

*Measuring Radon
in
Iowa Child Care Facilities*



for the

Iowa Department of Public Health

by the

Midwest Universities Radon Consortium

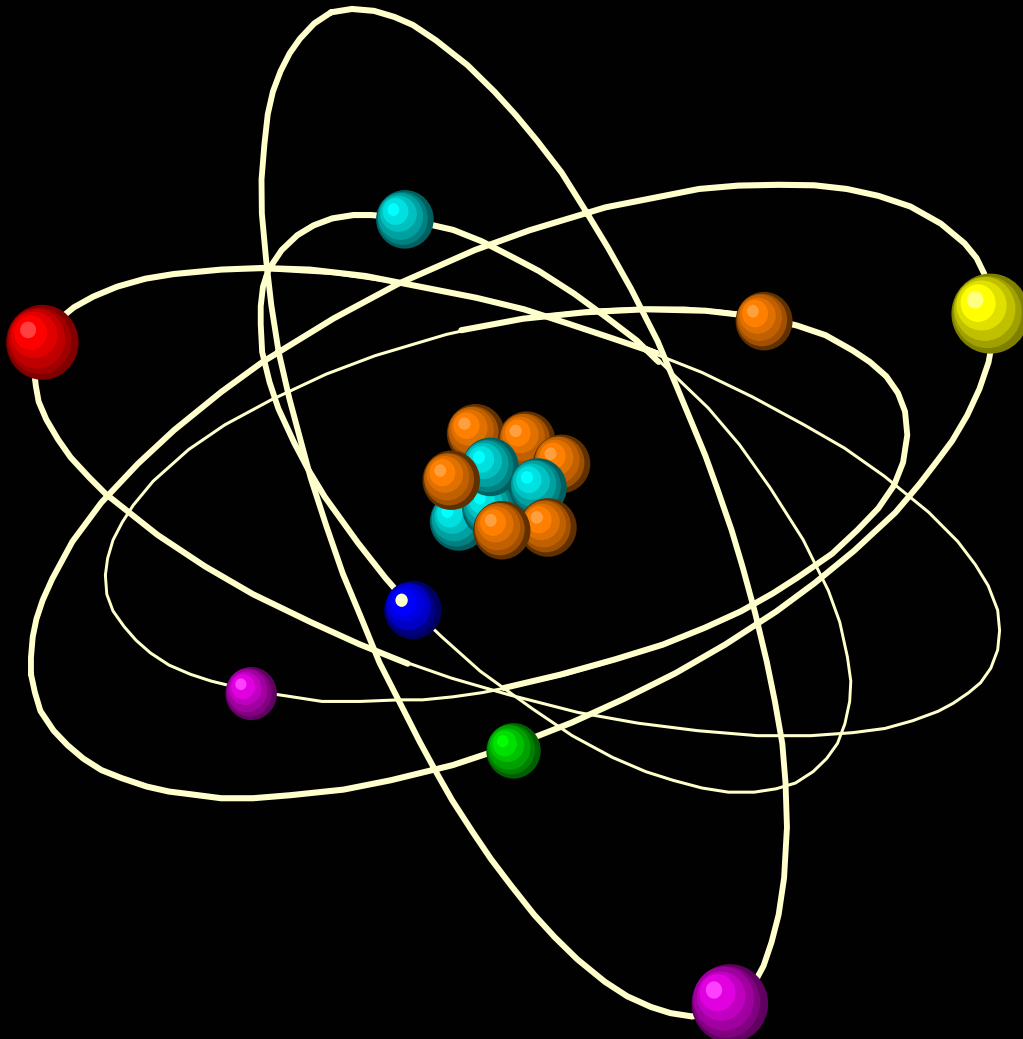
University of Minnesota

What's Iowa Law on Radon in Child Care Centers?



- Iowa (IDHS) law says owners of child care Centers must have radon testing performed as prescribed by the Iowa Department of Health
 - within one year of initial licensing or renewal
 - every two years after the initial testing

What is Radon?



- Naturally occurring
- Dangerous radioactive gas
- Known cause of cancer in humans



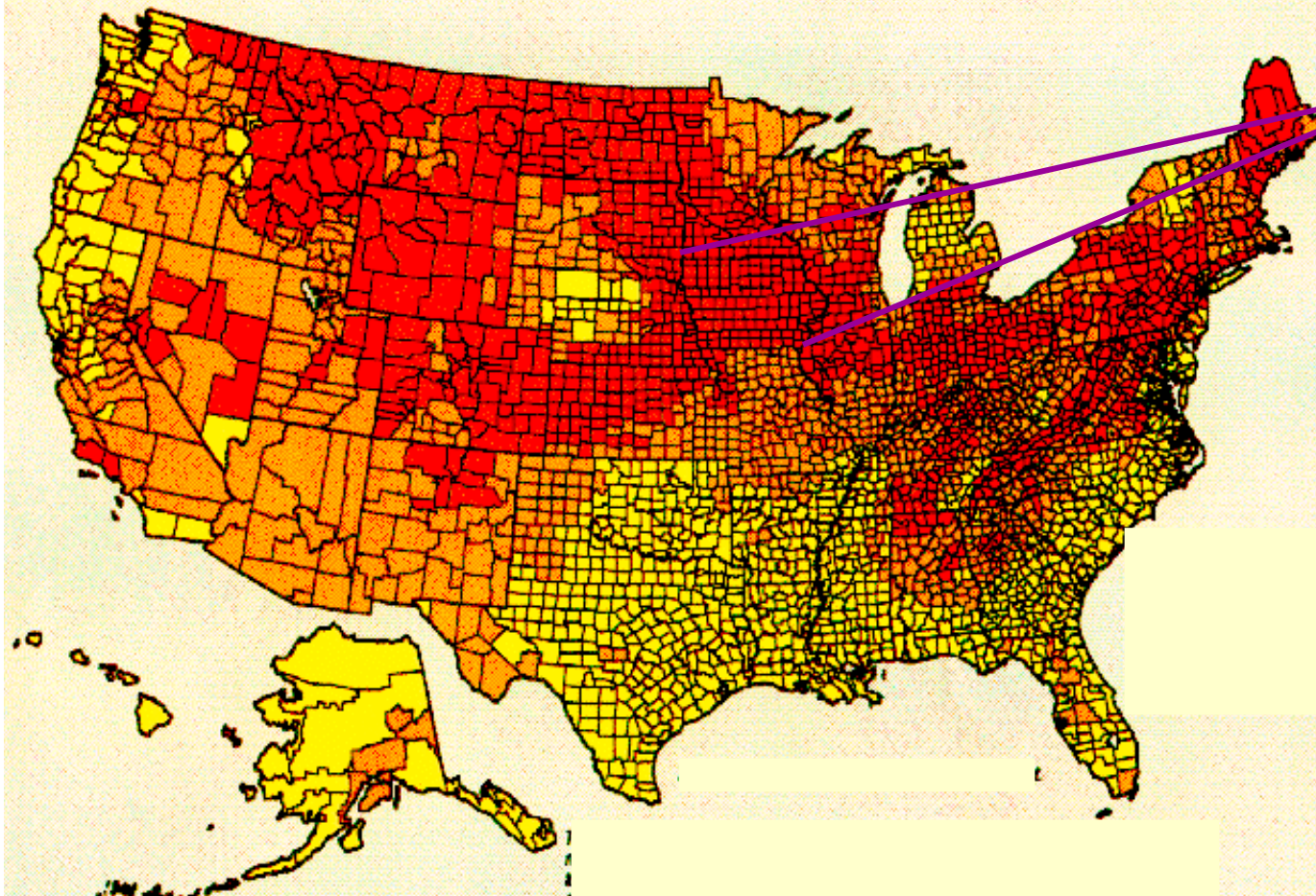
Where does Radon Come From?



- In Iowa, it comes from uranium and radium in soil and rock deposited by glacial activity, etc.
- Iowa has the highest portion of homes with elevated indoor radon in the U.S.

Where Has Radon Been Found?

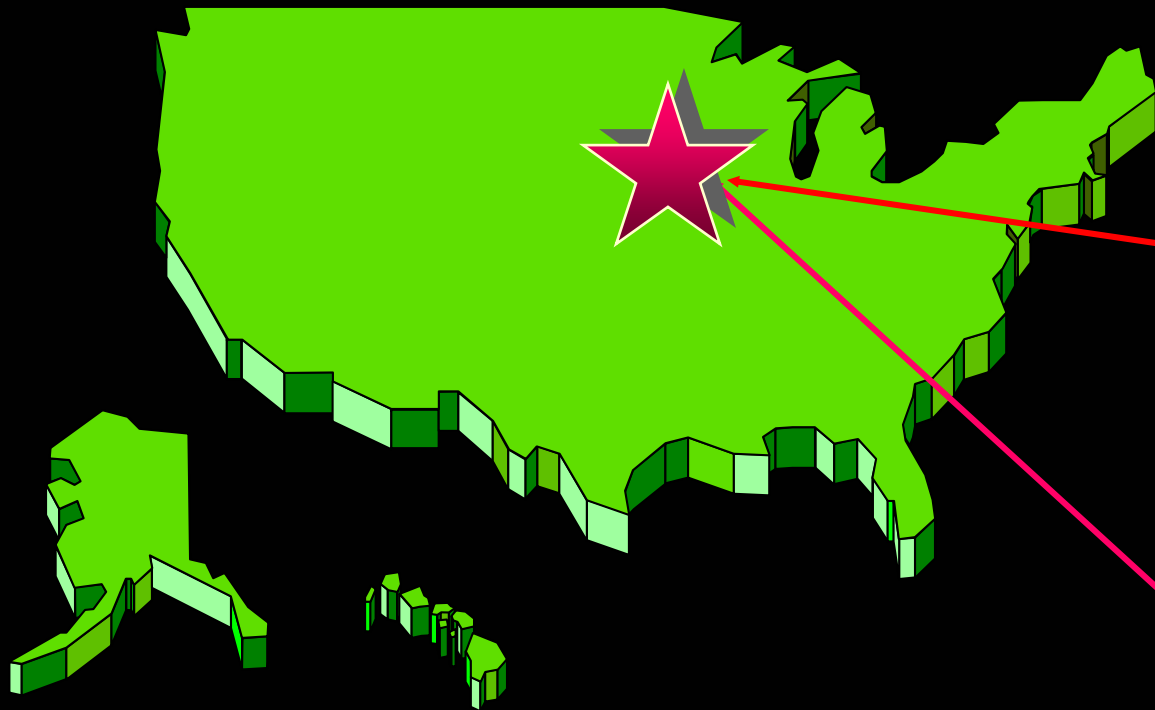
EPA Map of Radon Zones



Average Home

- Red = above EPA threshold
- Orange = 50 to 99% of EPA threshold
- Yellow = less than 50% of EPA threshold

How Common Are High Radon Levels In Homes?



