

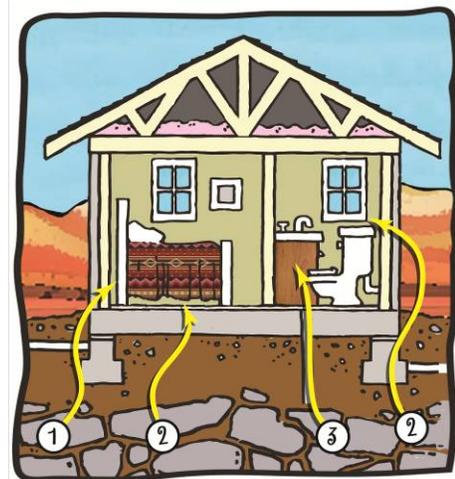
Radon: Teacher Background Information

You can't see radon. You can't smell it or taste it either, but it may be a problem in your home or school. Radon is a radioactive gas found in rock, soil and water. Radon is found all over the U.S. It can get into any type of building — homes, offices and schools — and result in a high indoor radon level. You and your family are most likely to get your greatest exposure at home, where you spend most of your time. The only way to know if your home or school has a radon problem is to test for it.

Breathing radon increases your risk of lung cancer. Radon is the number one cause of lung cancer among people who do not smoke. It is the second leading cause of lung cancer for people who do.

Radon in Homes or Buildings

Radon comes from the decay of uranium that is found in nearly all soils. It typically moves up through the ground to the air above and into your home through cracks and other holes in the foundation. Your home traps radon inside, where it can reach dangerous levels. Any home may have a radon problem. This means new and old homes, well-sealed and drafty homes, and homes with or without basements.



Radon can get into homes through:

1. Construction joints
2. Cracks and gaps in floors and walls
3. Gaps around service pipes and through water supply lines
4. Sometimes radon enters the home through well water.

Compared to radon entering the home through water, radon entering your home through the soil is usually a much larger risk. In a small number of homes, the building materials can give off radon, too.

Radon in Water

Radon in water supplies poses an inhalation risk and an ingestion risk. Research has shown that the risk of lung cancer from breathing radon in air is much larger than the risk of stomach cancer from swallowing water with radon in it. Most of your risk from radon in water comes from radon released into the air when water is used for showering and other household purposes.



Radon in your home's water is not usually a problem when it comes from surface water. A problem is more likely when the radon source is ground water, such as a private well or a public water supply system that uses ground water. If you are concerned about radon coming from a public water supply, contact your water supplier or the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Uranium Mining and Radon

Uranium mining releases radon from the ground into the atmosphere. Underground mines could pose a higher radon risk to both the public and workers. Mines and mining waste can release radioactive elements, including radon, and other pollutants to streams and other bodies of water. Federal and state agencies have set limits and drinking water standards, and continue to monitor these sites for public safety.

Uranium mine waste from operations that closed before the mid-1970s are of particular concern. Many abandoned uranium mines are located in the western U.S. and near Native American communities where uranium is generally found. In some cases, these mines were abandoned and the waste piled near the mine. Weathering can cause radioactive dust to be blown by the wind and seep into surface and ground water. There are also cases of uranium mine waste being used for house construction, which creates significant radon and radiation hazards for the people living in those homes.



Uranium miner.

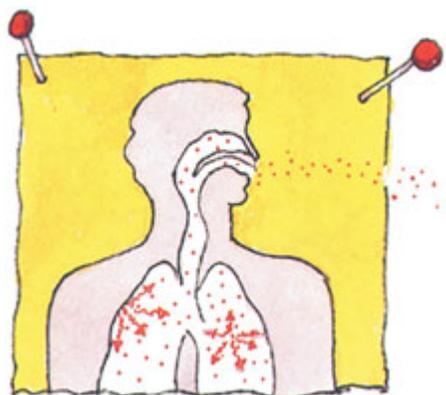
Source: National Institute of Environmental Health Sciences

Living with Radon

Radon gas decays into radioactive particles that can get trapped in your lungs when you breathe. As they break down further, these particles release small bursts of energy. This can damage lung tissue and lead to lung cancer. However, not everyone exposed to elevated levels of radon will develop lung cancer. The amount of time between exposure and the onset of the disease may be many years.

Like other environmental pollutants, there is some uncertainty about radon health risks. However, we know more about radon risks than risks from most other cancer-causing substances, due to studies of cancer in humans (including underground miners).

Smoking combined with radon is an especially serious health risk. If people stop smoking and lower radon levels in their home, they can reduce their lung cancer risk significantly.



