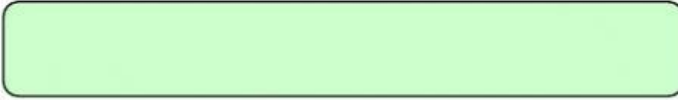




ACTIVITY 1: Read and listen. AUDIO 41



An electronic **signal** is a signal that carries information between two pieces of electronic equipment. Signals can be **analog** or **digital**. Analog signals alter the voltage to create a pattern that is similar to the data being sent. Digital signals are based on binary code. Digital signals are popular because they are easy to track and to store. Consequently, analog signals are sometimes turned into digital ones. Electronic circuits use an **analog-to-digital** converter to achieve this. A **waveform** is a signal, as represented on a graph. Graphs are often used in electronics. They can show information like the **amplitude**, **frequency** or **phase relationship** of a wave, and **cycles**. There are several different types of waves: **square waves**, **sine waves**, and **sawtooth waves**. These waves generate **harmonic energy** and other electromagnetic radiation. Each wave forms a different shape on a graph.

Time is another variable that is often recorded. Time is used to calculate **duty cycles**, **fall times** and **rise times**.

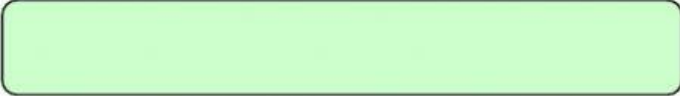


ACTIVITY 2: Fill in the blanks with the correct words or phrases.

analog-to-digital converter, harmonic energy, duty cycle, phase relationship, waveform, rise time, sine wave, square wave.

- 1 The _____ is the amount of time it takes for the transition to move from ten to ninety percent of its final height.
- 2 A _____ is a signal as it appears on a graph.
- 3 A _____ is a smooth wave with a pure tone.
- 4 A _____ is made by turning a signal on and off repeatedly.
- 5 A _____ is the percentage of time spent in the "on" state versus the "off" state.
- 6 The _____ compares two signals and is measured in degrees.
- 7 _____ is sound made at multiples of the same frequency as a base sound.
- 8 The technician used the _____ to change analog information into digital information.

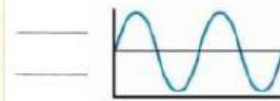
ACTIVITY 3: Listen and complete the conversation. AUDIO 42 (No les doy las palabras como ayuda pero aparecen en el texto, excepto la última frase)



Exper. Tech: So, have you ever used an 1 _____ before?
Apprentice: Yes, I have. But I'm not familiar with this model.
Exper. Tech: No problem. Today, we're going to use the oscilloscope to look at 2 _____.
Apprentice: Okay.
Exper. Tech: Do you know how to tell the 3 _____ of waves apart?
Apprentice: I look at the shape, right? I mean both the 4 _____ and the sawtooth wave have different rise and fall times.
Exper. Tech: Very good. And unlike the sawtooth and square waves, the 5 _____ forms a smooth, flowing signal.
Apprentice: Got it. How did the sawtooth wave get its name?
Exper. Tech: Well, the sawtooth wave rises 6 _____.

Different types of waves

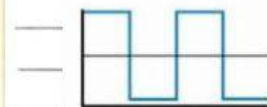
Sine waves - _____



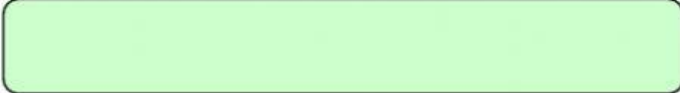
Sawtooth waves - _____



Square waves - _____



ACTIVITY 4: Listen again and choose the correct answers. AUDIO 42



- 1 What is the purpose of the conversation?

| | |
|----------------------------|-----------------------------|
| A to compare oscilloscopes | C to report dropped lines |
| B to explain types of wave | D to record signal patterns |

- 2 What kind of lines does a sawtooth wave have?

| | |
|-------------------------|-----------------------|
| A peaked and downwards | C smooth and flowing |
| B horizontal and square | D angled and vertical |