- Homes

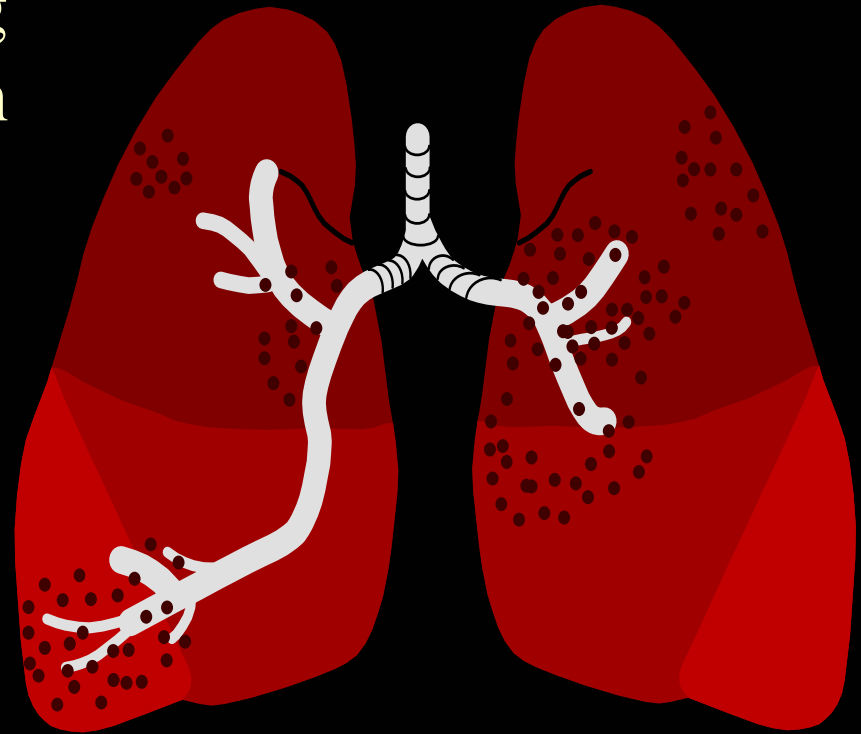
- U.S.: 1 in 15
- Iowa: 11 in 15 (or 71.6 %)

- Schools

- U.S.: 1 in 5 with 1 + classrooms
- Iowa: probably greater than 1 in 5 schools

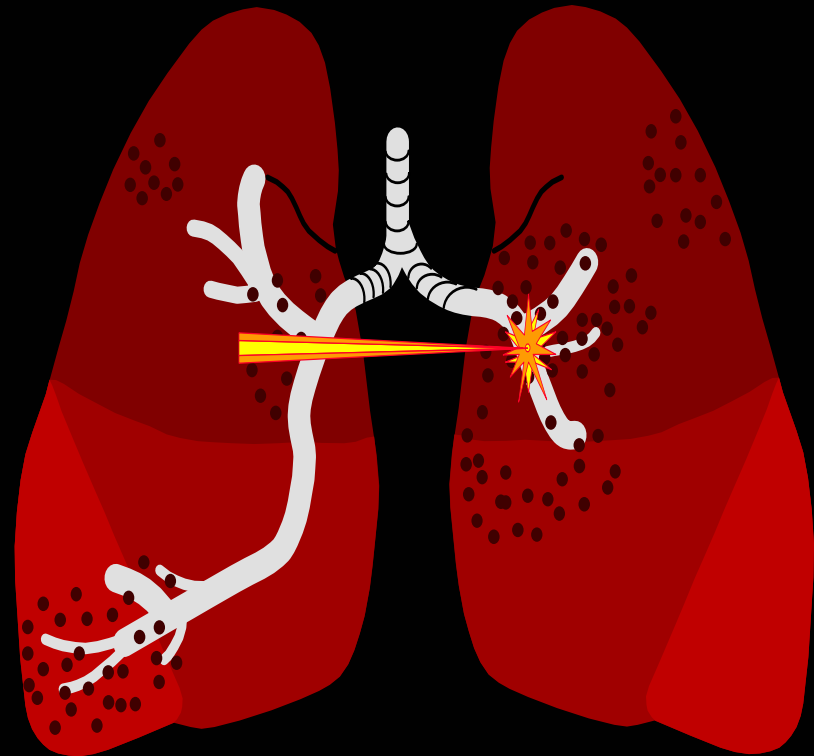
Why is Radon Dangerous?

- It is the second leading cause of lung cancer in the United States . . .
. . . second only to smoking



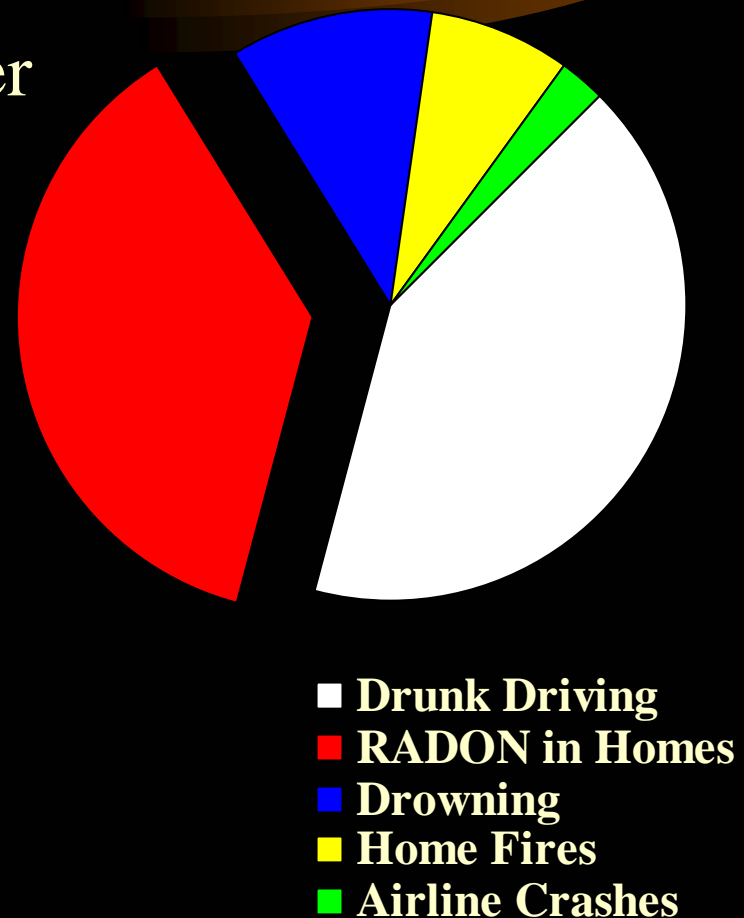
How does Radon Cause Lung Cancer?

- When you inhale radon and its radioactive decay products . . .
 - DNA in lung tissue can be damaged, which
 - Overtime can result in the development of lung cancer



How Serious is the Risk?

- Radon in homes causes 14,000 to 15,000 lung cancer deaths per year - more than
 - drownings
 - home fires
 - airline crashescombined!
- There is additional risk in schools but this risk has not been published



How do We Know that Radon is a Serious Health Risk?

- Most recently,
 - in 1998, the *National Academy of Sciences* found¹
 - 15,400 lung cancer deaths/ year are due to radon in homes
 - infant risk appears to be slightly higher than that of adults
 - in a study of Iowa women, the *University of Iowa* found:
 - a 50 to 80% increase in lung cancer in women exposed to 4 pCi/L radon in their homes over just 15 years²

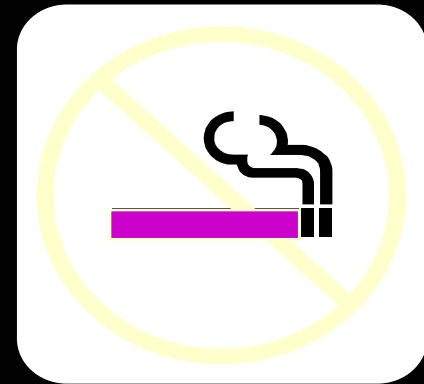
¹www.epa.gov/iaq/radon/beirvi.htm

²www.epa.gov/iaq/radon/iowastudy.htm

What do Radon Levels Really Mean?

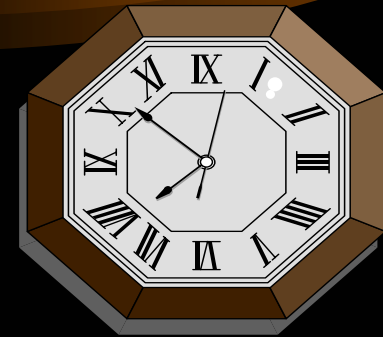
- The lung cancer risk of
 - 2 pCi/L
 - = 200 x-rays per year
 - 4 pCi/L
 - = 400 x-rays per year or
 - = smoking 1/2 pack of cigarettes per day

X-rays



What Factors Influence a Child's Risk?

- The level of radon
 - in your daycare and
 - in the child's home
- The amount of time the child spends in areas with high levels of radon
- Whether or not someone in the child's home smokes



What Level of Radon is Safe?

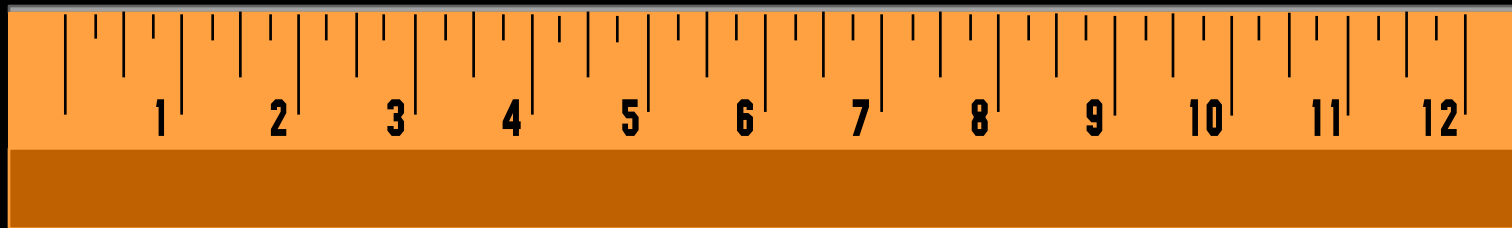
- **NO LEVEL OF RADON IS SAFE!!!**
- EPA and IDPH recommends that you fix your child care facility if radon levels are above 4 picoCuries/Liter of air (pCi/L).



