



**BALL STATE UNIVERSITY** EDUCATION REDEFINED

# Going Native

## A Process Oriented Approach to Digital Oral Histories

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'Can You Hear Me Now? Digitizing the Voices of the Past'

Ball State Oral History Conference – September 20, 2007

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# What does Going Native Mean?

“Going Native” in anthropological or ethnographic terms is a fairly common strategy to gain a better understanding of the people and the culture one is studying.

# What does Going Native Mean?

- Approaching the subject of oral history not from a humanities viewpoint, but from the perspective of a sound technician
- A better understanding of sound in general will result in superior audio recordings
- Increased knowledge of digital audio processes and terminology will aid you in making equipment and procedural choices

# What does Going Native Mean?



BITS PER  
CHANNEL

Analog  $\uparrow$   $\uparrow$   $\Omega$   
m  
Sampling

Frequency  
Rate

AUDIO  
WAVEFORM



# What does Going Native Mean?

- Introduction to the Elements of Sound
- Basic Overview of Audio Recording
- Summary of Recommendations and Best Practices for Archival Digital Audio

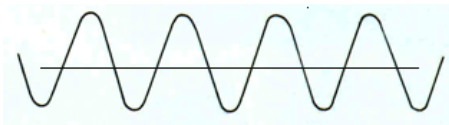
# ELEMENTS OF SOUND

At it's most basic, sound can generally described the creation of a wave, that vibrates something else.



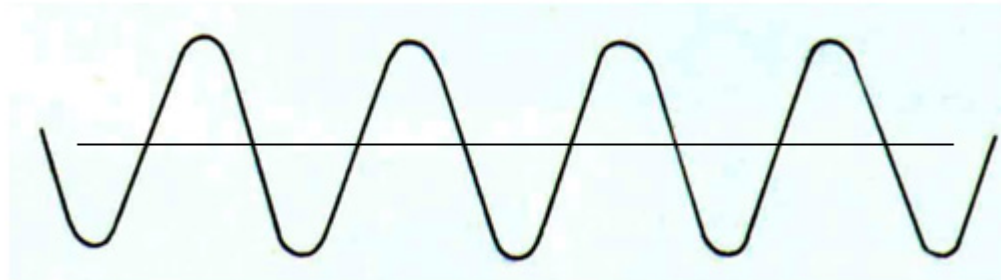
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# ELEMENTS OF SOUND

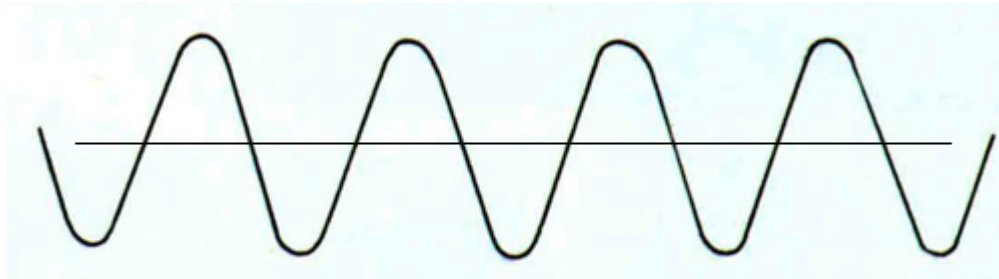
Conversely, Something vibrating can create a sound wave.



# ELEMENTS OF SOUND

A sound wave has two major characteristics:

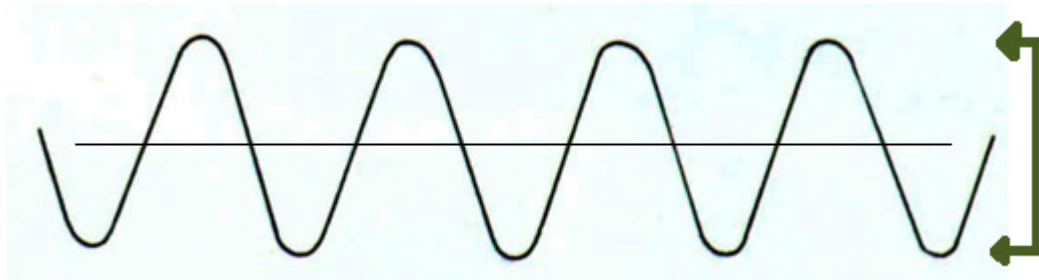
Amplitude and Frequency



# ELEMENTS OF SOUND

A sound wave has two major characteristics:

