

PERISHABLE FRUIT CONTAINER

UNIT: MANUFACTURING_LEVEL 2

CASE STUDY:

Fruit and vegetables are shipped in containers every day. These containers may come from across town or from other cities or countries. Your team's objective is to design and construct a container that will hold 25 pieces of fruit.

The fruit is from a tropical rainforest in Africa. Because this fruit grows only in a remote area, all supplies must be air lifted in and out. Due to the limited space, your package must be sent to Africa flat and then be assembled by the villagers, so your team must supply directions for them. Because they do not understand English, your instructions must not include any numbers or letters. The fruit is sensitive to temperature change so your package must protect the fruit from sudden or gradual temperature change. It must also protect it from being damaged during shipment.

This case study will involve many problem-solving methods. You must work as a team and assign members specific jobs to do. The rules for the container development are listed below. These must be followed by every team. These rules reflect a Request For Proposal (RFP), which is how companies, the government, and other agencies outline their requirements for a project.

According to Lilley Information Systems, "An RFP in its most formal sense is a specification of requirements that is sent out to suppliers who reply with proposals. Although common with large companies, the idea can be applied usefully at varying levels of sophistication to small - and medium - sized organizations as well. Used properly, it is a tool that supports and protects the buyer."

RFP**TO:** Engineering teams of three**SUBJECT:** Request For Proposals**PROJECT:** Shipping Container, Perishable Fruit Design**AGENCY:** Anyteam, Anywhere, USA

PROJECT DESCRIPTION: Design a container that will hold 25 pieces of fruit. The container is to be shipped flat and assembled on site with the directions included. Once loaded, the container must protect the fruit from normal shipping impacts.

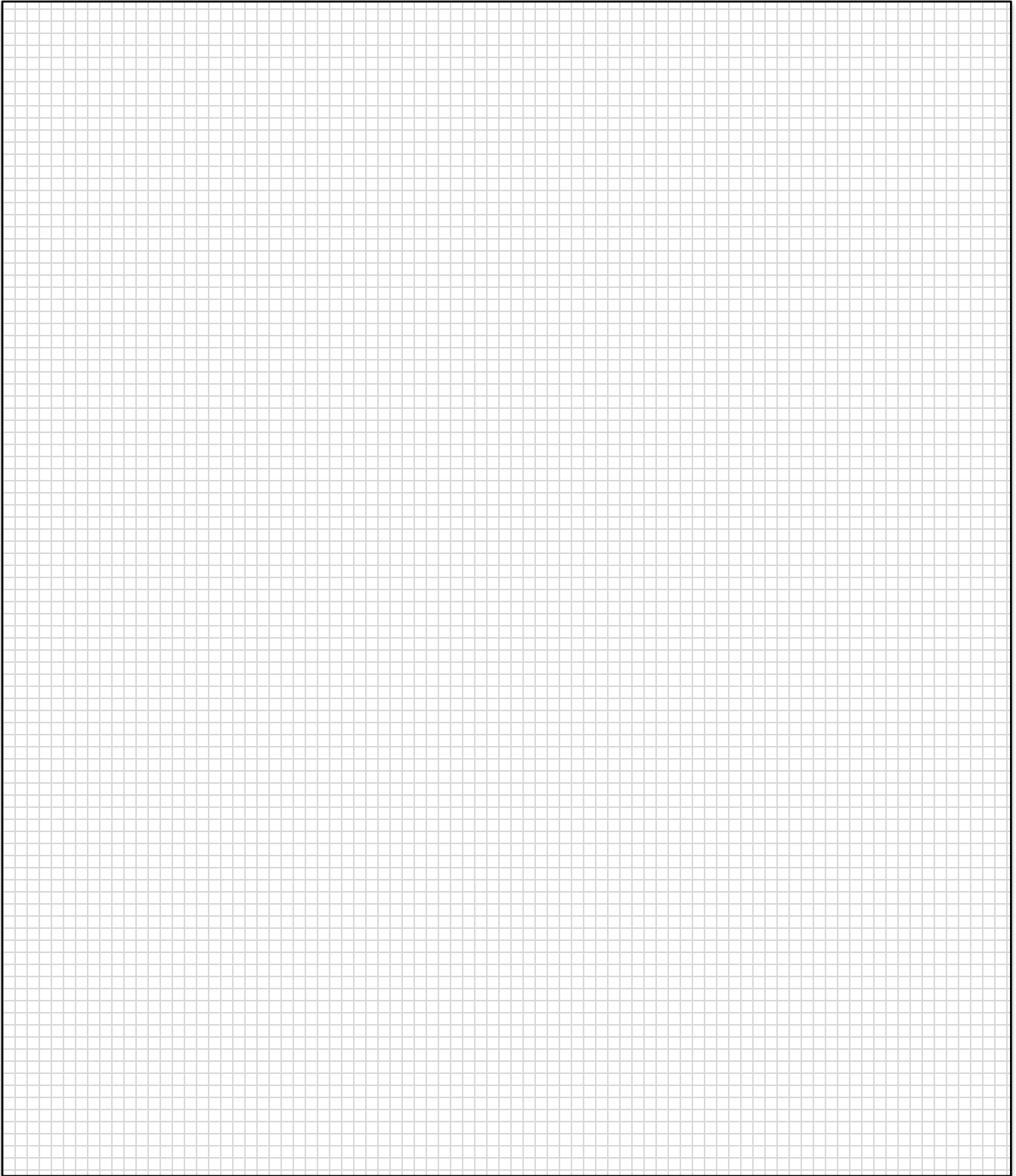
1. Container must hold 25 pieces of fruit (Fruit is tennis ball size)
2. The container may be made from any material you choose. Standard cardboard and 12" of clear packaging tape will be provided. Other materials will be at your team's expense. DUCT TAPE IS NOT ALLOWED.
3. As space and cost are important, you will receive bonus points for using less material. Your team will also receive bonus points for how easy the container can be packed (See assessment).
4. Since the fruit is very fragile, your package must maintain a constant temperature. A 10-degree temperature drop is acceptable. One point per degree after 10 degrees will be deducted.
5. The instructions for the assembly of the container must be in pictograms or "cartoon" format so that language is not a problem for people.
6. 12" of packaging tape is for assembly only. 5 bonus points will be awarded if the tape is not used.
7. Container must withstand a 4' drop

