GRIT Camp Lunch Guide

For Hosts & Education Leads

Last Revised: September 17th, 2026

Planning Lunch

Lunch is part of GRIT Camp and will need to be provided by the Host. Lunch should be planned well in advance of the GRIT Camp's date to allow ample time for the following:

Count every diner, including Students, Mentors, Volunteers, the Education Lead, and Host staff, when ordering food, drinks, utensils, and seating.

- Deciding what food to serve
- Assigning Volunteers to help stage and serve lunch on camp day
- Connecting with local organizations for sponsorships
- Determining which lunch activities will be used
- Getting the materials needed for the planned activities

FAQ: What should I serve for lunch at my GRIT Camp?

Lunch is incredibly open-ended and will depend on your local options. There does NOT need to be a complicated spread, but here are some popular favorites:

★ **Pizza**

★ **Baked pasta**

★ **Barbecue**

★ **Sub sandwiches**

★ **Chick-fil-A**

We generally recommend having a mix of hot and cold food. Students can use the thermal imaging camera to see the temperature differences!

Handling Allergies and Dietary Restrictions

If a Student has dietary restrictions, GRIT makes it clear that **parents are responsible for packing a safe lunch**. Mentors with dietary restrictions will have to pack their own lunch, too.

However, if a Host *wants* to make the whole meal accommodate everyone's food allergies and accepts the extra responsibility and planning it will require, they may do so.

Lunch Sponsorships

We encourage Hosts to reach out to local catering businesses and ask for lunch sponsorships. In these situations, the local business provides lunch in exchange for community involvement and local recognition rather than a set dollar amount.

Here are some things to keep in mind when starting these discussions:

- If the business has a history of doing sponsorships in the community, point to similar cases in the past
- Share names of other sponsors involved, if applicable
- If possible, point to newspapers and other publications to show the reach of GRIT Camp to the prospective sponsor
- Emphasize the positive impact of GRIT Camps on the community
- Explain what the sponsor will get out of the partnership—examples include:
    - Tagging the company on social media
    - A positive mention in local publications
    - Pictures of the company's food being served at the GRIT Camp

Lunch Module Basics

Students get to learn while they eat at GRIT Camp! During the 45–60 minute lunch session, which includes the meal and module, Students take a break from their main Blueprint adventure to interact with scientific objects and learn about them.

The Host and Education Lead choose a few demonstrations in advance to fit the 45–60-minute meal-and-activity period. Record the selected activities and their materials in the Host checklist and Camp Ready supplies view; supplies are required only for those selections. Include the tarp/sheet or approved tracer/ribbon if choosing those activities. The Education Lead may adapt the choices on the day to the group, time, and available materials.

Bernoulli bags are one of the options for lunchtime activities.

The lessons are all here, and the Education Lead will conduct a series of demonstrations, letting the Students freely replicate or slightly change the experiments on their own.

Safety & Cleanliness Considerations for the Lunch Module

Here are just a few safety considerations to keep in mind during the lunch module:

- Keep liquids, glass, hot surfaces, demonstration cords, and small parts away from food
- Let food service settle before passing shared objects

General Sequence of Lunch and the Module (45–60 minutes total)

1. **Students grab their food**. (Immediately)
2. **Students eat and have a little time to eat and let their food settle.** (~5 minutes)

3. **The Education Lead introduces a few lunch items quickly.** (8–10 minutes)
    a. They'll ask for a prediction before each result and give just enough information for the Students to start exploring and filling in the knowledge gaps on their own.
    b. These items and their experiments are detailed throughout this guide. Do NOT use all eleven; pick the ones that make the most sense for the facility, the group size, and your budget.

The Education Lead demonstrates how to use a thermal imaging camera.

4. **The Students do some open exploration. The Education Lead lets Students handle appropriate items, repeat demonstrations, compare results, change one variable, and ask questions.** (15–20 minutes)

A Student explores thermal imaging with his Mentor after the concept has been introduced.

5. **The Education Lead hands off the remainder of the lunch activity to a Mentor, who will engage the group by connecting everyday trades work to the experiments that have happened over the last half hour.** (Final 10 minutes)

    a. Examples are best kept between 30–60 seconds each, to allow for several trades and viewpoints to be heard.

    b. Objects should stay available so that Students can continue trying them quietly while Mentors talk.

    c. The Education Lead remains available for a technical question here or there, but they are no longer responsible for carrying the conversation.