DANGER!!!
RADIOACTIVE!!!

What is a picoCurie?

- A picoCurie is a unit used to measure radiation.
- Equals 2.22 disintegration's per minute.



Who Should Test For Radon?

- **Every Child Care Operator!**
- **Every Home Owner**
- **Every School Board**
- Your neighbor may have tested and found low radon, but your child care may still have high radon



How Much Radon is There in Your Child Care?



- It is . . .
 - invisible
 - odorless
 - tasteless
- But . . .
 - it can **easily** and **inexpensively** be
 - **measured** and
 - **reduced**

How Does Radon Get Into Your Child Care Facility?



*Is
There
a
Radon
Problem
in this
Child Care
Facility?*



To Know Radon Concentrations in Your Child Care You Must Test!

- U.S. EPA has two testing procedures
 - one for residential buildings that should be followed for home child care facilities
 - ... which will be described in the next slides
 - another for schools that should be followed for non-home child care facilities
 - ... which will be summarized after the home child care slides

*Radon Testing in
Home or
Residential Child
Care Facilities*

What is the First Step in Testing Home Child Cares for Radon?

- Obtain an Iowa licensed radon testing device
 - by calling the Iowa Air Coalition at 319-892-6055
 - cost of short-term test, including analysis is \$5.00 per test
 - cost of long-term test, including analysis is \$19.00 per test
 - send check to Linn County Public Health, 501 13th Street NW, Cedar Rapids, IA 52405
 - or from an Iowa certified radon measurement laboratory
 - or from an Iowa certified radon measurement specialist

What is the Next Step in Testing Home Child Cares for Radon?

- Place the radon test device
 - use a short-term testing device for 2 to 7 days (follow device instructions)
 - under closed house conditions
- If the initial test result is 4 pCi/L or greater, you should retest - - - *Go to Step 3*
- If the initial test result is less than 4 pCi/L, do not test further unless, in the future:
 - the day care is remodeled or unused space is occupied
 - the day care air handling system is replaced or changed

Radon Testing in Home Child Care Facilities

Step 3: if the Initial Test is 4 pCi/L but Less than 10 pCi/L

- Retest
 - use a long-term testing device in the same location(s) as the first test(s)
 - for 3 to 12 months
 - *under normal house conditions*
- If the results of the long-term test(s) is greater than 4 pCi/L, take steps to reduce indoor radon

Radon Testing in Home Child Care Facilities

Step 3: if the Initial Test is 10 pCi/L or Greater

- Retest
 - use a short-term testing device for 2 to 7 days
 - in the same location(s) as the first test(s)
 - under closed house conditions
- If the average of the first and second short-term test(s) is greater than 4 pCi/L, take steps to reduce indoor radon

What are Closed Home Conditions?

- All windows and outside vents are closed
- All doors to the outside are closed, except for normal entry and exit
- Whole-house and window fans should be off
- Window air conditioners may be on unless they bring outside air in
- Attic fans should be off unless they only control attic conditions
- Heat Recovery Ventilators should be functioning
- Combustion or make-up air must not be closed.

What are Short-Term Testing Devices?



- Charcoal devices are examples
- All short-term devices must be used only under closed house conditions
- Typical retail cost, including analysis, is \$15 to \$25

What are Long-Term Testing Devices?



- Alpha track detectors are common long-term testing devices
- All long-term devices may be used under normal lived-in conditions
- Typical cost, including analysis, is \$20 to \$30

Radon Testing in Home Child Care Facilities

How do You Use the Radon Test Device?

- Carefully follow the directions that comes with the radon test kit
- Accurately complete and fill out information sheets
- After the test is complete, send the test device back to the lab
- The lab will send you the results

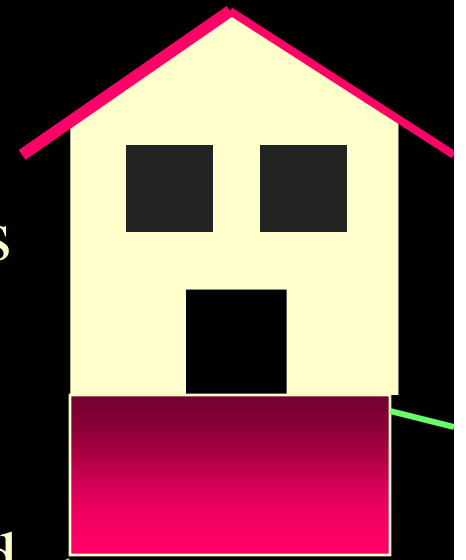
Instructions for the Radon Detector Kit

Follow these directions carefully and then return the detector to the lab for analysis. They will send you your results within a few days. Do not disturb the kit while the test is being conducted.

You may need to close up your house during the test, depending on the type of detector that is being used.

Where Should You Put the Radon Test Device?

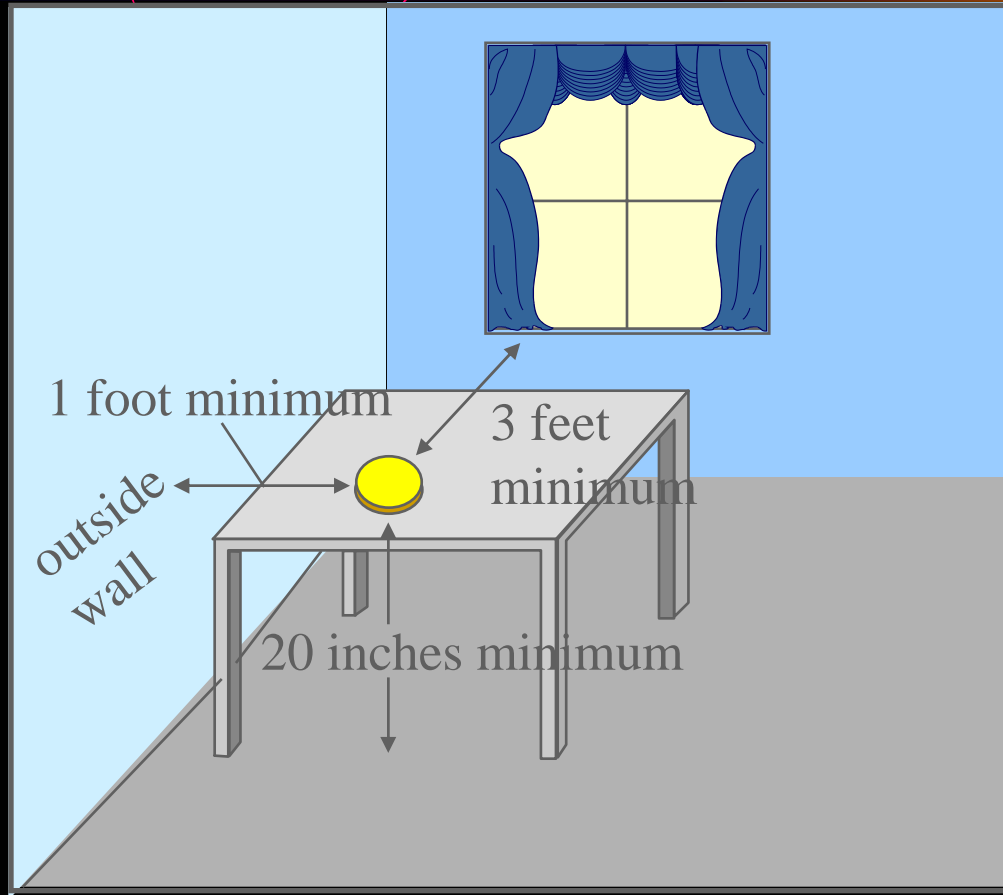
- On the lowest “lived in level” of your day care
 - preferably in areas where children spend time
 - not in bathrooms or kitchens
 - where it will not be disturbed
 - away from drafts and heat
 - at least 3 feet from windows and doors
 - at least 1 foot from exterior walls
 - at least 20 inches above the floor
 - 6 to 8 feet above the floor if suspended



Radon Testing in Home Child Care Facilities

Where to Place the Radon Detector (continued)

Placing the detector on top of a tall book case, away from children, may be a good location for day cares



Another location for the detector in day cares is to suspend the detector from the ceiling in which case it must be within 6 to 8 feet of the floor

Radon Testing in Non-Home Child Care Centers

*for example, in
commercial, institutional, religious,
and school buildings*

Radon Testing in Home Child Care Facilities

What is the First Step in Testing Non-Home Child Care Facilities for Radon?

- Obtain an Iowa licensed radon testing device
 - by calling the Iowa Air Coalition at 319-892-6055
 - cost of short-term test, including analysis is \$5.00 per test
 - cost of long-term test, including analysis is \$19.00 per test
 - send check to Linn County Public Health, 501 13th Street NW, Cedar Rapids, IA 52405
 - or from an Iowa certified radon measurement laboratory
 - or from an Iowa certified radon measurement specialist

What is the Next Step in Testing Non-Home Child Cares for Radon?

- Determine who will do the testing
 - if the testing will be done by the owner or the owner's employee
 - obtain, read, and complete U.S. EPA's *Radon Measurement in Schools: Self-Paced Training Workbook*
 - to obtain a workbook, call 1-800-438-4318 for IAQ Information Clearing House
 - if the testing will be done by someone else, it must be done by
 - an Iowa certified radon measurement specialist

