

# ExactListening.Org

## 21-25 Words

### Note to Exact Listening Guides

For strings up to and including 15 words, use a newspaper or magazine, following the instructions in the Exact Listening manual. For 16+ words, start with <http://www.exactlistening.org/words/16-20.pdf>. Use this document when the student is ready for 21 words.

There are one hundred 25-word strings in this document. For 21 words, simply eliminate the last 4 words of the string. You may wish to cover them with something before you begin reading. When the Student is ready to go on to 22 words, continue down the list from where you left off, only now eliminate the last 3 words. And so on until the Student reaches 25-word strings and you eliminate no words. The strings are numbered for easy reference, but the numbers are not read to the Student.

If the Student has not graduated to 26 words by the time you reach the 100<sup>th</sup> string in this document, just start again with #1. Generally, we want to avoid repeating the same string so the Student does not rely on memorization by repetition. With a hundred strings, this problem is avoided, since there will be a considerable length of time between using a string one time and its repetition, if any.

When the Student is ready for 26 words, use <http://www.exactlistening.org/words/26-30.pdf>.

- 1 To talk about the invention of the watch, you have to of course begin with the invention of the clock. It is thought that the
- 2 clock was invented around the early 1300's, although we don't have an exact date or inventor. The first public clock was made and erected in
- 3 Milan, Italy in 1335. People did not have clocks in their homes until later in the 14th century. In 1500, a German locksmith named Peter
- 4 Henlein began to make small clocks driven by a spring - the first portable timepieces or watches. These tiny clocks only had an hour hand (minute
- 5 hands did not appear until 1670), and had no glass protection on top. In fact, the glass over the face of the watch that we
- 6 are familiar with did not come about until the 17th century, almost 200 years later. These early watches were almost the size of a hockey
- 7 puck. They were carried about in the hand or in the pocket rather than on the wrist. The wristwatch emerged during the First World War.

- 8 Until the printing press was invented in the 1450's, every book had to be hand-written. (I bet those scribes got some awful writer's cramps!) A
- 9 printing press is a machine that automates the process of creating books. The press swipes ink across a raised surface and presses it against sheets
- 10 of paper. Johannes Gutenberg, a businessman from Germany, is said to have invented the printing press in the early 1450's. For many centuries, the Catholic
- 11 Church was producing most of the books that were available at the time, by hand-copying each one. But then things began to change. Paper was
- 12 developed and proved to be a good alternative to the animal skin -- or "vellum" as it was called -- that had been available until then. As
- 13 well, more and more people were learning to read, so the demand for books increased. The scribes simply could not keep up. Gutenberg's machine used
- 14 individual letters, hand-carved out of metal, that could be removed and re-positioned for each page in a book. Then he would sweep ink over the
- 15 letters and "press" them on to the paper. Sometime around 1450, Gutenberg succeeding in building his first printing press and began printing bibles in Latin.
- 16 Unfortunately, they were very expensive: the first bible that Gutenberg produced sold for 30 florins each, or about three years' salary. But the invention was
- 17 an instant hit and soon many people were printing, and the price of books came down. Lots of people were able to buy them, and
- 18 this forever changed the way people were able to learn. Today, the printing press is still being used, although the technology of the last 20
- 19 years is slowly making the printing press obsolete. But there remain a few daily newspapers that still use the basic design that Gutenberg imagined over
- 20 In ancient Rome, scribes wrote on papyrus (an early form of paper) with a thin metal rod called a stylus, which left a light but
- 21 readable mark. Other early styluses were made of lead. In 1565 German-Swiss naturalist Conrad Gesner first fabricated a writing instrument in which graphite, then thought
- 22 to be a type of lead, was inserted into a wooden holder. The name graphite is from the Greek word 'graphein', meaning, "to write." Graphite
- 23 came into common use when a large graphite deposit was discovered in Borrowdale, England in 1564. Graphite left a darker mark than lead, but it

24 was so soft and brittle that it needed a holder. At first, sticks of graphite were wrapped in string. Later, the graphite was inserted into

25 wooden sticks that had been hollowed-out by hand. And the wooden pencil was born. The hardness of a pencil depends on how much clay is

26 keeping the graphite together (clay is used as a binder). The dark pencil mark means the pencil has deposited more particles of graphite onto the

27 paper. Today we still call the core of a pencil the "lead" even though it is made from nontoxic graphite. The telescope is the most

28 important tool for investigating astronomy. It provides a means of collecting and analyzing radiation from objects in outer space, even those in the far reaches

29 of the universe. As with most inventions, several different people claim to have invented the telescope. Many historians believe it was invented in 1608 by