Condensed Activity Sequence (20 minutes within lunch)

Plan 45–60 minutes for the full lunch session and module. If you choose fewer demonstrations, this 20-minute activity sequence fits within that overall lunch period; allow the remaining time for getting food, eating, transitions, and cleanup:

1. **Students get their food and eat.**
2. **Education Lead introduces THREE items and shares enough information and asks enough questions to spark the Students' curiosity without giving away answers.** (~8 minutes)
3. **Let the Students continue to interact with the items and retry activities.** (~7 minutes)

4. **Education Lead steps aside to eat. The Host or a Mentor takes the lead and offers one or two clear examples of how the science appears in everyday trade work.** (5 minutes)

Over the next several pages, we will explore some possible demonstrations for the lunch lesson. Hosts **should not** plan to include every single demo; it's much better to have a few strong demos that leave room for exploration than to rush the lunch by packing too much content into the short timeframe.

The activities are numbered, but these numbers do **NOT** indicate the sequence in which they need to be presented to the Students. These numbers correspond with the purchasing links at the back of the booklet for easy reference.

Activity #1: Density Samples & Thermal Camera

Materials:

- ☐ Thermal imaging camera (or infrared thermometer at minimum)
- ☐ Tungsten, aluminum, and/or copper cubes of the same volume (1”x1”x1” recommended)

How the Education Lead Shows the Demo:

Pass around equal-size aluminum, copper, and tungsten samples. Ask students to rank them by mass.

Then, use the thermal camera on hands, food, a wall, and a cup.

Questions for the Education Lead to Ask:

- How can objects of the same size have different mass?
- Is the brightest color on a thermal image always the hottest surface?

The Real-World Explanation:

Density is mass divided by volume. Equal-volume materials can have different mass.

A thermal imager senses infrared radiation emitted from and reflected by surfaces. It uses that data to estimate surface temperature. Shiny metals emit less radiation than dull, matte, or dark surfaces; these metals can reflect their surroundings and give a misleading image.

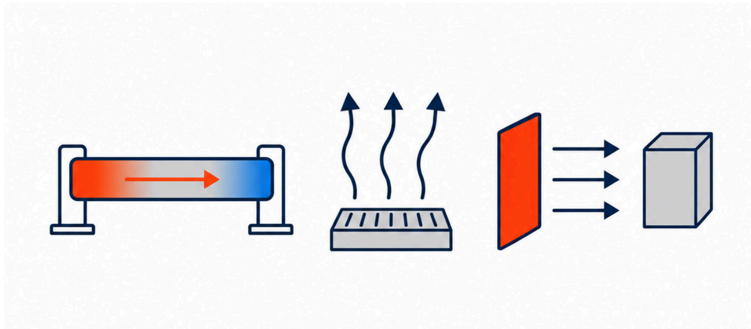
Trades Connection:

Material selection and thermal imaging are important in construction, electrical work, HVAC, refrigeration, piping, and diagnostics.

Safety and Accuracy:

- Use the camera for patterns and questions, not as proof that a surface is safe to touch.
- Reflective surfaces may be misleading.

Activity #2: Conduction, Convection, and Radiation



Materials:

- ☐ Warm surface (like a heat mat)
- ☐ Plug-in or battery-powered fan (or another object that moves air)
- ☐ Radiant heat source (such as a heat lamp)

How the Education Lead Shows the Demo:

Use direct contact with a warm surface, moving air from a fan, and radiant warmth from a safe source.

Questions for the Education Lead to Ask:

- Which path needs contact?
- Which moves with air or water?
- Which can cross open space?

The Real-World Explanation:

Conduction transfers energy through direct contact with a material. **Convection** involves bulk motion of a fluid such as air or water. **Radiation** transfers energy by electromagnetic waves. Real equipment usually uses all three at once.

Trades Connection:

Insulation, ovens, heat exchangers, refrigeration, buildings, and comfort systems all depend on managing these heat paths.

Safety and Accuracy:

- Do not reduce the lesson to "heat rises."
- Talk about heat moving from warmer to cooler because of temperature difference.
- Warm fluid can rise because its density changes, but radiation and conduction do not need upward motion.

