



WATERPROOF THE ROOF

UNIT: ENVIRONMENTAL AND AGRICULTURAL CONCEPTS

THE PROBLEM:

Develop a system of roofing to cover a miniature house and prevent water from leaking.

CONSTRAINTS:

1. Completely cover the top of the house.
2. Utilize no single pieces larger than 2 square inches.
3. Prevent any water from a 1-liter rainstorm from getting into the house.

MATERIALS:

- White craft fluffs
- Paper towels
- Twine
- Paper clips
- Card stock
- Tape
- Chenille pipe cleaners
- Foil
- Planter (the “house” to be protected from water)
- Twist ties

TOOLS:

- ✓ Measuring cup
- ✓ Large bin (to place planter in)
- ✓ Water
- ✓ Scissors

DIRECTIONS:

Be sure to check off each step ☒ as you progress.

- ☐ **Step#1** – Read through the design brief.
- ☐ **Step#2** – Listen as your teacher reviews constraints, the materials, and specific testing procedures. If necessary, write down any additional constraints.

- ☐ **Step#3** – Brainstorm some ideas for your roof. Write these ideas in the space provided. Discuss your ideas with your group. Write down the materials you would need for your designs.
- ☐ **Step#4** – With your group, determine which idea you will use and sketch your final solution in the space provided. Write down the materials you will need.
- ☐ **Step#5** – Construct your roof.
- ☐ **Step#6** – Test your roof by placing it in the bin and pouring a liter of water over it.
Note: Follow your teacher's directions for testing.
- ☐ **Step#7** – If your roof leaks, discuss with your group what you need to do to make it better. Make and write down your modifications then retest your design. Repeat this step until it works or until you reach the number of trials allotted by your teacher.
- ☐ **Step#8** – Read the reflection questions and write down your answers in complete sentences. Write a formal report addressing and answering the questions.



GENERATE IDEAS

Draw pictures of your ideas here. Be sure to include the materials you expect to need to build your design!

Materials Required for Building:

FINAL SOLUTION

Draw a picture of your group's final roof design here.



Period: _____

GRADING RUBRIC

Effort/Task Commitment Points 4/ _____	Resistant 1	Inadequate effort observed for task and /or did not meet most criterion 2	Appropriate effort and time on- task, also followed criterion. 3	Extensive effort; uses time well; self-motivated, surpassed criterion 4
Appearance Points 4/ _____	Inadequate; not neat, little care evident 1	Adequate; needs more attention to detail 2	Attractive & visually appealing; neatly completed 3	Eye catching; aesthetically pleasing, beyond expectations 4
Creativity Points 4/ _____	Uses others ideas 1	Typical responses; little creativity 2	Creative: added to more typical idea 3	Unique ideas or responses 4
Time Management Points 4/ _____	Did not complete task 1	Needed frequent assistance 2	Used time appropriately 3	Autonomous; mature time management 4
Carried Out Plan Points 4/ _____	Did not complete plan or lacked plan 1	Completed with frequent assistance and prompting 2	Completed plan; limited prompting needed 3	Followed through well; autonomous; exceeded expectations 4