



JUNIOR ENERGY AUDITOR

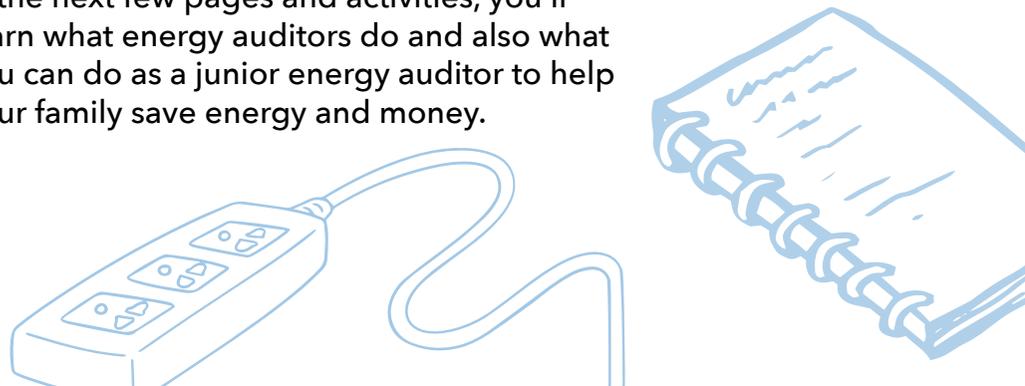
FIELD GUIDE & ACTIVITY BOOK



Read this book and earn your Junior Energy Auditor Badge!

Professional energy auditors are trained to use special tools, equipment, and techniques to search your entire home (both inside and out) for escaping energy. Then they provide a detailed report of your home's energy efficiency score and make suggestions for improvements and repairs that will help your family save more energy and spend less money.

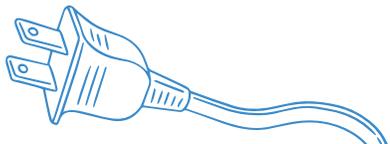
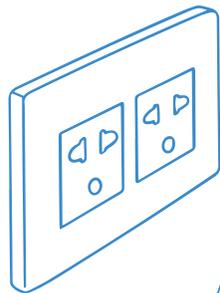
In the next few pages and activities, you'll learn what energy auditors do and also what you can do as a junior energy auditor to help your family save energy and money.



What Is an Energy Auditor Looking For?

Energy auditors look at how your house uses energy to stay warm in winter and cool in summer. They look at your appliances and pay attention to things like cracks that can let outside air in. Energy auditors can let you know how you can stay comfortable at home while using less energy. Using less energy makes your home more energy efficient, which saves power and money.

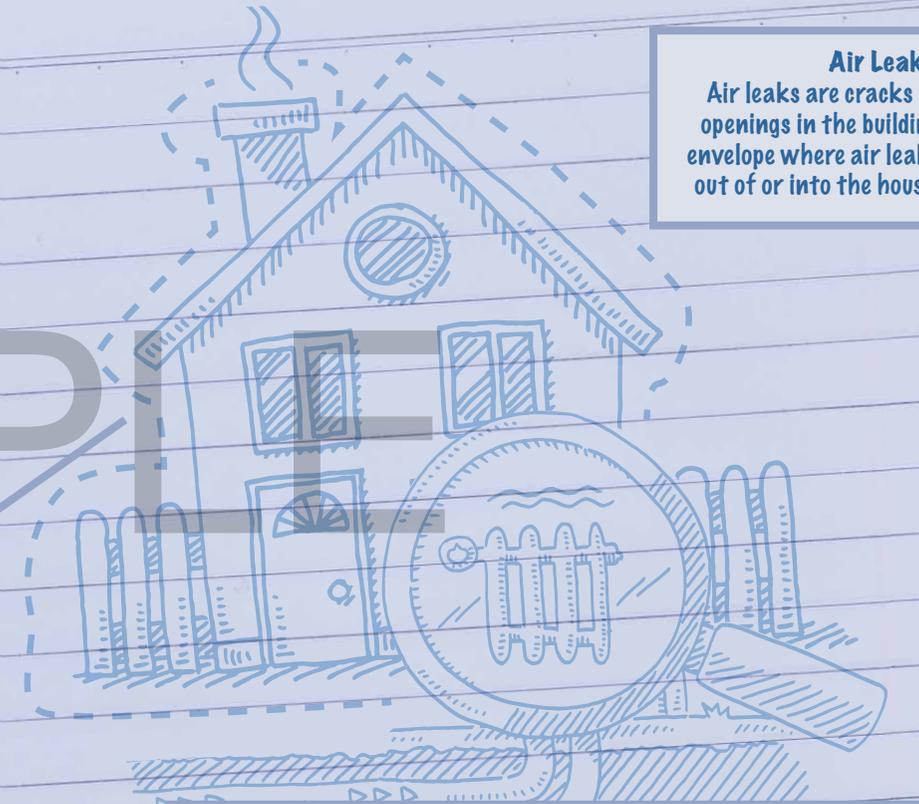
So how do energy auditors do their job? They have to look at how the whole house works together. A brand new energy-efficient air conditioner won't save energy if all the cold air escapes out an open window. That's why energy auditors don't just look at appliances, but also at where indoor air is leaving, where outdoor air is coming in, and where air is trapped.