Activity #3: Stirling Engine

Materials:

- ☐ Tabletop Stirling engine (low-temperature-difference gamma or displacer-style)
- ☐ Ice cube and/or a gentle heat source (such as a heating mat)

How the Education Lead Shows the Demo:

Apply gentle heat beneath the broad metal plate, or place a bagged ice cube directly on top of that same plate. Give the flywheel a light starting spin if the model requires it.

Questions for the Education Lead to Ask:

- Where is the warmer side?
- Where is the cooler side?
- Why can the engine run with heat below or ice above?
- What do you predict if we reverse the temperature difference?

The Real-World Explanation:

A Stirling engine contains a sealed gas. A displacer moves that gas between warmer and cooler regions. Heating and cooling change gas pressure, which drives a power piston.

The flywheel carries the mechanism through the repeating cycle. The engine needs a temperature difference, not a particular idea of "up" or "down."

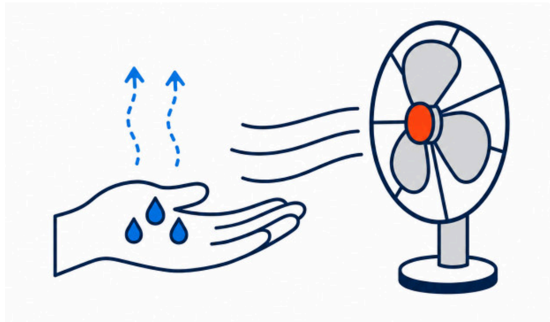
Trades Connection:

Heat engines, refrigeration cycles, pressure-volume relationships, bearings, seals, and energy conversion all appear in trade and engineering work.

Safety and Accuracy:

- Keep water from pooling in the mechanism and be patient with a small temperature difference.

Activity #4: Evaporative Cooling



Materials:

- ☐ Spray bottle with water
- ☐ Plug-in or battery-powered fan

How the Education Lead Shows the Demo:

Spray a light mist of clean water on one hand and move air across it with a small fan.

Questions for the Education Lead to Ask:

- Why does moving air feel cooler on wet skin?
- What changes on a humid day?
- Does water need to boil to evaporate?

The Real-World Explanation:

Evaporation requires latent heat. Energy leaves the skin and water as the liquid becomes vapor.

Moving air removes the humid boundary layer and usually speeds evaporation. High humidity weakens the effect.

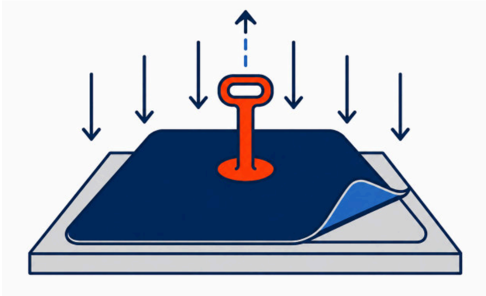
Trades Connection:

Evaporative cooling connects to how we cool off when we sweat in any line of work. It also connects to wet-bulb temperature, cooling towers, evaporative condensers, drying, latent load, and indoor comfort in the HVAC and refrigeration industry.

Safety and Accuracy:

- Make sure Students' hands are clean before spraying.
- Keep water away from food, outlets, cords, meters, hot surfaces, and floors.

Activity #5: Atmospheric Mat



Materials:

- [ ] Atmospheric-pressure mat with hook or handle

How the Education Lead Shows the Demo:

Place an atmospheric-pressure mat flat on a smooth, clean, sturdy table. Ask a student to pull the center handle straight up; they will struggle. Then, peel one edge to release it easily.

Questions for the Education Lead to Ask:

- Is suction pulling down, or is the air above the mat pushing?
- What changed when we peeled the edge?
- Why does a larger area matter?

The Real-World Explanation:

Force depends on the pressure difference times the effective area. Lifting the center creates lower pressure beneath the mat. The greater atmospheric pressure above pushes the mat against the table.

Near sea level, atmospheric pressure is about 14.7 pounds per square inch, but the real holding force is lower than area times 14.7 because the seal is not perfect and the space below is not a perfect vacuum.

