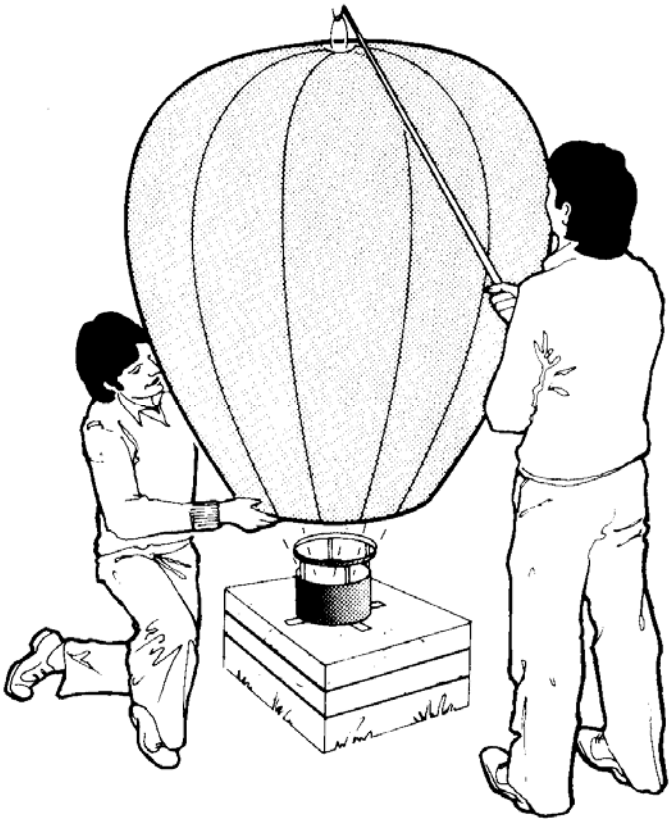
HOT-AIR BALLOONS



How High can it Go

Western Technical-Commercial School

School:

Integrated Technologies, TTI1O

Course:

Grade 9 juniors

Grade:

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Hot-Air Balloon Project

Project:

14

Pages:

Table of Contents

Hot-Air Balloon Power!

Hot-Air Balloon To Design, Build, & Fly!

Situation:

"Beautifully Quite Sky Limited" is looking for new ideas in technology, from young students today. Retirements are up and more people are taking to the sky as part of their fun and excitement. High above the hustle and bustle, noise and pollution, the air is light, the sky is quite and the view is beautiful. They are looking for four students to work full time for the summer with their company in three areas of the company. These areas include a designer, pattern maker, marketer and a pilot.

The Challenge:

Your Challenge is to research a related topic area, and create a page of key information in the form of text and illustration that will assist your peers in designing a "good looking" maximum sized hot-air balloon, with your logo in large view from the limited materials and resources given. Balloons will be tested with a tethered line in an appropriate and suitable location to see which balloon goes up the highest, stays up the longest and looks the best. Beautiful Quite Sky is also looking for a recorded process of work completed in a formal report including your research plus a minimum of two peers research papers, sketches, drawings, colour schemes, shapes, technical information, steps taken, resume, etc., in order to be a chosen candidate.

Resources and Materials:

You have many resource areas such as the internet, library, this module, and professional expertise that you may rely on for researching your related topic. You will have use of shop tools along with the following materials to design and build your hot-air balloon:

- Tissue paper,
  - ____ standard sheets of white,
  - ____ standard sheets of colour,
  - ____ standard sheets of pattern
- _____ Clear 0.65 mil plastic
- Some nylon string and ~22 - 18 AWG gauge wire
- Construction paper for pattern layout and template

You may use markers, to mark/decorate/design your balloon to make it unique, but be very careful with the tissue paper as it is very fragile

Rough Due Dates:

1. Research Rough ____
2. Research Final ____
3. 3 Thumbnails ____
4. Final Ortho with sizes and details ____
5. Colour schemes _____
6. Prototype _____
7. Production _____
8. Competition _____
9. Report _____