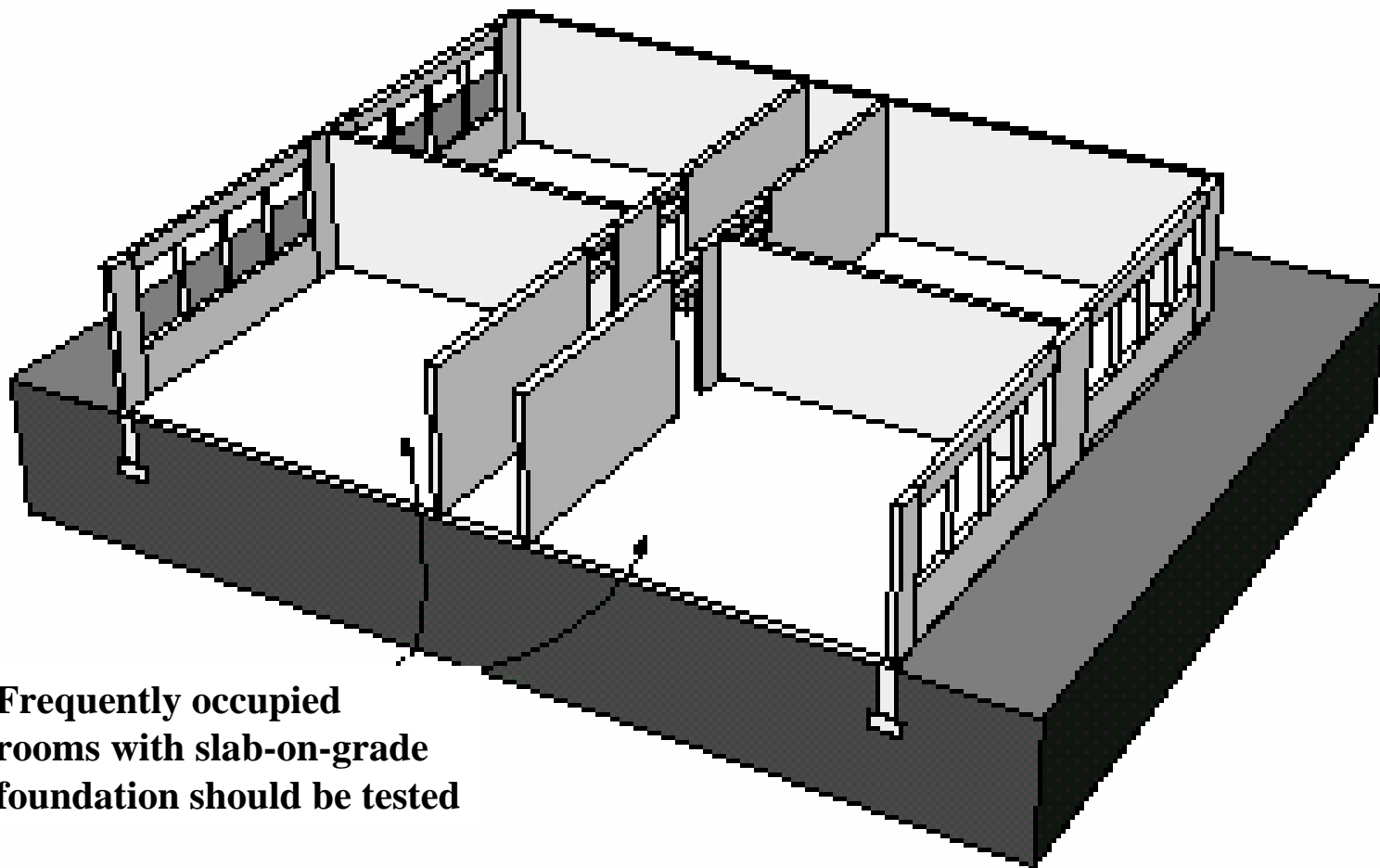
Radon Testing in Non-Home Child Care Facilities

What is the Next Step in Testing Non-Home Child Cares for Radon?

- Plan to test *all frequently-occupied rooms in contact with the ground* at the same time (*)
- Determine if you are going to test over either
 - the short-term of at least two days but not more than 90 days
 - this is the quickest way to measure and
 - less likely than a long-term measurement to give an average radon level over a year
 - the long-term of more than 90 days
 - gives a better reflection of risk than a short-term measurement, although initially more expensive.
 - in either case, use only Iowa certified testing devices

Radon Testing in Non-Home Child Care Facilities

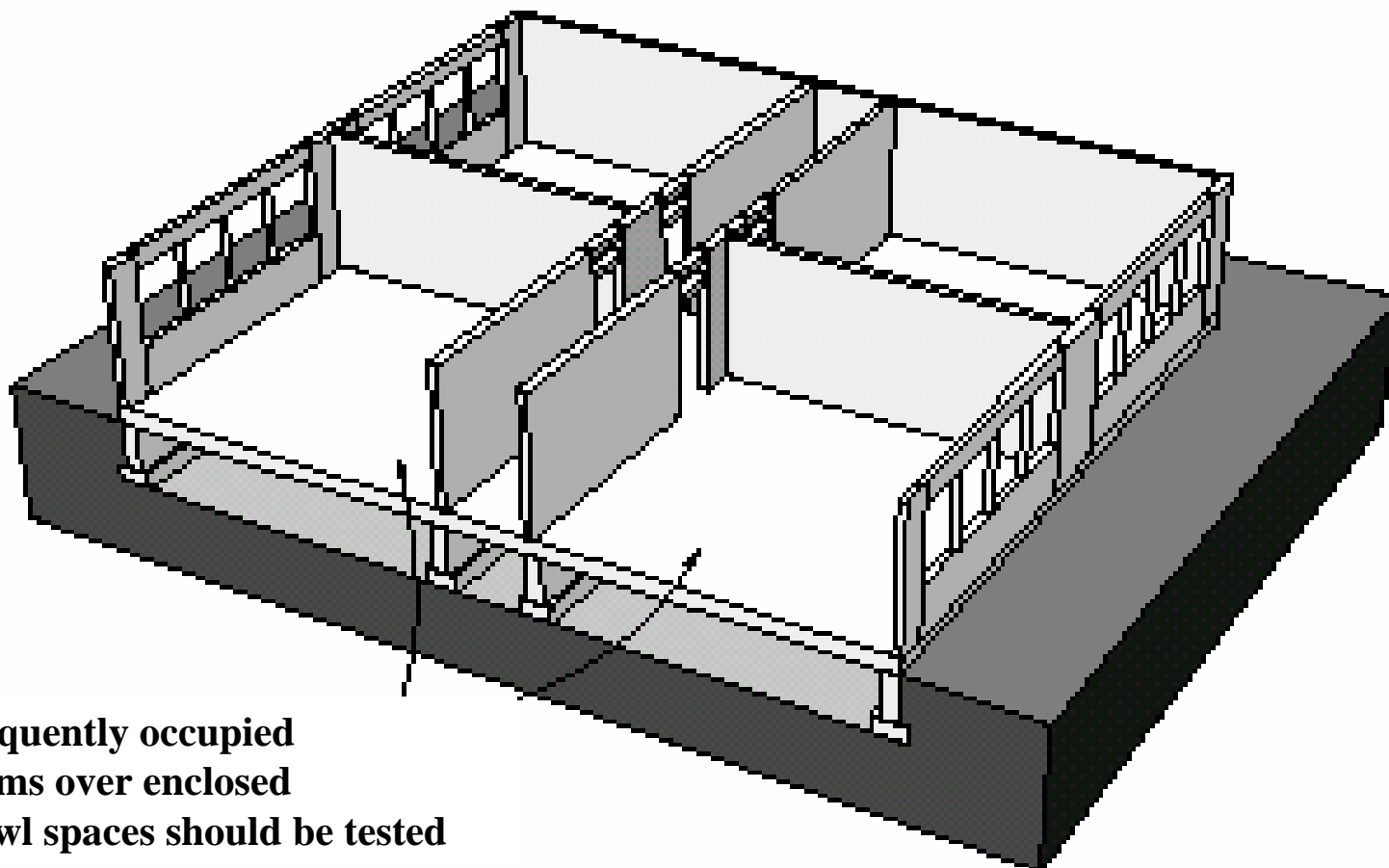
Where Do You Test Non-Home Child Care Facility for Radon?



Frequently occupied
rooms with slab-on-grade
foundation should be tested

Radon Testing in Non-Home Child Care Facilities

Where Do You Test Non-Home Child Care Facility for Radon?

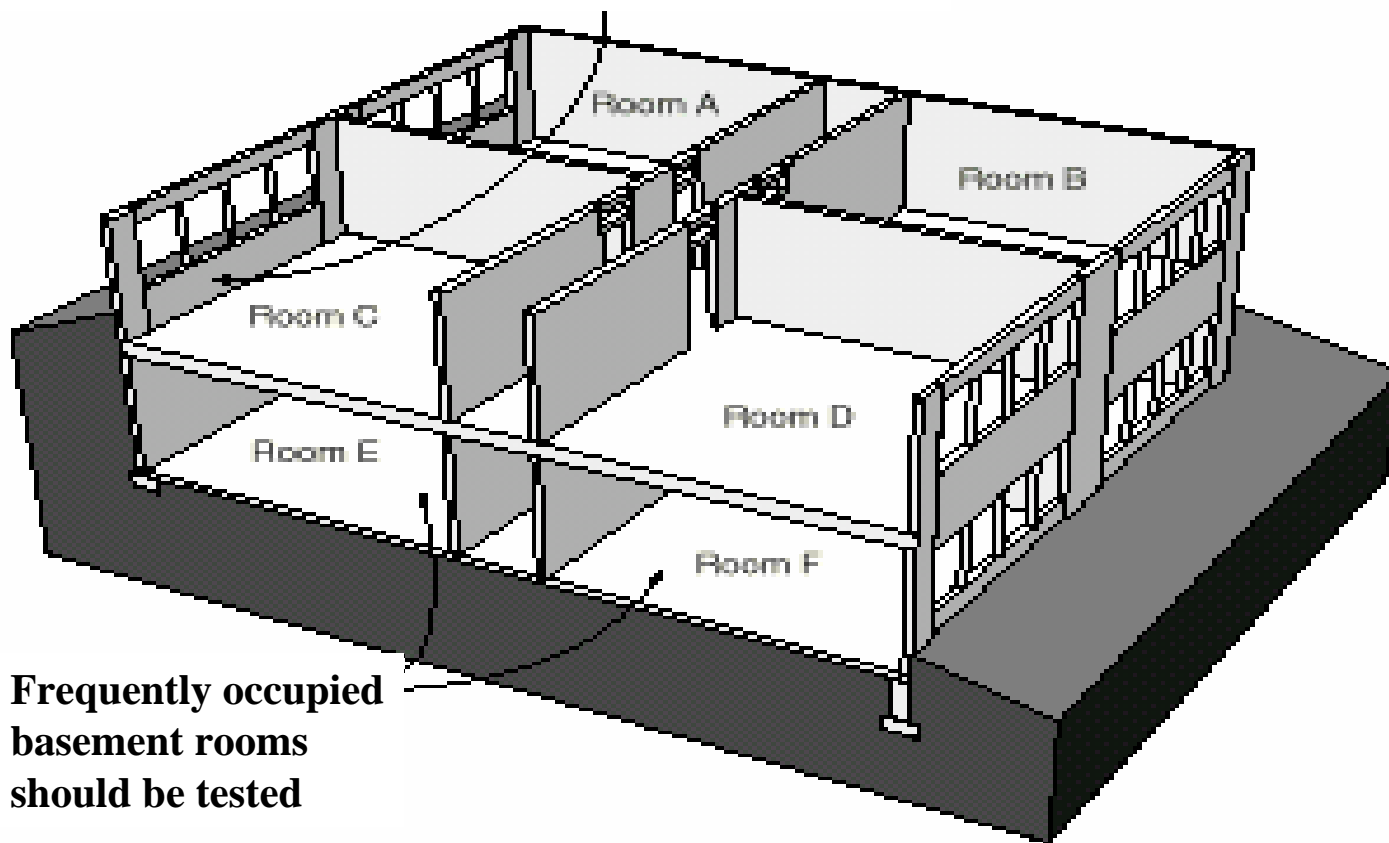


Frequently occupied rooms over enclosed crawl spaces should be tested

Radon Testing in Non-Home Child Care Facilities

Where Do You Test Non-Home Child Care Facility for Radon?

