



SUPPORT HVACR TRADE INC.

HVAC Boot Camp

Activity Pack

Real challenges for future HVACR technicians.

AGES 8-12

What's Inside

- Basic Electricity Challenge
- Thermostat Decision Challenge
- 2 hands-on STEM experiments
- Build-Your-Own HVAC design challenge
- Thermostat Wiring Puzzle
- HVAC Matching Game
- Career Exploration
- Answer Key & Certificate

supporthvacrtrade.com | oneil@supporthvacrtrade.com



Welcome, Future Technician!

HVAC Boot Camp is where curious kids start thinking like real HVAC technicians. You'll test your knowledge of electricity, practice reading a real wiring color code, make thermostat decisions, run two hands-on STEM experiments, and design your own HVAC system. Complete every challenge to earn your Boot Camp certificate.

Boot Camp Challenges

ELECTRICITY

WIRING

THERMOSTATS

MATCHING

STEM LABS

CAREERS

DESIGN

Boot Camp Rules

- ✓ Use a pencil so you can fix mistakes.
- ✓ It's okay to ask an adult for help — real technicians work in teams too.
- ✓ Check your answers on the Answer Key page near the end.
- ✓ Finish every challenge to earn your HVAC Boot Camp Certificate!

Ready for More?

Explore online HVACR courses and hands-on workshops built for students ready to go further, at supporthvacrtrade.com



Basic Electricity Challenge

For electricity to flow, it needs a complete, unbroken path called a circuit. Look at each circuit below. Will the light bulb turn on? Circle YES or NO.

Circuit A



Will it light up?

YES NO

Circuit B



Will it light up?

YES NO

Circuit C



Will it light up?

YES NO

Circuit D



Will it light up?

YES NO

Fill in the Blanks

Word bank: circuit • switch • voltage • current

1. Electricity flows through a complete path called a _____.
2. A _____ opens or closes a circuit to stop or start the flow of electricity.
3. _____ is the push that moves electricity through a wire.
4. The flow of electricity itself is called _____.

Why It Matters

Every HVAC system relies on electrical circuits to run fans, compressors, and controls. Technicians use exactly this kind of thinking to troubleshoot systems that aren't working — tracing the circuit to find where the path is broken.



Thermostat Wiring Puzzle

Real HVAC technicians follow a standard color code when wiring a thermostat. Match each wire to its job by writing the correct letter in the blank.



Wire

Job (write the letter)

- | | |
|-------------------------|----------------------|
| 1. R — Red wire | <input type="text"/> |
| 2. C — Blue/Black wire | <input type="text"/> |
| 3. Y — Yellow wire | <input type="text"/> |
| 4. G — Green wire | <input type="text"/> |
| 5. W — White/Ivory wire | <input type="text"/> |

Jobs:

- A. Turns on cooling
- B. Turns on heating
- C. Powers the thermostat (24V)
- D. Turns on the fan
- E. Completes the circuit (common)

Real-World Tip

Technicians memorize this color code because mixing up wires can keep a system from heating, cooling, or running the fan correctly.



Thermostat Decision Challenge

Think like a technician. Read each situation and write your answer.

1. It's a 95°F summer afternoon and your family is home relaxing. What cooling temperature would you set, and why?

2. Everyone is leaving for school and work for 8 hours on a cold winter day. What should you set the heat to, and why?

3. Grandma is visiting and gets cold easily, but your family wants to save energy. What's a smart compromise?

4. The thermostat is set to 60°F in the middle of summer, but the AC runs constantly and never shuts off. What might be going wrong?

5. Your family is going on vacation for a week in winter. Should you turn the heat off completely? Why or why not?

Technician Tip: A setback of 7-10°F for 8 hours can save up to 10% a year on heating and cooling.



HVAC Matching Game

Match each term on the left to its definition on the right. Write the letter in the blank.

Term

- Furnace
- Compressor
- Thermostat
- Duct
- Filter
- Refrigerant
- Evaporator Coil
- Condenser Coil

Definition

- A.** Tube that carries air throughout the building
- B.** Coil inside that absorbs heat from indoor air
- C.** Heats air for the building
- D.** Coil outside that releases heat to the outdoors
- E.** Pumps refrigerant through the system
- F.** Traps dust and debris from the air
- G.** Controls the temperature setting
- H.** Special fluid that absorbs and releases heat



STEM Experiment: Hot Air Rises

Discover the convection currents that help move air through HVAC systems.

