

THE EVOLUTION OF SOUND RECORDING

soundbreaking
Stories from the Cutting Edge of Recorded Music


Est. Time: 45-90 minutes
Subjects: Music, Science
Age Range: High School
See the full lesson [here!](#)

★ *TEACHROCK* ★



How has recording technology evolved in the last 100 years, and what is multitrack recording?

In this lesson you will:

- Explore the development of recording technology from early disk etching to contemporary digital recording
 - Understand the terms “Track,” “Multitrack,” “Mix,” “Overdub,” “Digital Audio Workstation,” and “Mix Down” as they apply to recording science
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Print out **this handout** or your own chart similar to the handout. You will be using it throughout the lesson.



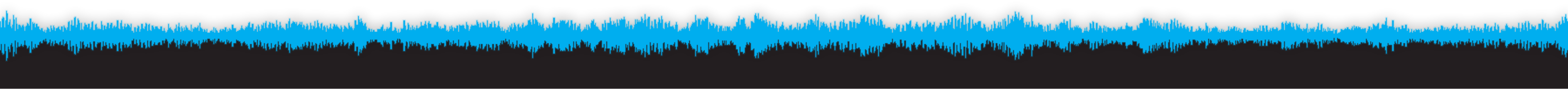


RECORDING BEFORE MAGNETIC TAPE

Watch [this clip](#) from the *PBS Soundbreaking* miniseries. Make a note on the chart of the benefits and drawbacks to recording directly onto a disc and using magnetic tape.



Think about or ask a friend:

- What benefits did etching directly to a disc offer musicians? Would it have been possible to record a song prior to this?
 - Watch the beginning of the clip once again. How many microphones do you see recording Duke Ellington's Band?
 - Using direct etching, would it be possible to record members of Duke Ellington's band individually, and then put them together? Why or why not?
 - How do you think musicians prepared for these early recording sessions?
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LES PAUL & SOUND-ON-SOUND

Les Paul and Mary Ford were musicians who experimented with magnetic tape to create “multitrack recording.” Watch [this clip](#) and write your observations on your chart.


Describe in your own terms:

- How are Les Paul and Mary Ford creating the song featured in the recording?
- Could this have been done using the previous disk etching process?



While magnetic tape looks like a singular strip of plastic, it is actually a composite of many individual magnetic **tracks** that you can record onto. Recording one track on top of another is known as **overdubbing**.






Using a tape machine, the recording engineer can select which tracks to record to, and route different microphones to different tracks. This is known as **multitrack recording**.

Depending on its width and other characteristics, magnetic tape is able to capture anywhere between 2 to 16 tracks.

Recording engineers are also able to record from one tape machine into another. So, 16 tracks from one tape machine can be recorded onto 2 tracks on another. This practice is called **mixing down** and allows a near infinite number of recording tracks.



Multitrack recording also gives recording engineers the ability to mix the volumes of each track on the tape. Use this **TechTool** to see how recording engineers mix a song.

Press the mute buttons and slide the faders up and down to create your “mix.”

Take a screenshot of your mix and share it on social media or with info@teachrock.org



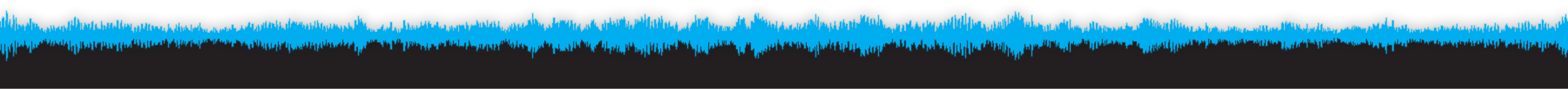


PINK FLOYD & THE DARK SIDE OF THE MOON

Watch [this clip](#) to see how the band Pink Floyd used magnetic recording and other technology to develop a new approach to recording.



Think about or ask a friend:

- Pink Floyd suggests that multitracking allowed them to create an album that expressed their feelings about “life, human emotion, and how the world impinges upon us”? How do you think multitracking helped them accomplish what they could not have by playing “live”?
 - What does Roger Waters suggest he likes about multitrack recording in this clip?
 - What art form does Roger Waters liken multitrack recording to? In what ways do you think this analogy applies?
 - In what ways does Roger Waters see multitracking as having potential pitfalls?
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DIGITAL AUDIO WORKSTATIONS

By the late 1970s, digital technology began to allow people to record directly onto a computer, eliminating the need for tape altogether.

Programs known as Digital Audio Workstations (DAW) allow recording engineers to record, mix, overdub, and mixdown audio from their computer.

With DAWs, the number of tracks a person can record is no longer limited to tape and tape machines. An engineer can now record and mix hundreds of tracks in their bedroom.