Radon Testing

Radon is measured in picocuries per liter of air (pCi/L), a measurement of radioactivity. In the United States, the average indoor radon level is about 1.3 pCi/L. The average outdoor level is about 0.4 pCi/L. The U.S. Surgeon General and the U.S. Environmental Protection Agency (EPA) recommend fixing homes with radon levels at or above 4 pCi/L. EPA also recommends that people consider fixing their homes for radon levels between 2 pCi/L and 4 pCi/L.

Testing your house for radon is easy. A simple test will tell you if your home has a high radon level. It's as easy as opening a package and putting the test kit in the right place for several days. After sending the test kit back to the address in the package, the company will send your radon test results in about 2 weeks. Fixing a radon problem reduces the risk of lung cancer for you and your family.

How to Get Radon Test Kits

To get an easy-to-use radon test kit you can:

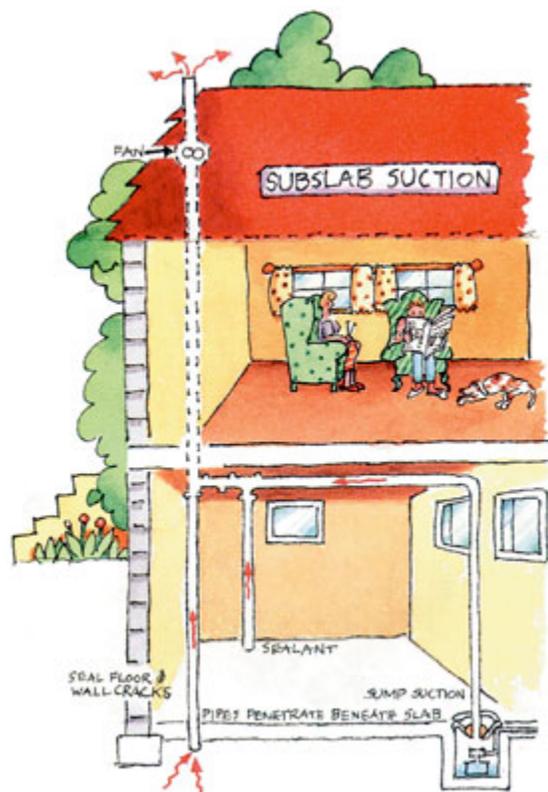
- Buy a test kit online or at your local home improvement or hardware store. Many kits are priced under \$25.00.
- Order a test kit at <http://www.sosradon.org> or by calling 1-800-SOS-RADON (1-800-767-7236); customizable radon test kit coupons are available too.
- Learn where you can get a radon test kit by visiting <https://www.epa.gov/radon/find-radon-test-kit-or-measurement-and-mitigation-professional#where>. Visit <https://www.epa.gov/radon/find-information-about-local-radon-zones-and-state-contact-information#radonmap> to see radon levels.
- Hire a qualified tester to do a radon test for you. Your state radon program may keep a list of these professionals.

Fixing and Avoiding Radon Problems

Buildings with high levels of radon have been found in every state. In fact, radon levels can vary greatly from building to building or home to home, even in close proximity. There are several proven methods to reduce radon in buildings, but the one primarily used is a vent pipe system and fan which pulls radon from beneath the house and vents it to the outside. This system, known as a soil suction radon reduction system, does not require major changes to the home or building. Sealing foundation cracks and other openings makes this kind of system more effective and cost-effective. Similar systems can also be installed in houses with crawl spaces.

If radon in water is a problem, it can be fixed. Water supply treatments can be used to remove radon from the water before it enters your home, or at the tap. Treating water at the tap only treats a small portion of the water you use and is not effective in reducing the risk from breathing radon released into the air from all water used in the home.

Building new homes with simple and cost-effective radon-resistant features can reduce radon. Contact your builder or visit <https://www.epa.gov/radon/building-new-home-have-you-considered-radon> for more information. Every home should be tested before, or soon after, you move in. Even homes built with radon-resistant construction features should be tested. If high radon levels are found, it is easier and costs less to reduce radon levels in homes that are built radon-resistant.



Additional Resources:

- RadTown USA: <https://www3.epa.gov/radtown>
- Radon (Rn): <https://www.epa.gov/radon>
- Radon Information for Kids, Students and Teachers: <https://www.epa.gov/radon/radon-information-kids-students-and-teachers>
- A Citizen's Guide to Radon: <https://www.epa.gov/radon/citizens-guide-radon-guide-protecting-yourself-and-your-family-radon>
- Dose Calculator: <https://www.epa.gov/radiation/calculate-your-radiation-dose>