



An Unhealthy Home

Part 1: An Ailing Family

Mrs. Smith brought her two children, Grace (age 18 months) and Jack (age 4 years), to the health clinic. She was worried because they had been coughing and had runny noses for several months. She explained that both children were tired and not as active as usual. Jack also complained that he had a headache and nausea.

The children had been healthy until the family moved into an older home several months ago. The physical exam for both children was normal except for increased breathing rates in both children. Mrs. Smith and her husband were healthy except for recurring mild headaches and fatigue that they blamed on stress.

1. What symptoms do members of the Smith family have?

2. List three possible things that you think might be causing the symptoms the family members are experiencing.

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Part 2: Medical Tests

The nurse practitioner at the clinic was concerned because the children had been experiencing symptoms for two months. She ordered a strep test and blood tests (white blood cell count and blood lead level).

Strep Test

A strep test is used to determine if a patient has strep throat, an infection caused by *Streptococcus* bacteria.

1. Jack's Strep Test:

Use the supplies in the small plastic bag labeled **Jack Smith Strep Test**. The cotton swab contains material collected from the back of the Jack's throat.

a) Dip Jack's swab into the tube of Strep Test Solution. If the cotton part of the swab turns pink, it means that *Streptococcus* bacteria are present.

b) Does Jack have a strep throat infection? Explain how you can tell.

c) Discard the used strep test cotton swab in the trash.

2. Grace's Strep Test:

Use the supplies in the small plastic bag labeled **Grace Smith Strep Test**. The cotton swab contains material collected from the back of the Grace's throat.

a) Dip Grace's swab into the tube of Strep Test Solution. If the cotton part of the swab turns pink, it means that *Streptococcus* bacteria are present.

b) Does Grace have a strep throat infection? Explain how you can tell.

c) Discard the used strep test cotton swab in the trash.

White Blood Cell Counts

A larger than normal number of white blood cells indicates that a patient may have an infection. Your lab kit contains photos of microscope slides of samples of normal blood, Jack's blood and Grace's blood (**Blood Slide Photos**). Compare the photos of Jack's and Grace's blood slides with the normal blood slide.

3. What can you conclude based on Jack and Grace's blood slides?

Blood Lead Test

The nurse practitioner ordered a blood lead test because the Smiths live in an older home that was built before 1978. A blood lead test is used to determine if a patient is suffering from lead poisoning. People who seem healthy can still have high levels of lead in their blood. Symptoms of lead poisoning usually don't appear until dangerous amounts of lead have accumulated in the body. Use the supplies in the small plastic bag labeled **Blood Lead Test**.

4. **Jack's Blood Lead Test:**

- a) Dip a strip of Lead Test Paper into the tube of Jack's blood for 2 seconds.
- b) Immediately compare the color of the strip with the Blood Lead Concentration Color Chart to determine Jack's blood lead level.
- c) What is the concentration of lead in Jack's blood? _____ $\mu\text{g lead/dL}$
- d) Discard the test strip in the trash.

5. **Grace's Blood Lead Test:**

- a) Dip a strip of Lead Test Paper into the tube of Grace's blood for 2 seconds.
- b) Immediately compare the color of the strip with the Blood Lead Concentration Color Chart to determine Grace's blood lead level.
- c) What is the concentration of lead in Grace's blood? _____ $\mu\text{g lead/dL}$
- d) Discard the test strip in the trash.

6. What can you conclude based on Jack and Grace's blood lead tests?

Base your answers to questions 7 through 10 on the information in the **Lead Fact Sheet**.

7. Why are low levels of lead more damaging to children than to adults?

8. How might Grace and Jack be affected by lead in their blood?

9. The Smiths' home was built before 1978. How might this account for the lead found in the children's blood?

10. List five actions the Smith family could take to reduce or prevent future lead exposure.

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Part 3: Healthy Home Inspection

The Smith family agreed to have a public health nurse inspect their home to determine if there are other health hazards that may be harming Jack and Grace’s health. The public health nurse is trained to identify home environmental health hazards and provide suggestions for creating a healthier home.

The public health nurse noticed a “musty” odor in the home that might indicate the presence of mold. He suggested that Jack and Grace’s respiratory symptoms might be due to high levels of mold in their home.

Base your answers to questions 1 through 4 on the **Mold Test Photo and Mold Fact Sheet** in your lab kit that shows the results of mold tests done in the Smiths’ home.

1. Where is the Smith family exposed to the highest concentration of mold?

2. List two symptoms that Grace and Jack are experiencing that might be caused by exposure to mold?

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- _____

3. Explain two reasons why it might NOT be worth the cost of doing mold tests on a home.

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4. List at least four actions that the Smith family could take to reduce their exposure to mold.