What You'll Need

- ☐ Paper (a paper plate works great)
- ☐ Scissors
- ☐ Pencil
- ☐ String or thread
- ☐ A warm lamp (adult supervision required)

Steps

1. Cut a spiral out of the paper plate, starting from the outer edge and working inward, like a snake shape.
2. Poke a small hole in the center and tie a string through it.
3. Hold your paper spiral by the string a few inches above (not touching) a warm, lit lamp.
4. Watch closely and see what happens to the spiral.

What Happened?

Q What did you observe? Did the spiral spin?

Q Why do you think warm air made this happen? (Hint: warm air is lighter and rises!)

HVAC Connection:

HVAC systems use fans and ductwork to move air on purpose, instead of waiting for convection to do it slowly on its own.



STEM Experiment: Insulation Investigation

Find out which material insulates best — just like insulation in a home.

What You'll Need

- ☐ 4 ice cubes (same size)
- ☐ Aluminum foil
- ☐ Cotton fabric or a sock
- ☐ Bubble wrap
- ☐ A timer and a tray

Steps

1. Wrap one ice cube in foil, one in cotton fabric, one in bubble wrap, and leave one unwrapped (the control).
2. Place all four on the tray at the same time, in the same room.
3. Check every 5 minutes and record which ice cube has melted the most.
4. Record how long each one takes to melt completely.

Record Your Results

Material	Melted First?	Time to Melt
Foil		
Cotton Fabric		
Bubble Wrap		
Unwrapped (Control)		

Q Which material insulated best? Why do you think it worked so well?



Your HVACR Career Ladder

HVACR careers offer a clear path to grow — without necessarily needing a four-year degree.

Business Owner / Estimator — runs a company

Master Technician — leads projects, trains others

Journeyman — works independently on complex jobs

Technician — installs, maintains, and repairs systems

Apprentice — learns on the job alongside experienced techs

Skills You'll Use

MATH

PROBLEM-SOLVING

TOOLS

COMMUNICATION

SAFETY

Activity: Ask a Pro

Know an HVACR technician, or a family friend in the trades? Ask them these questions:

- What's your favorite part of the job?
- What's the hardest thing you had to learn?
- What advice would you give someone starting out?

Did You Know?

Many HVACR careers start with a certificate program instead of a four-year degree — and technicians who work with refrigerant need an EPA 608 certification to do it legally and safely.



Design Challenge: Build Your Own HVAC System

Design a complete HVAC system for the floor plan below. Your design must include:

- ☐ A furnace or heat pump location
- ☐ Ductwork routed to every room
- ☐ An outdoor unit location
- ☐ A thermostat in a central location

Self-Check: Rate your design 1-5

- | | | | | | |
|-----------------------------------|---|---|---|---|---|
| Comfort (every room gets air) | ○ | ○ | ○ | ○ | ○ |
| Efficiency (shortest duct routes) | ○ | ○ | ○ | ○ | ○ |
| Safety | ○ | ○ | ○ | ○ | ○ |
| Creativity | ○ | ○ | ○ | ○ | ○ |



Answer Key

Basic Electricity Challenge

Circuit A: YES Circuit B: NO Circuit C: NO Circuit D: YES

Fill in the blanks: 1. circuit 2. switch 3. Voltage 4. current

Thermostat Wiring Puzzle

R = C C = E Y = A G = D W = B

HVAC Matching Game

1=C 2=E 3=G 4=A

5=F 6=H 7=B 8=D

Great Work, Future Technician!

Ready to keep learning? Explore hands-on workshops and online HVACR courses built for students at supporthvacrtrade.com

Quick Reference: Thermostat Wire Colors

R (Red) = Power • C (Blue/Black) = Common • Y (Yellow) = Cooling

G (Green) = Fan • W (White) = Heating

Quick Reference: The HVACR Career Ladder

Apprentice → Technician → Journeyman → Master Technician → Business Owner



SUPPORT HVACR TRADE INC.

HVAC Boot Camp

Certificate of Completion

This certificate is proudly presented to

for successfully completing HVAC Boot Camp — demonstrating real skills in electricity, wiring, thermostats, HVAC systems, and hands-on STEM problem-solving.



Oneil Fuller, Founder

Date