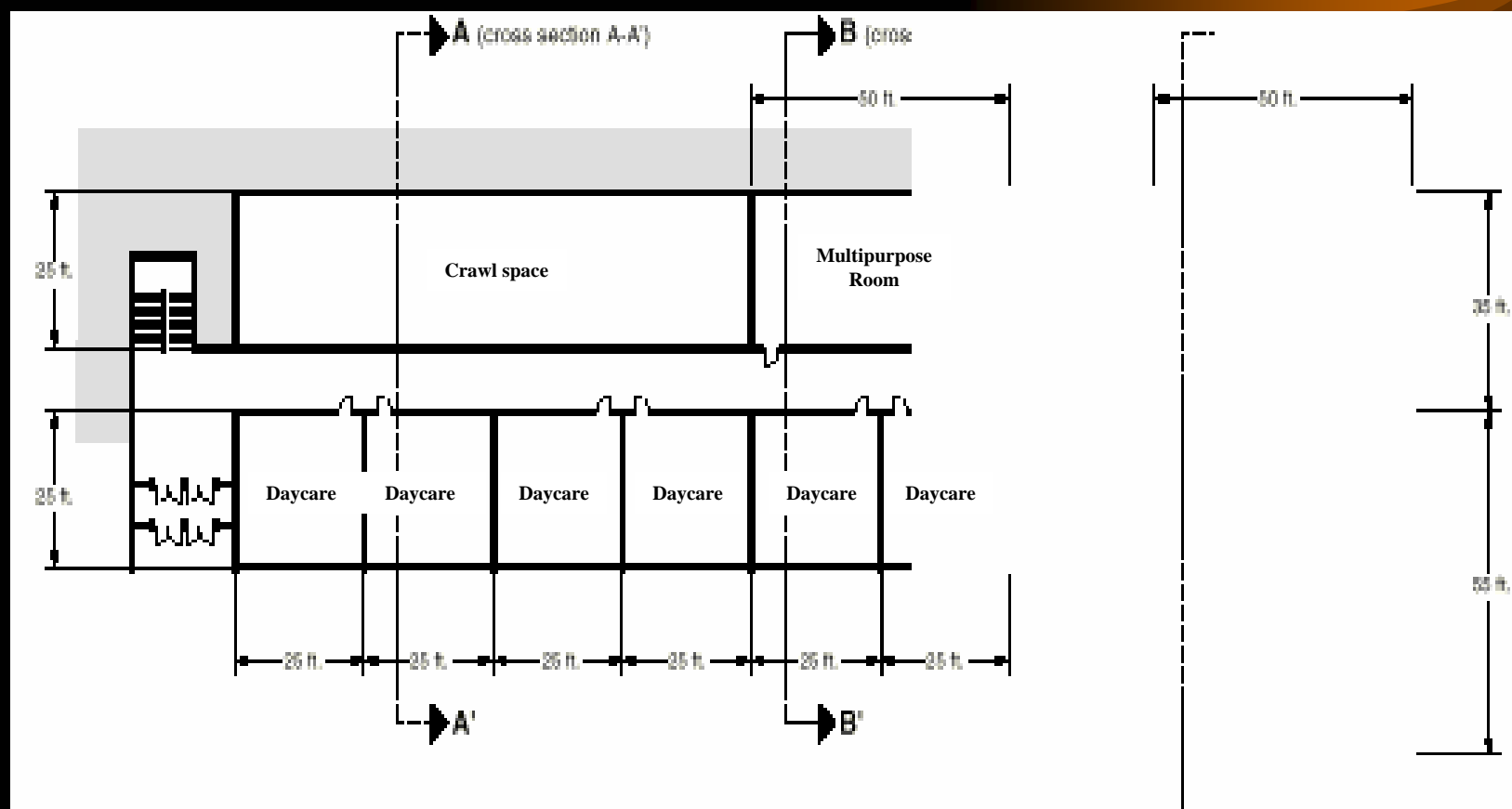
On sloping sites, some rooms above basements may have rooms in contact with the soil --- if frequently occupied, the rooms should be tested



Frequently occupied
basement rooms
should be tested

Radon Testing in Non-Home Child Care Facilities

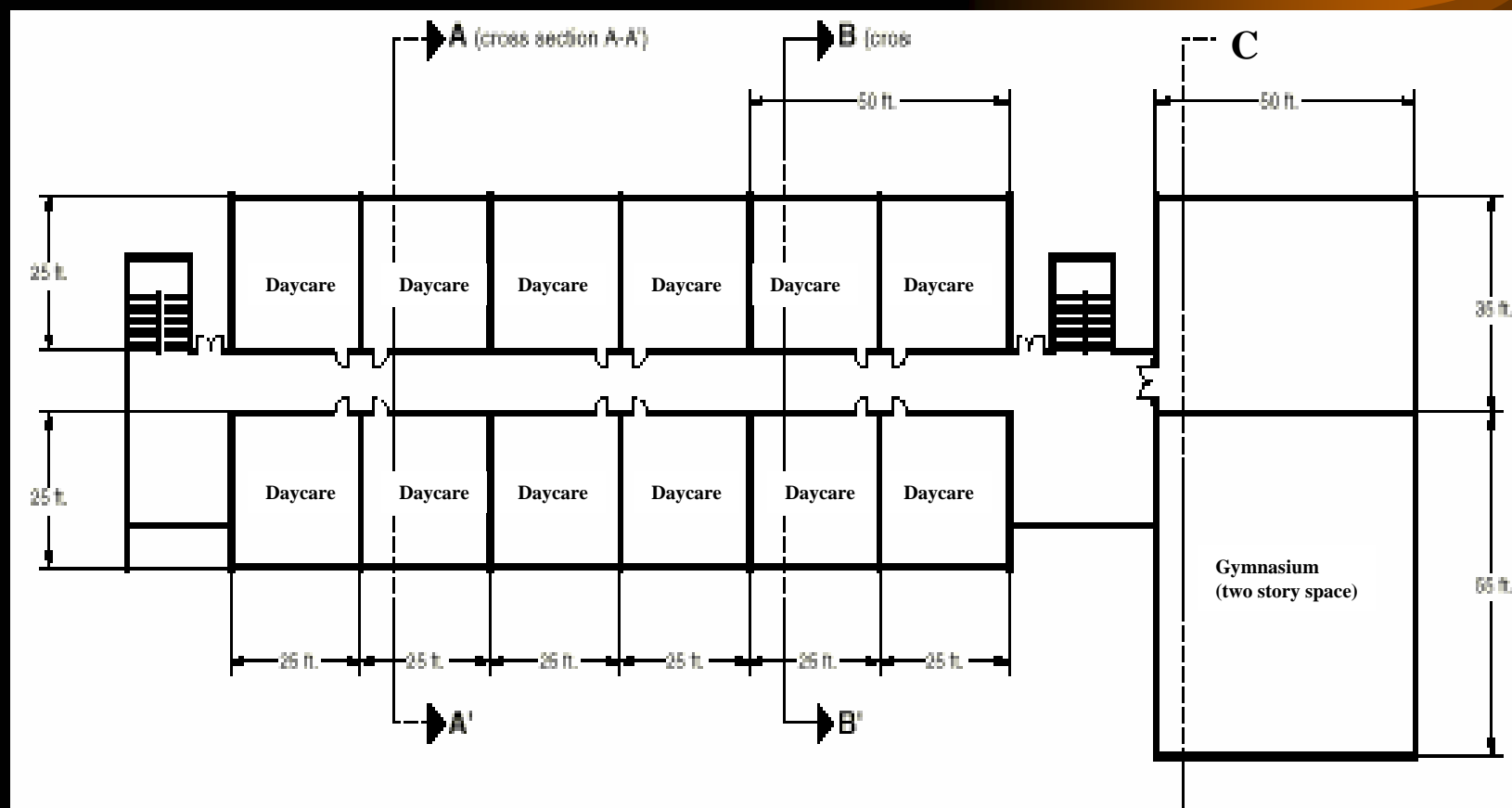
Where Do You Test Non-Home Child Care Facility for Radon?



Plan View: First Floor

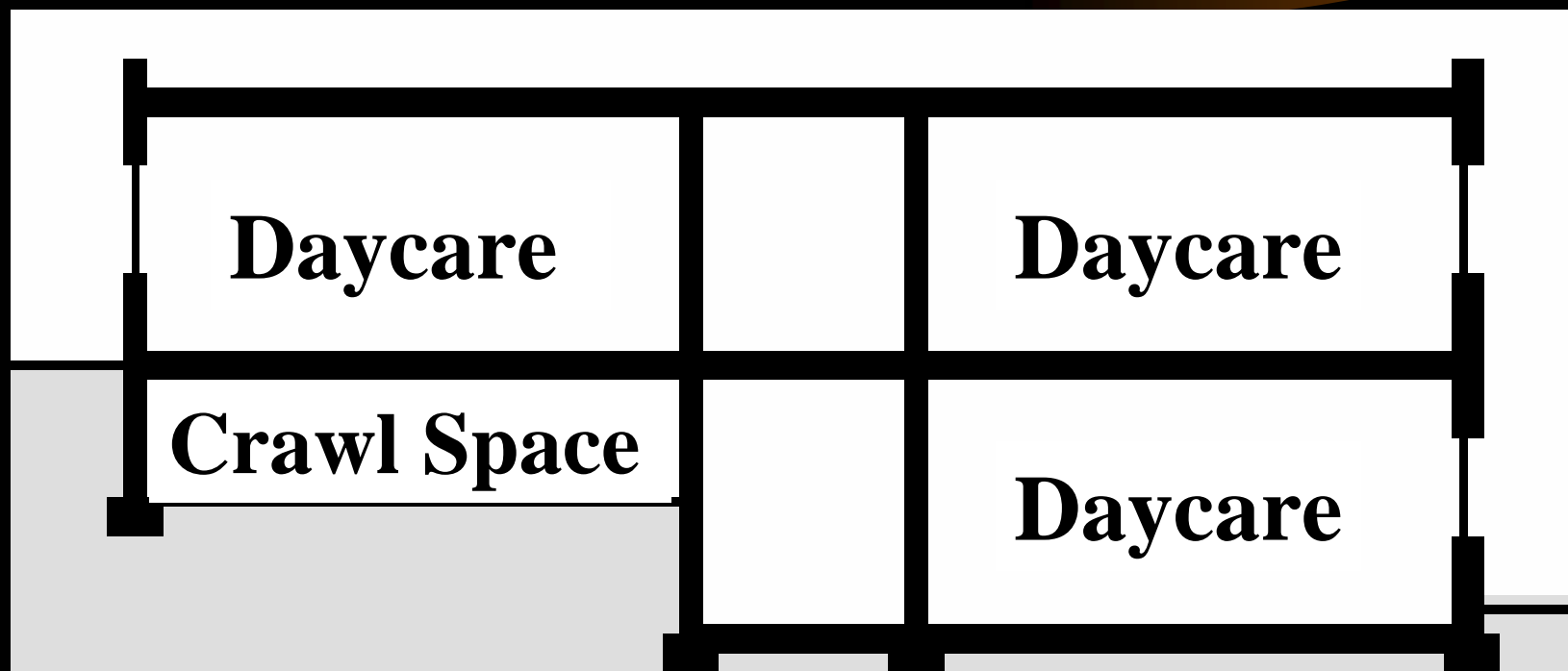
Radon Testing in Non-Home Child Care Facilities

Where Do You Test Non-Home Child Care Facility for Radon?