Project Report Overview:

1) ***Report:*** Put together a report during the process of the project with the usual components showing your project design process including:

   a) All primary, secondary rough drawings, notes, and information

      i) One page of research related to project, half text, half illustration

      ii) One page showing three detailed thumbnails

      iii) One final orthographic drawing showing dimensions and detailed notes

   b) Spread sheet showing all materials used, overall dimensions of your balloon- height-width-neck, weight of your balloon, weight/load capacity of your balloon, colours used, competition height, competition in air time, and competition placement standing.

   c) Resume showing education, work experience, volunteer services, strengths, and interests with your logo (as if you were applying for a summer job this summer)

   d) Bibliography and Resources showing proof of your sources in proper format

   e) Half a page SPICE and a full page reflection (12 font, 1 ½ line spacing)

   f) Half a page Conclusion about the project and details on what you have learned.

All above work must include title, name, date, and course section with electronic media including your tech logo.

Research:

Here are some suggestions that may be useful to you when research needs to be done.
There are basically two types of research namely pure research and existing information search.

Pure Research

You are finding out things that have not been found before and therefore are not available in any books or periodicals. This you do by experimentation and keeping careful notes on what you are doing. This is to make for continuity of your research on a day-to-day basis and also to prove that you actually did it and to validate your findings. Proof is usually your research notes and possibly actual products that you tested (e.g. An example of a new type of airfoil).

Existing Information Search

This type of information, created others can usually be found in books, periodicals, newspapers etc. You are allowed to use this information providing you recognize that this is not your own information. This you do by clearly indicating where you found this information. A reasonable way of doing this is in the following manner. State where you found it (Name of book, magazine, etc. when it was published and by what organization, and who was the author of this particular article).

Possible Related Topics:

No two topics can be the same when each student signs up for your topic area to research. You will have the opportunity to trade off with a minimum of two peers interested in your topic. Research must be a full page with about half text and half illustration, with your header information on it and bibliography showing your source of information on the back of your sheet in proper format. See library for outline, and/or check the back of a book for examples. Topics must be directed towards a specific area of the hot-air balloons project that will help peers understand more of the technical side to this project. Some main topic areas may be:

1. Parts of the hot-air balloon
2. Theory of how they work
3. Tips and tricks
4. Resume writing
5. Pattern design ideas
6. Weight and balance importance
7. Real Technical info
8. Uses for hot-air balloons
9. Working hot-air balloon shapes
10. History of hot-air balloons
11. Key terms used in ballooning

Research Information is to be presented quickly to the class for show and tell, with a minimum of two extra copies ready for trade, with other students. (Each research paper above 2 is to receive 2 bonus marks)

Steps to Designing and Constructing your Hot-Air Balloon

1. First step is to layout your tissue paper and plastic to get an idea on how much material you have to work with when creating your design. Make sure when you select your colours that they will work with each other (contrast) in creating your balloon. Writing down sizes and calculation of total sizes is also possible here also, but remember choosing colours, patterns, and clear will have to be taken into account.

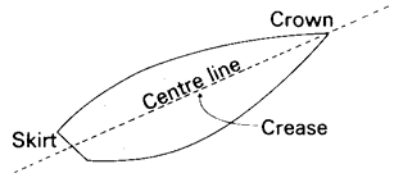


Fig 1 Template material brown paper

2. Decide on your basic shape and size that you may be able to accommodate, based on practicality, looks, design, given materials, research you have collected, your sketches and drawings you created

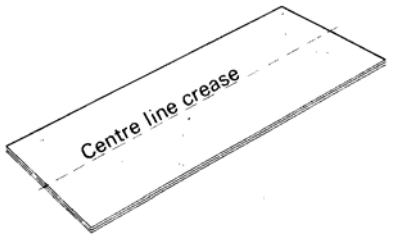


Fig 2 Pile of tissues

3. Create a prototype balloon about a quarter the size of your final, so that you may go through the steps again for the full size balloon construction, using some white tissue paper only (use appropriate future steps to complete this step).