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Part 4: Another Health Hazard

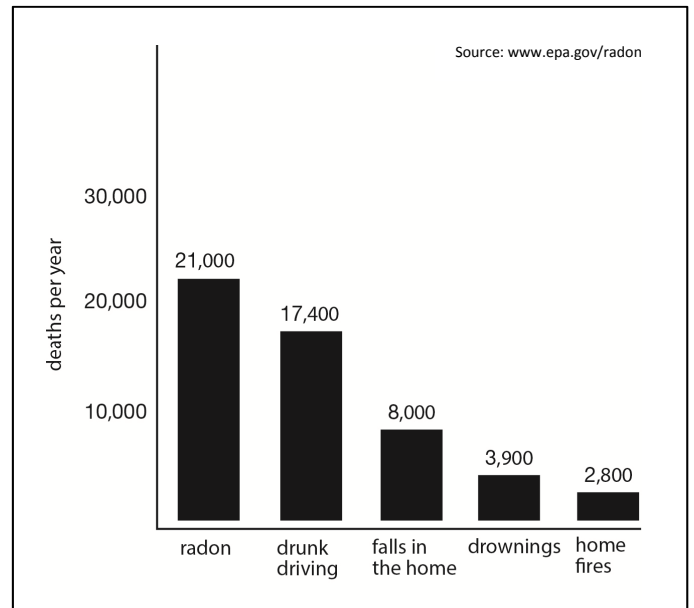
The public health nurse noted that the Smiths' home had not been tested for radon. He suggested that the Smiths purchase and follow the instructions for a short term home radon test kit.

Base your answers to questions 1 and 2 on the information in the **Radon Fact Sheet** in your lab kit.

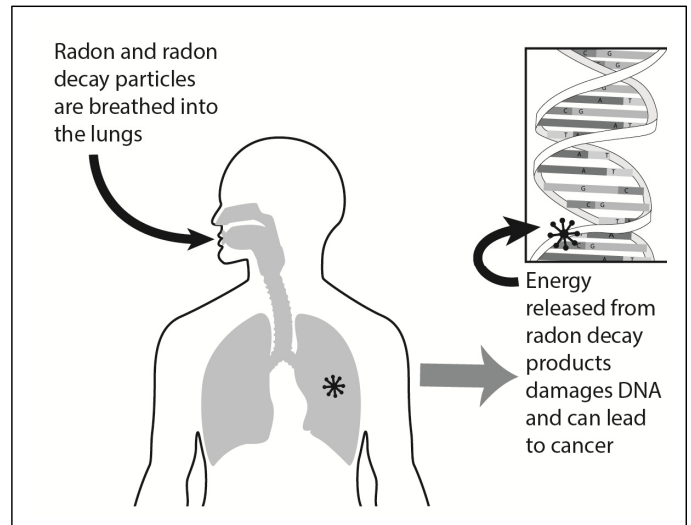
1. What is radon?

2. How does radon get into a home?

3. Based on the graph on the right, why is it important for the Smiths to have their home tested for radon?



4. Use the information in the diagram on the right to explain how radon increases a person's risk for developing lung cancer.



Base your answers to questions 5 through 9 on the information in the **Radon Fact Sheet**. For each statement, write one fact from the **Radon Fact Sheet** that explains why the statement is a myth.

5. **MYTH:** It is easy to tell without testing if a home has dangerous levels of radon.

FACT: _____

6. **MYTH:** Radon is not a health hazard unless you are a smoker.

FACT: _____

7. **MYTH:** Radon affects only older homes in certain parts of the country.

FACT: _____

8. **MYTH:** Radon testing is difficult and expensive.

FACT: _____

9. **MYTH:** If you have radon levels at or above 4.0 pCi/L in your home, the radon problem cannot be fixed.

FACT: _____

Part 5: An Emergency Health Hazard

The public health nurse noticed that the Smith family had a carbon monoxide detector that needed new batteries. When he replaced the batteries in the carbon monoxide detector, it beeped loudly to indicate that the home had high levels of carbon monoxide.

Immediately, the public health nurse called 9-1-1 to report potential carbon monoxide poisoning. He told the Smiths that they should go to the emergency room to be evaluated for carbon monoxide poisoning, and they should not return home until the source of carbon monoxide had been identified and the problem had been fixed.

Base your answers to questions 1 through 8 on the **Carbon Monoxide Fact Sheet** in your lab kit.

1. What is carbon monoxide?

2. Explain how CO (carbon monoxide) interferes with the transport of oxygen in the body?

3. What things in or near the Smiths' home may have produced CO fumes?

4. List at least 4 symptoms of CO poisoning.

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5. Explain why it is difficult to diagnose CO poisoning.

6. Why is it especially important that the Smiths install CO detectors near areas where people may be sleeping?

7. List at least 3 things that you SHOULD NEVER DO because they increase your risk of CO poisoning.

- _____
- _____
- _____

8. List at least 3 things that you SHOULD DO to prevent CO poisoning.

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- _____
- _____