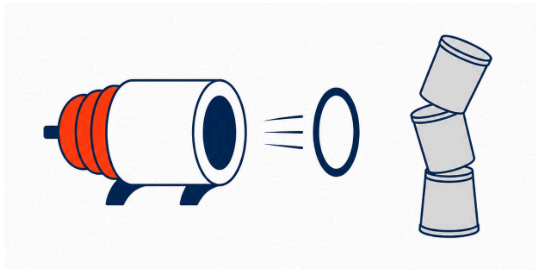
Trades Connection:

Pressure difference appears in vacuum pumps, suction cups, refrigeration, pneumatics, duct testing, and airflow diagnostics. It also ties to the air cannon and Bernoulli bag lessons.

Safety and Accuracy:

- Use a solid surface and peel to release.
- Do not use the mat to lift furniture or fragile objects around students.
- Keep faces and fingers clear of anything that could shift.

Activity #6: Air Cannon and Cup Stack



Materials:

- ☐ Air cannons
- ☐ At least 10 paper cups

How the Education Lead Shows the Demo:

Stack cups and let students aim an air cannon from a marked location several feet away.

Questions for the Education Lead to Ask:

- What moved the cups?
- Why did the air pulse stay organized long enough to cross the room?

The Real-World Explanation:

Changing the cannon volume by pulling back the membrane creates a pressure difference that draws air in. Releasing the membrane drives air through the opening. The shear at the edge rolls the moving air into a vortex ring that carries momentum farther than a mere disorganized puff.

Trades Connection:

Fans, duct outlets, jets, ventilation, air curtains, and combustion systems depend on moving air and how it mixes with surrounding air.

Safety and Accuracy:

- Aim only at the stacked cups, never at someone’s face.
- Pressure difference starts the air movement; vortex formation explains the traveling ring.

Activity #7: Hand Boiler

Materials:

- [ ] Hand Boilers

How the Education Lead Shows the Demo:

Point out the liquid in the lower bulb. Let a student warm that bulb with one hand and watch the liquid move.

Questions for the Education Lead to Ask:

- Is your hand squeezing the liquid upward, or is something changing in the space above it?

The Real-World Explanation:

Body heat increases evaporation of the low-boiling liquid and raises vapor pressure in the warmed bulb. The pressure difference pushes liquid toward the cooler bulb.

Cooling reverses the process as vapor condenses.

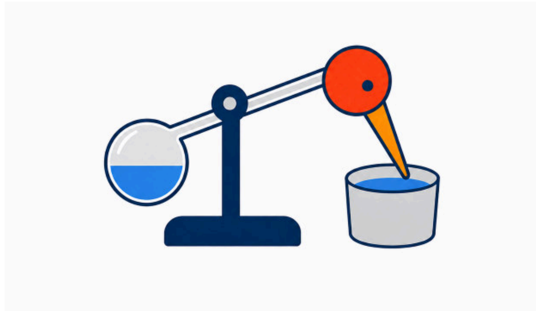
Trades Connection:

Pressure-temperature relationships and phase change appear in refrigeration, vacuum work, boilers, steam systems, pumps, and sealed vessels.

Safety and Accuracy:

- Inspect the glass before use.
- Use body heat only; do not add flame, a heat lamp, or hot water.

Activity #8: Drinking Bird



Materials:

- ☐ Drinking birds

How the Education Lead Shows the Demo:

Wet the felt head, place the beak near water, and let the cycle develop while students watch the liquid column.

Questions for the Education Lead to Ask:

- Why does wetting the head make the liquid climb?
- What makes the bird tip, and what resets it?

The Real-World Explanation:

Evaporation cools the head. Vapor pressure becomes lower at the cooler top than at the warmer lower bulb. The pressure difference raises the liquid, shifts the center of mass, and tips the bird. Tipping reconnects the vapor spaces and resets the cycle.