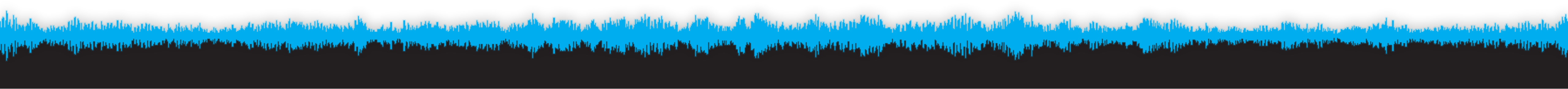


PRO TOOLS AND THE DIGITAL AUDIO WORKSTATION

Watch [this clip](#) to see musician Bon Iver's approach to digital recording, and make observations on your chart about the benefits and drawbacks to digital recording.



Think about or ask a friend:

- What language does Bon Iver use to express what he sees as the possibilities enabled by the Digital Audio Workstation?
 - What is Pro Tools enabling Bon Iver to do as a composer that he wouldn't have been able to do in the era of tape? In what ways does the “digital” nature of Bon Iver's set up permit this?
 - Thinking back to Roger Waters' comments in the previous clip, how might software such as Pro Tools increase the possibility of the “pitfalls” he mentioned?
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SUMMARY

- Electric recording technology began in the 1920s. At that point, musicians could only record into a single microphone that would etch the sound directly onto a disc
- The advent of magnetic tape in the 1940s allowed recording engineers to use multiple microphones and record multiple “tracks” of audio simultaneously on a single strip of tape



SUMMARY

- Musical pioneers such as Les Paul, Mary Ford, and Pink Floyd used magnetic tape recording to push the boundaries of what was possible in creating music
- By the 1970s, digital recording began replacing tape recording, allowing multitrack recording within a single computer

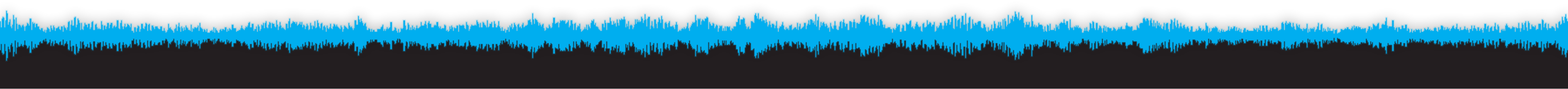


BE CREATIVE

Audio Multitrack Activity (2 or more people required)

Nearly all phones and tablets have a “voice memo” option. This is a simple, one-track recording device. Using these three steps, you can accomplish multitrack recording:

- Step One: Using a voice memo feature, have a student record the statement, “1-2-3-4, Today is [date], we are recording.”



BE CREATIVE

- Step Two: Now have a second person open voice memo. Person two will now record him/herself reciting the same sentence along with the playback of the first recording. Make sure the device playing the first message is close enough to be recorded by the second device.
- Step Three: Have a third person record a voice memo with the playback of student two's recording. Continue this process as many times as you wish.



BE CREATIVE

Visual Multitrack Activity (2 or more people required)

Roger Waters compared multitrack recording with painting. In this activity, you will make a visual representation of the “layers” in a song of your choice.

- With friends or family, choose a song you all like.
- Give a blank piece of paper to one person. Play the song, and have the first person paint or draw along to it. After the song is over, this person will share their work and explain what about the song they were trying to represent visually. Was it a particular instrument? The lyrics? The general “mood” of the song?



BE CREATIVE

- Pass the paper to the next person. Play the song again. The second person will try to focus on another aspect of the song, and draw another layer on top of the layer the first person created.
- Continue to pass around the blank piece of paper, until you feel your visual multitrack work is finished, or you feel everything about the song has been visually represented.



CAREER CONNECTIONS

Interested in the music producing? You might be interested in pursuing careers in:

- Design, visual, and media arts

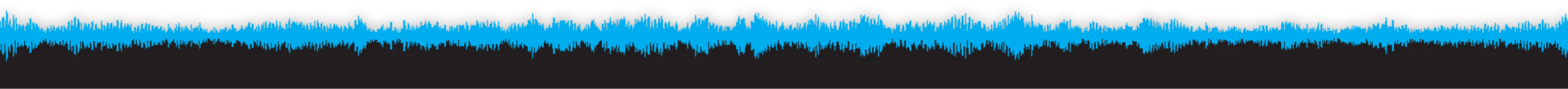
Interested in creating new musical instruments? You might be interested in pursuing careers in:

- Product Innovation and Design
- Engineering Design
- Mechanical Systems Installation and Repair
- Engineering Technology



CONNECT

Share your work with us! Either you or an adult in your life can share your work with TeachRock on **Instagram** or **Facebook**, email to **info@teachrock.org**, or Tweet it to **@TeachRock**





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