

# Clock and watchwork

[History](#)



The present-day quartz clock developed in the early 1900s, the clock needs certain basic requirements for it to work. First, it must have a power source that will allow it to create motion. Second, the clock must have a time base which provides a periodic oscillation dictating the measurement of time. The time base is essentially the device that controls clock signals. Lastly, it must have a way to convey the information generated by the time base and be able to display this information to actually tell time.

During the 19th century until the middle of the 20th century, the pendulum clock was the standard time teller. The principle of the pendulum at work is such that its swing is independent of the amplitude, or size, of the swing. In effect, the only factors affecting the amplitude are the length of the pendulum and the force of gravity. Each swing of the pendulum releases a spring-loaded ratchet in the clock mechanism, which drives the hands. If the pendulum is left alone, frictional forces would act upon it and so it will eventually stop. Thus, a pendulum clock must contain a weight-driven or electrically operated mechanism that periodically pushes the pendulum to keep it swinging.

Pendulum clocks and earlier versions of watches known as chronometers are quite cumbersome because their movement stops when they are not wound. In addition, pendulum clocks are highly dependent on external forces such as the force of gravity and temperature. Thus, quartz clocks and watches are the more popular options today. Quartz clocks are battery powered with gears regulated by a tiny crystal of quartz. When the battery sends electricity to the quartz crystal through an electronic circuit, the quartz crystal oscillates at a precise frequency of 32, 768 times each second. The circuit counts the number of vibrations and uses them to generate one

electric pulse per second regularly. These pulses then drive a small electric motor turning gear wheels that spin the clock's second, minute, and hour hands. As the second hand completes one cycle, the minute hand moves by six degrees, and the same concept apply to the movement of the hour hand after the minute hand completes one cycle.