



## Who is holding a rock or bag of soil??

Which of these items do you think is emitting radioactive gas?

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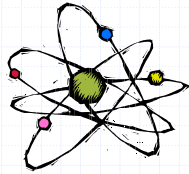
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## Radon, Real Estate and You



Instructor Name  
Instructor contact information  
Training Location  
Date

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## Agenda

- I. Introductions
- II. Pre-test
- III. Overview of objectives
- IV. Radon training: lecture and other methods
- V. Questions
- VI. Post-test and feedback forms



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**Pre-test** 

◆ Please take a moment to fill out the pre-test form that has been provided to you.

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**Overview of objectives**

By the end of this presentation, we hope that you will be able to :

1. Communicate basic information about radon to your clients.
2. Recognize common testing devices used to measure radon in air.
3. Interpret radon testing results and their implications.
4. Act as a referral source for your clients with regard to radon during real estate transactions.
5. Recognize the value in using qualified radon testing professionals.
6. Retrieve radon information from website and other sources cited in the student manual.

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**An Introduction to Radon** 

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## What is Radon?

- ◆ A naturally occurring radioactive gas.
- ◆ Colorless, odorless and tasteless.
- ◆ Found all over the U.S. in all types of buildings.

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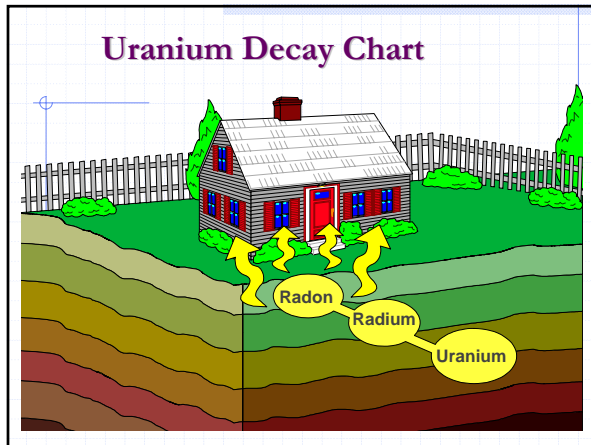
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## Uranium Decay Chart



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## Other facts about radon

- ◆ Radon is commonly measured in picocuries per liter (pCi/L)
- ◆ The only way to know if a home has high radon levels is to test

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## EPA Action Level

The Environmental Protection Agency (EPA) recommended action level for radon in air is

**4 pCi/L**

This action level is technology-based...not health-based.

The EPA recommends that radon levels of greater than or equal to 4.0 pCi/L be reduced to decrease risk of developing lung cancer.

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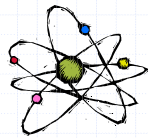
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## Questions?



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## EPA Radon Potential Map for Connecticut

What it looks like and what it means



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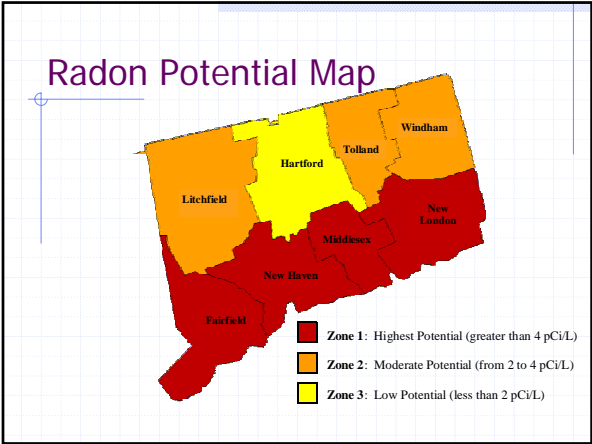
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- ### Radon Potential Map
- ◆ Radon is found in high levels in homes in ALL regions of the state
  - ◆ Main uses:
    - Planning and development activities for federal, state, and local programs
    - Developed to assist building officials in deciding to build radon-resistant new construction (in homes and schools)

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### Questions?