Amplitude and Frequency

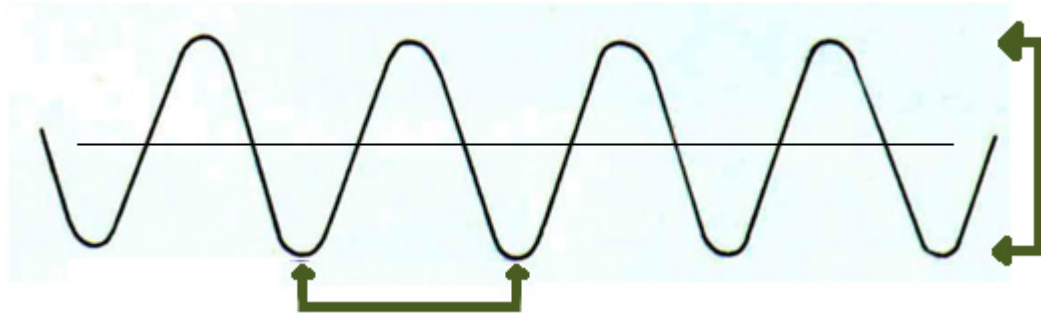


Amplitude = How hard the vibration is.

# ELEMENTS OF SOUND

A sound wave has two major characteristics:

Amplitude and Frequency

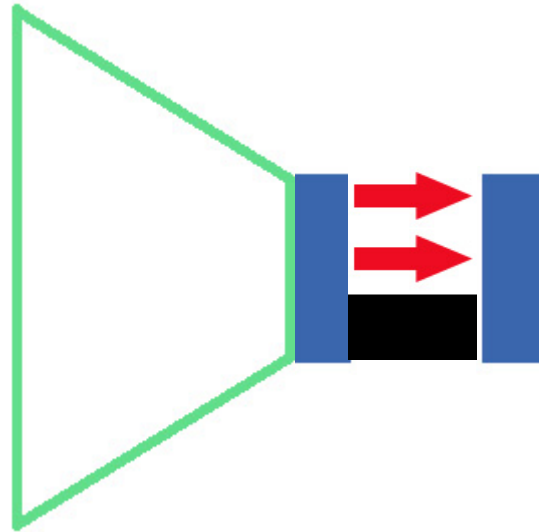
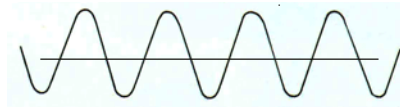


Amplitude = How hard the vibration is.

Frequency = How fast the vibration is.

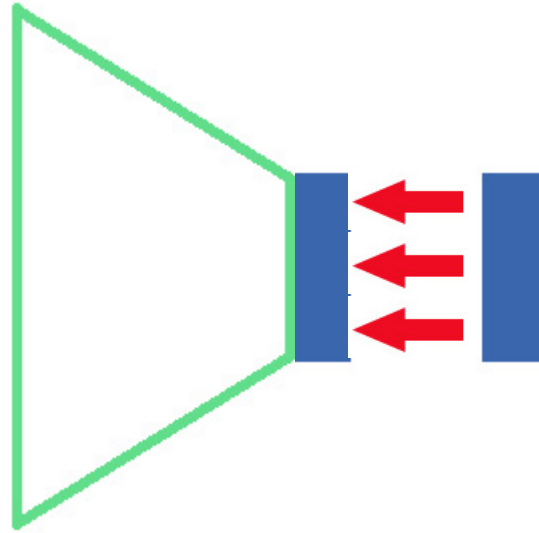
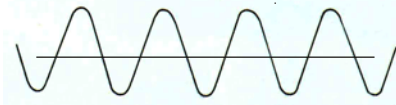
# AUDIO RECORDING

Input Signal



# AUDIO RECORDING

Output Signal



# AUDIO RECORDING



ANALOG

DIGITAL



# AUDIO RECORDING

Digital Audio Consists of Two Major Components:

Bit Depth and Sampling Rate

# Bit Depth = Range of Sounds Available

## What is a bit?

A Bit is a single instance of binary code

1 Bit = On or Off

0



1



# Bit Depth = Range of Sounds Available

## What is a bit?

A Bit is a single instance of binary code

2 Bits

00



01



10



11



# Bit Depth = Range of Sounds Available

Bit Depth	Range of Sounds Available
1 Bit	2
2 Bit	4
4 Bit	16
8 Bit	256
16 Bit	65,536
24 Bit	16,777,216
36 Bit	4,294,967,296
48 Bit	281,474,976,710,656

