For High School Students: How much do you know about the military and its science & technology? Take this quiz and find out.

1. Who invented dynamite and what did it lead to?
2. What goes on in the PENTAGON? When was it built and how long did it take? Who was the chief engineer during its construction and what was his next assignment? How many people work there today? How many restrooms and miles of corridors are in it?
3. Some modern luxury cars have a GPS for navigation and an infra-red sensor for night driving. Can you name other technologies originally developed for military uses that are now used everyday?
4. Why do tanks have tracks and treads instead of wheels? How big is a tank? How many soldiers work inside? How much heavier is it than a family car?
5. Some air vehicles have wings, some have rotors, some have both and some have none. Why?
6. Why is a smart weapon called “smart”?
7. How do air-cushion vehicles work? How does the military use such vehicles?
8. When was the first American submarine built? How was it used? Did it work?
9. What Civil War era invention helped improve the accuracy of accelerating projectiles? Can you think of examples from your own experience where the same principle is at work?
10. Who was the first US Secretary of War and who is the modern equivalent? Were they scientists or engineers?
11. What countries has the US fought in during your parents’ lifetime? During your lifetime? Did new technology play a role? How? Interview a veteran; perhaps you may become interested in helping to preserve oral history.
12. Name the military services. Which new technologies do you think are most important for each of the services?

The answers are included on the next page, but be sure you are done before going there. If any of these topics interest you, you can find out lots more about them by searching on www.searchmil.com or www.defenselink.mil.

Are you sure you're ready for the answers?
If so, continue to the next page.

ANSWERS TO THE DoD QUIZ

Question 1

Yes, it leads to lots of things blowing up. Alfred Nobel invented dynamite in 1866. This invention made him a wealthy man. Dynamite had commercial applications in construction, mining and demolition. Dynamite also had obvious military applications. In his later years, Alfred Nobel became disturbed by the military applications of his work. As a result, he decided to use his wealth to establish the Nobel Prize to reward excellence in physics, chemistry, medicine, economics, literature and peacemaking. Also see http://www.nobel.se/nobel/alfred-nobel/

Question 2

The PENTAGON is the headquarters of the U.S. Department of Defense. The building also serves as the headquarters of the U.S. Army, Navy, Air Force and many defense agencies. It was built in 1941-42 to respond to the many military needs as the U.S. was getting involved in WW2. It was built in record time—in 16 months from start to finish. Its chief engineer was Col. Leslie Groves, who immediately afterwards went on to lead the Manhattan Project that lead to the development of the atomic bomb. The PENTAGON is a huge building with five sides that sits in Arlington VA, just across the river from Washington DC. It has 23,000 employees, 284 restrooms and 17.5 miles of corridors. It is no surprise that small electric vehicles are used by delivery people to get around in the building and that many of its civilian employees wear sport shoes all day. Also see
http://www.defenselink.mil/pubs/pentagon/
http://www.hq.usace.army.mil/history/vignettes/vignette_34.htm

Question 3

There are so many—the tough requirements of the military have often jump-started commercial markets in the development of new technology. The need of commercial markets to show profits rather quickly makes it difficult for them to institute research that needs 10-20 years to come to fruition, but the military has done so many times. The radar, the laser, the Internet, and microelectronics, are examples.

Question 4

Tanks need tracks and treads to travel over uneven surfaces and slopes. These work much better than wheels in similar situations. The modern M1 series tank is 32' L, 12'W, and 8'H. Typically 4 soldiers work inside, including a driver, commander and gunner. It weighs 60-70 tons, which is 30 times heavier than a typical family car. You would not want to use it for commuting! It's top speed is only about 40 MPH, about 1/3 of the top speed of a typical family car. It also uses incredible amounts of fuel. Your family car gets 20-40 miles per gallon, in a tank it's more like gallons per mile!
Also see http://www.fas.org/man/dod-101/sys/land/m1.htm
http://www.army-technology.com/projects/abrams/index.html
http://www.ifilm.com/ifilm/product/film_info/0,3699,2354390,00.html
http://www.geocities.com/Pentagon/Bunker/8757/armor.html

Question 5
Air vehicles must operate in many different environments. Some have the traditional role of needing to fly quickly from place to place and have access to airfields with runways for takeoff and landing. These aircraft have wings. If there is no access to runways and speed of flying is not an issue, then the aircraft use rotors, like those on helicopters. If speed is needed but runways are not available, a hybrid aircraft with rotors for takeoff that rotate downwards for level flight with wings are used. Aircraft that eventually go into space only have fins for stabilization while in the atmosphere, but are propelled by rockets. Also see http://www.freewing.com/advantages.html
http://www.simlabs.arc.nasa.gov/library/tiltrotor/ctr20th.html