The Building Envelope:

The outside of your house (roof, walls, windows, doors, and foundation) is called the building envelope. But it's not the kind of envelope you can mail! It stops the weather outside from coming indoors and the air inside from escaping.

Your House Is a System



Air Leaks:

Air leaks are cracks or openings in the building envelope where air leaks out of or into the house.

Heating and Cooling:

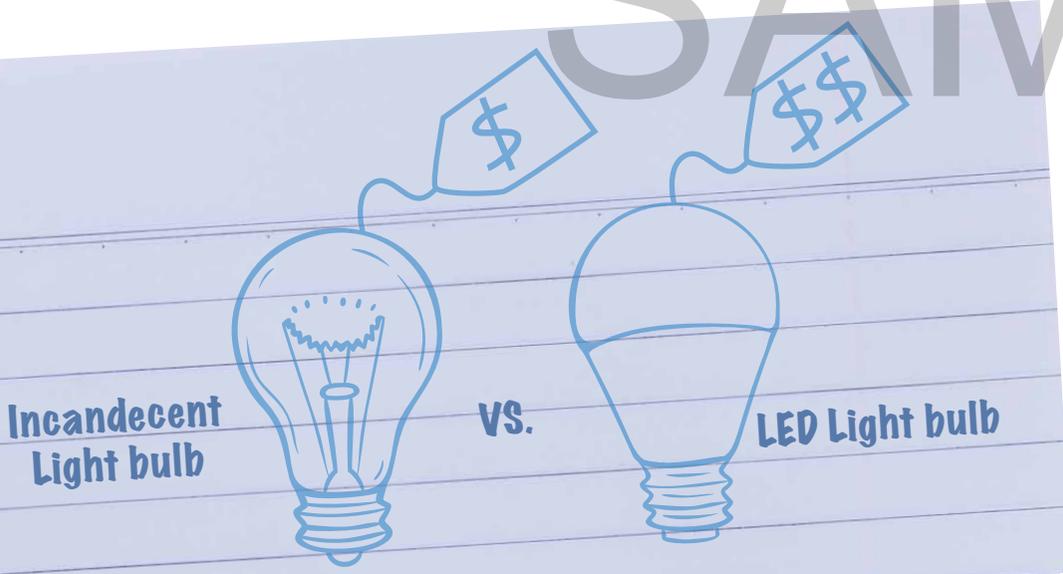
Your home's heating and cooling appliances may include a central air conditioner, a furnace, and/or a boiler. If these appliances aren't working properly, they waste a lot of energy.

LED Lights—What a Bright Idea!

Becoming more energy efficient can also mean using technology and replacing less energy-efficient items with better, more cost-effective products. For example, an LED (light-emitting diode) light bulb gives off the same amount of light as an older style incandescent light bulb—but it uses less energy, gives off less heat, and lasts much longer. An LED light bulb is also safer and more durable than an incandescent bulb.

'Watt's' the Difference?

LED bulbs are more expensive than incandescent bulbs, but they save money in the long run. Try this activity to find out how.



- 1) A 9-watt LED bulb provides about the same amount of light as a 60-watt incandescent bulb. Do the math! What's the difference?

$$60 \text{ watts} - 9 \text{ watts} = \underline{\hspace{2cm}}$$

Answer: 51 watts. Yes! The LED bulb uses approximately 51 watts LESS than the incandescent bulb to give the same amount of light. That saves a lot of energy!

Now take it one step further. The LED bulb should last for 25,000 hours. The incandescent bulb will only last 1,000 hours.

- 2) How many incandescent bulbs will it take to equal the life of one LED bulb? Again, do the math!

$$25,000 \div 1000 = \underline{\hspace{2cm}}$$

Answer: 25. Wow! It would take 25 incandescent bulbs to equal the life of just ONE LED bulb.



