

Read and Do With the Animaroos™

by

Amilcar Fuertes

Submitted to the Department of Mechanical Engineering
in Partial Fulfillment of the Requirements for the Degree
of

Bachelor of Science

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Abstract

This thesis is intended to teach children about drawing , design and manufacturing, and marketing processes, with a focus on modularity and the use of a basic platform to serve as a starting point for multiple derivative products.

Thesis Supervisor: Alexander Slocum

Title: Professor of Mechanical Engineering

Acknowledgements

I would like to thank my mom, Lillian Nieves, for noticing and encouraging my gift of art an early age and my family and friends for believing in me and my projects. I would especially like to thank my good friend, Nicole Homan for helping me plan out a schedule for finishing my thesis, and making sure that I stuck with it.

I am especially grateful to have such a caring and understanding academic advisor, Professor Alexander Slocum. Thank you for seeing my potential, and giving me the chance to prove to myself and to others that I have what it takes to be a toy designer. You helped me think “outside of the box”, and supported every decision that I had made, even the unconventional ones. I would also like to thank Dean Bonnie Walters, who has given me sound advise throughout the years since I was a freshman struggling with classes and my personal life. Thank you for caring.

1. The first step is to identify the problem or question that needs to be answered.

2. The second step is to gather relevant information and data.

3. The third step is to analyze the information and data to identify patterns and trends.

4. The fourth step is to develop a hypothesis or a proposed solution.

5. The fifth step is to test the hypothesis or solution through experimentation or observation.

6. The sixth step is to evaluate the results of the test and determine if the hypothesis is supported.

7. The seventh step is to draw conclusions based on the results of the test.

8. The eighth step is to communicate the findings of the study to others.

9. The ninth step is to reflect on the process and identify areas for improvement.

10. The tenth step is to apply the knowledge gained to other situations.

11. The eleventh step is to continue to learn and grow through ongoing education and research.

12. The twelfth step is to share knowledge and resources with others to help them learn and grow.

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Chapter 1

Introduction

During my M.I.T. education I found that my major, Mechanical Engineering, was not creative enough for my tastes. I decided to do something about my unhappiness and modified my major into a program that I found creative and intellectually challenging. This thesis is a culmination of what I have learned.

I want to be a toy designer, and in the little spare time that I have from school I design my own action figures and cuddly stuffed animals. One of my personal projects from the summer was making little stuffed animals for my friends. I wanted to make something that was cute and simple, and that incorporated my sense of humor. The Animaroos were born. At the time I only had three character designs developed and each one was a slight modification of the previous one. To make things easier on myself I just used the same body structure, but added new faces, hands, ears, and other body parts to make new characters. I knew that the Animaroos' simple designs would appeal to children, so I decided to make the patterns and instructions for the Animaroos.

The thought of children liking my toys excited me, but I wanted to make sure that what I was doing could help teach kids and inspire their creativity. The Animaroos project then evolved into a book that would teach children about Mechanical Engineering and the Manufacturing process. This book would be an arts and crafts based publication with projects that ranged from beginner (Drawing the Animaroos), to intermediate.(Animating the Animaroos for the Internet), to advanced (How to Make an Animaroo Stuffed Animal).

I wish to use this thesis as a foundation for a children's activity and story book based on the Animaroos, and as a way for me to launch my toy designing career.

1. *Chlorophyll a* is the primary photosynthetic pigment in most plants and algae. It is a green pigment that absorbs light energy in the blue-violet and red-orange regions of the visible spectrum.

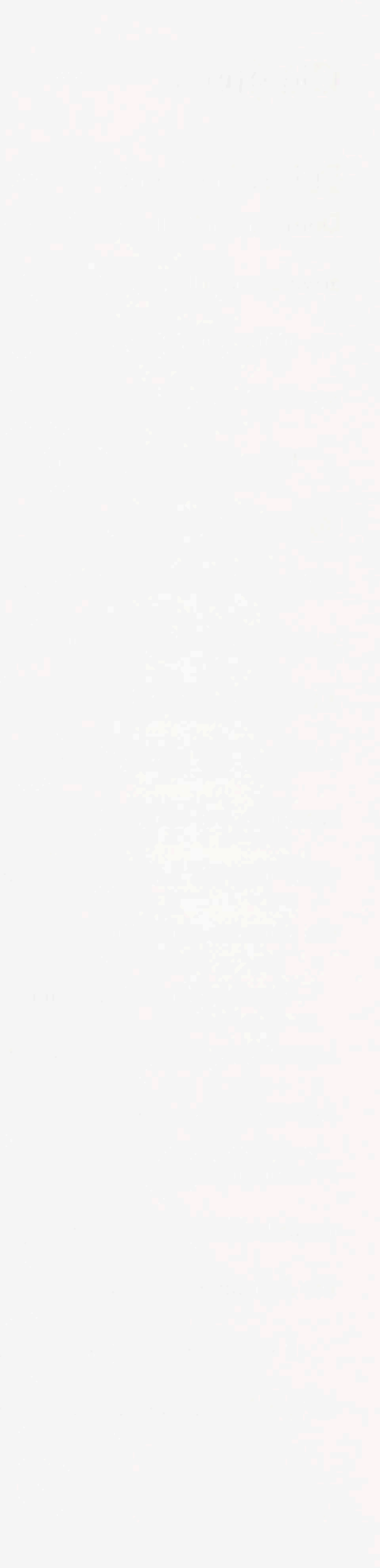
2. *Chlorophyll b* is an accessory pigment that broadens the range of light wavelengths that can be used for photosynthesis. It absorbs light in the blue and orange-yellow regions.

3. *Carotenoids* are accessory pigments that absorb light in the blue and green regions. They include *beta-carotene* and *xanthophylls*.

4. *Xanthophylls* are a group of carotenoids that include *zeaxanthin* and *lutein*. They are involved in photoprotection and energy transfer.

5. *Phycocyanin* is a blue pigment found in cyanobacteria and some algae. It absorbs light in the orange and red regions.

6. *Peridinin* is a red pigment found in some dinoflagellates. It absorbs light in the blue and green regions.

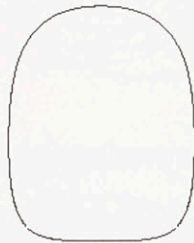


Chapter 2

How To Draw the Animaroos

2.1 Arpin the Turtle

1) Draw a blob.



2) Draw in the eyes, mouth, and tummy.



3) Draw in the shell line, the feet and the tummy lines.



4) Draw in hands, finger, and tail.



5) Clean up the drawing, erasing the overlapping lines.

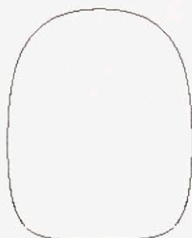


6) Color in the drawing with green, dark green, and yellow as shown below.



2.2 Buggles the Fly

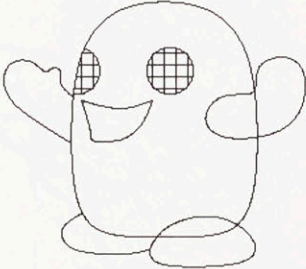
1) Draw a blob.



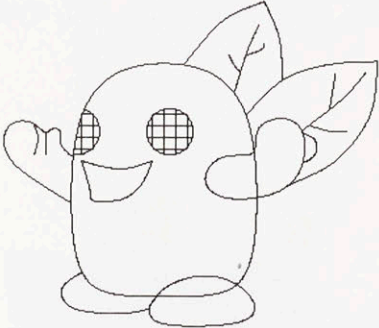
2) Draw in the eyes, mouth and feet.



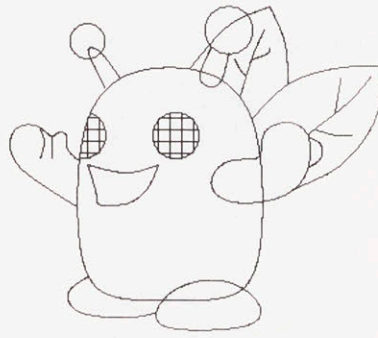
3) Draw in the hands and add the detail to the eyes.



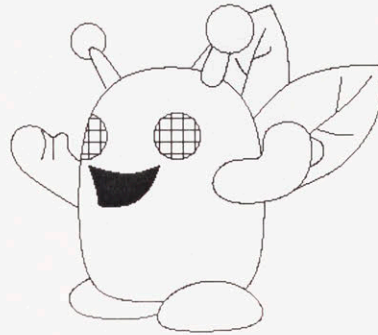
4) Draw in the wings, and the fingers.



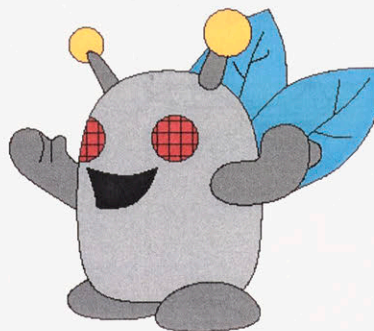
5) Draw in the antennae.



6) Clean up the drawing by erasing the overlapping lines and fill in the mouth.

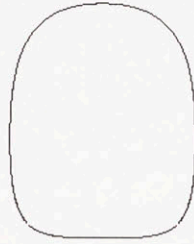


7) Color in the drawing with gray, dark gray, red, cyan, and light orange as shown below.

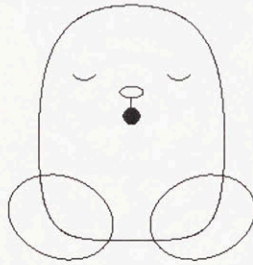


2.3 Elbee the Lamb

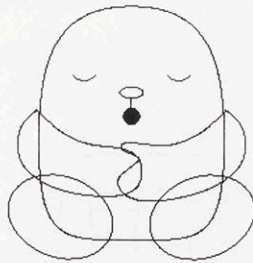
1) Draw a blob.



2) Draw in the eyes, nose, mouth, and feet.



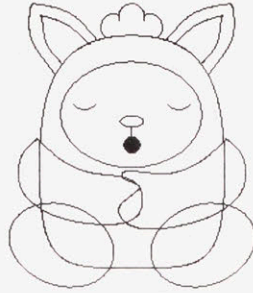
3) Draw in the hands.



4) Draw in the ears, and the face outline.



5) Draw in the hair tuft and the ear detail.



6) Clean up the drawing by erasing the overlapping lines.

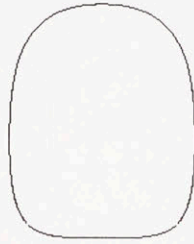


7) Color in the drawing with pink, white, and dark gray.



2.4 Finster the Shark

1) Draw a blob.



2) Draw in the mouth and eyes.



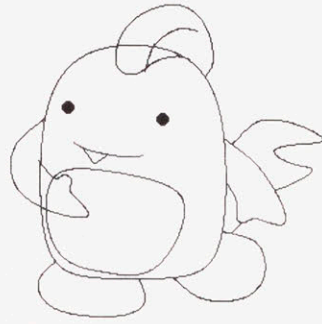
3) Draw in the tummy and feet.



4) Draw in the head fin, and hands.



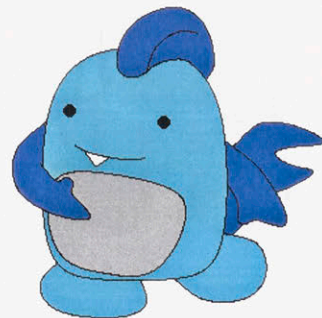
5) Draw in the tail and add the head fin detail.



6) Clean up the drawing by erasing the overlapping lines.

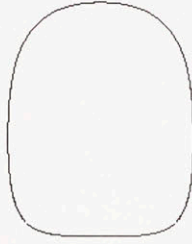


7) Color in the drawing with royal blue, cyan, white, and light gray as shown below.



2.5 Hops the Bunny

1) Draw a blob.



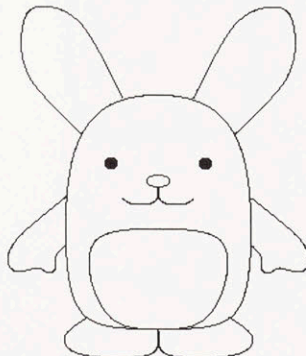
2) Draw in the mouth and eye.



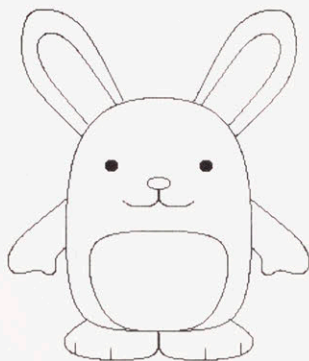
3) Draw in the tummy and feet.



4) Draw in the hands and ears.



5) Draw in the detail of the feet and the ears.

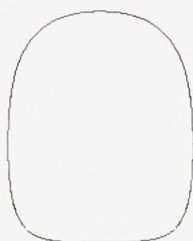


6) Color in the drawing with yellow, pink, and white as shown below.



2.6 Jules the Raccoon

1) Draw a blob.



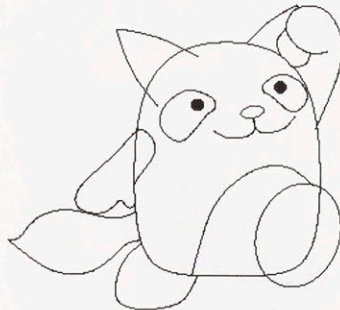
2) Draw in the eyes, mouth and feet.



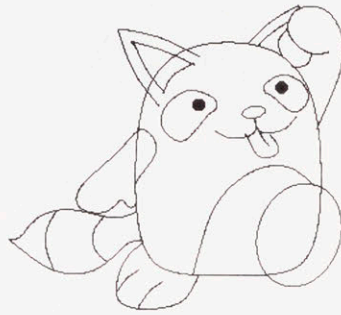
3) Draw in the tummy and the hands.



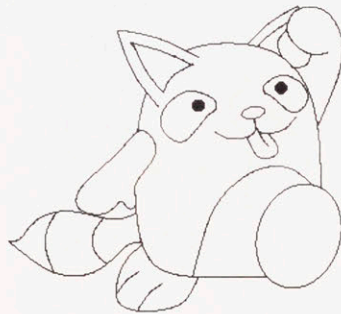
4) Draw in the ears and the tail.



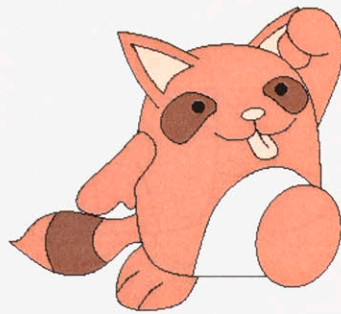
5) Draw in the tongue, and detail to the ears, feet, and tail.



6) Clean up the drawing by erasing the overlapping lines.

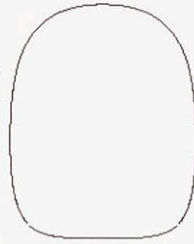


7) Color in the drawing with light brown, dark brown, white, and pink as shown below.



2.7 Nip the Cat

1) Draw a blob.



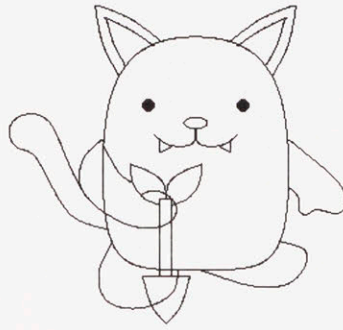
2) Draw in the eyes, mouth, and feet.



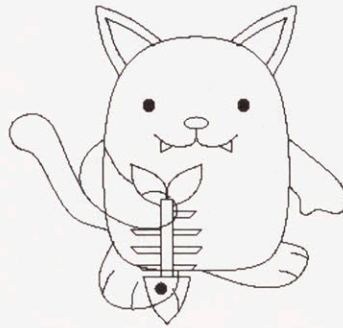
3) Draw in the ears, and hands.



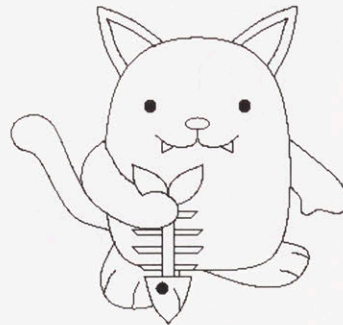
4) Draw in the fish bone, the tail and add detail to the ears.



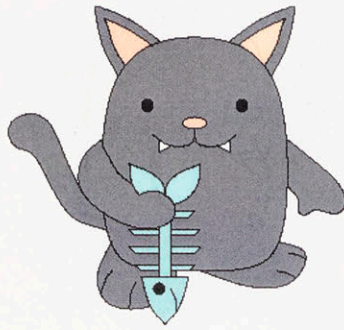
5) Draw in the details of the fish bone and the feet.



6) Clean up the drawing by erasing the overlapping lines.



7) Color in the drawing with dark gray, pink, white, and light cyan as shown below.

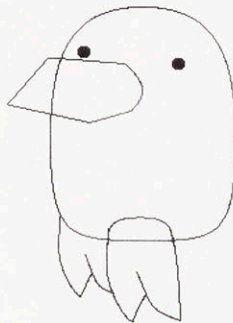


2.8 Pahja the Parrot

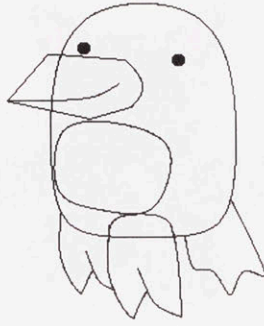
1) Draw a blob.



2) Draw in the beak, eyes, and feet.



3) Draw in the tummy, tail, and mouth detail.