DIRECTIONS:

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

- ☐ **Step#1** – Read the case study.
- ☐ **Step #2** – Listen and read along as your teacher reads the constraints (RFP) and write down any additional constraints.
- ☐ **Step #3** – With your small team, brainstorm and discuss possible design ideas for the container. Write down your ideas in the space provided.
- ☐ **Step #4** – Once your team has determined a final solution, sketch it in the space provided.
- ☐ **Step #5** – Construct your container while taking notes on how you constructed it.
- ☐ **Step #6** – Test your container by monitoring temperature changes and doing a 4’ drop test.
- ☐ **Step #7** – Discuss possible modifications with your group. If modifications are needed, make the modifications and take notes.
- ☐ **Step #8** – Once you are satisfied with your design, use your building notes to brainstorm and outline possible pictograms to use as instructions for assembling your container.
- ☐ **Step #9** – Test your instructions by trying to rebuild your container if time permits.
- ☐ **Step #10** – Make modifications to your instructions if necessary and sketch out your final solution for your assembly instructions.
- ☐ **Step #11** – Discuss and write a brief presentation of your process and your solution with your group. Share your solution by speaking in front of the class and presenting your container.

SKETCH IDEAS FOR CONTAINER:

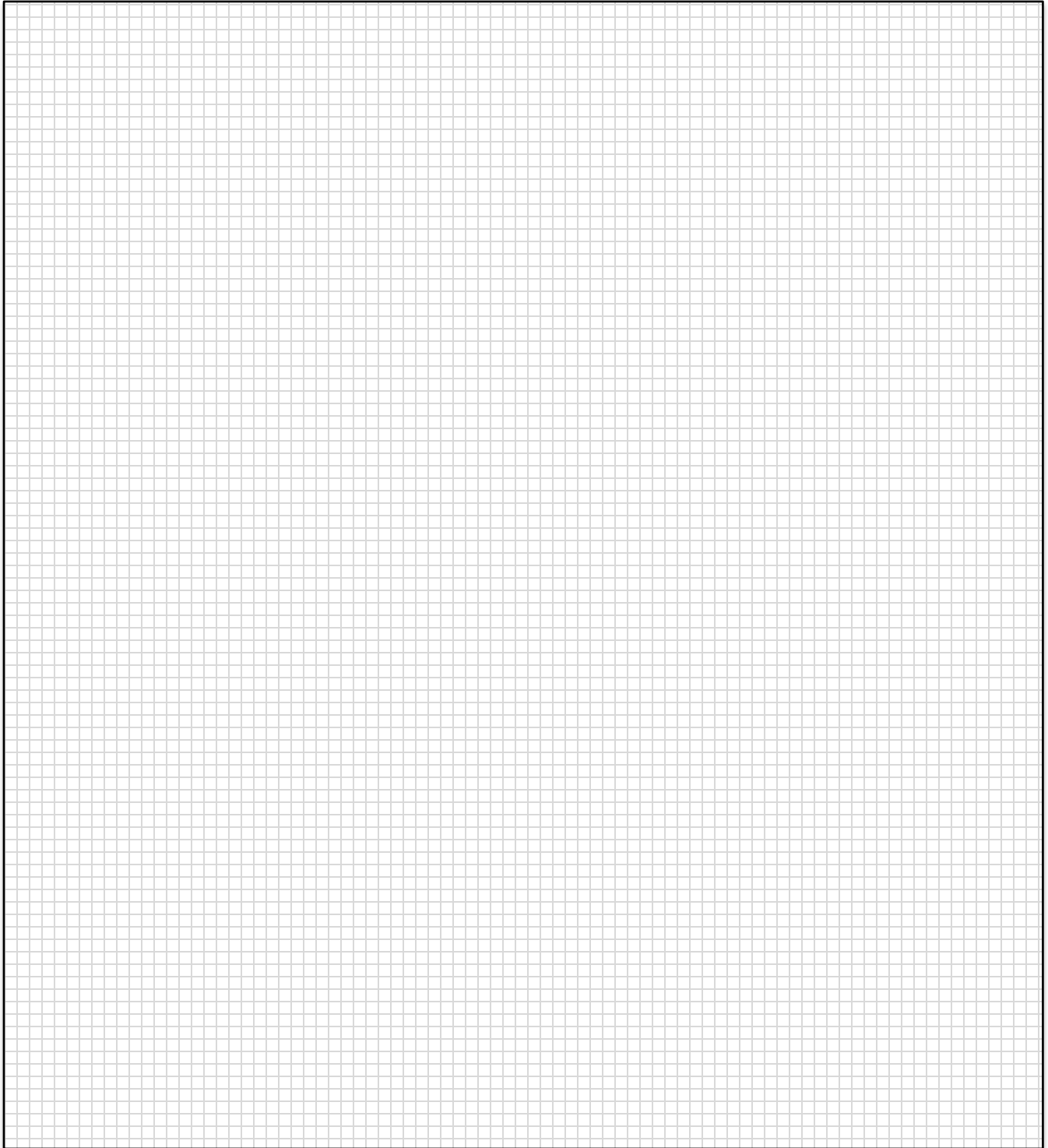




FINAL SOLUTION FOR CONTAINER:

SKETCH IDEAS FOR ASSEMBLY INSTRUCTIONS:

Use this space to take notes on how you constructed your container and to brainstorm how you will use pictograms to write your instructions.





FINAL SOLUTION FOR ASSEMBLY INSTRUCTIONS:

ASSESSMENT:

Category	Exemplary	Accomplished	Developing	Beginning	Score
	30-24	18	12	6	
Temperature specifications	The container can maintain its temperature with a drop of 40 degrees in its environment and lose less than 2 degrees in 10 minutes	The container can maintain its temperature with a drop of 30 degrees in its environment and lose less than 2 degrees in 10 minutes	The container can maintain its temperature with a drop of 20 degrees in its environment and lose less than 2 degrees in 10 minutes	The container can maintain its temperature with a drop of 10 degrees in its environment and lose less than 2 degrees in 10 minutes	