30 Hans Lippershey, who made glasses in Holland. He discovered that by placing two lenses inside a tube, distant objects seemed to be much closer. The

31 great Italian scientist Galileo Galilei (1564-1642) is also credited with inventing the telescope, though he may have got the idea from Lippershey. In the

32 early 17th century Galileo modernized astronomy by using the telescope to study outer space. Using the telescope, Galileo discovered Jupiter's four largest satellites, spots on the

33 Sun, hills and valleys on the Moon, and the phases of Venus. The basic telescope has an objective (the lens that forms the image) and

34 an eyepiece (or ocular), which is in front of the focus - without this part the image would appear upside down. These simple telescopes (called refracting

35 telescopes) are still used for modern opera glasses. Since the telescope's invention, much more powerful versions have been developed: Radio, X-ray, and gamma-ray telescopes are

36 capable of sensing and measuring things like invisible forms of radiation. These telescopes have helped us learn about the solar system, the Milky Way, and

37 the universe itself. People first started putting lights on Christmas trees back in the middle of the 17th century. They attached small candles to the

38 ends of tree branches with wax or pins. The switch to electricity came in 1882. Edward Johnson (he was a colleague of Thomas Edison) made a

39 string of 80 small electric light bulbs, and put them on a tree in New York. About eight years later, strings of lights became available

- 40 commercially. One of the first electrically lit Christmas trees was put up in Westmount, Quebec in 1896. In 1900, some large stores started to put
- 41 up large illuminated trees to attract customers. Before electricity was widely available, people didn't usually put up their trees until December 24 because of the
- 42 risk of fire. Once electric Christmas tree lights were invented, people started to put up trees earlier, and leave them up longer. Single-lens microscopes
- 43 were used as early as the mid-15th century, but a Dutch scientist developed the actual prototype of the modern multiple-lens microscope in 1674. A battery,
- 44 or electric cell, is a device that converts chemical energy into electricity. The battery was invented 200 years ago by Alessandro Volta in Italy. In
- 45 1774, Volta was a physics professor at the Royal School of Como, Italy, where he developed an idea for an instrument that produced controlled charges
- 46 of static electricity. He called his idea the "electrophorus," but it would be almost 25 years before he developed his idea of an "electrophorus" into
- 47 the predecessor of our everyday batteries. He called his first successful battery the Voltaic Pile. It was composed of a series of silver and zinc
- 48 disks in pairs. Between each of these discs was a sheet of pasteboard wet with salt water (salt water conducts electricity better than regular water). A
- 49 steady stream of electricity was produced when the top disk of silver was connected by a wire to the bottom disk of zinc. In honor
- 50 of his efforts, Napoleon named Volta a Count in 1801. The Volt (a measurement of electricity) was named in honor of Alessandro Volta in 1881.
- 51 The problem with the voltaic cell was that it lost power rapidly once current was drawn from it. In 1836 British chemist John Daniell invented
- 52 the "Daniell cell," which supplied an even current during continuous operation. There are many kinds of batteries, and many other scientists further improved them. Today
- 53 When England's Dr. Edward Jenner first came up with the idea of injecting a healthy person with a mild disease called "cowpox" to protect them
- 54 against a much deadlier disease called "smallpox," he created a way to protect future generations from many infectious diseases, from measles to polio and more.
- 55 The clothes dryer was originally tried in England and France in the early 1800s. One early type, called a "ventilator," had the clothes wrung out

56 by hand, placed in a cylindrical metal drum with holes or slits in it, and turned by hand over a fire. The clothes would dry

57 out, but they might burn, and they would always smell strongly of smoke, and they might pick up soot from the smoke. The first electric

58 models appeared in England and North America around 1915. When most people think of the steam engine, they picture the steam-powered locomotive, which was invented

59 in 1803. But the engine that uses steam to generate power is actually much older than the train. A steam engine is an engine that

60 uses heated water to generate power. The earliest steam engines were used by the Greeks in the 1st century AD. Their engine was a hollow

61 sphere with a pair of hollow tubes that delivered steam from a cauldron. The steam escaped from the sphere from one or more bent tubes

62 projecting from its equator, causing the sphere to revolve. Although it was considered a toy or a novelty, it is the first known device to

63 transform steam into energy. It is believed that Hero, a Greek inventor from Alexandria, invented it. In 1698 Thomas Savery patented a pump with hand-operated

64 valves to raise water from mines by suction produced by condensing steam. In about 1712 another Englishman, Thomas Newcomen, developed a more efficient steam engine

65 with a piston separating the condensing steam from the water. In 1765 James Watt greatly improved the Newcomen engine by adding a separate condenser to