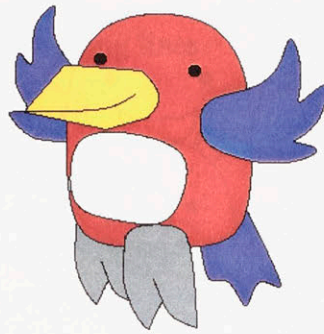
4) Draw in the wings.



5) Clean up the drawing by erasing the overlapping lines.

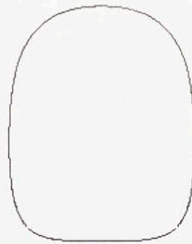


6) Color in the drawing with red, purple, yellow, light gray and white as shown below.



2.9 StingRu' the Stingray

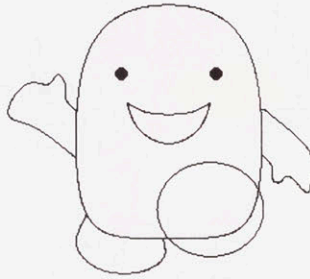
1) Draw a blob.



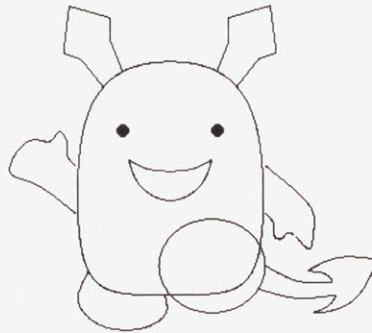
2) Draw in the feet, eyes, and mouth.



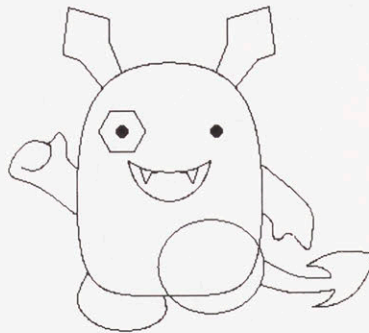
3) Draw in the hands and add the mouth detail.



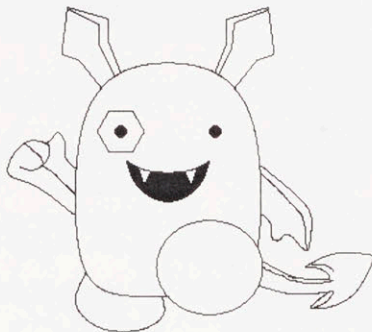
4) Draw in the antennae, and tail.



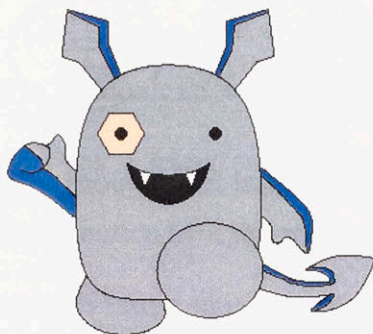
5) Draw in the eye patch, teeth and hand detail.



6) Draw in the detail lines on the antennae, hands, and tail. Fill in the mouth, and clean up the drawing by erasing the overlapping lines.

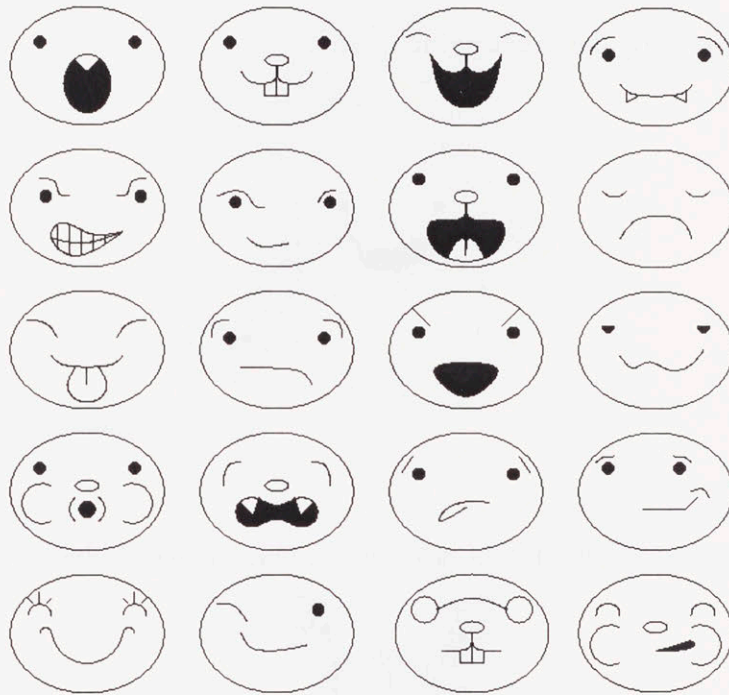


7) Color in the drawing with light gray, white, tan, and royal blue as shown below.

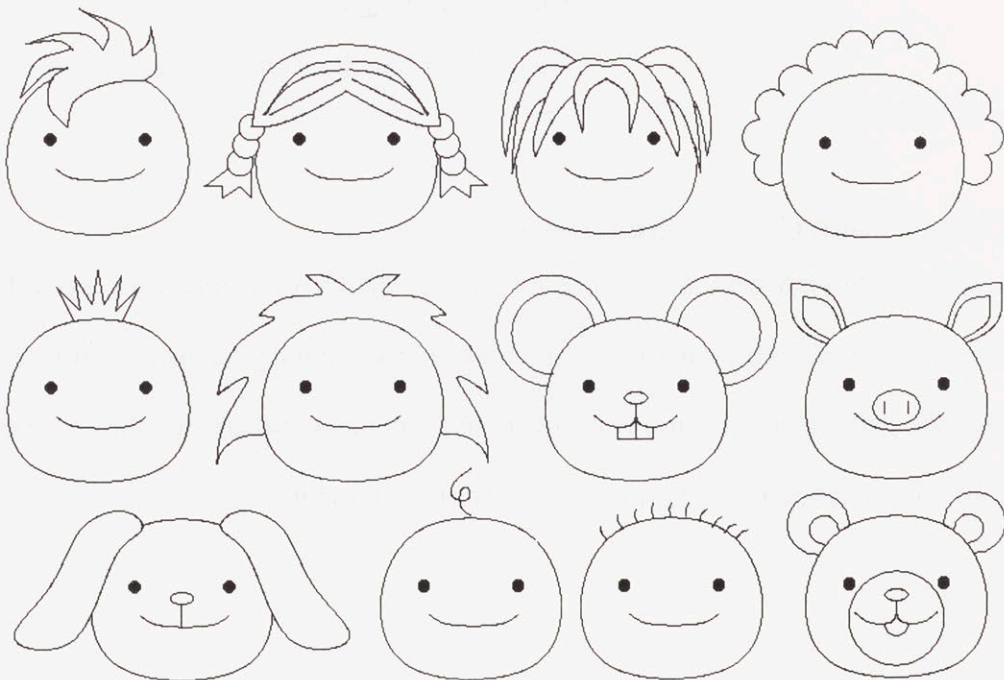


2.10 Create Your Own Animaroos

You can create your own Animaroos by adding different mouths, ears, eyes, feet and tails. Below are some extra parts that you can use in creating your own Animaroos. Mix and match the parts to your liking. Feel free to use any parts that are not shown below. You can create infinite amounts of Animaroos by using your creativity.



Facial Expressions



Different Hairstyles and ears.

Chapter 3

How to Animate the Animaroots for the WEB

3.1 Plan Your Animation

Think about what and who you want to animate. What actions will be shown? Are the animations complex or simple? Do you want the animation to continuously loop or end after one animation? I suggest sketching out the main frames of the animation on paper so that you know what you are doing or at the very least have an idea of where your animation is headed. If you think before you draw, you will save a lot of time on the computer.

3.2 Observation

If you want to draw an animation but don't know how to start, you could try acting out the animation in front of a mirror, or ask a friend to act out for you. If you want to draw a jumping animation you should take notice how the whole body reacts. You begin by bending your knees and lowering yourself into a squatting position, while you lower your arms for balancing. As you are getting ready to jump you swing your arms forward and upward while extending your legs. All of this action is happening at the same time, your animation should show this. The more realistic your animation is, the better it will look. Break up the animation in parts then fill in the detail by adding more frames.

3.3 Be Consistent

You must make sure that when you are animating, the size of the drawings that you are drawing remain the same. Almost all animation programs will not let you save your work if the drawings are not the same size. One of the easiest ways to keep your drawings the same size is to draw on top of an existing one. Also make sure that you save your drawings in either a *gif* or *bitmap* format. Small actions should get only a couple of frames worth of

animation where large actions should get considerably more. This will help keep your animations looking smooth and not choppy. (A blinking eye animation should be about two to three frames, where as a jumping animation can be up to 20 frames or more.) When saving your works of art, name the frames in a consistent way. I like to name my starting frame *start* and my last frame *end*. This is how I might name a blinking animation for the bunny AnimarooTM:

FRAME1: bunny-start.gif

FRAME2: bunny-blink1.gif

FRAME3: bunny-blink2.gif.

Use the same colors. If you made a color that is not in the basic palette of your drawing program, then make sure you save it. It can be frustrating trying to get the same shade of pink you wanted for your bunny's nose, every time you draw a new frame. If you do not save your created colors, you could end up using different shades of colors for each frame, which can make your animation look like its glowing.

3.4 Get the Software

There are many free gif animation programs available to download off the WEB. Most of them are really basic and easy to use, which is perfect for the beginner animator. More complex programs can add special effects to your drawings, but can be expensive. Remember that special effects will only enhance your animation, not fix it. If your animation is choppy then the effects wont really make your animation look any better. A simple smooth animation always looks better than a flashy choppy one. You can download animation programs from <http://www.cnet.com>.

3.5 Get the Mindset

Animating can be tedious work, training your brain to visualize actions in slow motion will really help. Learn from the pros; look at your favorite cartoon on tv. If you have a vcr then record the show and play it back on slow motion. You can also get an idea on how many frames are needed to make a certain action look smooth. Another great way to visualize actions is to play with a poseable action figure. You can slowly position the figure into the animation you want and then draw what you see. Remember each frame is slightly different from the previous one. If the action is too gross between frames then the animation will look choppy. Patience is the key, if you are patient in drawing all of your frames then your animation will look great. If you rush your animation and skip frames then your animation will be something to be desired, a few extra frames placed here and there can make all the difference.

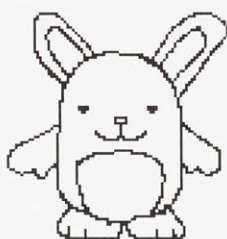
3.6 Blinking Eye Animation

frame1: start.gif



eyes open

frame2: blink1.gif



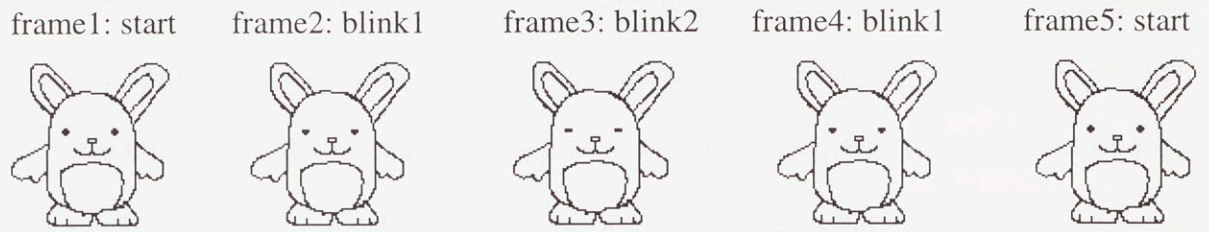
eyes half closed

frame3: blink2.gif



eyes shut

This animation shows the bunny closing its eyes, if we want the bunny to look like he is blinking then we have to get his eyes to open again. This is done by adding two more frames to the animation. Frame 4 will be bunny-blink1.gif and frame 5 will be bunny-start.gif. Notice that our animation is 5 frames long but we only used 3 different gifs in the animation.



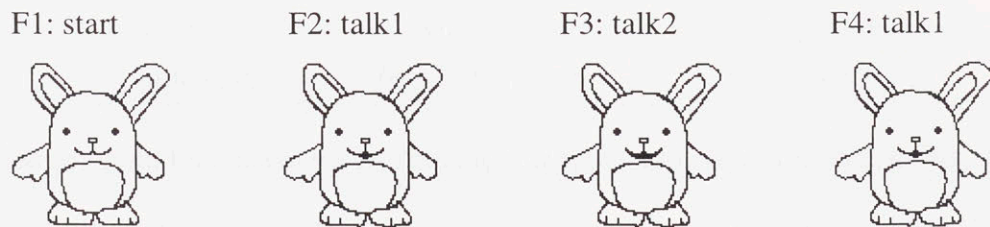
completed blinking animation

3.7 Talking Animation



This animation is very similar to the blinking animation except that we are using two new gifs. This animation allows the bunny to say one syllable. If we want to keep the bunny talking then repeat frames 2 through 5 for every syllable you want the bunny to say.

Example: we want the bunny to say the word *animate*. An-i-mate is a three syllable word, so we need to repeat frames 2 through 5 twice.



-AN-

F5: start



F6: F2 repeat



F7: F3 repeat



F8: F4 repeat



-/-

F9: F5 repeat



F10: F2 repeat



F11: F3 repeat



F12: F4 repeat



F13: F5 repeat



-MATE-

3.8 Turning Animation

This is a much more advanced animation than the previous animations because we will now change the position of the bunny's body. Before we were only animating parts of his face.

F1: start



F2:turn1



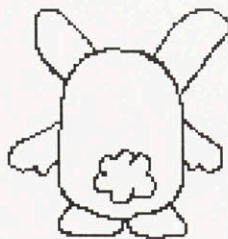
F3:turn2



F4:turn3



F5:turn4



F6:turn5



F7:turn6



F8:turn7

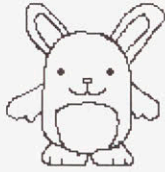


3.9 Complex Animations

Complex animations are made by combining simpler animations into one animation.

Example: Lets combine the talking and blinking animation into one animation.

F1: start



F2: b-talk1



F3: b-talk2



F4: b-talk1



F5 start



Now come up with your animations.

Chapter 4: How to Sew Arpin the Turtle

Materials:

- 24" x 24" piece of light green fabric
- 24" x 18" piece of dark green fabric
- 7" x 6" piece of yellow fabric
- black shiny button eyes about 1/2" in diameter
- light green thread
- dark green thread
- yellow thread
- black thread
- red thread
- stuffing

Preparation

Wash and dry all of the fabric. This will remove any excess dye from the fabric, and will shrink the fabric so that it is easier to work with. Before marking down the pattern, make sure that you iron out any wrinkles in the fabric. Cut out the pattern and mark out the pieces on the fabric, leaving at least an inch of space between each and from the fabric's edge, as seen in Figures 4.1, 4.2, and 4.3. Draw in the mouth, eyes, and tummy lines of the turtle on the wrong side of the fabric, using the pattern as a guide. Cut out the fabric so that there is a half inch of material surrounding each piece as seen in Figure 4.3.

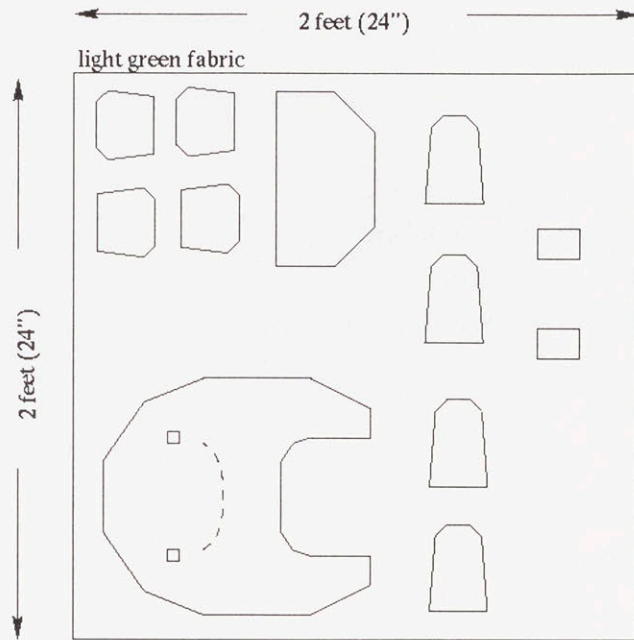


Figure 4.1: Arrangement of pieces for the light green fabric

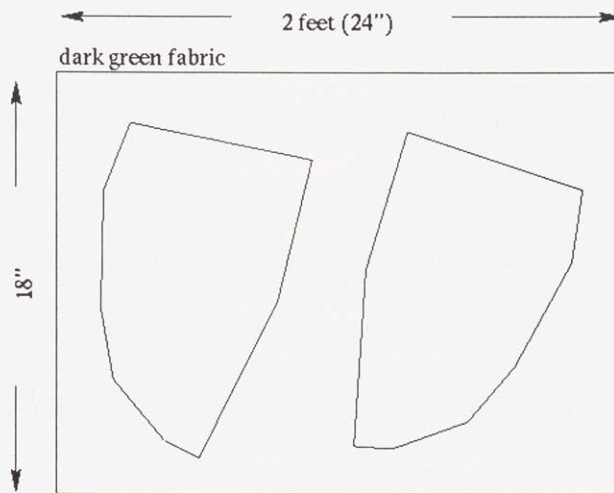


Figure 4.2: Arrangement of pieces for the dark green fabric

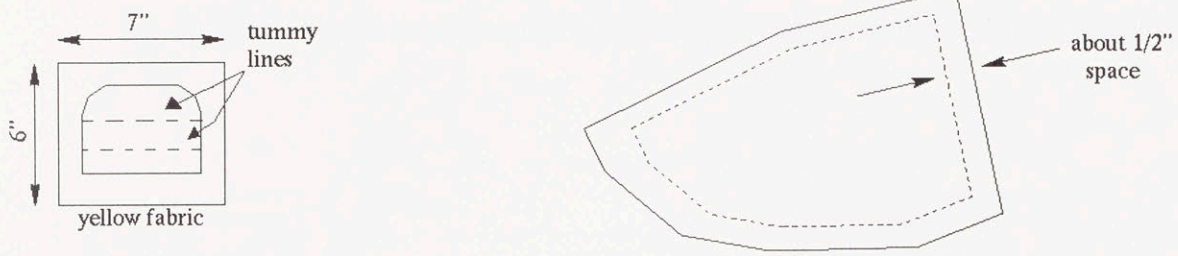


Figure 4.3: (l) Arrangement of pieces on yellow fabric (r) Example of cut piece.