Surface area competition	The team with the least amount of surface area will be awarded first place and 20 bonus points. Places will be awarded up to 5 th place (1 st =20 points, 2 nd =17.5 points, 3 rd = 15 points, 4 th = 12.5 points and 5 th = 10 points. CIRCLE TEAM PLACE: 1 2 3 4 5				
Tape bonus points	Teams that don't use the 12" of tape are awarded 5 bonus points here				
CAD Drawings	The drawings are complete with detail and relevant materials and labels	The drawings are complete using relevant materials and labels	The drawing includes relevant information but is missing dimensions	The drawings are incomplete, but an attempt was made	
Pictograms	The pictograms accurately describe the instructions and are easy to read, without language or numbers	The pictograms accurately describe the instructions and are without language or numbers	The pictograms accurately describe the instructions but include language or numbers	The pictograms provide an overview of the instructions, but are incomplete	
Fruit is contained properly	The layout and use of the prototype is clearly formatted, including alternative uses	The layout and use of the prototype is clearly formatted	The layout and use of the prototype is available but has uncertainty to its use	The layout is available but is incomplete	
Electronic presentation	Presents easy-to-follow information that is logical and adequately detailed. All graphics and supplemental information included	Most of the information is included. All graphics and supplemental information is included	Most of the information is included. No graphics or supplemental information included	Most of the information is missing, disordered or is confusing	
Model	The model is complete with detail and relevant materials and labels	The model is complete using relevant materials and labels	The model is missing information or dimensions	The model is incomplete, but an attempt was made	
Design Proposal/ Research report	Information is well organized with ideas and details added to give meaning.	Information is well organized, and an attempt is made to add meaning.	Student is demonstrating a basic understanding of content and information.	Limited effort is made to understand content at a very simplistic level.	

RESOURCES:

Food loss prevention in perishable crops ISBN 92-5-101028-5 The Food and Agricultural Organization (FAO) of the United Nations.

http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/s8620e/S8620E0a.htm