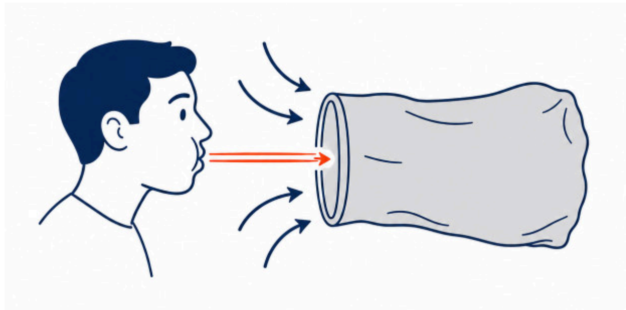
Trades Connection:

The same cluster of evaporation, temperature, pressure, phase change, and gravity appears in refrigeration and heat-transfer equipment.

Safety and Accuracy:

- Use the drinking bird as a slow background demonstration; it may take time to cycle.
- Do not heat the drinking bird.

Activity #9: Bernoulli Bag



Materials:

- [ ] Bernoulli bags

How the Education Lead Shows the Demo:

Have the Students hold the bag open and blow a fast stream from several inches away rather than sealing their lips to the opening. Compare it with a slow breath directly into the bag.

Questions for the Education Lead to Ask:

- How did one breath move more air than your lungs held?
- Where did the extra air come from?

The Real-World Explanation:

The fast stream of air from several inches away transfers momentum to nearby room air and entrains it into the bag. Surrounding air joins the stream, so the total airflow entering the bag is much greater than the air from the lungs alone (breathing into the bag at close range).

Trades Connection:

Entrainment appears at supply diffusers, exhaust hoods, induction devices, air curtains, and jets used for air mixing.

Safety and Accuracy:

- Do not place bags over heads or around necks.
- "Bernoulli bag" is the common name, but air entrainment is the clearest explanation for the observed result.

Activity #10: Smoke Pen

Materials:

- ☐ Smoke generator OR tracer pen
- ☐ Fan

How the Education Lead Shows the Demo:

With the fan operating, use the smoke generator or tracer pen to show the air movement that is normally invisible.

Questions for the Education Lead to Ask:

- What does the smoke allow us to see?
- Where else could we use this tool to see how air is moving?

The Real-World Explanation:

Whether we see it or not, air moves due to differences in pressure. Heat and moisture also move with air, so when we can see it, we can understand where air is coming from (or going) and how to control it.

Trades Connection:

Construction workers have to keep air movement in mind while building. HVAC professionals are responsible for comfort in a home and must understand how air movement in the building affects it.

Safety and Accuracy:

- Use ONLY an approved tracer pen or smoke generator, like the Retrotec AirTracer.
- Do NOT use improvised smoke production methods; if you do not have a tracer pen or smoke generator, use a light ribbon instead.
- Prevent anyone in the area from directly inhaling smoke.

Activity #11: Tarp or Sheet

Materials:

- ☐ Tarp or sheet (large enough for ALL Students to grab onto at once)

How the Education Lead Shows the Demo:

Ask all Students to hold a section of the tarp. Lay the tarp on the ground and ask all of them to lift it on the count of three. With the tarp held up, ask the Students to pull it back to the ground on the count of three.

Have some Students go under the tarp and repeat the experiment.

Questions for the Education Lead to Ask:

- What did you feel when you pulled the tarp up and down?
- Did the tarp fall more quickly or more slowly than it rose? Why do you think that is?

The Real-World Explanation:

Whether we see it or not, air moves due to differences in pressure. Heat and moisture also move with air, so when we can see it, we can understand where air is coming from (or going) and how to control it.

Trades Connection:

Construction workers have to keep air movement in mind while building. HVAC professionals are responsible for comfort in a home and must understand how air movement in the building affects it.

Safety and Accuracy:

- Be careful NOT to trap anyone under the tarp; lift it a little right away after pulling it down while Students are underneath it.
- Do not let anyone get tangled in the tarp.
- Make it clear that pressure decreases as volume increases (lifting the tarp) and pressure increases as volume decreases (pulling the tarp down).

Additional Lessons

There are a few more activities you may include in the lunch module. These will generally start group discussions and don't have as much of a hands-on component for Students, but you may find them interesting and useful anyway.