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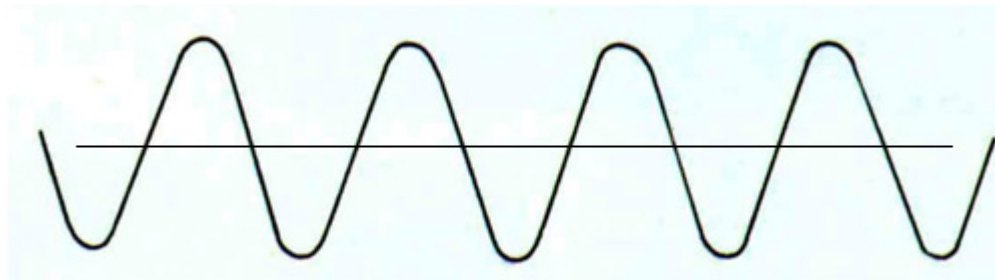
# AUDIO RECORDING

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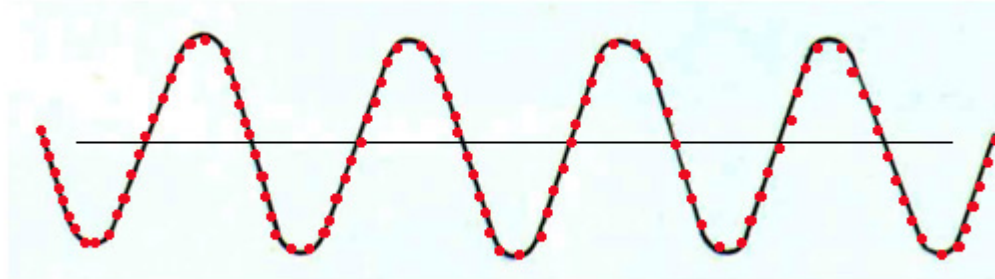
Bit Depth and Sampling Rate

Bit Depth = Range of Sounds Available

Sampling Rate = How Often the Sound Wave Is Measured



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Sampling Rate = How Often the Sound  
Wave Is Measured



Sampling Rate = How Often the Sound Wave Is Measured



Sampling Rates Are Frequently Expressed in **Kilohertz**

1 kHz = 1,000 times per second

Sampling Rate = How Often the Sound Wave Is Measured



Sampling Rates Are Frequently Expressed in **Kilohertz**

Compact Discs have a sampling rate of 44.1 kHz

Which means each second of the recording is comprised of 44,100 individual instances of sound.

# AUDIO RECORDING

Digital Audio Consists of Two Major Components:

Bit Depth and Sampling Rate

Bit Depth = Range of Sounds Available

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Wave Is Measured

# RECOMMENDATIONS

Digital Audio Consists of Two Major Components:

Bit Depth and Sampling Rate

How Much do I need?

# RECOMMENDATIONS

## Bit Depth

Most experts agree that the average human ear can only resolve 15 to 18 bit audio; however, some individuals (particularly audio engineers) report a quality difference between a 16 bit and a 24 bit recordings.

## Sampling Rate

Sampling at over 48 kHz will be beyond what the average human mind is capable of discerning.

# RECOMMENDATIONS

## Archival Quality Audio

### Minimum

44.1 kHz, 16 Bit, Stereo

### Better

44.1 kHz, 24 Bit, Stereo

### Optimal

96 kHz, 24 Bit, Stereo

# RECOMMENDATIONS

## Archival Quality Audio

Recommend an Uncompressed Format

- WAV – (Waveform Audio Format)
- AIFF – (Audio Interchange File Format)

# RECOMMENDATIONS

## Access Quality Audio

### Recommend a Compressed Format

- MP3 – (MPEG-1, Type 3 Audio)
- WMA – (Windows Media Audio)
- AAC – (Advanced Audio Coding)
- RA – (Real Audio)

# RECOMMENDATIONS

## File Upkeep & File Migration

Most storage media (CD-R, DVD, etc.) are only rated for 5 to 7 years before data corruption can set in.

Storage on hard discs and servers are a better bet.

Even so, plan to retain backups of all files (if possible, at two separate locations) and test regularly for data loss.