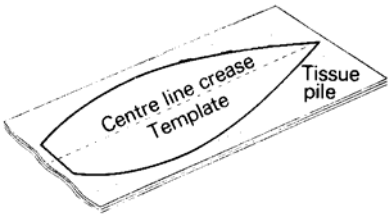


Fig 3 Template on pile of tissue paper, pin together

4. Create your pattern on the kraft paper such that it can be folded down the centre to get the shape uniform and then cut out after-see fig. 1

5. Depending on the number gores/panels will determine how many pieces you will need. Take your pattern and lay it on top of your tissue papers

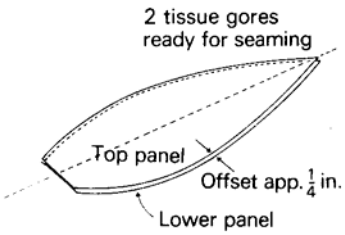


Fig 4 Two-tissue gores ready for seaming

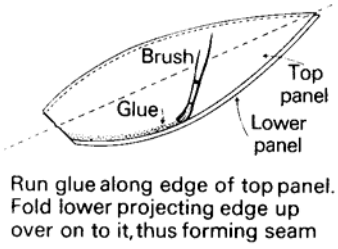


Fig 5 Seaming

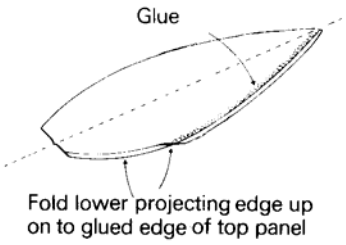
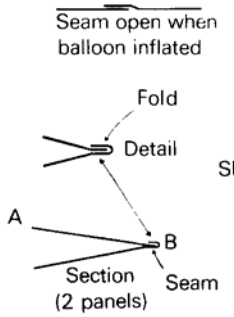


Fig 6 Seaming

(folded several times) and cut through all pieces to get all tissue papers cut at once. –see fig. 2 & 3