Question 6
A weapon is called smart if it uses information from sensors, electronics or computers to make decisions or parts of decisions that would normally be made by humans.
Also see http://www.fas.org/man/dod-101/sys/smart/
http://www.fas.org/man/dod-101/sys/smart/jdam.htm
http://www.globalsecurity.org/military/systems/munitions/intro-smart.htm

Question 7
An air-cushion vehicle pushes high-speed air directly onto the water surface so the vehicle does not sink into the water. This makes it suitable for carrying heavy equipment onto beaches, precisely suiting the Marine Corps missions. This technology is different from the hydrofoil, which uses high speed to propel the vehicle forward, which then causes it to rise out of the water. The air cushion vehicle can hover above the water's surface at very low speed. Also see http://www.ncsc.navy.mil/
http://www.chinfo.navy.mil/navpalib/factfile/ships/ship-lcac.html
http://www.globalsecurity.org/military/systems/ship/lcac.htm

Question 8
The first American submarine was built during the Revolutionary War. It was named the Turtle and it was discovered by David Bushnell in 1775. It floated just under the water surface, came close to the target ship, and used a screw to make a hole in the hull of a ship, which was then packed with explosives that were timed for a delayed detonation. Also see http://www.mayflowerfamilies.com/a_1776_submarine.htm
http://www.chinfo.navy.mil/navpalib/ships/submarines/centennial/subhistory.html

Question 9
The rifling of gun barrels places a spin on projectiles as they are accelerated before leaving the barrel. The spin results in a more stable trajectory, leading to more accuracy. Rifling was discovered during the Civil War and was added to the canons of that era. You may have experienced this same principle at work in baseball, basketball football and golf, where spinning balls fly more accurately.
Also see http://www.firearmsid.com/A_bulletIDrifling.htm
http://haislip.org/cwbullet/html/bullets_history_minie.html
http://medlib.med.utah.edu/WebPath/TUTORIAL/GUNS/GUNHIST.html

Question 10

The first Secretary of War was Henry Knox who served from 1789-1794.
Also see http://www.army.mil/cmh-pg/books/cg&csa/knox-h.htm
http://www.army.mil/cmh-pg/books/cg&csa/CG-TOC.htm
The National Defense Act of 1947 instituted the Department of Defense as separate from the Department of the Army. It made DoD a civilian oversight organization over the Army, the Navy and the Air Force. The last Secretary of War Kenneth Claiborne Royall became the first Secretary of the Army in 1947. James Forrestal became the first Secretary of Defense. Knox was a lawyer, Forrestal was an investment banker.
Also see http://foxfall.com/fmd-dod.htm
http://www.army.mil/cmh-pg/books/sw-sa/Royall.htm

Question 11

In my parents lifetime the US fought in WW2. In my lifetime the US fought in Korea and Vietnam. In your lifetime the US fought in Kuwait and Iraq, Somalia and Afghanistan. The Radar and the Atomic Bomb were critical to the conclusion of WW2. Imaging Sensors and advanced electronics were important in Vietnam. Communications and information sharing were critical in the wars of the last decade. Some histories and timelines are at http://www.rickard.karoo.net. To see interviews of veterans, namely, oral histories being generated see http://oralhistory.minds.tv/

Question 12

The traditional military departments are the Army, Air Force and the Navy. Each department has one service, but the Navy is unique; it has two. So there are four military services, the Army, the Air Force, the Navy and the Marines. Some folks think that the Coast Guard is a service, but they belong to the Department of Transportation. Others think that the National Guard is a service. The National Guard is part of the nation's reserve military. It belongs to the states as well as to the federal government. It has two branches, the Army National Guard and the Air National Guard. It is true, however, that the Coast Guard, along with the National Guard, can be mobilized in times of war or other government needs. The Army needs technologies that sustain the individual war fighter, yet make him/her a part of the larger fighting unit. They need better communications, batteries and information systems that keep them aware of what is going on at all times. The Navy needs mobility and fast response times. The Air Force is often used as the front line of attack in modern warfare. It needs smarter smart weapons and communications and information systems as well.
http://www.ngb.army.mil/about/
http://library.thinkquest.org/27225/
www.uscg.mil/general.html

You can find some additional resources on military history at
http://library.nps.mil/home/militaryinfo.htm
http://cybersleuth-kids.com/sleuth/history/military_/