Sewing

Draw in the diagonals on the “eye box” that you drew on the turtle front piece. Where the diagonals intersect is where you will center the button eyes to sew. Backstitch in the mouth with black thread. Use black thread to sew on the eyes so that they appear on the Right side.



Figure 4.4: Attaching the eyes to the front piece

Backstitch in the tummy lines with red thread, and attach the tummy to the front piece starting from **N** circling around to **O**, **P** and ending at **Q**, as shown in Figure 4.5.

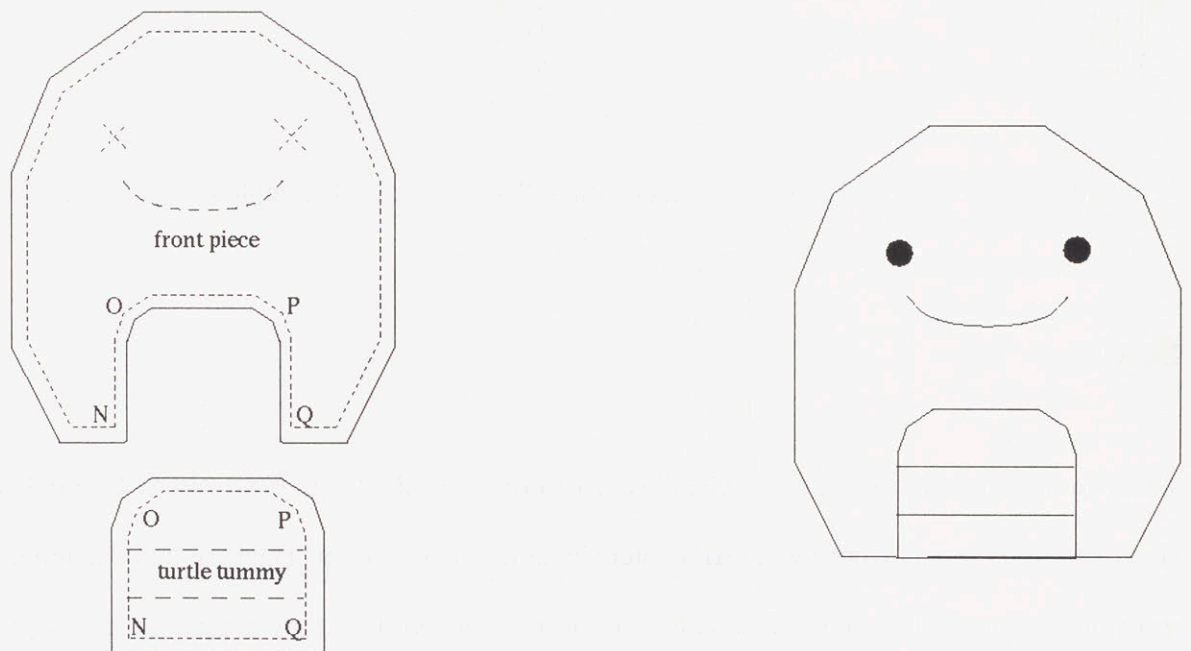


Figure 4.5: (l) Guide to sewing the tummy to the front piece. (r) Right side after sewing on the tummy

Sew on the hands to the front piece from **C** to **D**. Sew on the feet to the front piece from **E** to **F**. Shown in Figure 4.6.

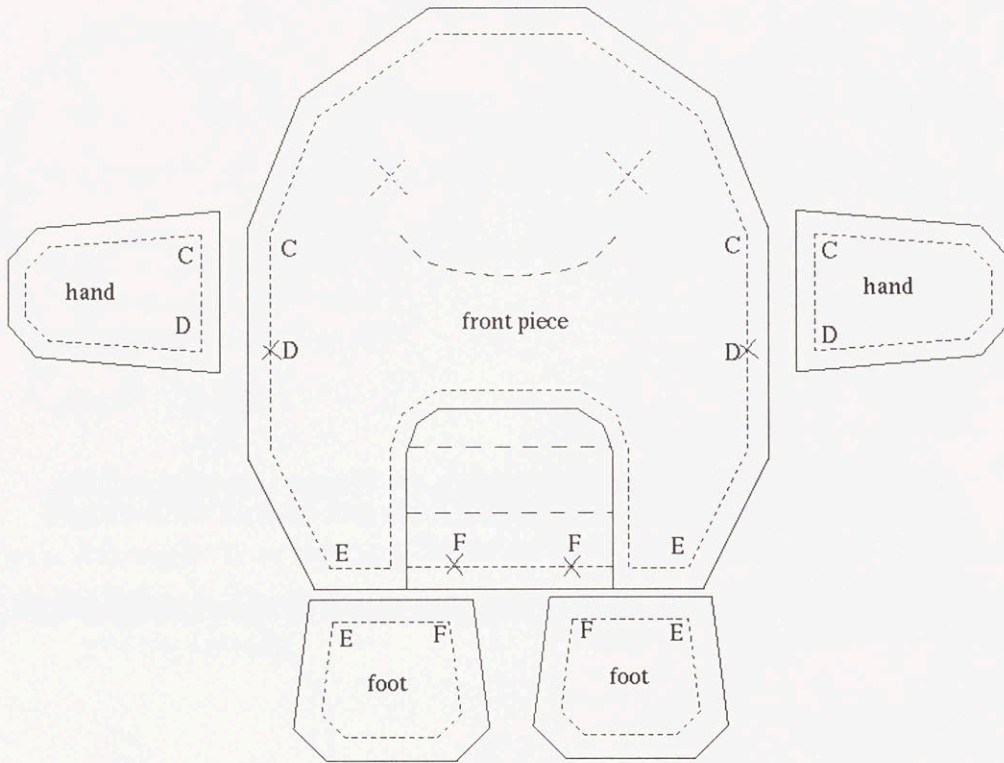


Figure 4.6: Guide to sewing on hands and feet to front piece.

Unfold the hands and feet from the front piece, folding them on their seams. Iron the seams and pieces flat. Shown in Figures 4.7 and 4.8.

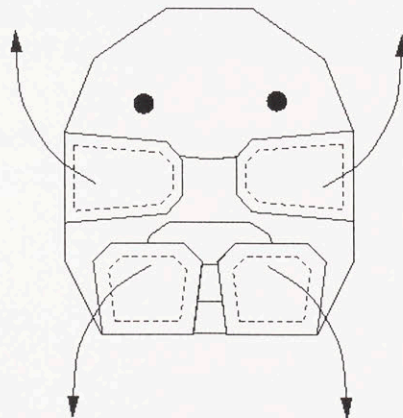


Figure 4.7: Unfold and iron at the seams.

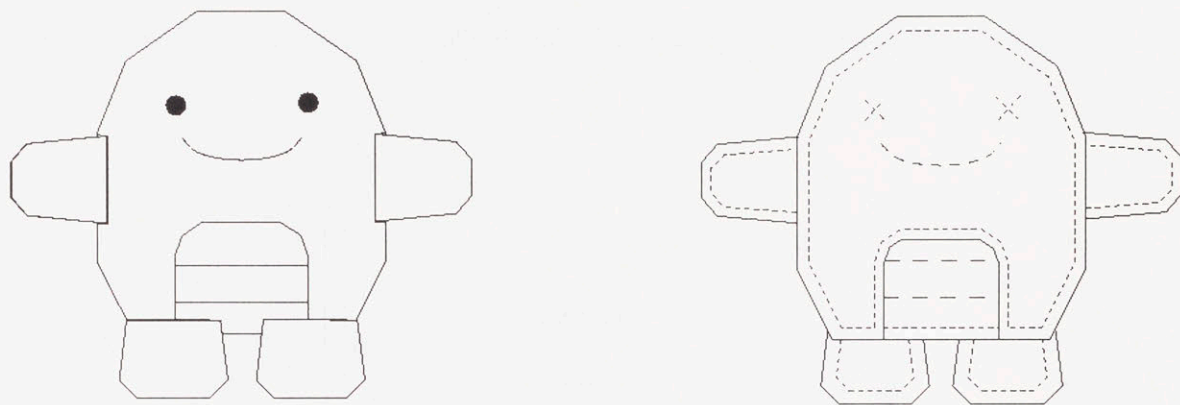


Figure 4.8: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on the feet to the bottom piece from points **E** to **F** as show in Figure 4.9.

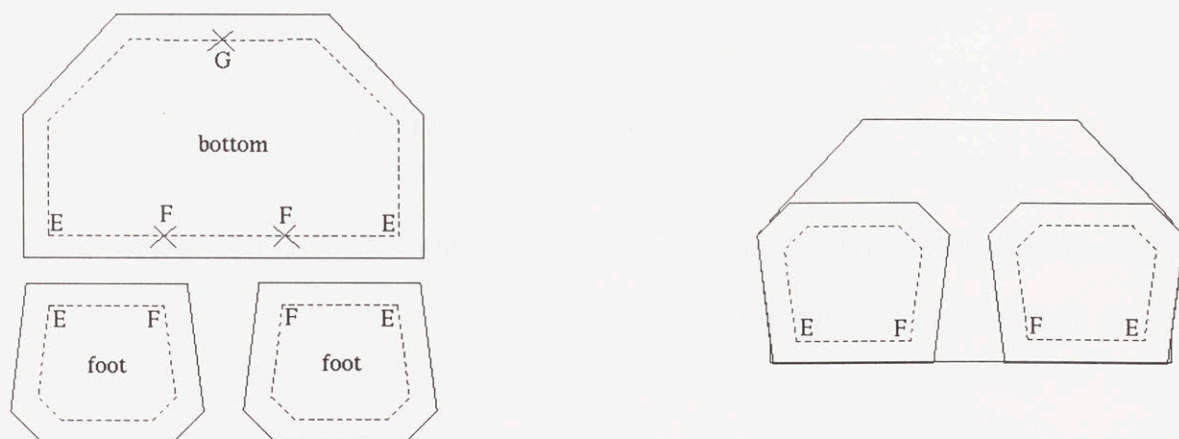


Figure 4.9: (l) Guide to sewing on the feet. (r) Right side of the bottom piece after sewing on feet.

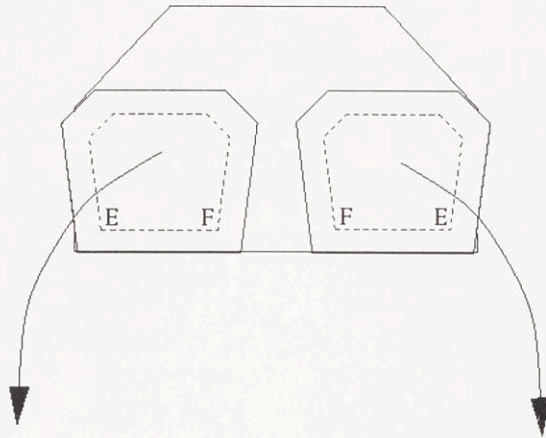


Figure 4.10: Unfold feet from bottom piece at the seams and iron flat.

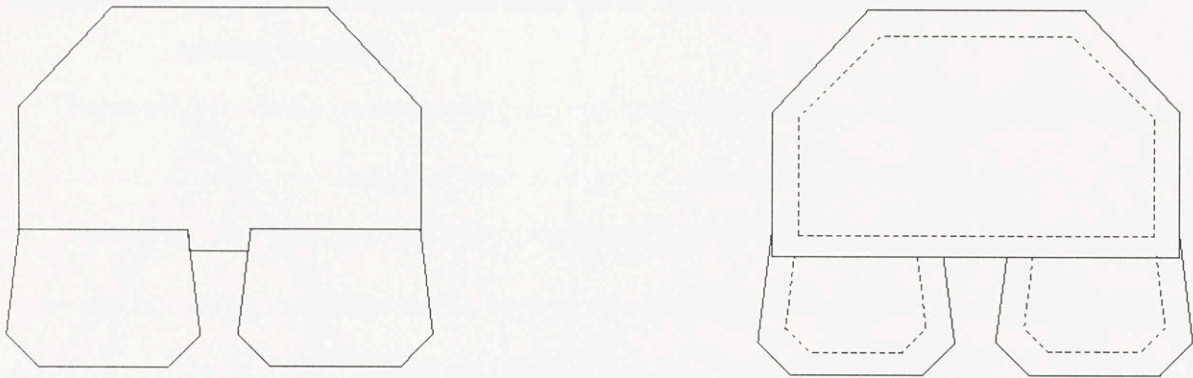


Figure 4.11: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on the hand to the “alpha” back piece from **C** to **D** as shown in Figure 4.12.

Unfold at seams and iron flat as shown in Figure 4.13.



Figure 4.12: (l) Guide to sewing on hand to “alpha” back piece. (r) Right side after sewing on hand.

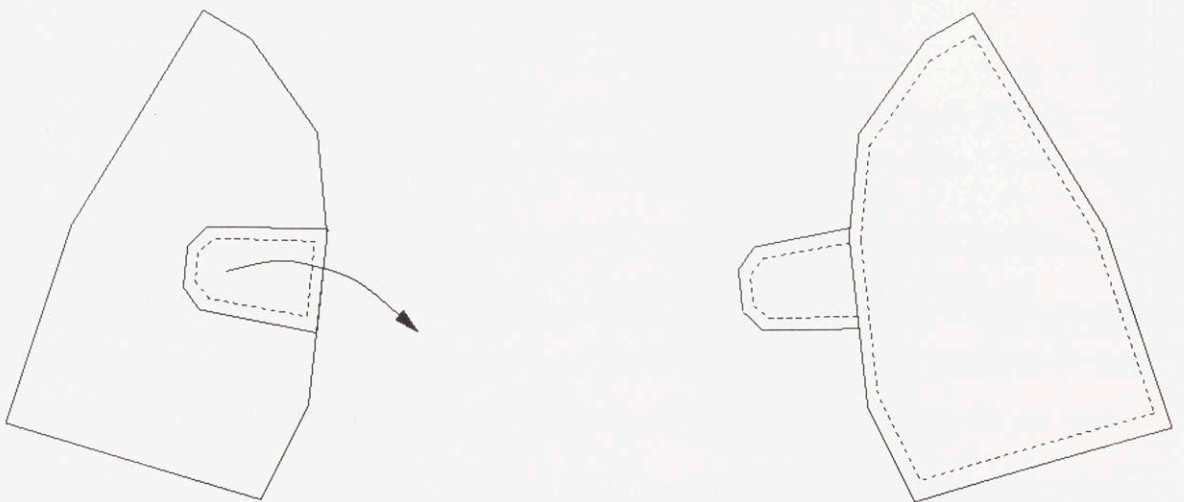


Figure 4.13: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Sew on the hand to the “beta” back piece from **C** to **D** as shown in Figure 4.14. Unfold at seams and iron flat as shown in Figure 4.15.

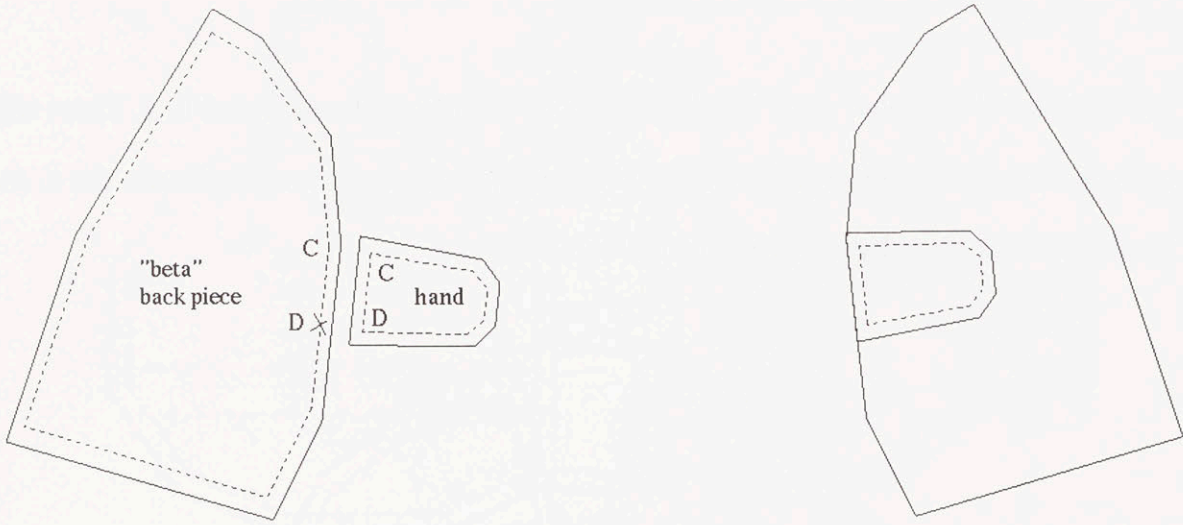


Figure 4.14: (l) Guide for sewing on hand fin to "beta" back piece. (r) Right side after sewing on hand.