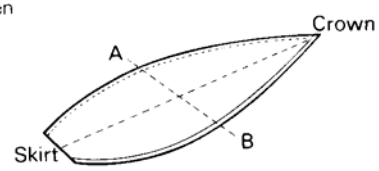


Fig 7 Completed seam Crown to skirt

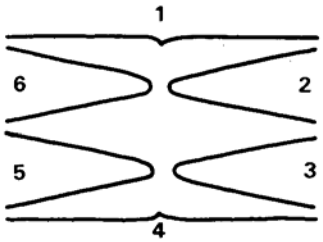


Fig 8a Panels assembled as above (section) concertina fashion

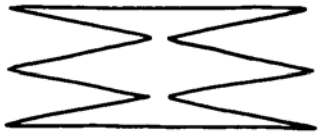


Fig 8b Collapsed balloon (section) as assembled

Fig 8c Collapsed balloon as viewed from crown

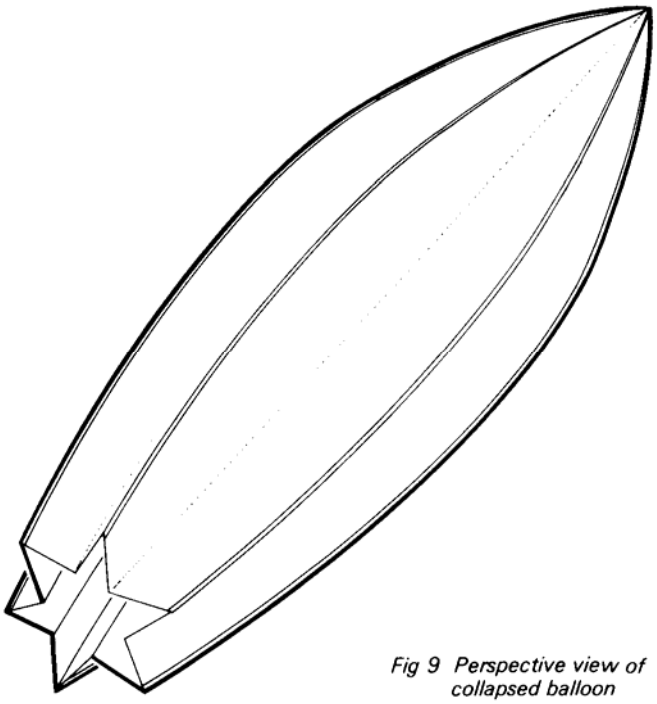


Fig 9 Perspective view of collapsed balloon

6. lay one panel flat on a smooth worktop, lay another on top offset sideways as shown by approximately ¼" to ½" depending on size of balloon., then run glue along one edge of top panel and fold lower projecting edge over on to it, thus making the seam, fig. 4-6, which when opened later gives a strong lap joint –see also fig. 7 & 8

7. Do the same for all of the joints. Upon completion, open out balloon immediately (fig. 9) to ensure no surplus glue is holding in the wrong place

8. When dry, cut a ~2" to 4", disc of tissue and glue to crown, together with a small nylon string loop, to hold during inflation prior to filling with hot-air, i.e. until the balloon can stand on its own –see fig 10

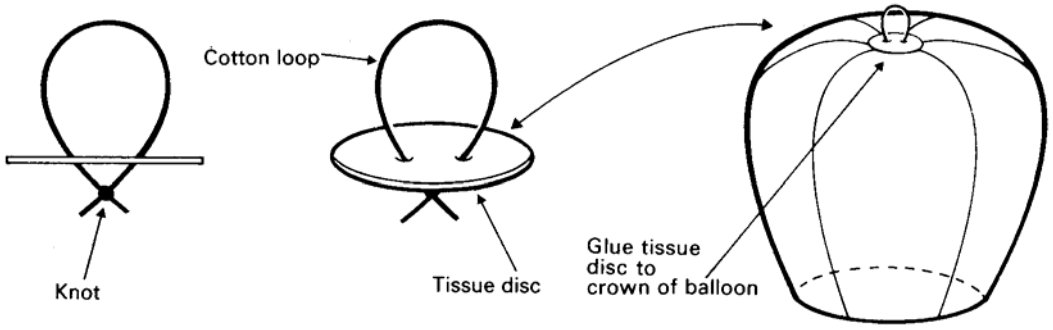


Fig 10

9. Create a simple ring of 22 AWG steel or aluminum wire will serve to keep the neck open, and will also weight the balloon bottom down, otherwise it may tilt in flight and spill the hot air before rising very far – see fig 11

