Roofing Sandwiches: A Tasty Exploration

A Learning Activity for Grades 6-8

Overview

Just like a sandwich, roofing systems are made up of many different ingredients. We know from our taste buds, that the ingredients used and the order they are placed (mixed) together, affects the resulting creation. The same is for a roofing system. This activity demonstrates materials, methods and vocabulary used in steel roofing systems. A simple design for a roofing system can be created when learners work together to plan out the design based on the materials available and information provided. This hands-on activity allows learners to get creative while learning about roofing systems with visual and tactile support, while exploring the skills and craftsmanship commercial roofers implement in their everyday work!

NB Curricular Connections

Middle Block Learning Areas
Technology: ○ *Strand:* Design Thinking Skills - *Big Idea:* Problem Solving – *Skill Descriptor:* Plan, execute (construct) and present a project within given parameters and with assistance
Personal Wellness: ○ *Strand:* Career Connected Learning - *Big Idea:* Experiencing Potential Career Pathways - *Skill Descriptor:* Engage in frequent and ongoing career connected experiential learning to learn about preferred career pathways and develop personal competencies.

What You'll Need

Please Note: These materials are for a class size of 28 with students in groups of 2.

- 15 Aluminum Bar-B-Que Grill trays (min 9" x 12")
- 1 roll of aluminum foil (min 50')
- 1 roll of wax paper (min 50')
- 15 pieces of thin plywood (meranti board) or substitute such cardboard (pieces cut into 8.5"x 11")
- 1 roll of self-adhesive (preferred) shelf liner (min 20' roll if 20" wide)
- 40 pkg of multi-coloured foam sheets (8.5" x 11")
- Coverboard paper roll (8" x 30') or substitute such as cardstock paper (8.5" x 11")
- 1 pkg of push pins (100 pcs/pkg)
- 2-4 bottles of school glue
- Rulers
- Scissors
- PowerPoint Presentation – *Roofing Sandwiches: A Tasty Exploration*

Instructions

1. Commercial Roofing Introduction: Gather your learners together. Before reading the statement below, ask students: *What is commercial roofing? What are the potential careers associated with commercial roofing?* Allow time for learners to share their thoughts. Then, read/show them the information below (on slides 2 – 6 of the powerpoint presentation).

What is commercial roofing?

- Commercial roofing/roofers install, repair or replace flat roofs as well as sloped roofs
- They use a variety of materials such as corrugated metal, wood, membranes, insulation, flashing, shingles and shakes
- They must consider many factors such as regional weather, weight expectancy, flat versus sloped roof and available roofing materials to use, as well as their sequence.

What are potential careers associated with commercial roofing?

- *Roofer* – the person completing the roofing work, including new construction, re-roofing and repairs
- *Consultant* – the person overlooking the design of the project, a contact between owner and contractor
- *Observer* – the person to report to the consultant and owner on the roof installation, confirming the work is matching the specifications
- *Estimator* – the person who will review the specifications and drawings to prepare pricing for the project
- *Superintendent* **–** the person overseeing multiple roofing crews, interacting with the roofing crew lead, ensuring they have the materials, equipment and other resources to complete the work
- *Instructor* – the person who teaches the apprentices to obtain their Red Seal, this person mentors, coaches and teaches all aspects of roofing

Let your learners know that today, they will in fact, be making a "sandwich" of roofing materials that represent all the layers of a flat commercial roof. Divide students into groups of 2 learners.

2. Roofing Materials and Layers: Using slides 7 - 14, have learners take an up-close look at the materials and layers commercial roofers use every day! Be sure discuss each different building layer and go over the definitions of each. Learners should be using these terms as they work during their building challenge.

A ***roof deck*** is installed as part of the building structure to keep the building together and support the roof system and the outside elements (rain, snow, ice, vegetated roof (plants), etc.) and are typically either wood, steel or concrete. When a roofer gets to the job site, a roof deck should already be in place. This is where a roofer's job begins.

The **deck cover** is the first step in building a roof. Typically used over a steel deck and only as required on wood or concrete decks if they are uneven. This is used to prepare the rest of the roof installation so it is solid and flat (gypsum board and plywood are common elements)

The **vapour retarder** (barrier), which slows the movement of interior air/water (vapour) into the roof system and the exterior air/water (vapour) from the roof system into the building.

Insulation insulates the roof of the building. It comes in various shapes, sizes and material types with various R- Values. It prevents loss of heat from the building and keeps the occupants of the building comfortable.

Coverboards are used to separate the insulation from the membrane. This is to allow movement from the two types of roof components caused by changes in temperature. The coverboard saves the membrane from potential ripping.

Flashing is a thin sheet of material used to cover any remaining gaps or openings left around seams and edges. This will prevent water from entering where it's not supposed to go.