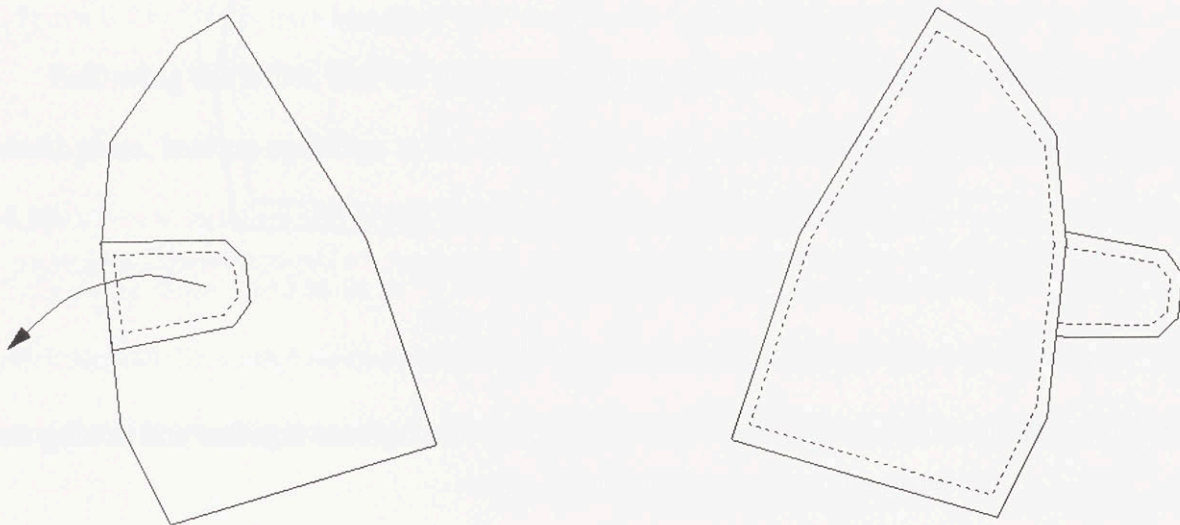


Figure 4.15: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Assembling

Sew together the “alpha” and “beta” back pieces from **G** to **H** and from **i** to **J**. There will only be an opening from **i** to **H**. Do not sew this opening shut! Sew on a turtle tail to the combined back piece by centering the tail on **G**.

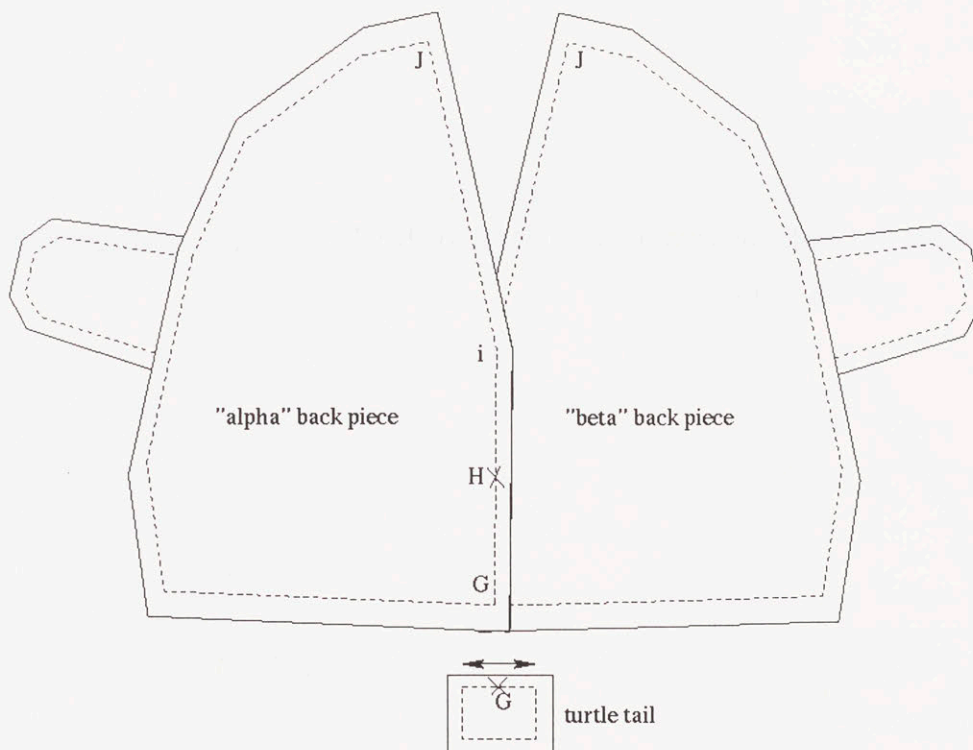


Figure 4.16: Guide to sewing the “alpha” and “beta” back pieces together and sewing on the turtle tail to the combined back piece.

Sew on a turtle tail to the bottom piece, centering the tail on **G**. Sew together the feet of the front piece to the bottom piece by circling around the feet from **e** to **f** and from **F** to **E** as shown in Figure 4.17. This will leave two openings at the base of the feet along **E** to **F** and **f** to **e**. Do not sew these openings shut! Notice that the front piece is only sewn *directly* to the bottom piece from **F** to **f**.

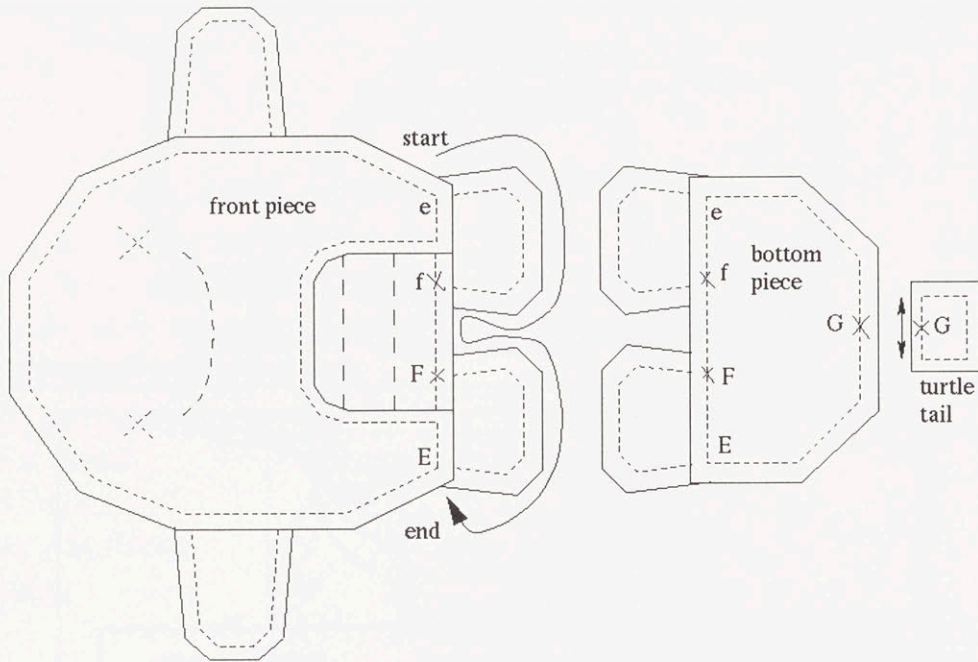


Figure 4.17: Guide to connecting the tail and the front piece to the bottom piece.

Following the arrow, sew the upper region of the combined back piece to the combined front piece, leaving openings at the base of the hand fins (**d** to **c** and **C** to **D**). See Figure 4.18.

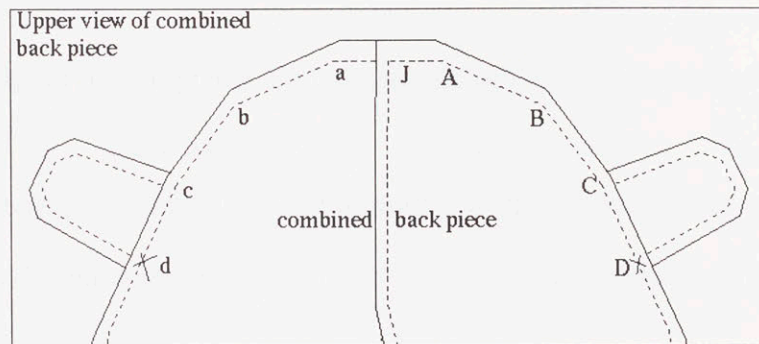
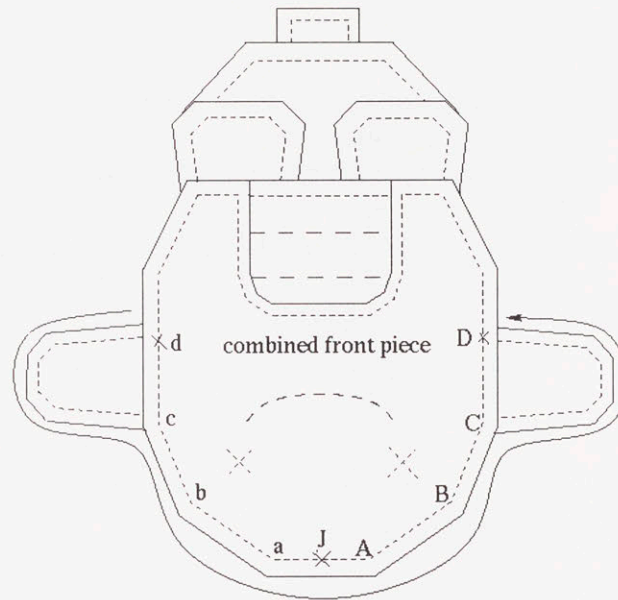


Figure 4.18: Guide to connecting the combined front piece to the combined back piece.

Continue to connect the combined back piece to the combined front piece by sewing from **d** to **k** to **e** and from **D** to **K** to **E** only. There will be a large opening from **e** to **G** to **E** of the combined back piece. See Figure 4.19.

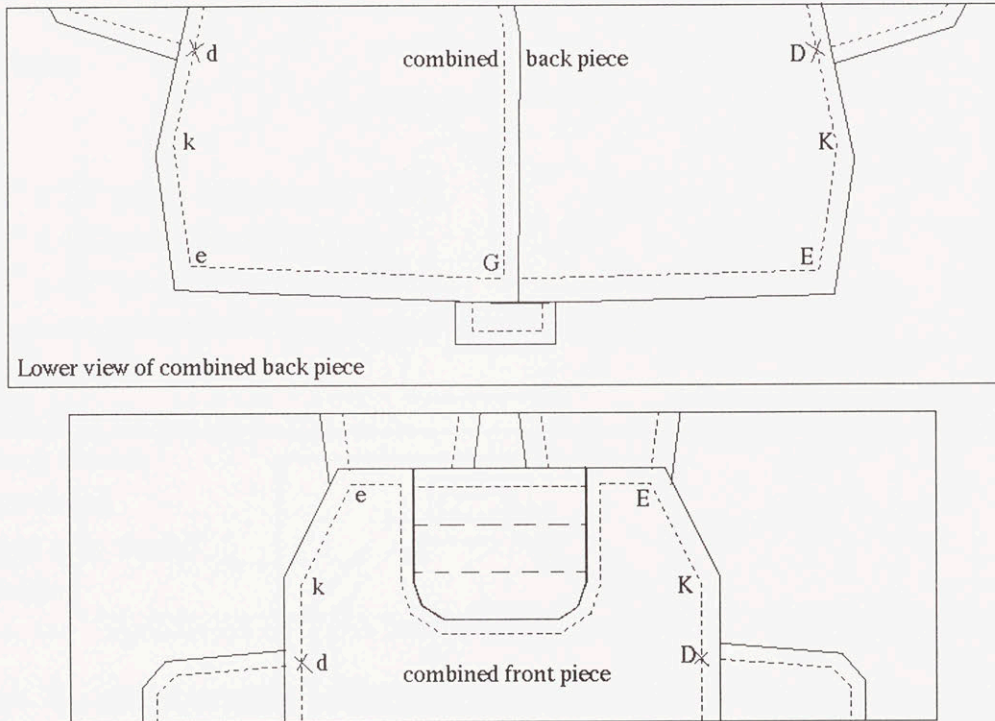


Figure 4.19: Guide to connecting the lower region of the combined back piece to the combined front piece.

Now sew together the bottom piece (from the combined front piece) to the combined back piece from **e** to **l** to **m** to **M** to **L** to **E** following the arrow as shown in Figure 4.20. Now the only opening that is left is on the back from **i** to **H**. This is the hole that you will turn the turtle inside out.

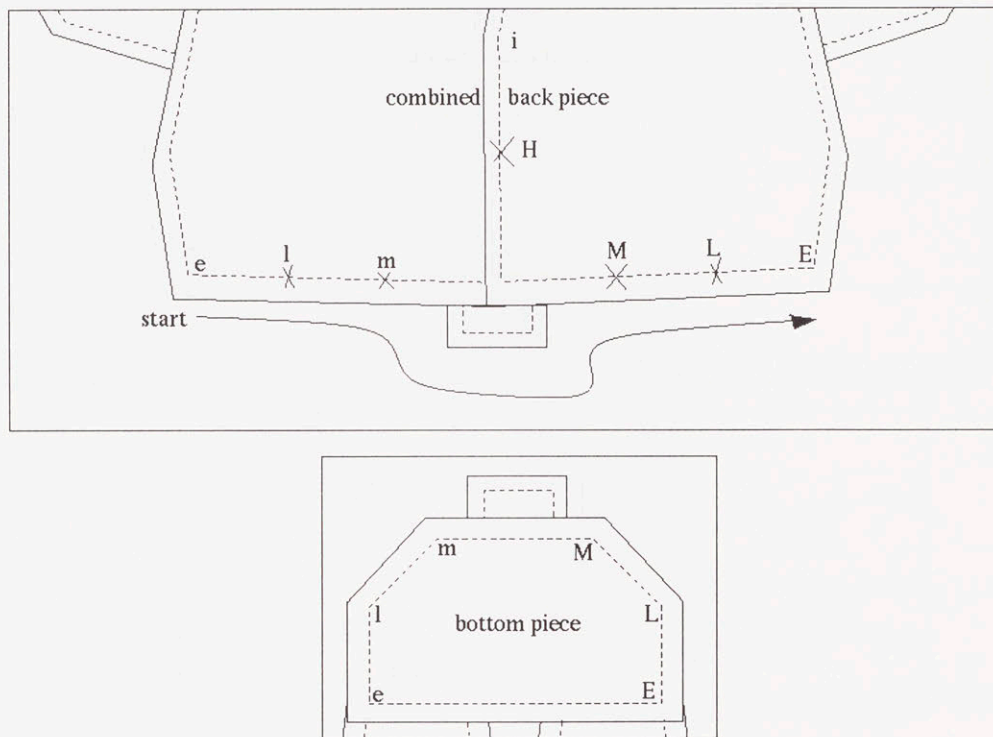


Figure 4.20: Guide to connecting the combined back piece to the bottom piece

Finishing

Turn the turtle inside out at the opening from **i** to **H**. Turn the hands, feet, and tail inside out as well. Stuff the hands, feet, tail, and body with polyester fiber to the level of firmness that you want. Close the opening in the back by lacing up the hole with thread.

Chapter 5: How to Sew Buggles the Fly

Materials:

- 32" x 24" piece of light gray fabric
- 12" x 12" piece of silver fabric
- 24" x 18" piece of dark gray fabric
- large red shiny button eyes about 1" in diameter
- silver thread
- dark gray thread
- black thread
- red thread
- light gray thread
- stuffing

Preparation

Wash and dry all of the fabric. This will remove any excess dye from the fabric, and will shrink the fabric so that it is easier to work with. Before marking down the pattern, make sure that you iron out any wrinkles in the fabric. Cut out the pattern and mark out the pieces on the fabric, leaving at least an inch of space between each and from the fabric's edge, as seen in Figures 5.1 and 5.2. Draw in the mouth and eyes of the bug on the wrong side of the fabric, using the pattern as a guide. Cut out the fabric so that there is a half inch of material surrounding each piece as seen in Figure 5.3.