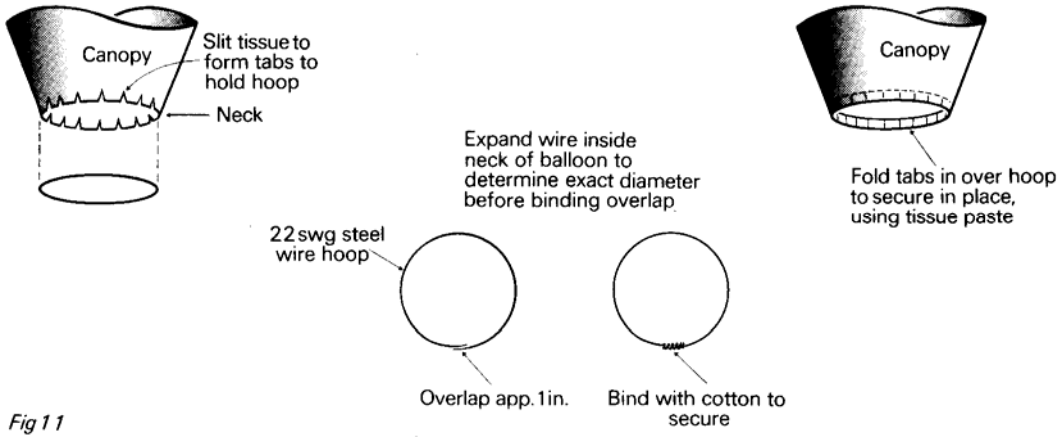
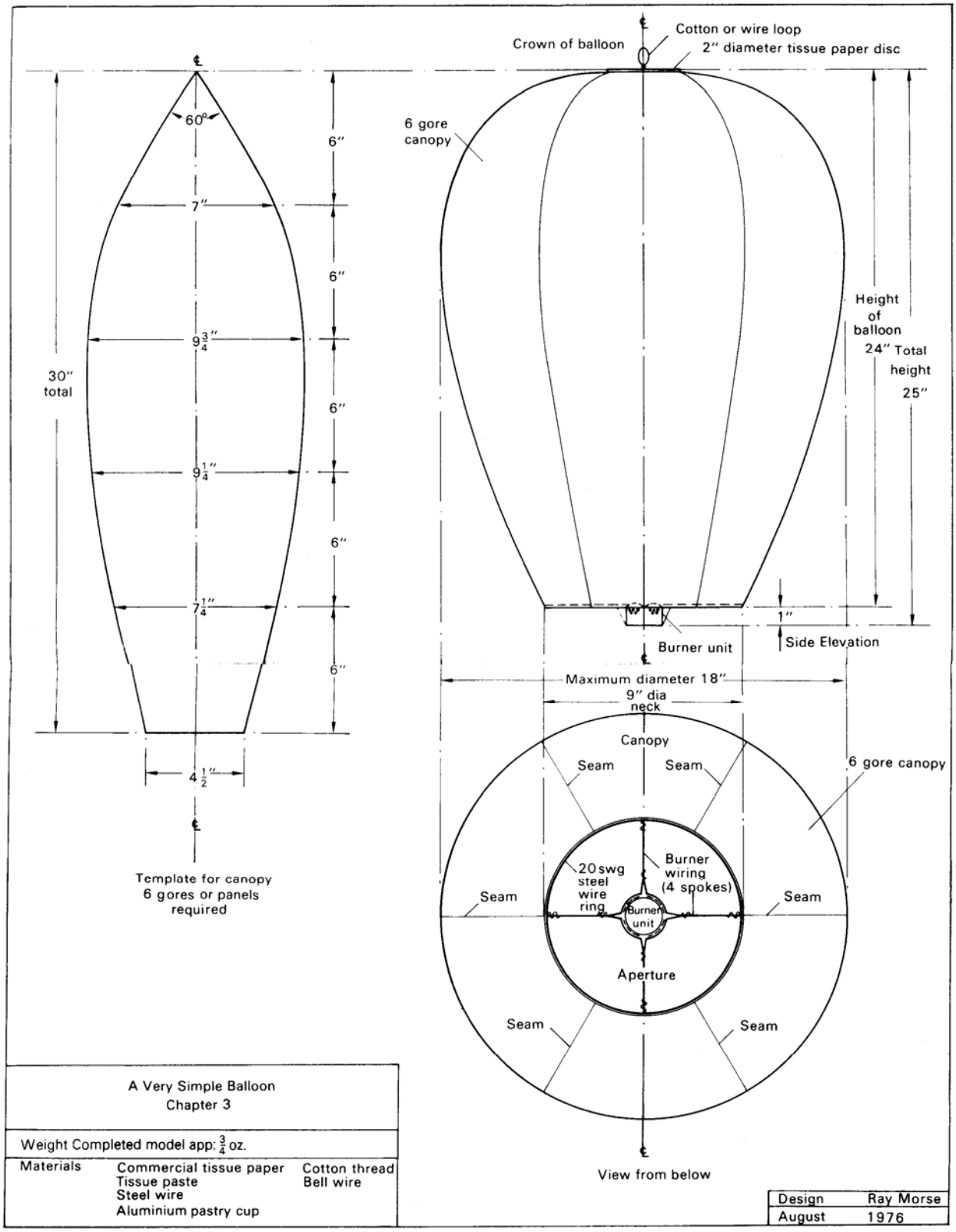