Plan View: Second Floor

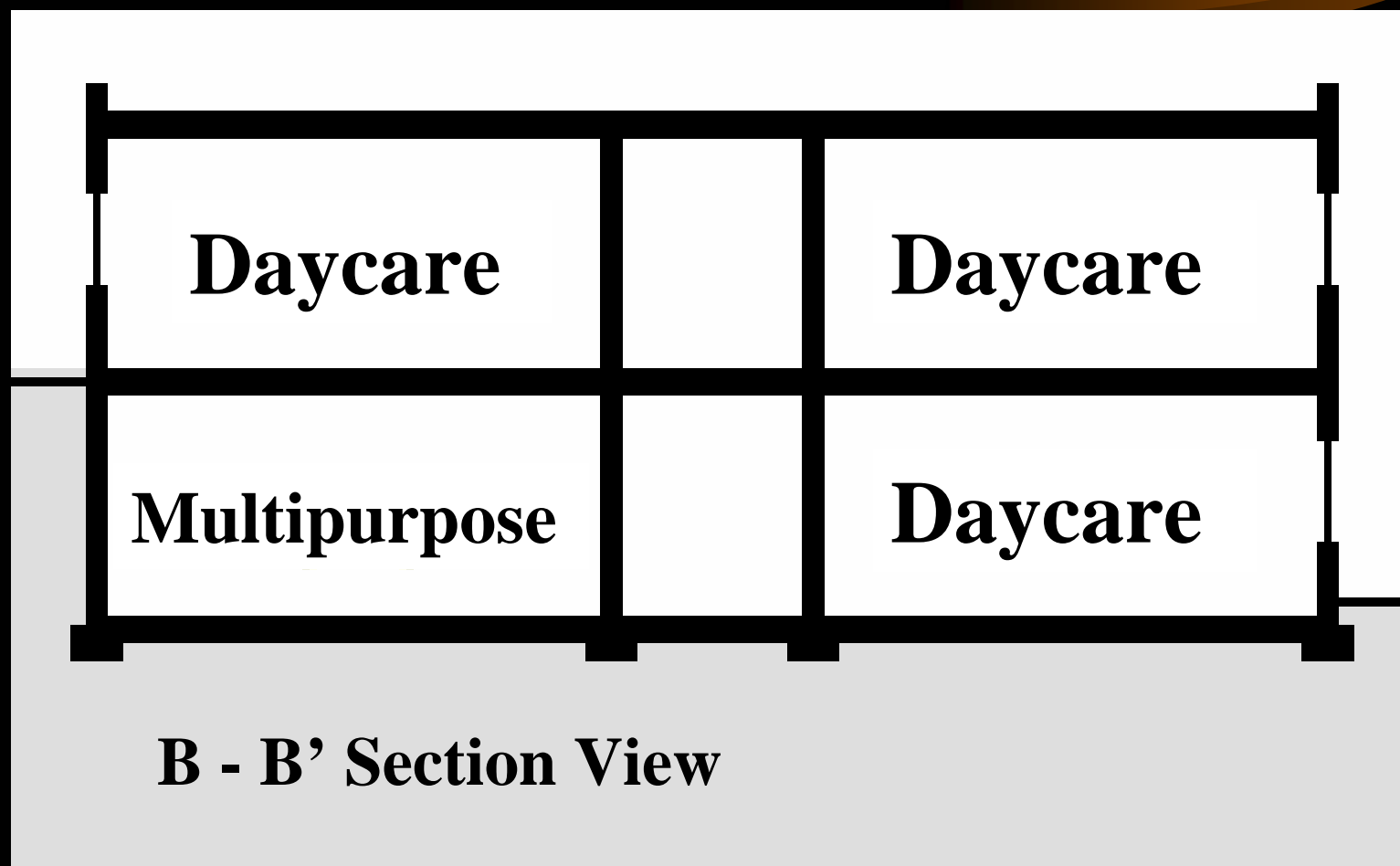
Where Do You Test Non-Home Child Care Facility for Radon?



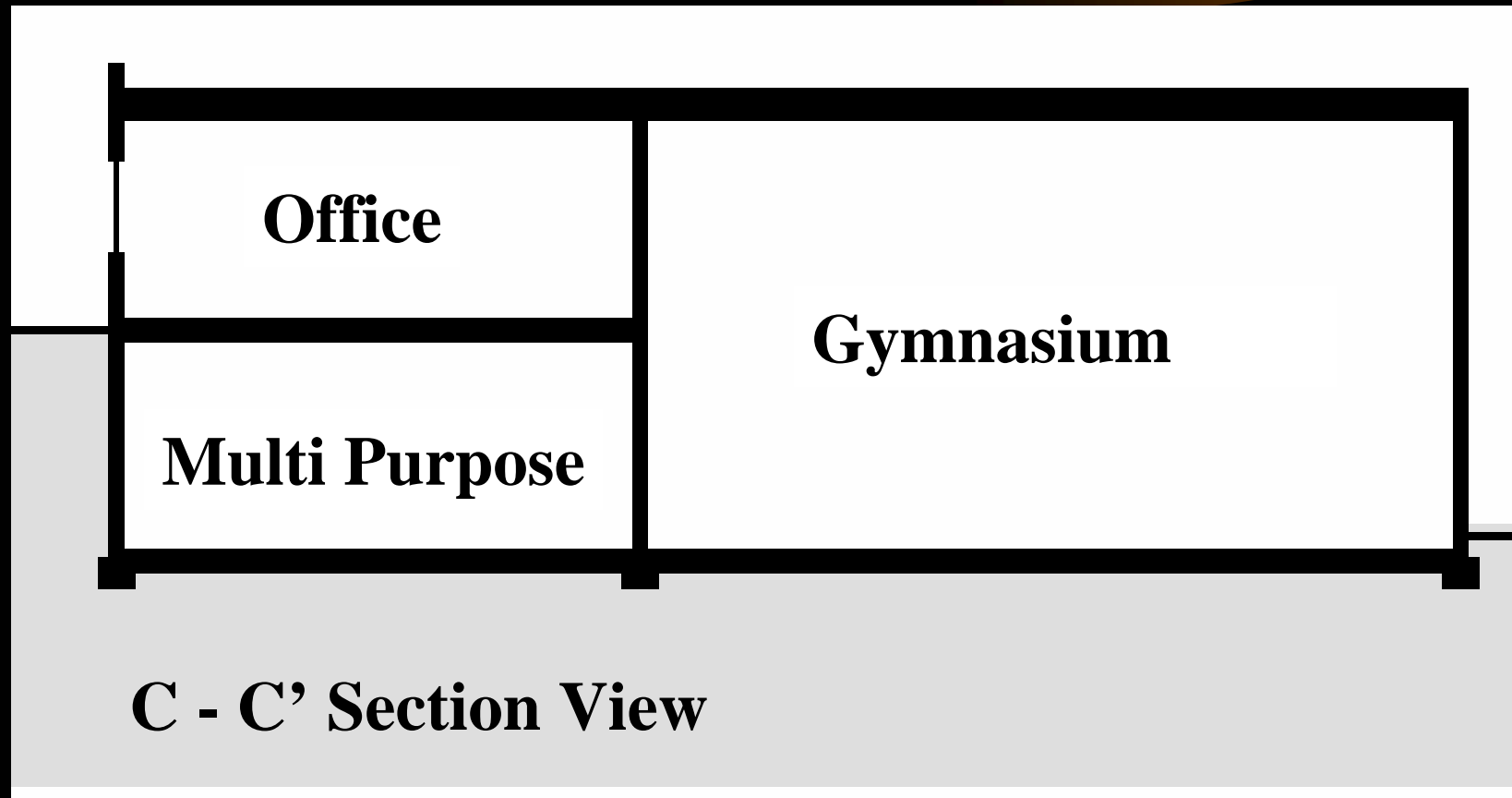
A - A' Section View

Radon Testing in Non-Home Child Care Facilities

Where Do You Test Non-Home Child Care Facility for Radon?