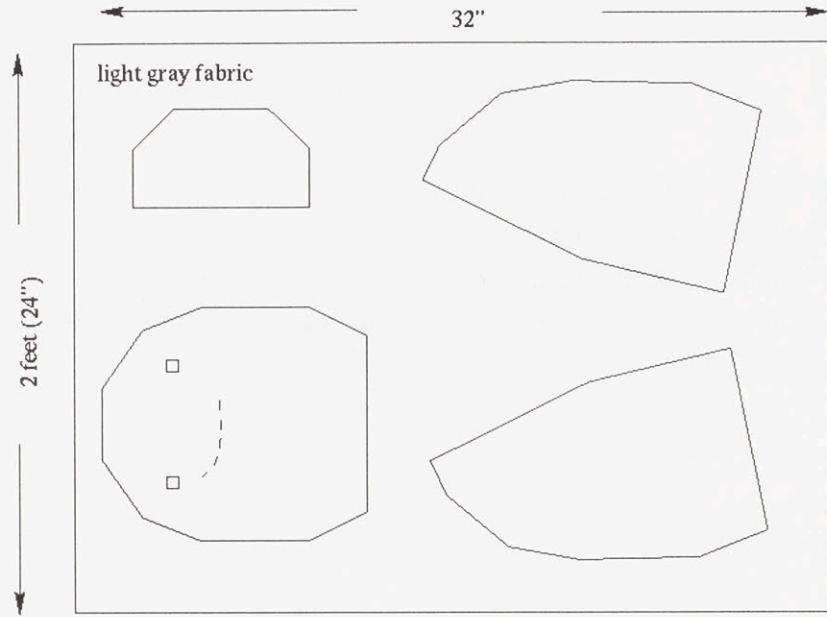


Figure 5.1: Arrangement of pieces for the light gray fabric

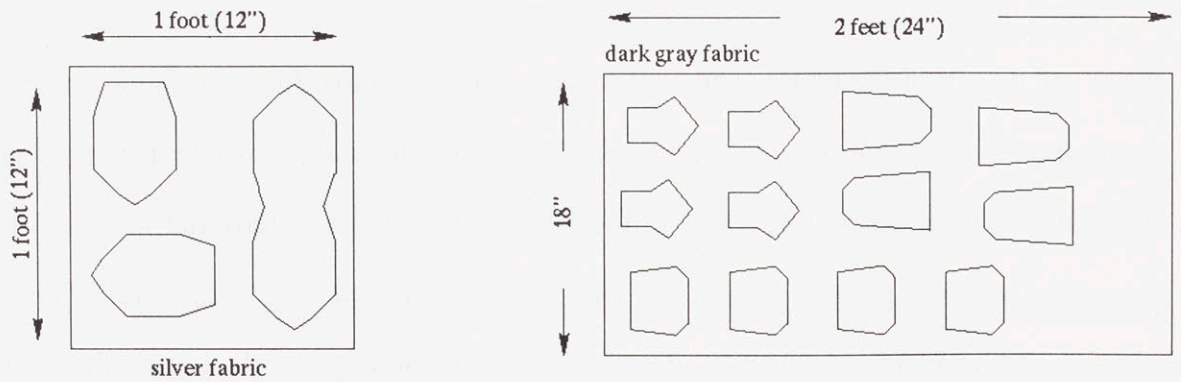


Figure 5.2: Arrangement of pieces for (l) the silver fabric and (r) the dark gray fabric

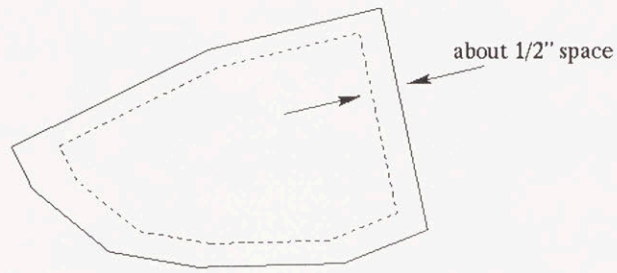


Figure 5.3: Example of cut piece

Sewing

Draw in the diagonals on the “eye box” that you drew on the bug front piece. Where the diagonals intersect is where you will center the button eyes to sew. Backstitch in the mouth with black thread. Use the red thread to sew on the eyes so that they appear on the Right side.

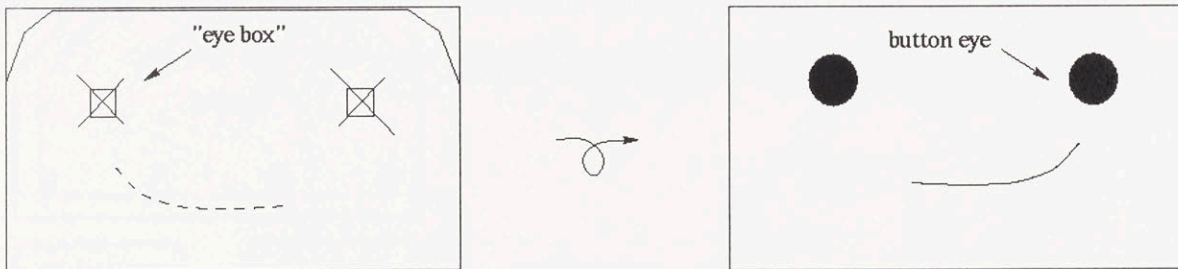


Figure 5.4: Attaching the eyes to the front piece

Sew on the bug ears from **A** to **B** on the front piece. Sew on the hands to the front piece from **C** to **D**. Sew on the feet to the front piece from **E** to **F**. Shown in Figure 5.5.

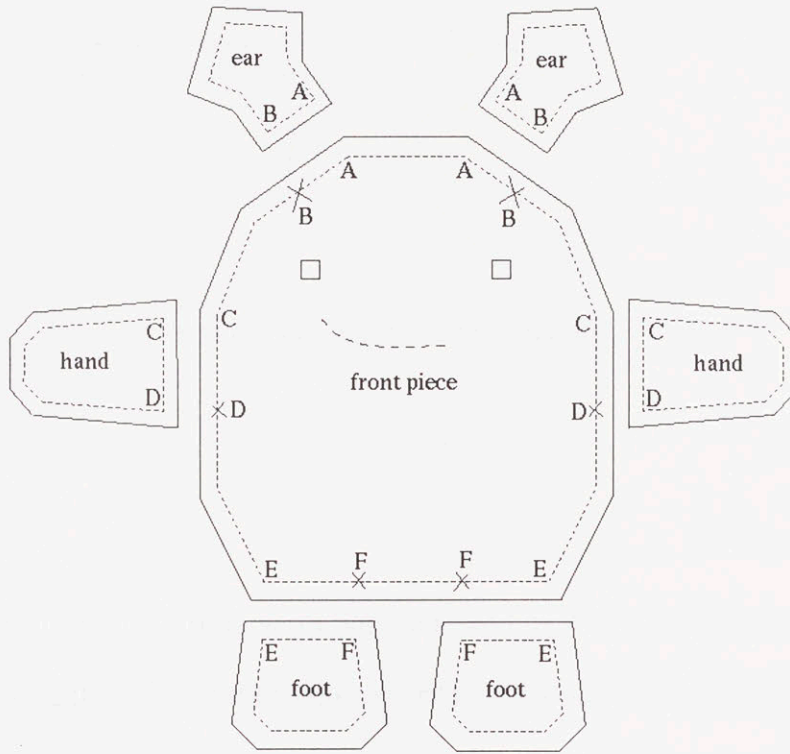


Figure 5.5: Guide to sewing on ears, hands, and feet to front piece

Unfold the ears, hands and feet from the front piece, folding them on their seams. Iron the seams and pieces flat. Shown in Figures 5.6 and 5.7.

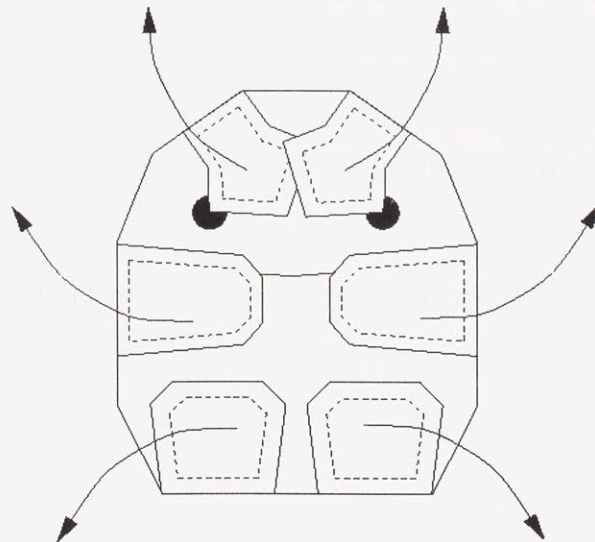


Figure 5.6: Unfold and iron at the seams.

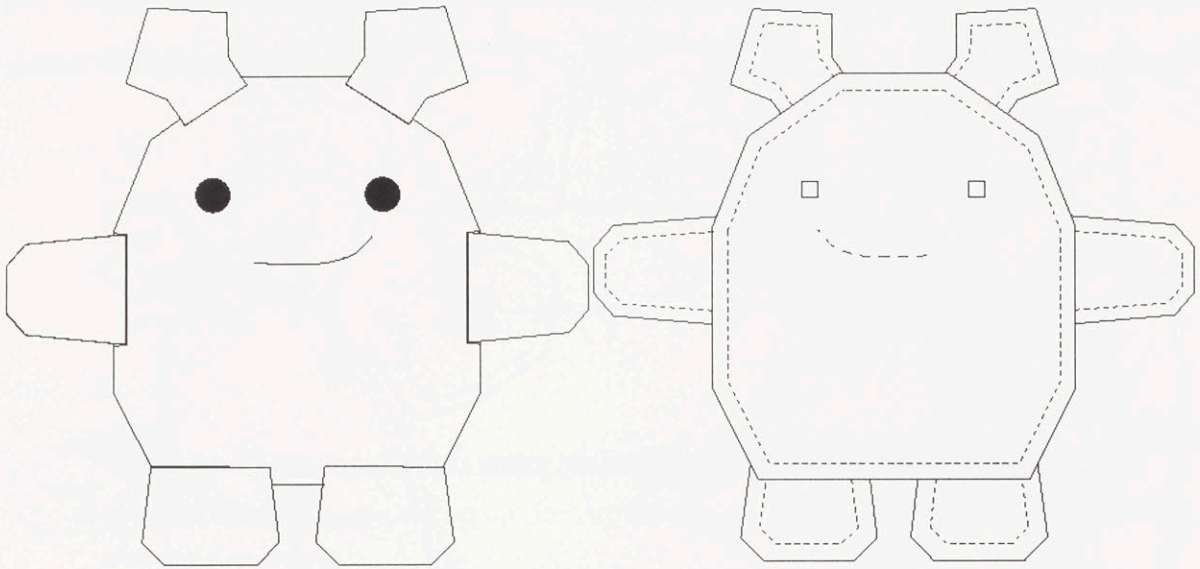


Figure 5.7: (l) Right side after ironing seams flat. (r) Wrong side after ironing

Sew on the feet to the bottom piece from points **E** to **F** as show in Figure 5.8.

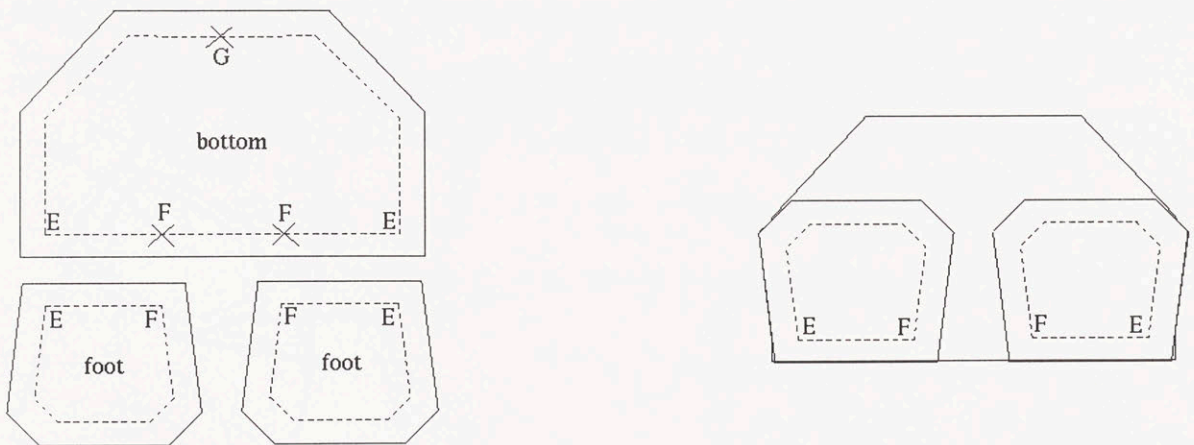


Figure 5.8: (l) Guide to sewing on the feet. (r) Right side of the bottom piece after sewing on feet.

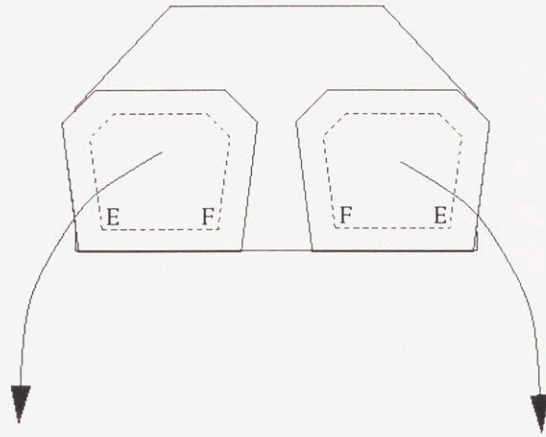


Figure 5.9: Unfold feet from bottom piece at the seams and iron flat.

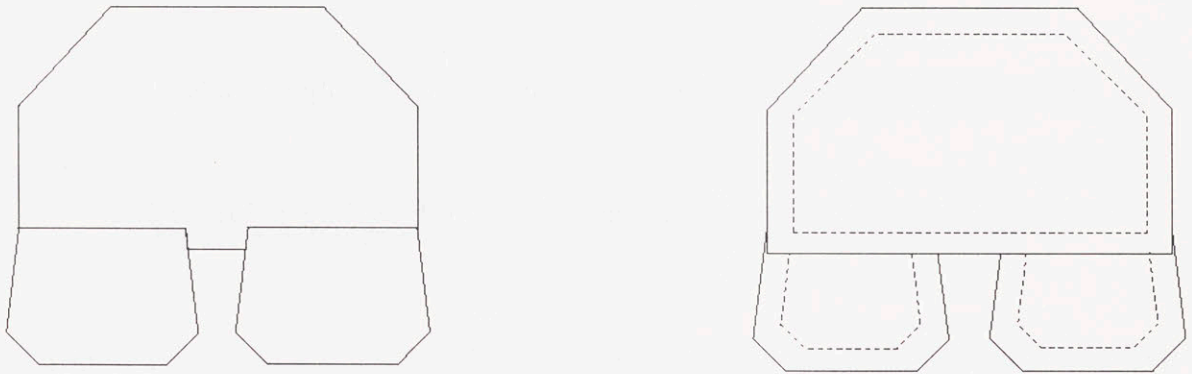


Figure 5.10: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on a bug ear to the “alpha” back piece from **A** to **B**, a hand from **C** to **D**, and a single wing piece from **i** to **K**, as shown in Figure 5.11. Unfold at seams and iron flat as shown in Figure 5.12.

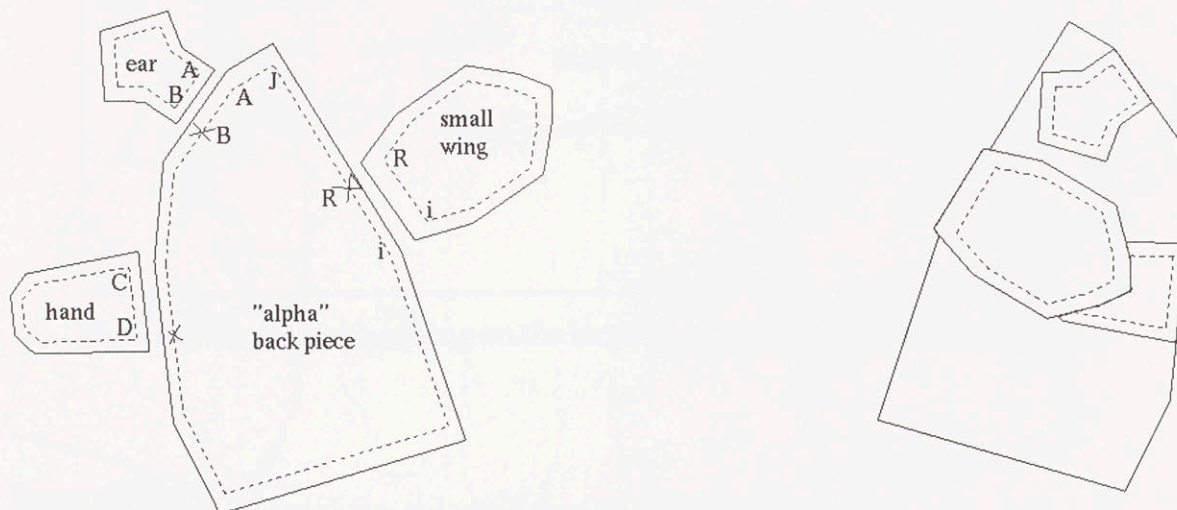


Figure 5.11: (l) Guide for sewing on bug ear, hand and single wing piece to “alpha” back piece. (r) Right side after sewing on bug ear, hand, and wing piece.

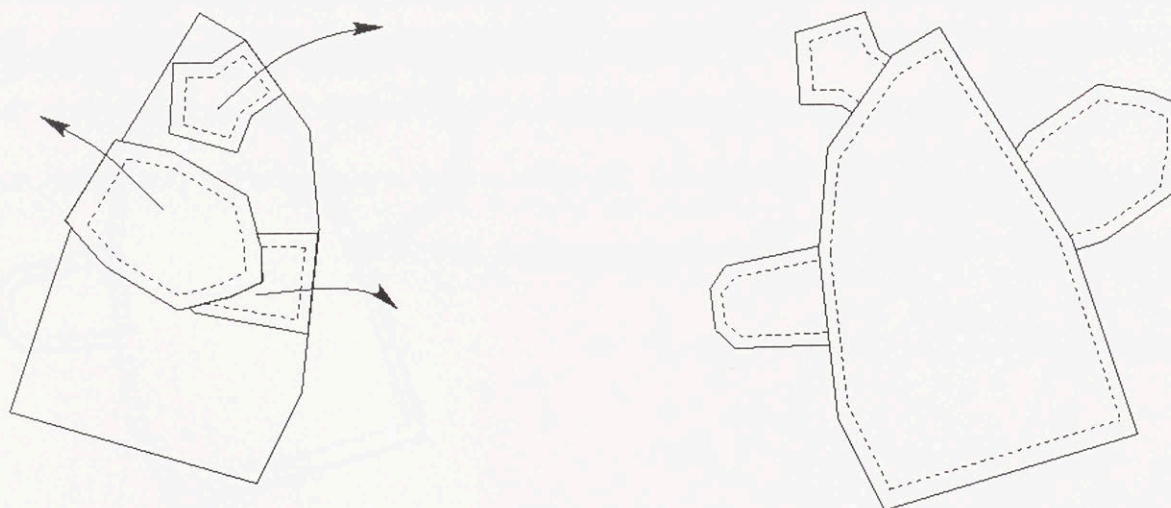


Figure 5.12: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Sew on a bug ear to the “beta” back piece from **A** to **B**, a hand from **C** to **D**, and a single wing piece from **i** to **K**, as shown in Figure 5.13. Unfold at seams and iron flat as shown in Figure 5.14.