Vacuum Activities (Trained Operator & Advance Preparation Required)

These vacuum activities require much more material preparation and must always be carried out by a trained operator who has carried out these exact demonstrations multiple times prior to GRIT Camp. **These should NOT be improvised on the morning of camp.**

Both demonstrations deal with vacuum, air, and pressure:

- Putting objects in a rated acrylic vacuum chamber (with vacuum pump and hoses)
  - Balloons
  - Marshmallows
  - Single-serving bag of chips or pretzels
  - Neodymium magnet
  - Washer (⅜", ¾", or ⅞")
  - Wind-up alarm clock

- Collapsing a 55-gallon drum with a vacuum pump
  - NAVAC ¾" flex vacuum hose
  - ¾" NPT to ⅜" bushing
  - ⅜" NPT male x ¼" flare male adapter
  - Nylog, Teflon tape, or pipe joint compound

The Real-World Explanation:

The vacuum chamber allows us to remove air, allowing molecules to spread farther apart (which affects how air presses down on objects, water's boiling point, and sound wave movement).

The barrel collapses when we pull a vacuum on it because the vacuum removes the air from inside it. Since the pressure of the air inside the barrel drops and isn't exerted against the inner walls, the air outside the barrel exerts much more pressure by comparison and crushes it.

Trade Connections:

These activities have a direct connection to the HVAC and refrigeration trades. When someone pulls a vacuum on a system, they're creating a pressure difference between the tubing and the outside. Moisture in the tubing can then boil off.

Safety and Accuracy:

- The Education Lead should operate the vacuum chamber and/or pump.
- Students should NOT operate the chamber or pump by themselves.
- Air **pressure** is the key to the real-world explanations.

Calories and Energy

While the Students are eating their lunch, before the real fun starts, the Education Lead can make the connection between the food they're eating and the upcoming activities!

There are no extra material requirements for this lesson.

The Real-World Explanation:

When we eat food, we get energy. That energy comes from calories. Food-label calories are actually kilocalories (1,000 small calories).

Scientifically speaking, those small calories are units of energy that represent the energy it takes to heat 1 gram of water by 1°C.

Trade Connections:

Whenever we do physical labor, we burn energy. We need to replenish it so that our bodies can work!

The same energy that helps our bodies work also heats water (plumbing) and air (HVAC, emphasis on furnaces and heating) and makes our air conditioning work (by having refrigerant absorb heat from the air blowing over it).

Material Procurement Note: HVAC School Fun Physics Kit

Several lunch props are included in the HVAC School Fun Physics Kit. Published HVAC School kit contents (per kit): 1 hand boiler; 1 drinking bird with 2 bird glasses; 1 AirZooka with 10 paper cups; and 1 electrical circuit kit containing 2 AA battery holders, 2 lightbulb holders, 5 lightbulbs, 2 SPDT switches, 1 SPST switch, 1 hand-crank generator model, 1 compass, 1 wind-powered car, 1 screwdriver, 10 wires, 1 electromagnet, 1 double-LED board, 1 transparent storage box, and 1 small wrench. A printed guide is included. Check the delivered version against the supplier’s packing list. Batteries and other lunch-demo items are separate unless the delivered packing list says otherwise. Do not double-count this kit’s components and GRIT-supplied electrical kits. For the published contents and instructions, see the PDF guide linked from the product page.

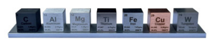
- Air cannons w/ paper cups
- Hand Boiler
- Drinking bird w/ drinking cup

If you are aiming for a compressed sequence, you may consider purchasing a few HVAC School Fun Physics Kits. Having three to five of these kits gives the Students ample objects to discover and share. It also comes with a handbook that explains how to use the discovery items and the scientific principles behind them.

Purchasing Links

Thermal Camera
Activity #1

Element Cubes (1”)
Activity #1



Heat Lamp
Activity #2

Warming Mat
Activities #2 and #3

Plug-In Fan
Activities #2, #4, and #10

Stirling Engine
Activity #3

Spray Bottles
Activity #4

Atmospheric Mat with Hook
Activity #5

[HVAC School Physics Fun Kit](#)
Activities #6, #7, and #8

[Air Cannon](#)
Activity #6
(Included in HVAC School Fun Physics Kit)

[Hand Boiler](#)
Activity #7
(Included in HVAC School Fun Physics Kit)

[Drinking Bird](#)
Activity #8
(Included in HVAC School Fun Physics Kit)

[Bernoulli Bags](#)
Activity #9

[AirTracer](#)
Activity #10

[Large Tarp](#)
Activity #11