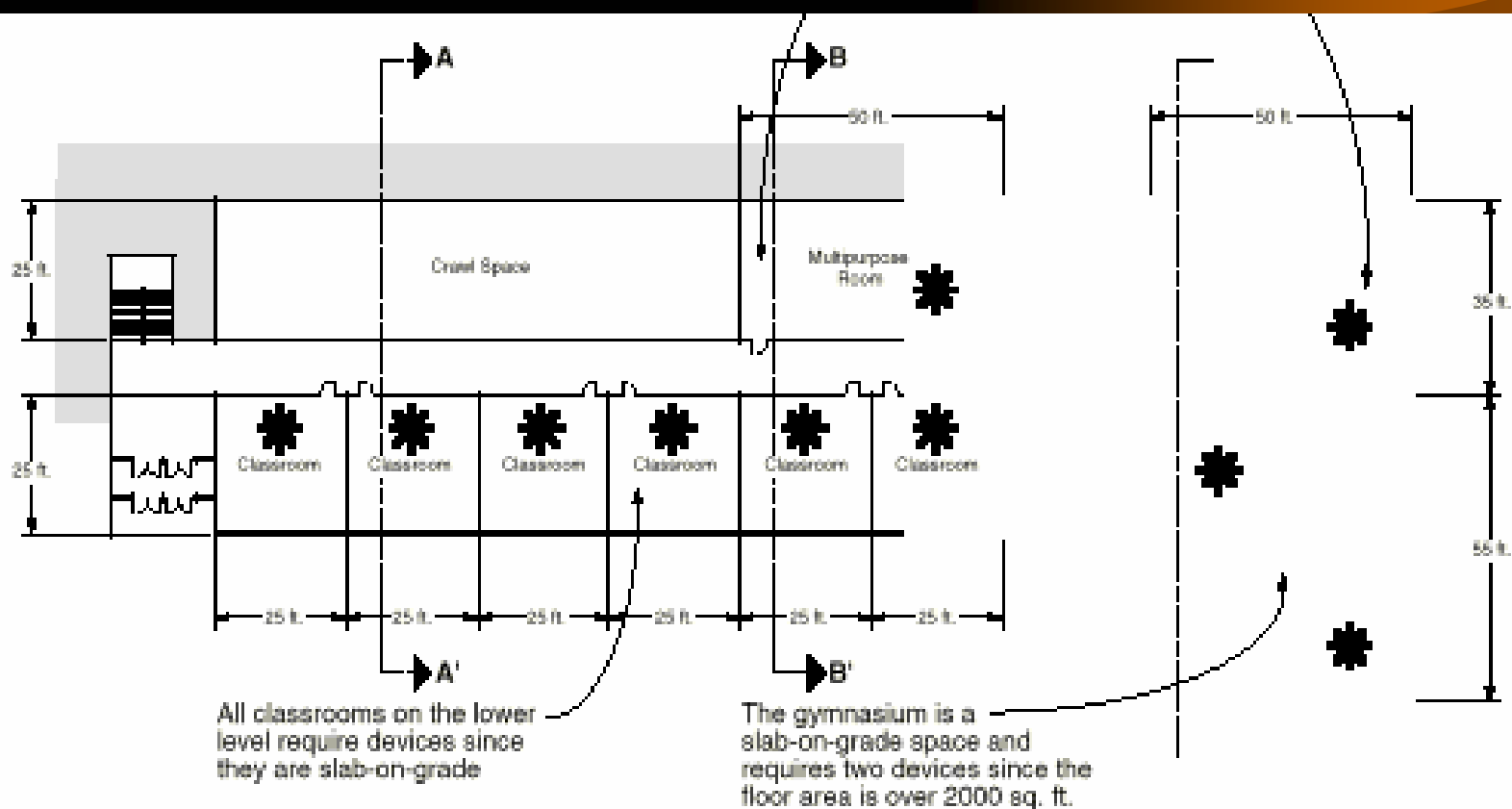


*Where Do You Test Non-Home
Child Care Facility for Radon?*



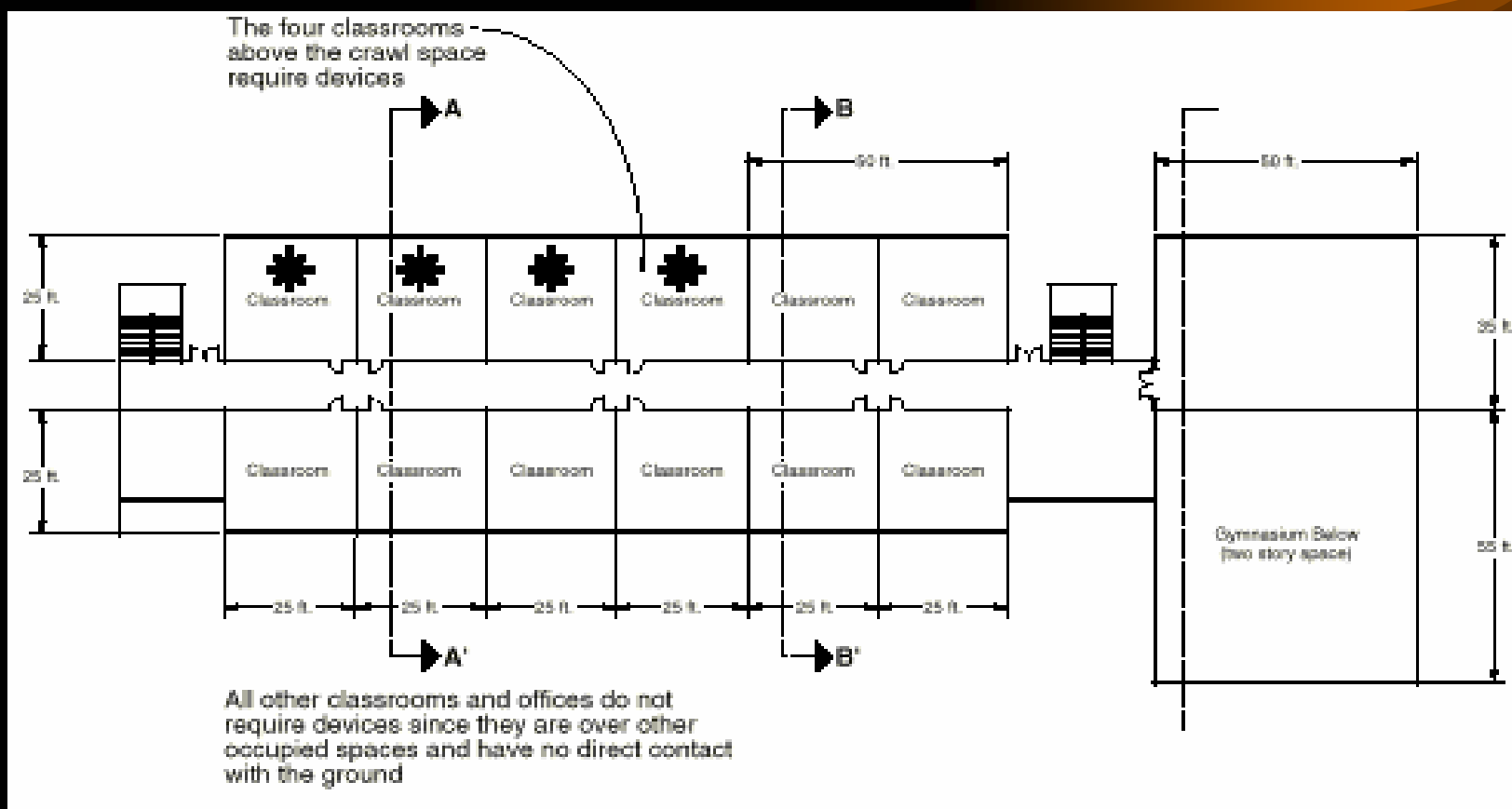
Radon Testing in Non-Home Child Care Facilities

Where Do You Test Non-Home Child Care Facility for Radon?



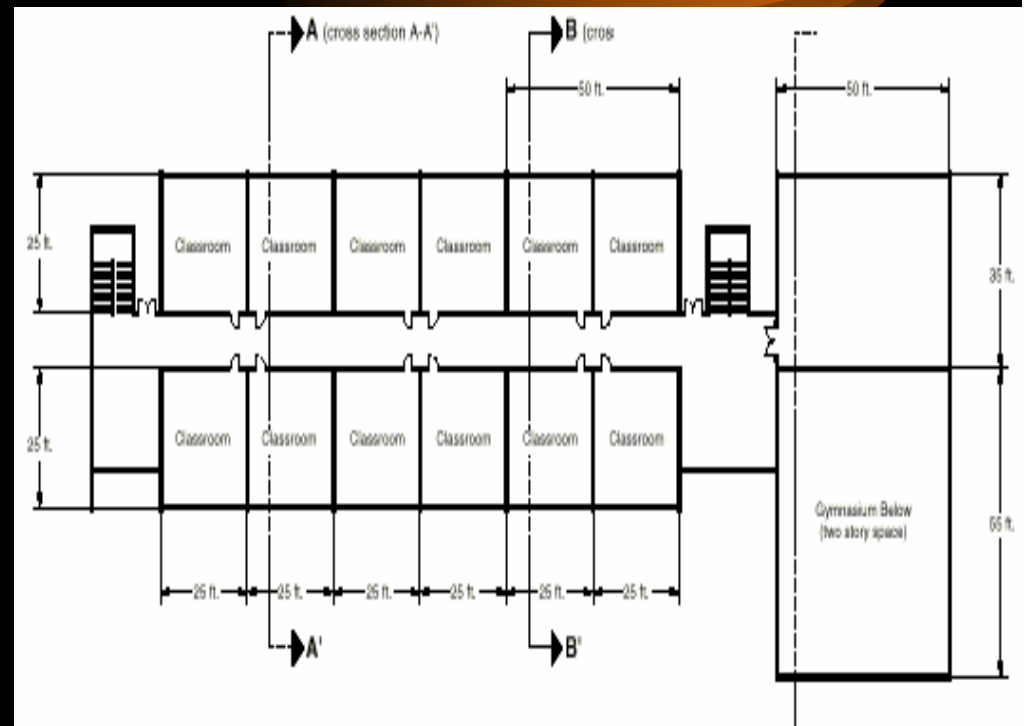
Radon Testing in Non-Home Child Care Facilities

Where Do You Test Non-Home Child Care Facility for Radon?