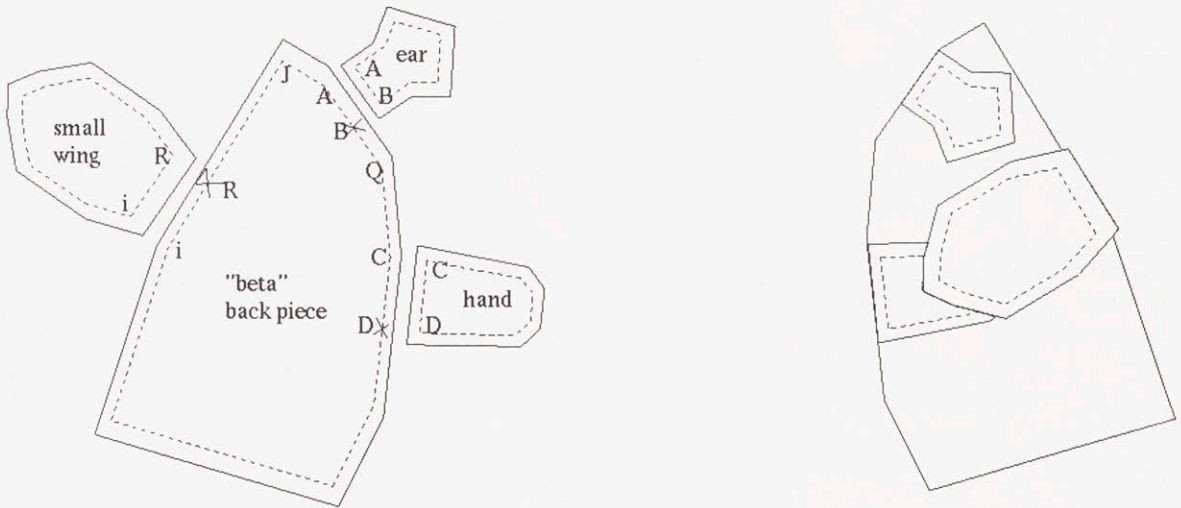


Figure 5.13: (l) Guide for sewing on bug ear, hand, and single wing piece to “beta” back piece. (r) Right side after sewing on bug ear, hand, and wing piece.

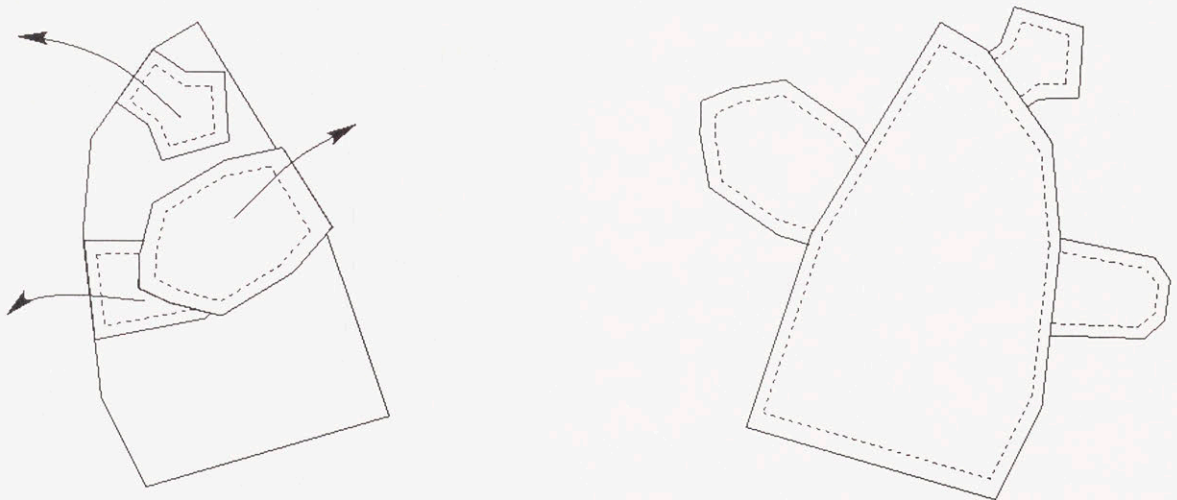


Figure 5.14: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Sew the large wing piece to both the small wings located on the “alpha” and “beta” back pieces, following the arrows, starting from **i** and ending at **K**. See Figure 5.15.

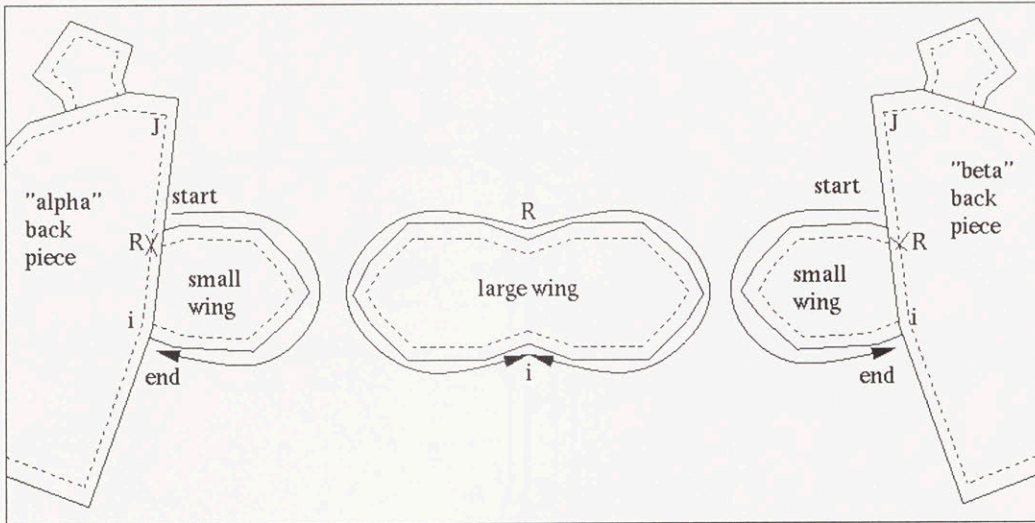


Figure 5.15: Guide to sewing on the large wing piece to the small wing pieces.

Assembling

Connect the "alpha" and "beta" back pieces by sewing from **G** to **H**. **H** is located at the midpoint of line **iG**. Then sew the back pieces together from **J** to **R**. There will only be an opening from **i** to **H**. Do not sew this opening shut!

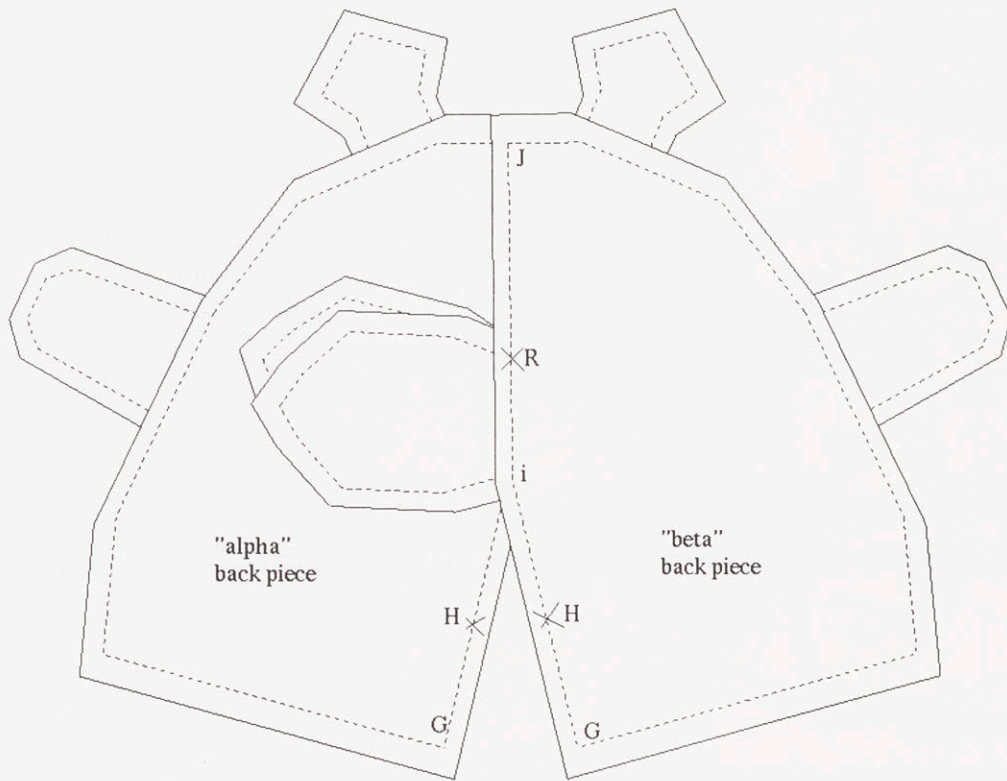


Figure 5.16: Sew together “alpha” and “beta” back pieces from **G** to **H** and from **J** to **R**.

Sew together the feet of the front piece to the bottom piece by circling around the feet from **e** to **f** and from **F** to **E** as shown in Figure 5.17. This will leave two openings at the base of the feet along **E** to **F** and **f** to **e**. Do not sew these openings shut! Notice that the front piece is only sewn *directly* to the bottom piece from **F** to **f**.

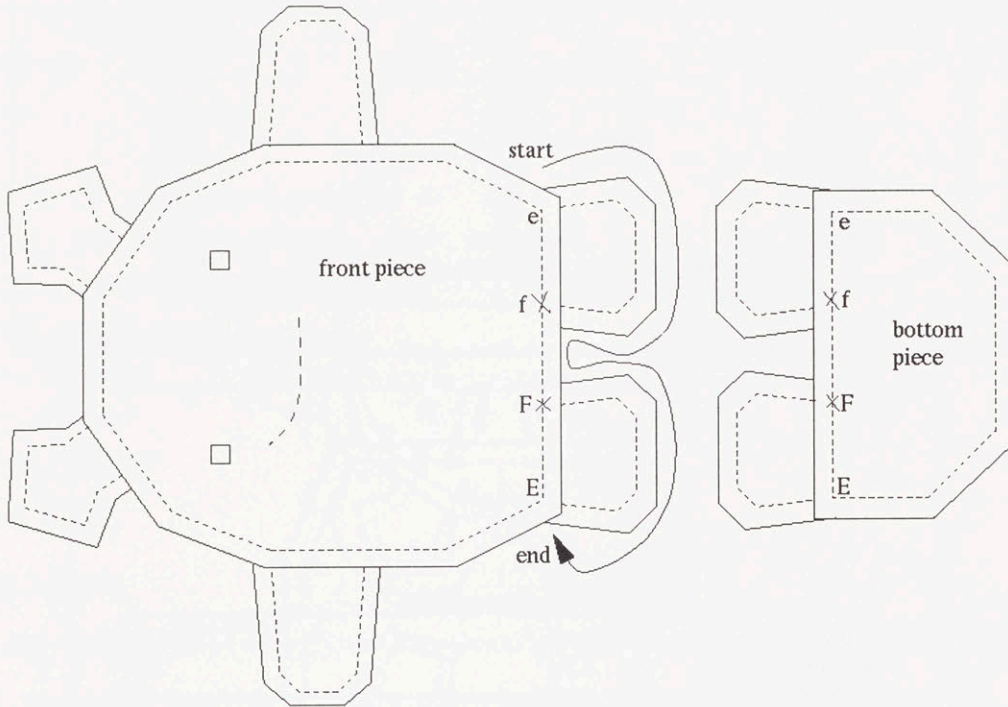


Figure 5.17: Guide to connecting the front piece to the bottom piece.

Following the arrow, sew the upper region of the combined back piece to the combined front piece, leaving openings at the base of the ears (b to **a** and **A** to **B**) and the base of the hands (**d** to **c** and **C** to **D**). See Figure 5.18.

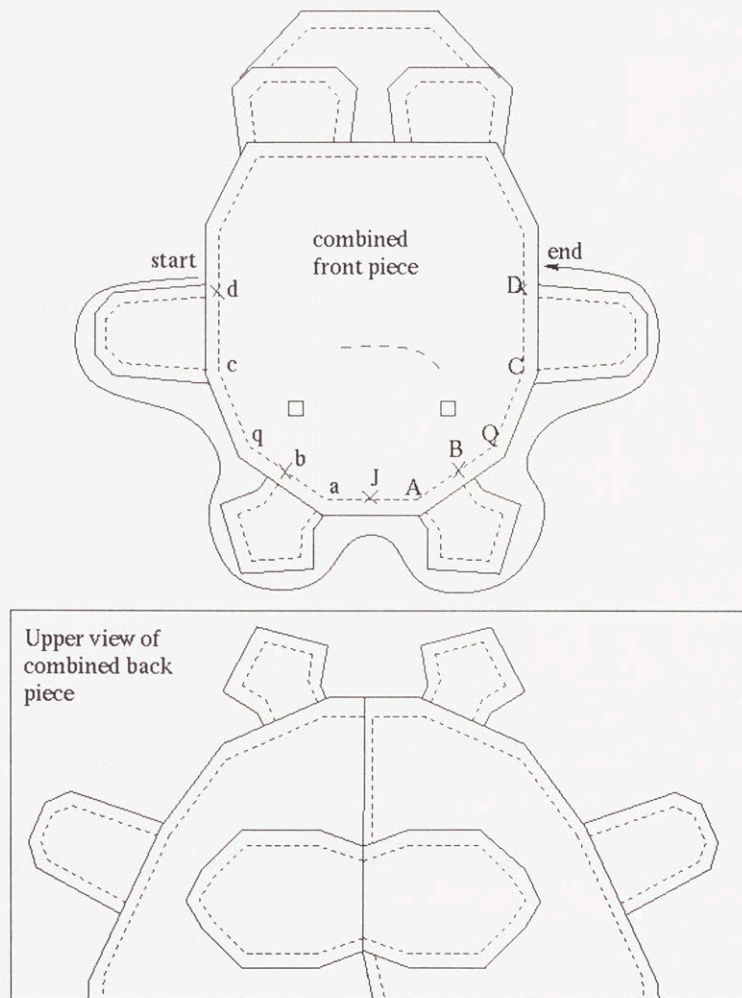


Figure 5.18: Guide to connecting the combined front piece to the combined back piece.

Continue to connect the combined back piece to the combined front piece by sewing from **d** to **k** to **e** and from **D** to **K** to **E** only. There will be a large opening from **e** to **G** to **E** of the combined back piece. See Figure 5.19.

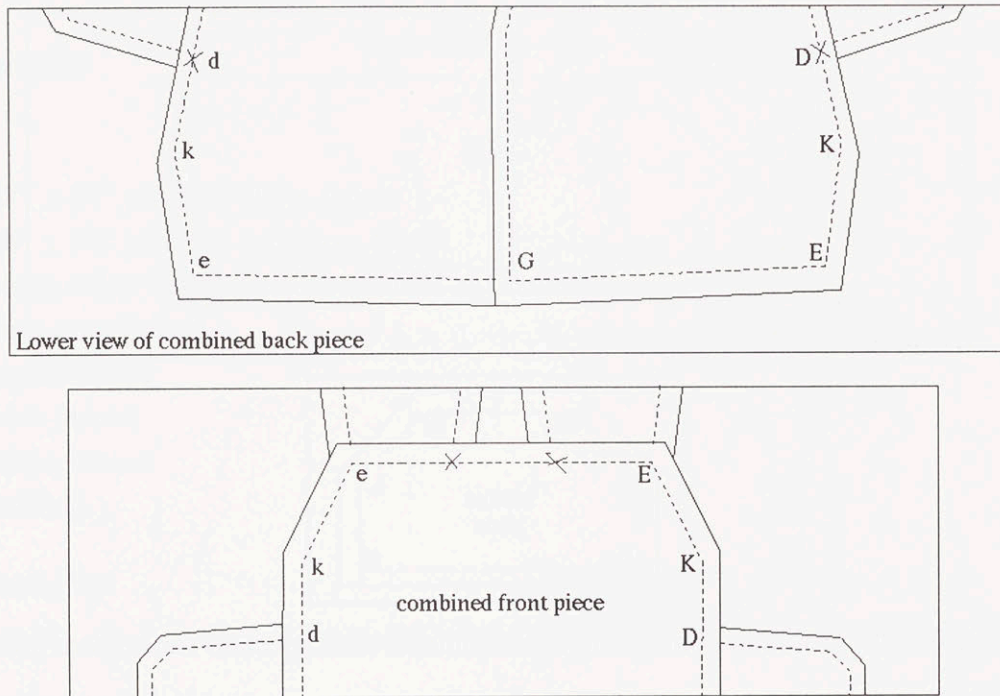


Figure 5.19: Guide to connecting the lower region of the combined back piece to the combined front piece.