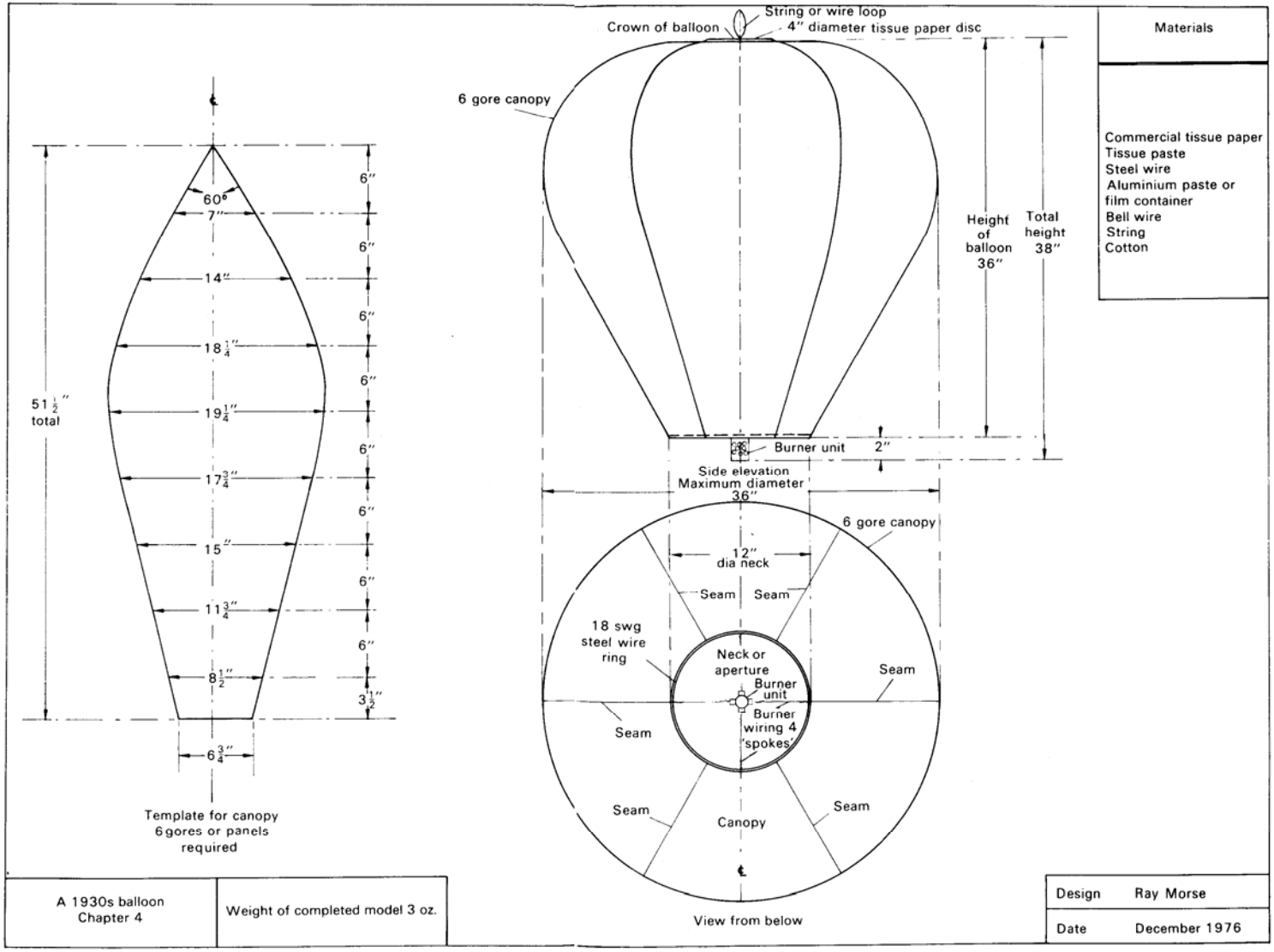