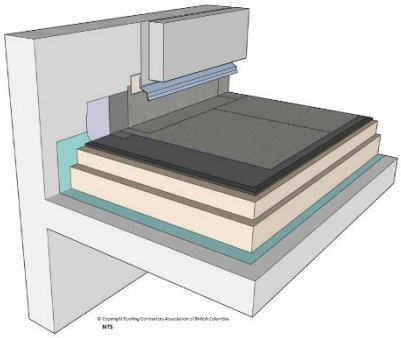
A **membrane** is the waterproofing layer, keeping rain, snow, ice, wind, etc. outside.
Two common types are modified bitumen and single-ply (EPDM, PVC, TPO).

3. Exploration of Materials: Using slides 15 -16, have students examine all the building materials. *For our building challenge today, what will be each layer? What will be our roof deck? What will we be our insulation layer? What will be our deck cover? What will be our vapour retarder? What will be our membrane layer? What will be our flashing? What will be our cover board layer?*

4. Roofing 101: Using slide 17, have learners watch the video embedded in the power point. This video shows the layers and construction of a commercial flat roof.

5. Roofing Building Challenge: In this activity, students build a miniature model of a commercial flat roofing system. They will use related materials that perform a similar function to the roofing materials in the real world.

Using slides 18-19, review the Roofing Sandwich Building Challenge!



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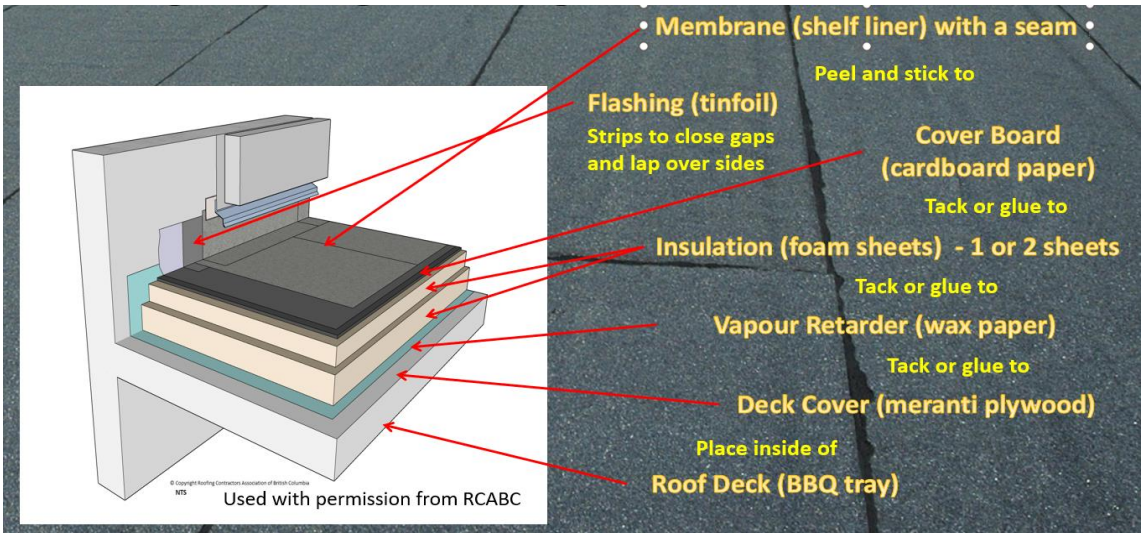
Each sandwich **MUST**:

- Include all 7 layers of a commercial roof
- Sandwich built in the correct order
- At least one seam in top membrane
- Demonstrate clean roofing skills (no glue leaking, flat roof, no holes in edge flashing)



6. Pair & Share: Using slide 20, give time for learners to do a Pair & Share – small groups showing and sharing about their roofing exploration with another group. Have each group share with one another something that went well, something that they would change for next time, and one challenge that they overcame.

Extension Ideas

- Using your knowledge about the roofing layers, create a writing piece about a "real" sandwich (or lasagna). What do your layers represent in the sandwich (or lasagna)? Take this new knowledge about of the layers of roof and draw and label a real food sandwich (or lasagna). Explain why each layer in the sandwich you created relates to each layer of a roof. Provide reasoning to strengthen your choices.
- To **increase difficulty**, provide description sheet of each roofing system layer without a material review (no slide 19). Include additional material options (plastic wrap, popsicle sticks, felts, cardboards etc). Have students decided which materials they think would best suit each roofing system layer.

- R Values Investigation – What is an R- Value? How can you increase R- Value? Do different building materials have the same or different R- Values?
- Test your ROOF! Is it waterproof? Pour water over it. Does water leak through the roof deck? Does it hold weight? How much? Use your roof to cover a tub of ice. Does the ice melt?

Reflection Activity

Please see the attached PDF for several choices on how you and your learners can reflect upon today's activity.

Global Competencies





Collaboration | **Communication** | **Critical Thinking & Problem-Solving** | **Innovation, Creativity & Entrepreneurship** | **Fostering and Teaching Self-Awareness and Self-Management**

Acknowledgements

1. A Roofing System Sandwich Skills for Success Kit; New Brunswick Roofing Contractor Association and Skills New Brunswick Canada