Now sew together the bottom piece (from the combined front piece) to the combined back piece from **e** to **l** to **m** to **M** to **L** to **E** as shown in Figure 5.20. Now the only opening that is left is on the back from **i** to **H**. This is the hole that you will turn the bug inside out.

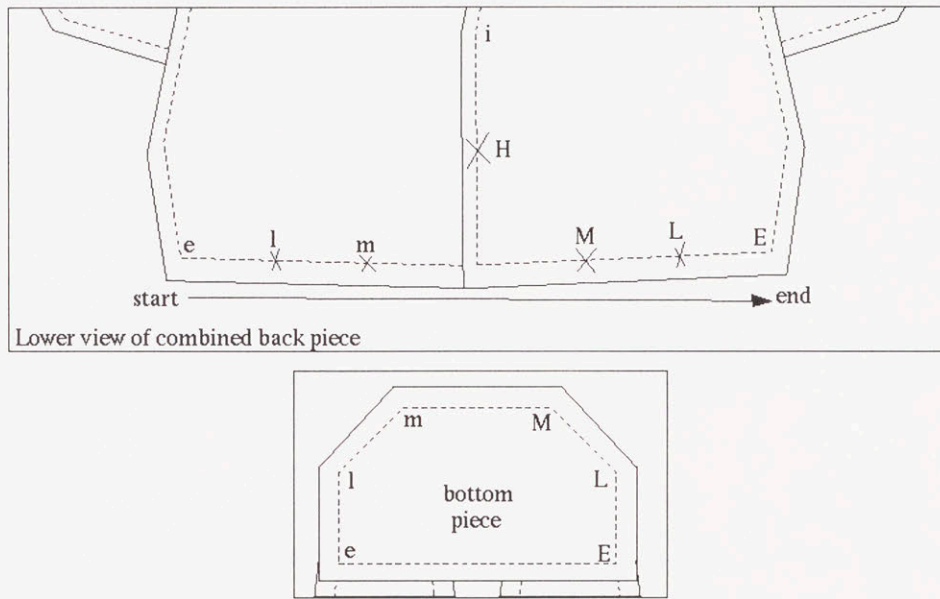


Figure 5.20: Guide to connecting the combined back piece to the bottom piece

Finishing

Turn the bug inside out at the opening from **i** to **H**. Turn the hands, feet, and ears inside out as well. Stuff the hands, ears, feet, wings, and body with polyester fiber to the level of firmness that you want. Close the opening in the back by lacing up the hole with thread.

Chapter 6: How to Sew Elbee the Lamb

Materials:

- 27" x 24" piece of white fabric
- 16" x 18" piece of dark gray fabric
- black shiny button eyes about 1/2" in diameter
- dark gray thread
- black thread
- pink thread
- white thread
- stuffing

Preparation

Wash and dry all of the fabric. This will remove any excess dye from the fabric, and will shrink the fabric so that it is easier to work with. Before marking down the pattern, make sure that you iron out any wrinkles in the fabric. Cut out the pattern and mark out the pieces on the fabric, leaving at least an inch of space between each and from the fabric's edge, as seen in Figures 6.1 and 6.2. Draw in the mouth, nose and eyes of the lamb on the wrong side of the fabric, using the pattern as a guide. Cut out the fabric so that there is a half inch of material surrounding each piece as seen in Figure 6.3.

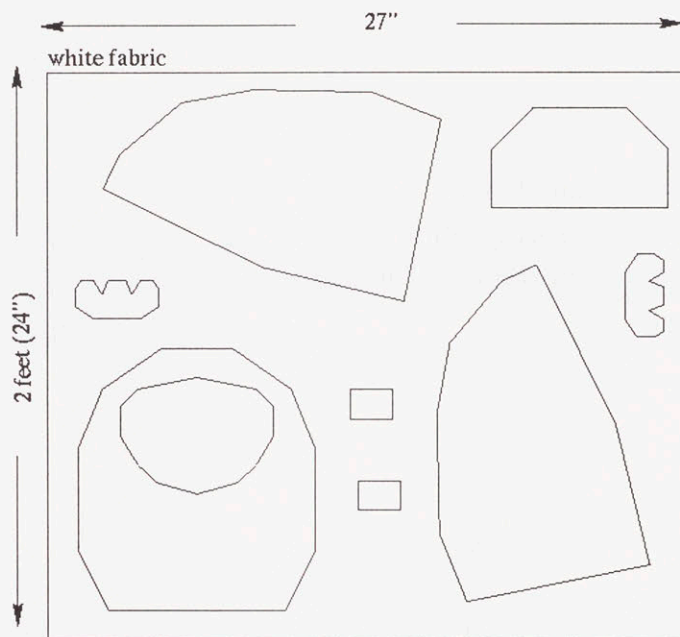


Figure 6.1: Arrangement of pieces for the bright teal fabric

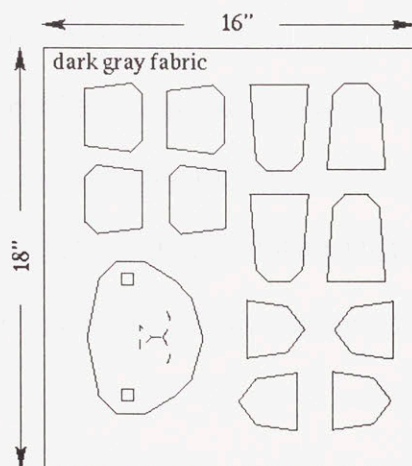


Figure 6.2: Arrangement of pieces for the royal fabric

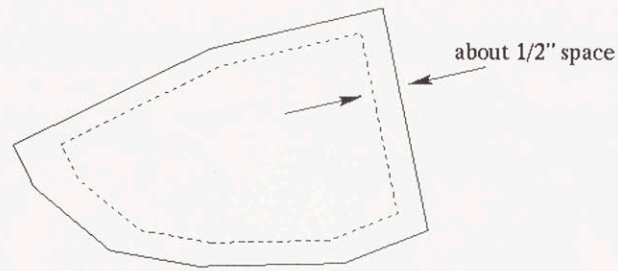


Figure 6.3: Example of cut piece.

Sewing

Draw in the diagonals on the “eye box” that you drew on the lamb front piece. Where the diagonals intersect is where you will center the button eyes to sew. Backstitch in the mouth with black thread, and the nose with pink thread. Use black thread to sew on the eyes so that they appear on the Right side

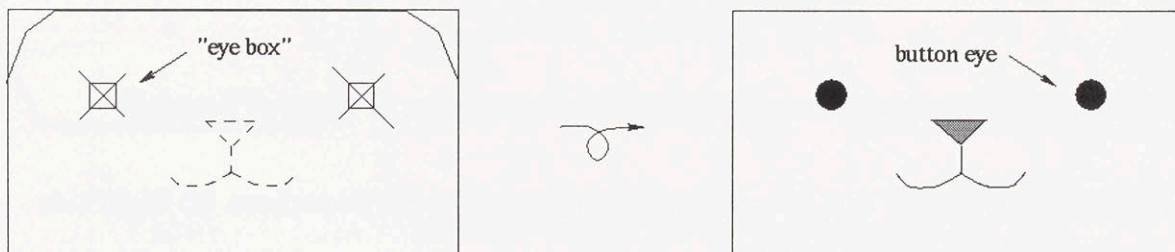


Figure 6.4: Attaching the eyes to the front piece.

Sew on the face piece to the front piece as shown in Figures 6.5 and 6.6

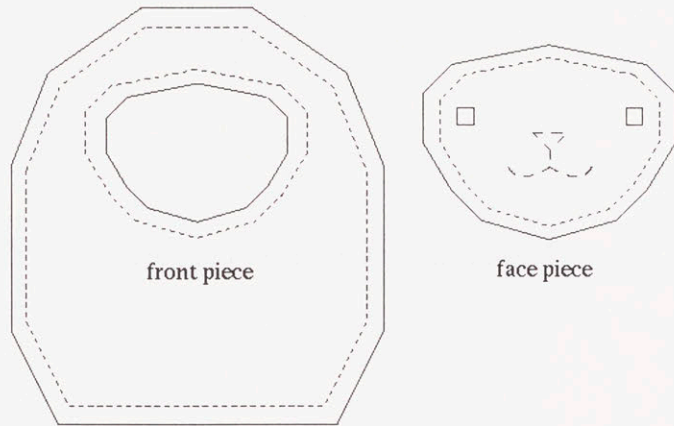


Figure 6.5: Attaching the face piece to the front piece

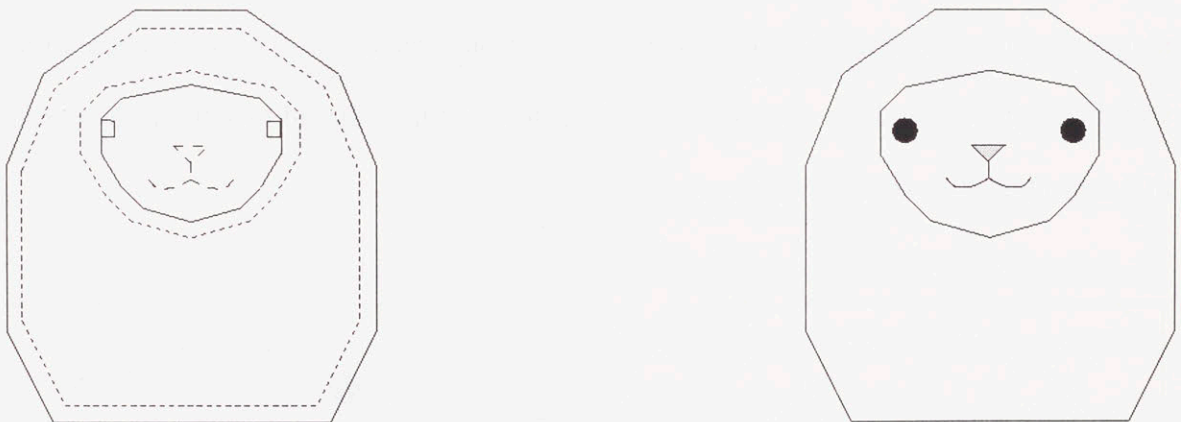


Figure 6.6: (l) Wrong side after sewing the face piece to the front piece. (r) Right side after sewing on face.

Sew on the hands to the front piece from **C** to **D**, the lamb ears from **A** to **B**, and a lamb tuft by centering on **J**. Sew on the feet to the front piece from **E** to **F**. Shown in Figure 6.7.

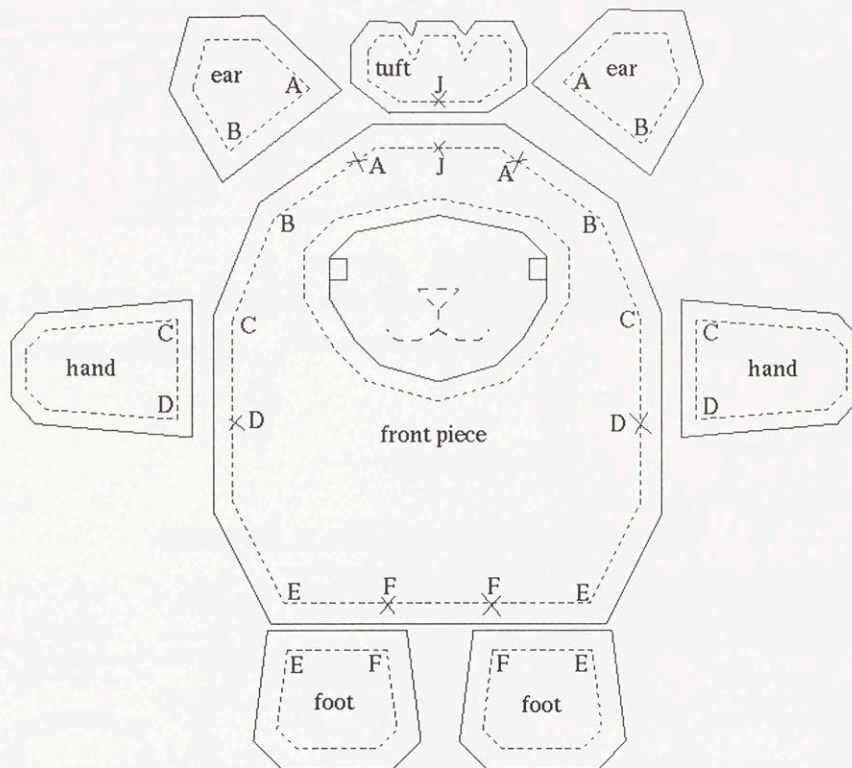


Figure 6.7: Guide to sewing on ears, hands, feet, and tuft to front piece.

Unfold the ears, hand fins and feet from the front piece, folding them on their seams. Iron the seams and pieces flat. Shown in Figures 6.8 and 6.9.

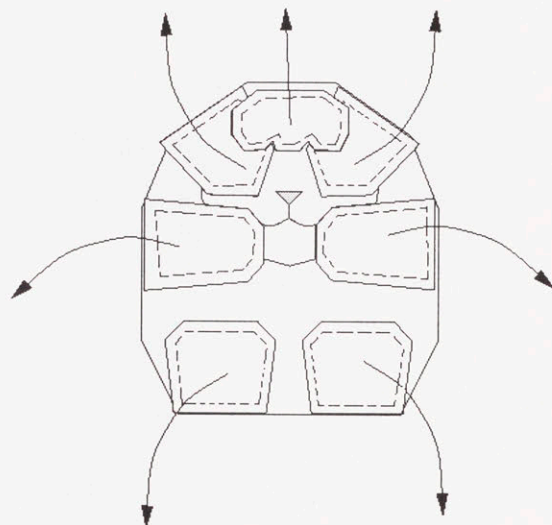


Figure 6.8: Unfold and iron at the seams.

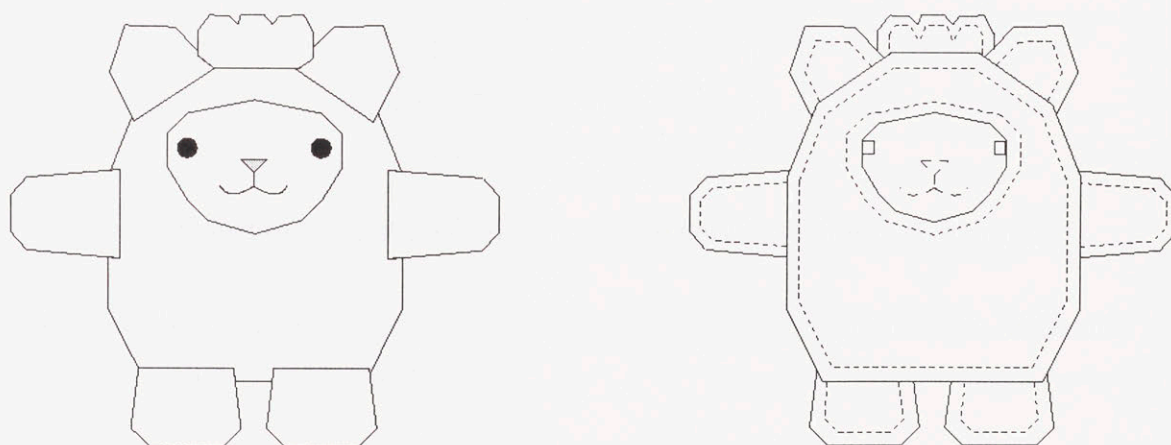


Figure 6.9: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on the feet to the bottom piece from points **E** to **F** as show in Figure 6.10.

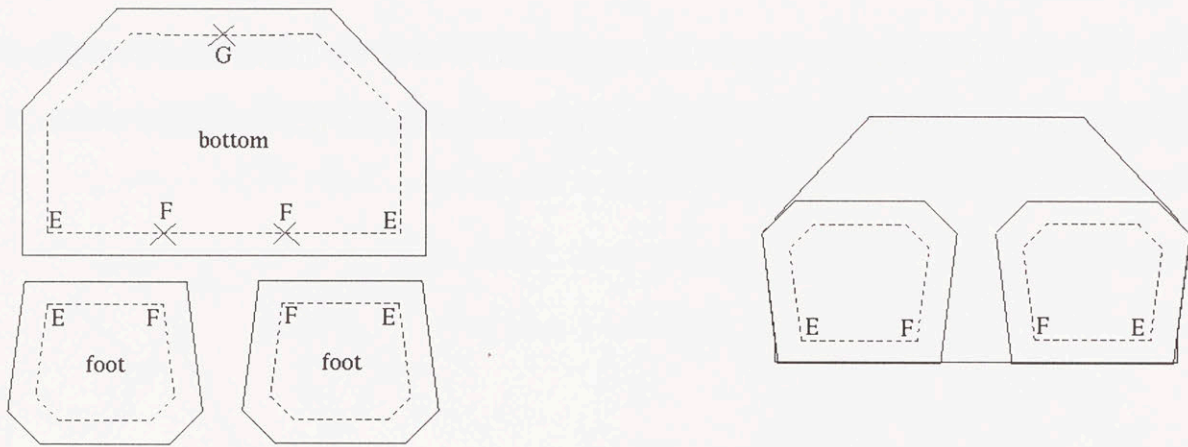


Figure 6.10: (l) Guide to sewing on the feet. (r) Right side of the bottom piece after sewing on feet.