Over time, the cost of the LED bulb turns out to be way less than the cost of buying 25 incandescent bulbs!

It's Cold in Here!

Setting your fridge or freezer to the right temperature will lower energy use while keeping your food safe.

What's the temperature in YOUR freezer?

You can find the perfect temperature by using the **Refrigerator/Freezer Thermometer Card**. Ask a parent or other trusted adult to supervise. They will learn a lot too! Hang the card in the freezer and close the door. After 15 minutes, check the reading. If your freezer is too warm or too cold, ask your parent or another adult to adjust the temperature control. This will keep your food safe and save money too!

How about the fridge? Check the temperature in your fridge the same way.

More: Try this experiment again once a week for one month. Record the information. How consistent is the temperature from week to week? How often does the temperature control need to be adjusted?

If you don't have a **Refrigerator/Freezer Thermometer Card** you can do this experiment with a cooking thermometer. Place the thermometer in the freezer between two pieces of already frozen food in the center of the freezer cabinet. Close the door and wait at least 12 hours to allow the thermometer to get a reading. To measure your fridge temperature, put a glass of water in the fridge for 8 hours, then measure the temperature of that water.

Freezing Bubbles

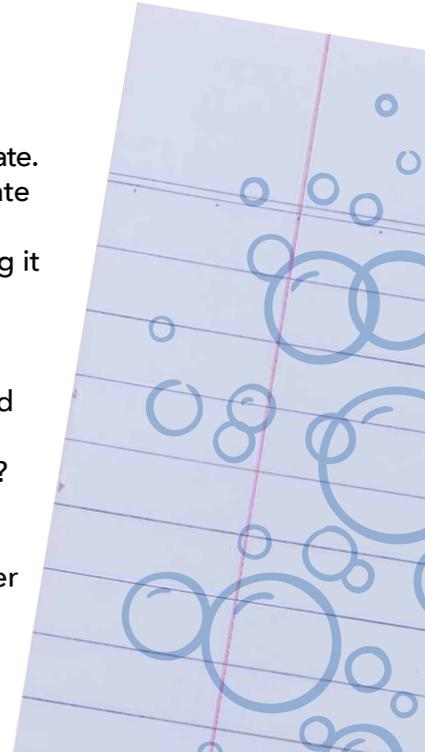
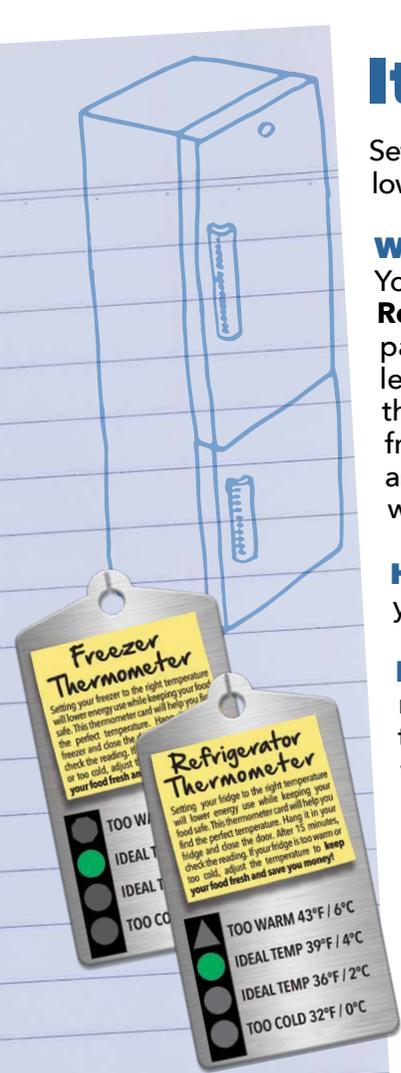
Now that you know that your freezer is at the right temperature, how about a bit of bubble fun? Brrrr!

What you will need:

- A bottle of bubble solution
- A straw
- A freezer-safe plate
- A freezer

Directions:

1. Pour a small amount of bubble solution onto the plate.
2. Use the straw to blow air into the mixture to create bubbles on the plate.
3. Carefully place the plate into the freezer, keeping it as level as possible.
4. Wait for 30 minutes to one hour for the bubbles to freeze.
5. Take the plate out of the freezer and observe and touch the bubbles. What texture, pattern, color, etc. do you see? Did the bubbles crack? Deflate? Do they look like crystal balls?
6. Draw what you see and record your results.
7. Think! How could the temperature of your freezer affect results?
8. Have a friend do the same experiment and compare notes. Did you get the same results?