66 avoid heating and cooling the cylinder with each stroke. Watt then developed a new engine that rotated a shaft instead of providing the simple up-and-down

67 motion of the pump, and he added many other improvements to produce a practical power plant. In February of 1804, the steam locomotive first journeyed

68 along a road in England. The steam engine was later adapted to travel on railways by English engineer George Stephenson in 1829, with his train

69 called the Rocket. The Rocket astonished everyone in the industry at the time. As a result of Stephenson's impressive Rocket, a railroad building spread rapidly

70 throughout Britain, Europe, and North America. Stephenson himself built many other railways and acted as consultant on many railroad projects at home and abroad. It

71 was not until 1879 that the first electric locomotive was introduced, and it took until 1925 for modern diesel locomotives to become popular. Many inventors

- 72 An early version of the bicycle was built around 1791 by a Frenchman. It was basically a scooter with a high seat. There were no
- 73 pedals - you had to push with your feet like you do with a skateboard or a scooter. Around 1816 or 1818 a German Baron added
- 74 a moveable steering handle. These early contraptions were often known as dandy horses or hobby horses, but weren't very popular. The innovation that made the
- 75 difference between an oddity and a craze was added by a Scottish blacksmith around 1839. Kirkpatrick Macmillan added pedals to enable him to get up
- 76 hills. His fellow villagers thought he was crazy, but it was this innovation that made the bicycle a serious form of transportation. Bikes began to
- 77 grow in popularity from this point on. They were called bone-shakers because of the lack of proper tires made for a rough ride. It wasn't
- 78 until around 1869 that they began to be called bicycles. Carriage makers in Paris switched the pedal to the front wheel. That's why they usually
- 79 get the credit for inventing the bicycle. In 1869 the penny-farthing or high-wheeler was invented. The large wheel meant that the rider could go much
- 80 farther with each push of the pedal, but caused many accidents because the seat was so far off the ground. In the mid-1880s Englishman James
- 81 Starley began to manufacture what he called the "safety bicycle" which had two similarly-sized wheels and a major improvement - a chain and sprocket driven rear
- 82 wheel, with the pedals between the two wheels like modern bicycles. One more historical note - it's possible that the idea of the bicycle was thought
- 83 of almost 400 years before it was actually invented. There is a drawing of a bicycle-like machine in one of Leonardo Da Vinci's notebooks, which
- 84 dates back to about 1493. Some historians say it is a modern fake, and others say that it was drawn by one of Da Vinci's students.
- 85 Canned food was invented for the British Navy in 1813 by Peter Durand. The cans were made of solid iron and usually weighed more than
- 86 the food inside them. Mr. Durand forgot something however - how to get the food out of the sealed cans! The instructions were "cut round the
- 87 top near the outer edge with a chisel and hammer." In the 1860's, when thinner steel cans began being used, the can opener was invented.

- 88 Ezra Warner's large curved blade was driven into a can's rim, and then worked around its edge with great force. This first can opener never
- 89 left the grocery store. A grocer had to open each can before it left the store. In 1870 the modern can opener was invented by
- 90 William Lyman; including a cutting wheel to roll around the rim. The next change occurred on 1925 with the introduction of a jagged wheel for
- 91 rotating the can by a San Francisco company. This basic idea continues to be used on today's can openers, and was the foundation for the
- 92 first electric can opener, invented in December 1931. The full name of the fax machine is the "telefacsimile" machine. A facsimile is "an exact copy."
- 93 A fax machine reads an image from paper, then sends the image over a telephone line, where another fax machine receives it and prints out
- 94 a copy. Transmitting images using telephone lines did not become common practice until the late 1980's, but the technology dates back to the nineteenth century.
- 95 In 1843 in England, Alexander Bain (1818-1903) invented an early fax machine. His invention had two pens that were connected to two pendulums. The
- 96 pendulums were joined to a wire, which could reproduce writing on an electrically-conductive surface. In 1862, the Italian physicist Giovanni Caselli built a machine he called
- 97 a "pantelegraph" (the word is a combination of "pantograph", a tool that copies drawing, and "telegraph", a machine that sends messages over a wire.) His
- 98 machine was based on Bain's invention, but also included a "synchronizing apparatus" to help two machines work together. His pantelegraph was used by the French
- 99 Post & Telegraph agency between Paris and Marseilles from 1856 to 1870. In 1934, the Associated Press news agency introduced the first system for transmitting
- 100 "wire photos," so news reporters could send photographs from place to place. Thirty years later, in 1964, the Xerox Corporation introduced Long Distance Xerography (LDX).