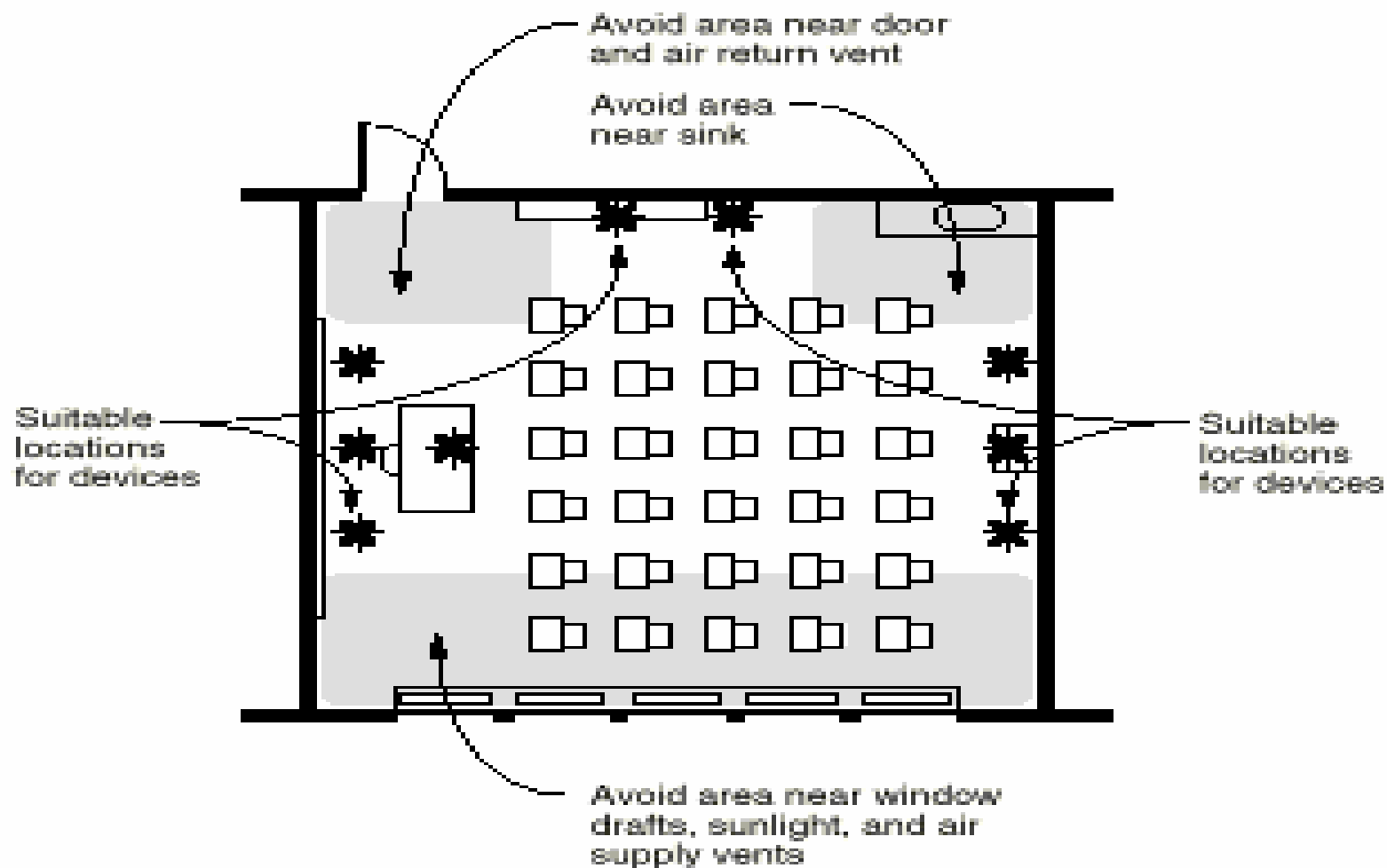
Where Do You Test Non-Home Child Care Facility for Radon?

- *Also test all second floor rooms or areas (not in contact with the soil) where there are rooms or areas below that are in contact with the soil but are unoccupied and not tested.



Radon Testing in Non-Home Child Care Facilities

Where Do You Test Non-Home Child Care Facility for Radon?

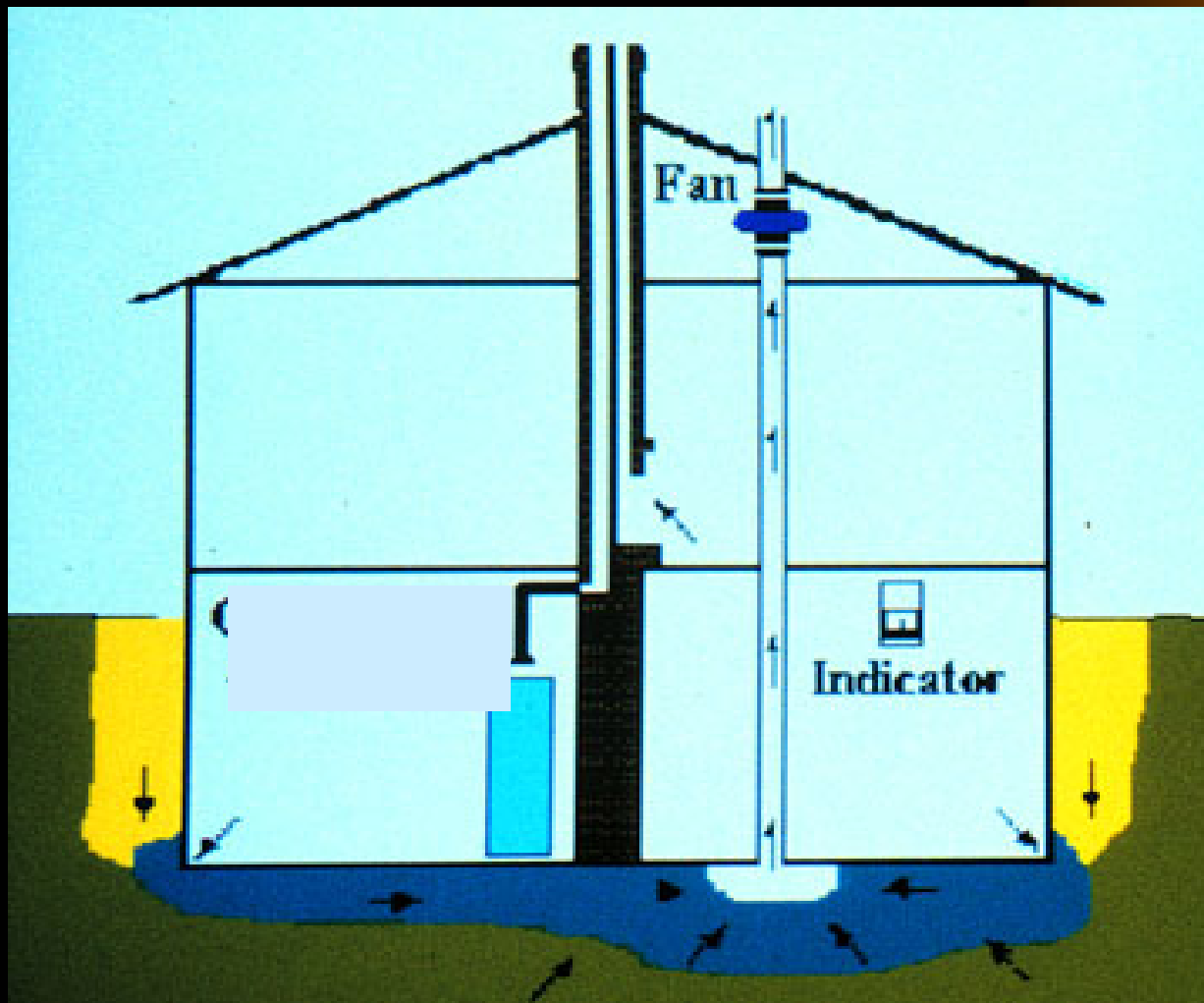


What do You do if You have High Test Results?

- EPA and IDPH recommends, if your home or school has radon levels over 4 pCi/L, you should mitigate (fix).
- Radon levels can be reduced!!



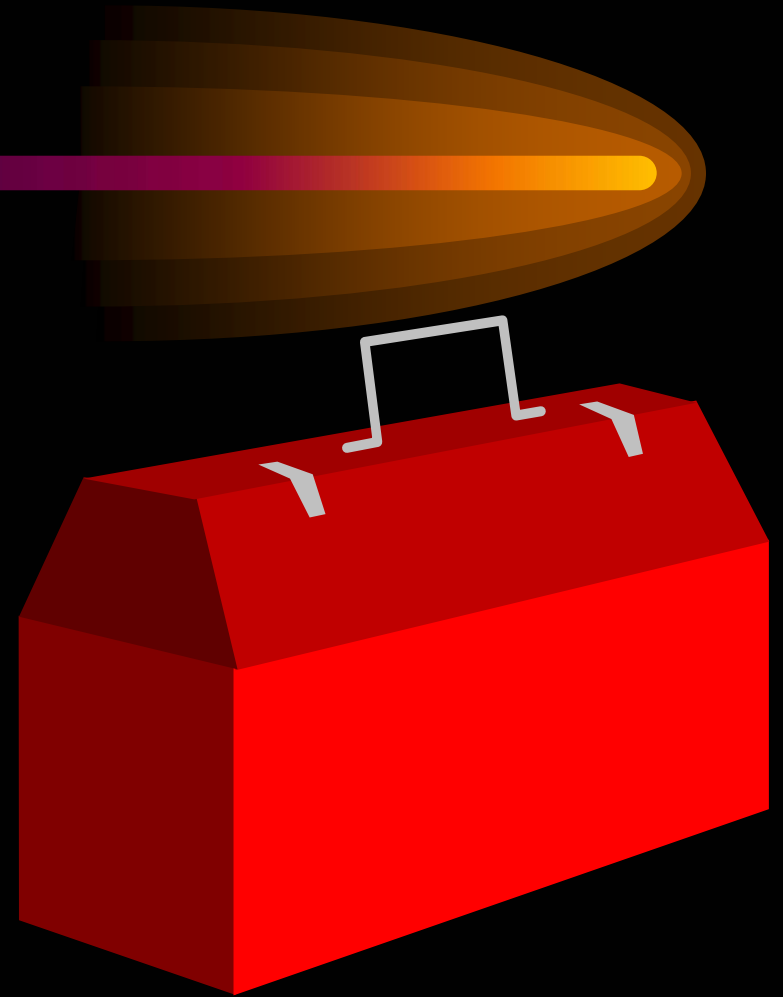
What Does a Residential Radon Reduction System Look Like?



School and other non-home buildings may have radon reduction systems that are similar to those in homes or systems that involve simple modifications to ventilation systems.

How Do You Fix Your Child Care Facility?

- Contact an Iowa credentialed Radon Mitigation Contractor
 - see your phone book or
 - contact your state public health agency for a list of contractors (1-800-383-5992)
 - visit radon web page at www.idph.state.ia.us/eh/engineering/engineering.htm



Where Can I Find Help for Radon Testing Questions?

- Call the Iowa Radon Hotline
 - 800-383-5992
- Visit the Iowa Radon Home Page
 - www.idph.state.ia.us/eh/engineering/engineering.htm
 - Scroll to the Radon Program for
 - lists of certified measurement laboratories and specialists or
 - list of credentialed mitigation specialists

Further Sources of Information

- US Environmental Protection Agency
www.epa.gov/iaq/radon/
- National Environmental Health Association
www.idph.radongas.org/
- National Radon Safety Board
www.nrsb.org/
- University of Iowa
www.cheec.uiowa.edu/misc/radon.html
- *Midwest Universities Radon Consortium*
 - *web address: dha.che.umn.edu/murc*
 - *telephone# 1-800-843-8636*

*No Wizard is Required to
Properly Test for Radon*