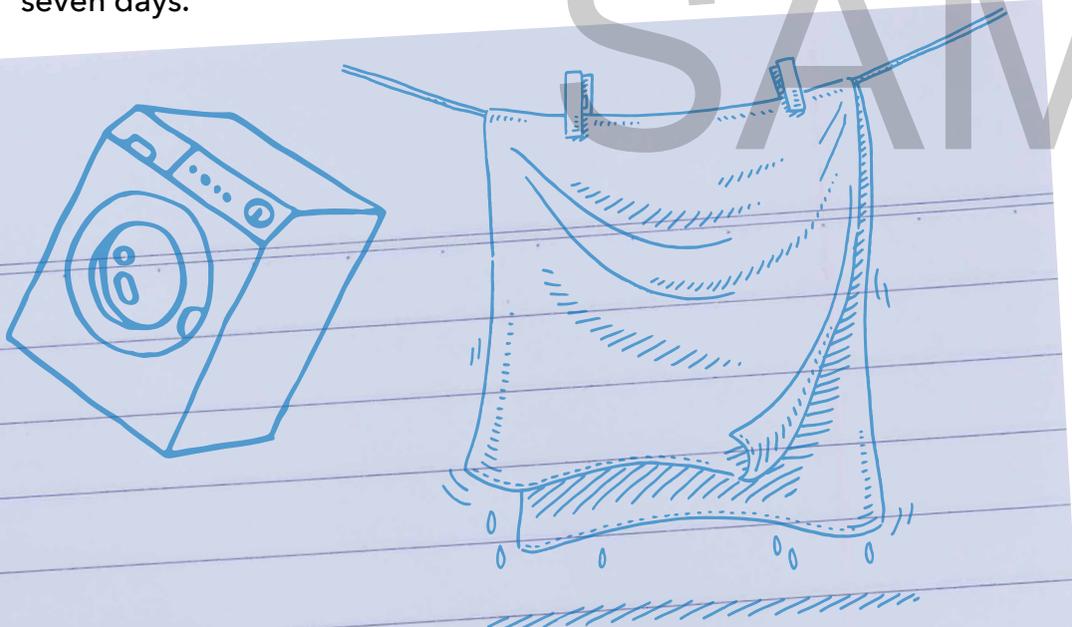
The Towel Test

Did you know that hanging up your towel after a bath or shower and using it more than once can save energy? You are just drying off your clean body with that towel anyway, so it's okay to use again. You'll cut down on the number of loads of laundry that need to be washed.

Find out for yourself!

The setup:

Each member of a family of four takes one shower or bath per day for seven days.



Scenario #1:

If every family member grabs a new towel after each shower or bath, how many towels will be used?

$$1) 4 \text{ family members} \times 7 \text{ towels} = \underline{\hspace{2cm}} \text{ towels}$$

Now let's figure out how many loads of laundry the family has to do if their washing machine holds seven towels as a full load.

$$2) 28 \text{ towels} \div 7 \text{ towels/load} = \underline{\hspace{2cm}} \text{ loads}$$

Scenario #2:

If each family member hangs up their towel to dry and uses it twice before throwing it into the laundry basket, how many towels will be used?

$$3) 4 \text{ family members} \times 3.5 \text{ towels} = \underline{\hspace{2cm}} \text{ towels}$$

Now let's figure out how many loads of laundry the family has to do. (Remember, their washing machine holds seven towels per load.)

$$4) 14 \text{ towels} \div 7 \text{ towels/load} = \underline{\hspace{2cm}} \text{ loads}$$

Wow! This one small change can cut your family's towel laundry by 50%!

Answers: 1:28 2:4 3:14 4:2

Energy-Efficiency Pledge

You are just one person, but you can make a difference when it comes to saving energy! Be aware of your habits and take small daily steps to make improvements. Be consistent.



Name _____

Age _____

Birthday _____

Draw Yourself Here

I commit to becoming more energy efficient at home.

Today, I will _____.

This week, I will _____.

This month, I will _____.

Put a  by the one idea you think will save the most energy.

Brainstorm at least three more ways you make your home more energy efficient. Jot down your ideas here.

You're a Junior Energy Auditor!

Color in this badge and cut it out to make it official!





Resources

For more information go to:

NASA
climatekids.nasa.gov/career-auditor

The United States Dept. of Energy
energy.gov/kids

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