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## Radon and Its Health Effects

Class activity and overview of health risks

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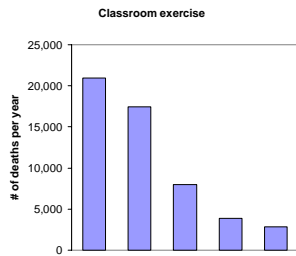
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### Class Activity: Do not advance slide!

- ◆ Break into groups and open student manual to page 5 (chart)
- ◆ Match the causes with the number of deaths
- ◆ Discuss your decisions as a group and share with the other groups



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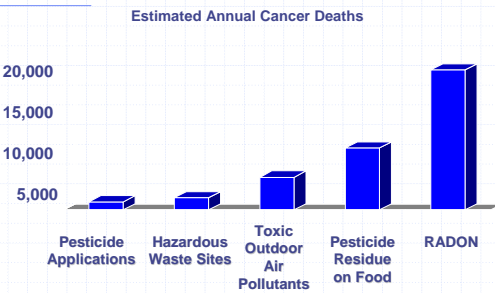
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### More comparisons...



From: EPA: radon overview (no date). Education Outreach packet. [powerpoint presentation]

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Radon Risk			
Radon Level	If 1,000 people who never smoked were exposed to this level over a lifetime...	If 1,000 people who smoked were exposed to this level over a lifetime...	What to do
20 pCi/L	About 36 people could get lung cancer	About 260 people could get lung cancer	Fix your home.
10 pCi/L	About 18 people could get lung cancer	About 150 people could get lung cancer	Fix your home.
8 pCi/L	About 15 people could get lung cancer	About 120 people could get lung cancer	Fix your home.
4 pCi/L	About 7 people could get lung cancer	About 62 people could get lung cancer	Fix your home.
2 pCi/L	About 4 people could get lung cancer	About 32 people could get lung cancer	Consider fixing between 2-4 pCi/L
1.3 pCi/L	Less than 2 person could get lung cancer	About 20 people could get lung cancer	Reducing radon levels below 2 pCi/L is difficult.
.4 pCi/L		About 3 people could get lung cancer	

Adapted from <http://www.epa.gov/radon/pubs/citguide.html>

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### Radon and Its Health Effects

- ◆ There are not immediate health effects
- ◆ Radon and radon decay products are inhaled into lungs and remain
- ◆ Radiation is emitted when radon breaks down
- ◆ The radiation damages tissue and DNA and leads to increased risk of lung cancer
- ◆ The link between radon and lung cancer is based on many studies worldwide.




Image from <http://www.epa.gov/radon/pubs/citguide.html>

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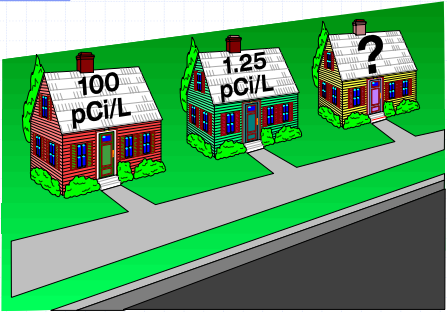
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### TESTING IS THE ONLY WAY TO KNOW



From: EPA: radon overview (no date). Education Outreach packet. (powerpoint presentation)

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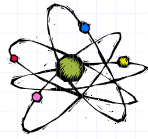
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Questions?



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How Radon Enters the Home



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Sources of Radon



- ◆ There are two sources of radon in the home:
  - Soil gases (rocks and soils)
  - Water
- ◆ A home acts like a vacuum drawing gases inside
  - Higher radon in air levels usually occur during winter months
- ◆ Radon from soil gases:
  - more common and a greater health risk
- ◆ Radon in water:
  - 10,000 pCi/L in water = 1.0 pCi/L of radon in the air\*
  - The numbers are higher, NOT necessarily the health risks

\* This is only a rule of thumb and depends on water usage patterns of homeowners.

Graphic from <http://www.epa.gov/radon/pubs/consguid.html>

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## How Does It Get Into Homes?