Fig 11

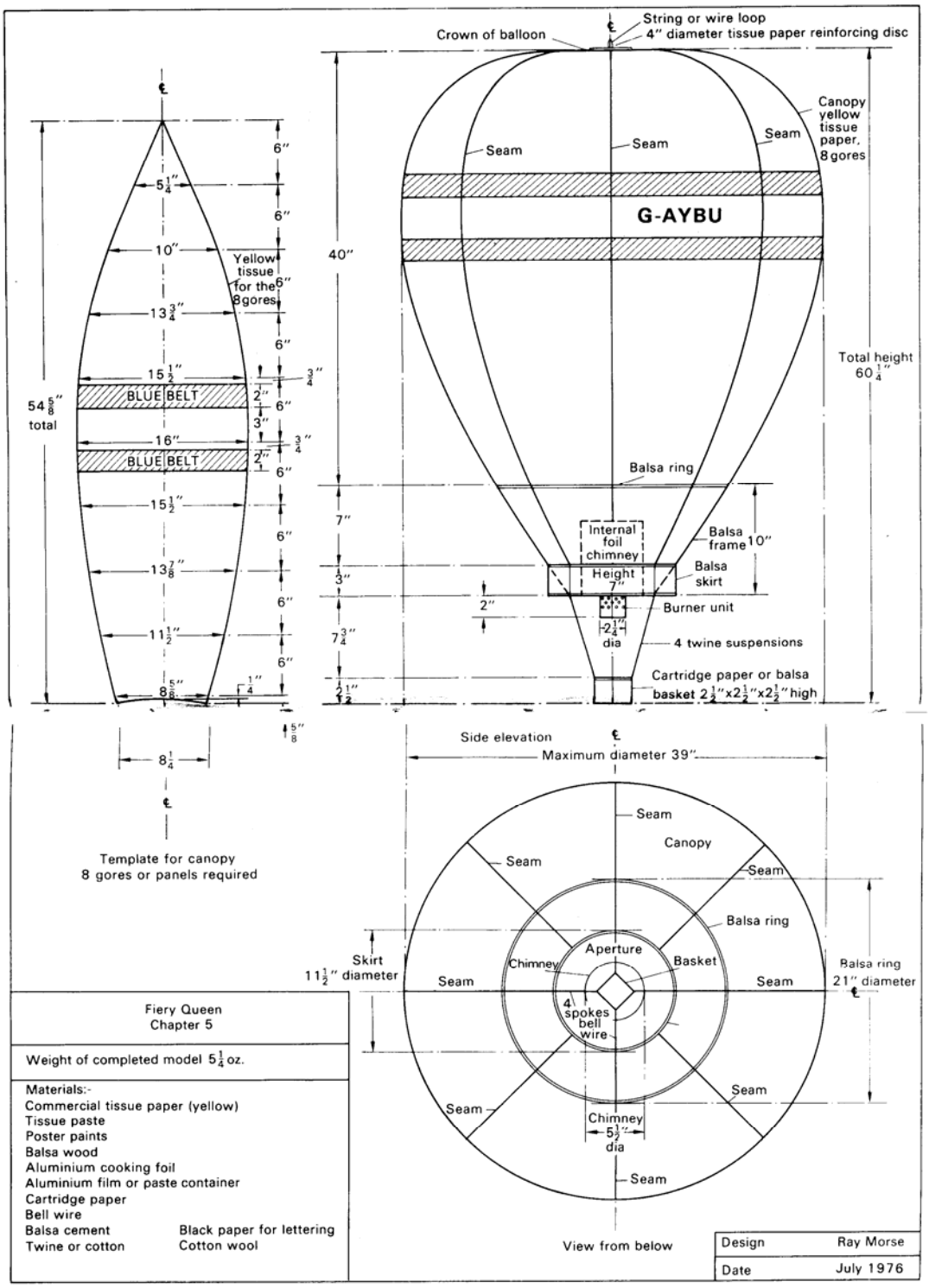
A Simple Hot-Air Balloon Plan:



1930's Hot-Air Balloon Plan:



Fiery Queen Hot-Air Balloon Plan:



Name:

Date: Section #

Check List for Project Module

In the Box:

- ☐ Hot-Air Balloon completed and fly tested with details recorded in report spreadsheet
- ☐ Prototype used for testing
- ☐ Original pattern, used to make hot-air balloon
- ☐ Report below

When handing in everything, double check prior to handing in by checking off the following items in chronological order:

In the Report

↓ Related Notes:

- ☐ Report cover with title page,
- ☐ table of contents
- ☐ Module information
- ☐ All related rough work and additional notes
- ☐ * Research –yours and 2 of your peers as a minimum
- ☐ * 3 isometric thumbnail ideas,
- ☐ * 1 full page detailed orthographic final drawing with details
- ☐ Material and detail sheet using a Spreadsheet
- ☐ Your Resume for a summer job
- ☐ SPICE ½ a page related to this project
- ☐ Finishing up with a 1 page conclusion reflection of project and course
- ☐ This check list- with items completed and included, checked off
- ☐ Final self and peer evaluation paper completed
- ☐ Diskette holder and diskette with your files saved in proper conventions

*All due date components handed in will have the teachers initial along with a plus #, OT, or minus # showing if they were completed on time with dates on front. These positive and negatives will directly affect your mark.

Index of Key Terms and Phrases:

Find ten new key terms or phrases and include the page number in the table below:

	New Key Term or Phrase	**Description/definition of the new term or phrase?**	Page #
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Integrated Technologies

Name:

Western Technical-Commercial School

Date: Section #

Project Evaluation Sheet Project Due_____

Did it fly High?

Peer Marker: _____

Note Peer marker must be completed or you will loose 5 marks automatically!

Balloon Away

Activity Process and Product Steps	Total Marks	Self Mark	Peer Mark	Earned Marks
Requirements Met: Finished Hot-Air Balloon 1) Research paper 2) Used up minimum 80% of materials effectively 3) Resume completed with serious intentions 4) Spreadsheet showing materials, sizes, weight, and details 5) Report, project box, pattern, related information	10			
Research and Information: 1) Research paper done, included 2 peer research papers. 2) Resources and bibliography 3) Test and Data Tracking Log Sheet complete	15			
Solutions: rough Ideas: Rough Designs: 1) Research, notes, diagrams, illustrations, etc. 2) Hot-air balloon thumbnails, and prototype(s) 3) Resume rough or previous with intentions/notes on improvement & update 4) Spreadsheet- materials, sizes, weight, and details	25			
Final Design: Solution: 1. Your final orthographic detailed, dimensioned drawing 2. Spreadsheet, Research paper, Resume, Spice summary, and conclusion	10			
Workmanship: Construction: Product: 1. Balloon well put together, no leaks or holes, and well cared for 2. Balloon has great looks, colour contrast and design 3. Report well put together, and in order	20			
Finished Product: Solution: 1. Final product look, eye catching, aerodynamic and colourful 2. Portfolio completion, process all present including reflection 3. Height in maximum lift_____ Length of time up_____ 4. Test and Data Tracking Log Sheet including final placement _____ If you had to do this project again, what would you change or include: _____ _____	20			
Final mark: **Students: Total up your marks →** Based on % finished and completion and fulfillment of requirements of the problem	100			