and forth. But how do we *hear* it?

Have you ever been in a crowd of people packed tightly together? People bump into you and you get jostled. If the chap behind you moves forward, you get pushed forward too. And then you push the chap in front of you, and so on. You get a chain reaction.

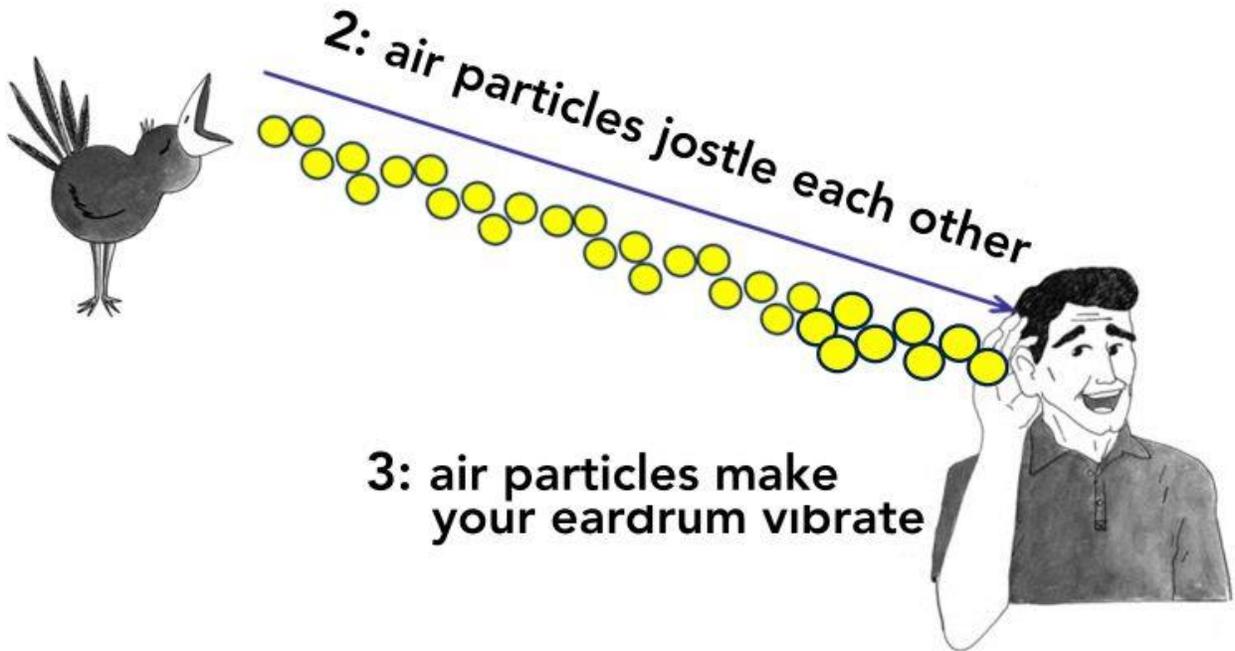
Sound works a bit like that. When you make the ruler vibrate, it jostles the particles of air next to the ruler and makes them vibrate as well. Those particles jostle the air particles next to them, causing them to vibrate, and so on. Every air particle in the room ends up vibrating.

And that includes the air particles inside the opening of your ears. As they vibrate, those air particles jostle your ear drums causing them to vibrate, and you hear the vibration as sound.

**Definition:** **sound** is our perception of vibrations in the air.

Next time you hear a bird singing, realize that it is making the particles of air next to it vibrate, and that the air particles are jostling each other all the way from the bird to your ear.

**1: bird's voice makes  
air particles vibrate**



How we hear sound.

# PRACTICAL

## BUILD YOUR SKILL

### Exercise 1: Make a vibration

1. Find a ruler (or something else that is long and flexible), and **make some vibrations**

A ruler is best, but you can also try using a ball-point pen or a credit card.

Hold one end firmly on the table, leaving most of the object sticking out. Pull the free end down and let it go.

Do you see a vibration?

Do you hear a sound?

A bit later, we're going to learn more about what makes a sound musical.

If you'd like more detailed instructions for doing the ruler experiment, read the appendix below.

## What's next?

In the next lesson, we're going to get back to work. You'll learn 2 more notes, and their names may be a bit of a surprise . . .

**Go on to your next lesson**



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## APPENDIX:

# HOW TO DO THE RULER EXPERIMENT IN LESSON 4

Here are your instructions for doing the first ruler experiment.

The purpose of the experiment is to learn something about sound.

If you want to watch me doing the experiment, watch this video:



Click the blue box above,  
or find the video on your Book 1 Course Materials page at  
[www.dempstermusic.com](http://www.dempstermusic.com)

*Reminder: To play the video in a new browser tab, right-click the blue box then select 'Open link in new tab' (in Windows), or the equivalent in Mac.*

To do this experiment yourself, you need an 18-inch steel ruler like this:



**An 18-inch steel ruler.**

What we're going to do is make the ruler bounce up and down (a back-and-forth motion), and see what happens as we make the bouncing part of the ruler shorter.

Here's how to get started:

1. Place the ruler so that 3 inches of it is on the table, and the rest (15 inches) is jutting out over the edge, free to move.
2. With the palm of your hand, press down firmly on the part of the ruler that is on the table, so it can't move. Make sure you are pushing down right at the edge of the table, like this:



**3 inches on the table. 15 inches jutting out, free to move.  
Press down firmly with your hand.**

3. Pull down the free end of the ruler and then let it go. Provided the ruler is flexible enough, it will start bouncing up and down.
4. Now put a bit more of the ruler on the table, so the bouncing part is shorter, and make it bounce again. Make sure you are holding the ruler on the table by pushing down with your hand right at the edge of the table. Observe what happens.
5. Keep putting more and more of the ruler on the table, so the bouncing part gets shorter and shorter.

Here's the result I get (which you can see on my video):

- As I make the bouncing part of the ruler shorter, it bounces faster.
- Eventually it is so fast that it looks like a blur.
- And then, with only 4 inches free to bounce, it starts to make a sound.



**14 inches on the table, only 4 inches free to move.  
Make sure your hand is very close to the edge of the table.  
Now it makes a sound!**

Here is what we have just shown:

**Sound is created by something moving back and forth rapidly.**

A motion like that is called a ‘vibration’.

**Definition:** a **vibration** is a rapid back-and-forth motion.

Sound is created by something vibrating.

## What's next?

OK, back to work! Let's learn to read and play some more notes.

**Go on to your next lesson**



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