1. Cracks in solid floors
2. Construction joints
3. Cracks in walls
4. Gaps in suspended floors



5. Gaps around service pipes
6. Cavities inside walls
7. The water supply

Image and content from [www.epa.gov/iaq/radon/pubs/citguide.html](http://www.epa.gov/iaq/radon/pubs/citguide.html)

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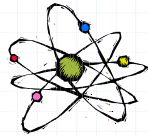
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## Questions?



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## Testing Radon in the Home

Basic information on test methods and devices.



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## What can you do?

- Make sure clients are using qualified radon testing professionals
- Benefits to using a qualified professional:
  - Evaluates the home and recommend testing approach
  - Explains proper testing conditions to occupants
  - Emphasizes the importance of maintaining conditions to achieve reliable test results
  - Analyzes the data and report measurement results
  - Provides an independent test (sometimes needed during home sale)

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## National certification programs



CT Department of Public Health Radon Program maintains a list of qualified professionals at the Radon Program Website:

[http://www.dph.state.ct.us/BRS/Radon/radon\\_program.htm](http://www.dph.state.ct.us/BRS/Radon/radon_program.htm)

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## Home Inspector Listing

- ◆ DPH/UCONN-developed course
  - 1-day course (8 hours)
    - EPA radon measurement protocols and standards
    - DPH established guidance
  - Pass an examination
    - = listed on Radon Program website
- ◆ Increased uniformity in services provided
- ◆ Improved quality of results

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## Testing Radon in the Home

- ◆ Most radon testing in Connecticut occurs during real estate transactions
- ◆ Realtors play an key role:
  - Providing clients with the necessary information to make an informed decision on whether or not to test
  - Referrals to testing professionals who can produce reliable results

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## Overview of Radon Testing-Air

- ◆ Two test procedures for radon in air:
  1. Short term testing (2-90 days)
    - ◆ Usually within a 7 day time frame
  2. Long term testing (91 days to one year)
- ◆ The EPA recommends that radon testing occurs BEFORE a home is placed on the market
  - ◆ It is worth asking the simple question, "Have you had your home tested for radon?"

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## Overview of Radon Testing-Air

- ◆ There are two types of devices for testing:
  - Passive devices:
    - ◆ not electrical or battery operated
  - Active devices:
    - ◆ Mechanical devices (powered)

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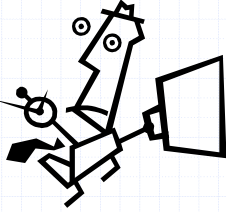
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## Radon Test Methods—Air

### Short-Term Testing Conditions

- All radon tests must last a minimum of 48 hours.
- Closed-house conditions must be maintained for 12 hours before testing and throughout the test period.

(Windows and outside doors should be closed except for regular entry/exit.)



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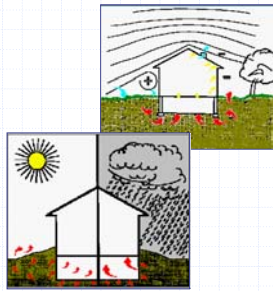
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## Radon Test Methods—Air

### Short-term Testing Conditions

The test should not be conducted during rain, snow or periods with unusually high winds.



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### Commonly used short-term test devices



Passive device: charcoal test kits



Passive device:  
Electret Ion Chambers



Active device: Continuous radon monitors

Pictures from EPA: Radon Overview (no date).  
Education Outreach packet. [powerpoint presentation]

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## Radon Test Methods - Air

- ◆ Long-term testing (91 days to one year)
  - Does not require closed-house conditions
  - Results are more representative of year round exposure
- ◆ If a client has a long closing, long term testing is better

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## Commonly used long-term test devices



Active device: Continuous radon monitors



Passive device:  
Electret Ion Chambers  
made for long-term testing

Pictures from EPA: Radon Overview (no date), Education Outreach packet. (powerpoint presentation)

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## Overview of Radon Testing-Water

- ◆ Hire a qualified professional to collect the sample
- ◆ Analysis must be performed by a laboratory approved to analyze radon in water



Image from: <http://www.epa.gov/radon/rmwater.html>

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## Overview of Radon Testing-Water

Advise clients to test for radon in water, if:

- ◆ The home is served by a private well and high radon levels have been found in the air (at or above 4.0 pCi/L)
- ◆ No testing has occurred and the home is served by a private well
  - Test both the air and water for radon

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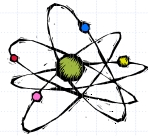
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## Questions?



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## Interpreting Radon Test Results

What do the numbers mean for my client?



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## Interpreting the Results - Air

Short-Term Testing Options	What to do next:
<p>Passive:</p> <p>Take two short-term tests at the same time in the same location for at least 48 hours.</p> <p>or</p> <p>Take an initial short term test for at least 48 hours. Immediately upon completing the first test, do a second test using an identical device in the same location.</p>	<p>Fix home if the average of the two tests is 4 pCi/L or more</p> <p>Fix home if the average of the two tests is 4 pCi/L or more</p>
<p>Active:</p> <p>Test the home with a continuous monitor for at least 48 hours</p>	<p>Fix the home if the average radon level is 4 pCi/L or more.</p>

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## Interpreting the Results - Water

- ◆ The CT Department of Public Health has a guideline of 5,000 pCi/L for radon in water.
- ◆ A client should consider reducing radon in the water if the average of two confirmatory tests are at or above 5,000 pCi/L

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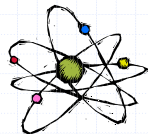
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Questions?




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## Reducing Radon in the Home

- ◆ A word on radon mitigation contractors and an overview of basic system operation

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## What Can You Do About Radon?

Radon is the health threat with a simple solution.



Radon mitigation systems are effective and relatively inexpensive and easy for trained professionals to install.

<http://www.epa.gov/radon/pubs/hmbyguid.html>

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## Terms

- ◆ **Radon Mitigation Contractors:** professionals who install systems to reduce radon in the home
- ◆ **Radon Diagnosticians:** professionals who evaluate buildings found to have high levels of radon to determine the most appropriate location and design of the system

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## Referring Clients to Professionals

The Department of Public Health maintains a list of qualified radon mitigation contractors at the Radon Program Website:

[www.dph.state.ct.us/BRS/Radon/radon\\_program.htm](http://www.dph.state.ct.us/BRS/Radon/radon_program.htm)

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## Reducing Radon in the Home

### In Air

#### ◆ Commonly used methods:

- Sealing cracks, gaps and other holes-as part of other reduction efforts
- Subslab suction
- Submembrane suction-for crawlspace homes
- House/room pressurization
- Heat recovery ventilators (HRVs)



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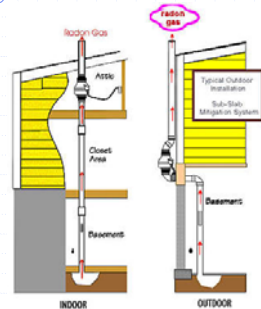
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## What does a system look like?



Basic Structure of a Sub-slab Depressurization System

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## Reducing Radon in the Home In Water

- Granular activated carbon system (GAS)
- Aeration system



Pictures from the CT DPH, Radon Program

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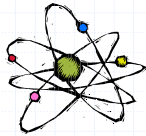
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Questions?



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Laws Pertaining to Radon



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## Laws Pertaining to Radon

### ◆ CT DPH Radon Program:

- Must maintain a list of qualified professionals who are listed by the NRSB and NEHA

### ◆ CT DCP:

- Uniform Property Disclosure Act
  - Disclose testing, results, and presence of mitigation system (when appropriate)
- Registration of radon mitigation contractors as "Home Improvement Contractors"

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## For more information:

Contact the  
Connecticut Department of Public Health  
Radon Program  
(860) 509-7367



Keeping Connecticut Healthy

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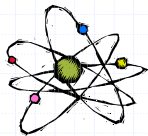
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## Questions?



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Post-Test and Feedback Forms

How much did you learn and was it worth your while?

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