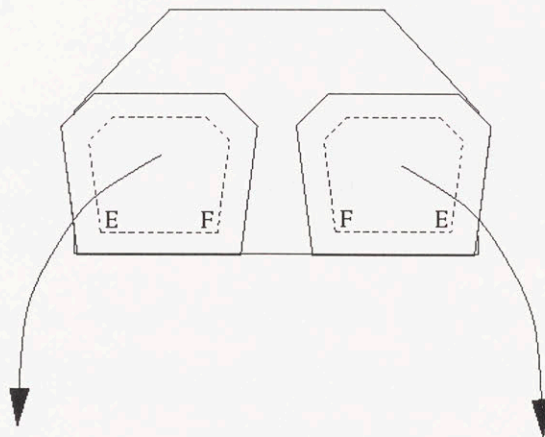


Figure 6.11: Unfold feet from bottom piece at the seams and iron flat.

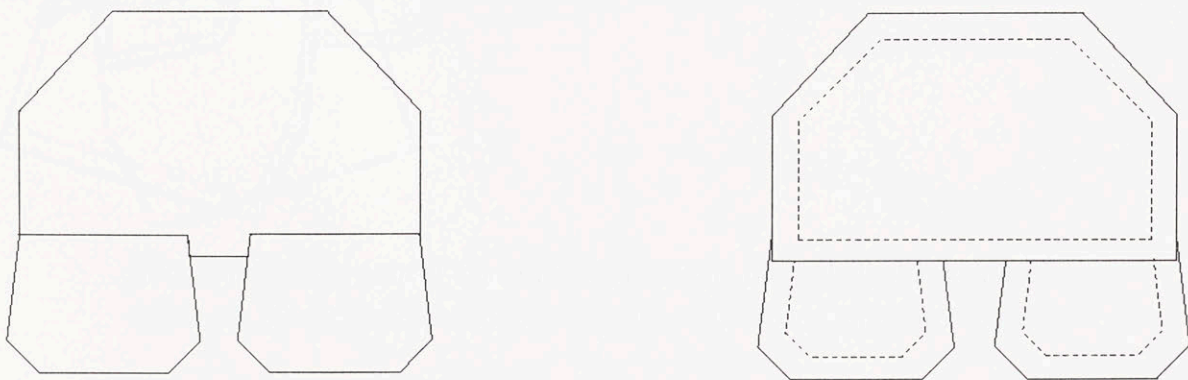


Figure 6.12: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on a lamb ear to the “alpha” back piece from **A** to **B**, the and an hand from **C** to **D** as shown in Figure 6.13. Unfold at seams and iron flat as shown in Figure 6.14.



Figure 6.13: (l) Guide for sewing on lamb ear and hand to “alpha” back piece. (r) Right side after sewing on eat and hand.

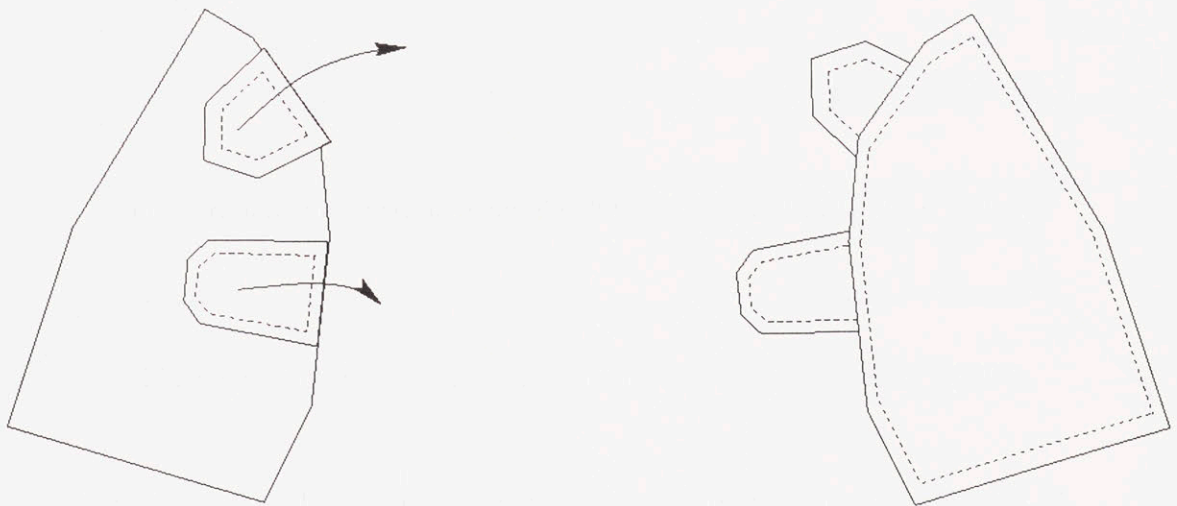


Figure 6.14: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Sew on a lamb ear to the “alpha” back piece from A to B, the and an hand from C to D as shown in Figure 6.15. Unfold at seams and iron flat as shown in Figure 6.16.

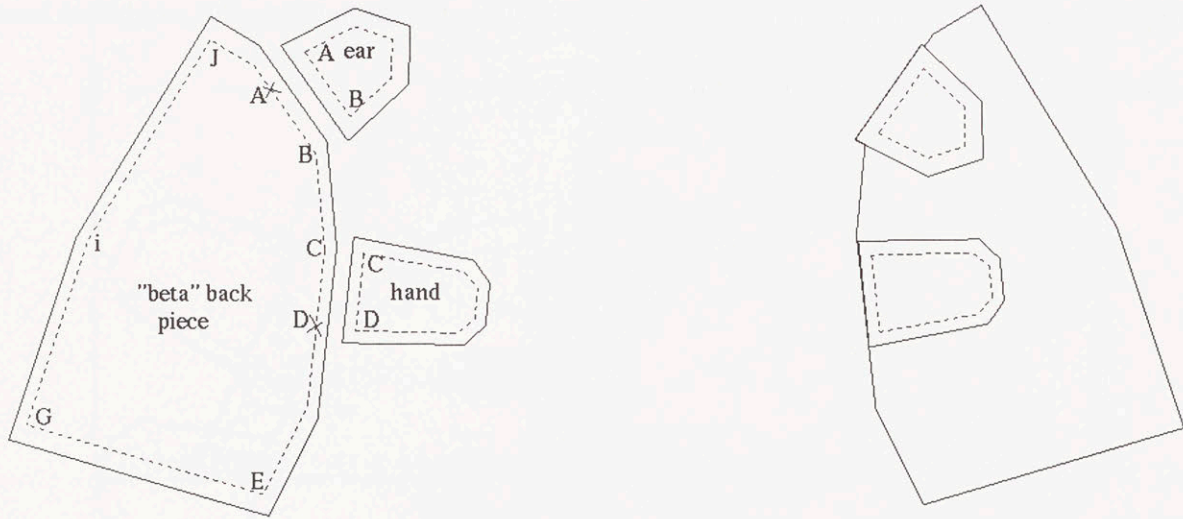


Figure 6.15: (l) Guide for sewing on lamb ear and hand to “beta” back piece. (r) Right side after sewing on ear and hand.

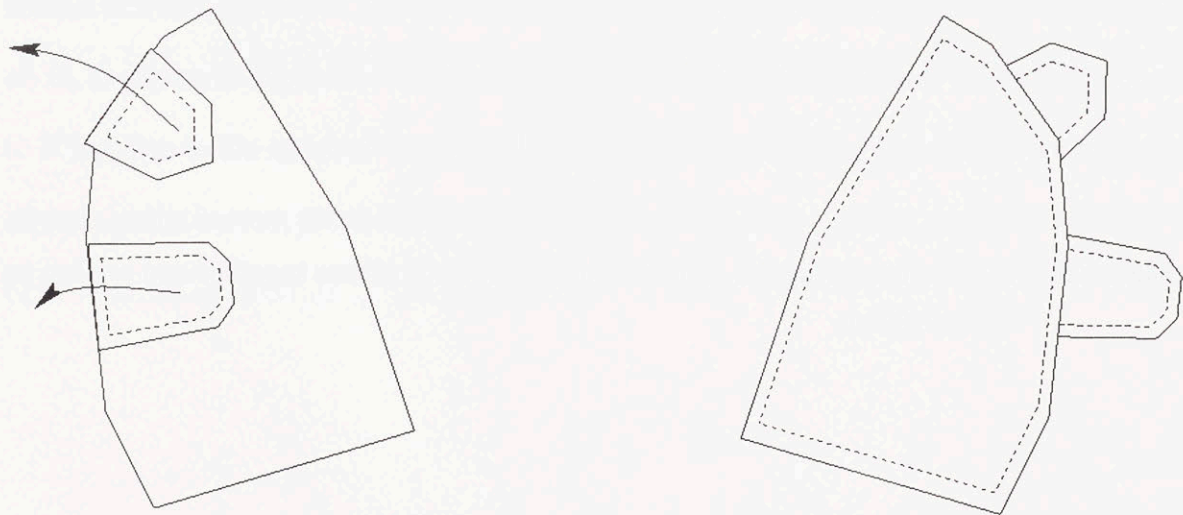


Figure 6.16: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Assembling

Sew the “alpha” and “beta” back pieces together starting from **G** to **H**. **H** is located at the midpoint of line **iG**. Then sew the back pieces together from **J** to **i**. There will be an opening from **i** to **H**. Do not sew this opening shut! Sew on the lamb tail to the combined back pieces, by centering the tail on **G**. Shown in Figure 6.17.

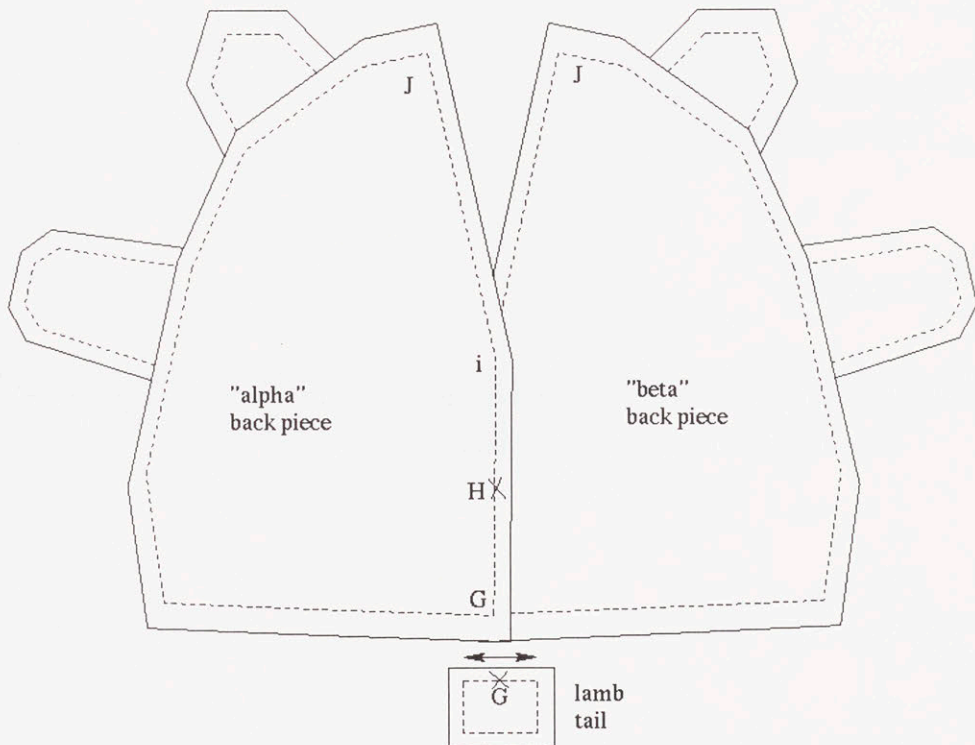


Figure 6.17: Guide to sewing the “alpha” and “beta” back pieces together and sewing on the lamb tail.

Sew on a lamb tuft to the combined back piece by centering the tuft on **J** as shown in Figure 6.18.

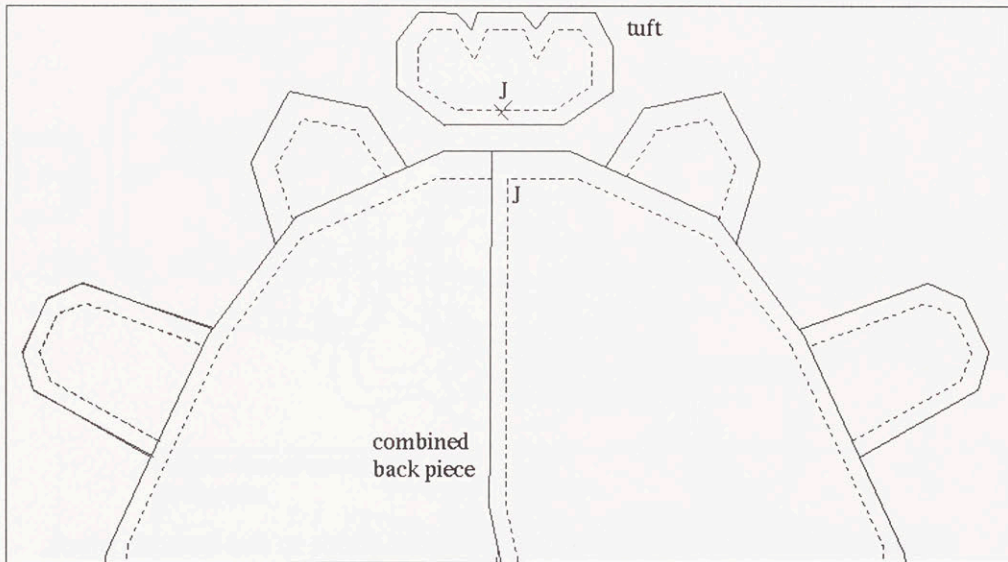


Figure 6.18: Guide to sewing on lamb tuft to the combined back piece.

Sew together the feet of the front piece to the bottom piece by circling around the feet from **e** to **f** and from **F** to **E**, and sew on a lamb tail to the bottom piece centering the tail on **G**, as shown in Figure 6.19. This will leave two openings at the base of the feet along **E** to **F** and **f** to **e**. Do not sew these openings shut! Notice that the front piece is only sewn *directly* to the bottom piece from **F** to **f**.

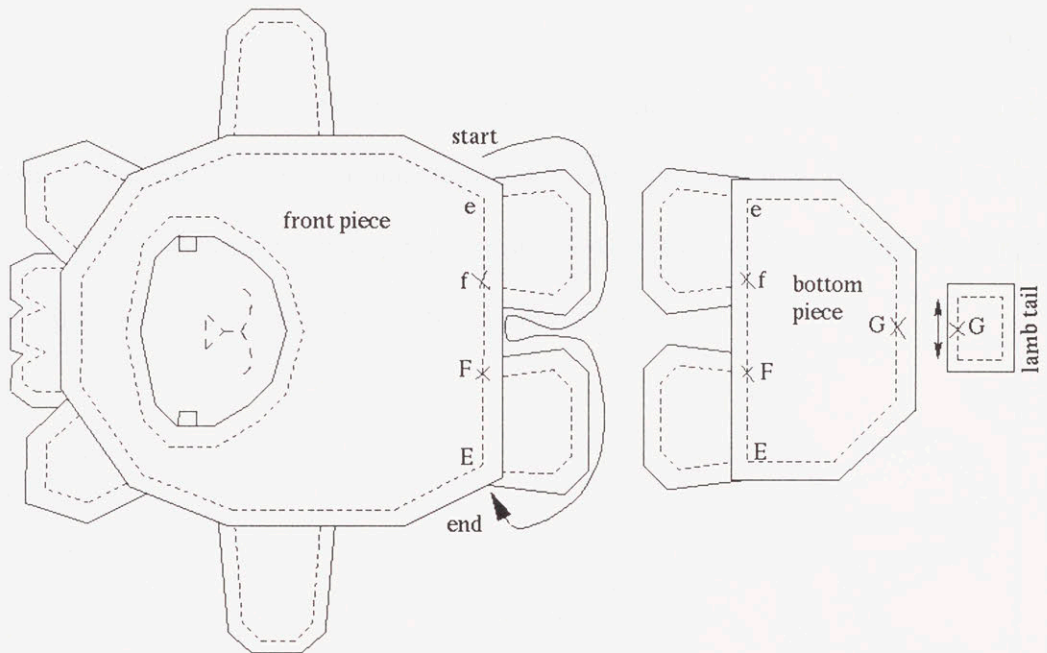


Figure 6.19: Guide to connecting the front piece to the bottom piece.

Following the arrow, sew the upper region of the combined back piece to the combined front piece, leaving openings at the base of the ears (**b** to **a** and **A** to **B**), hands (**d** to **c** and **C** to **D**), and the lamb tuft (**q** to **Q**). See Figure 6.20.

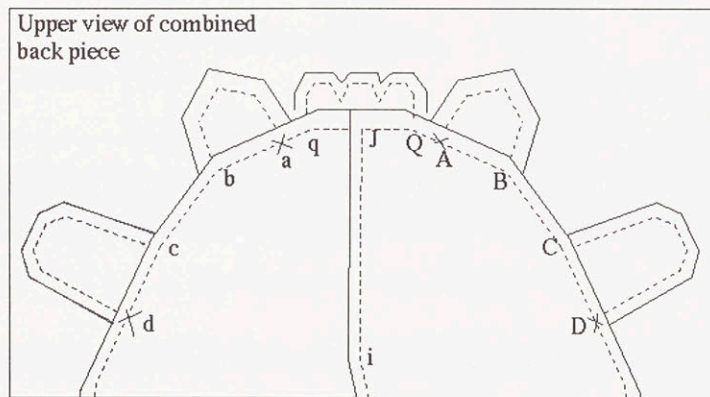
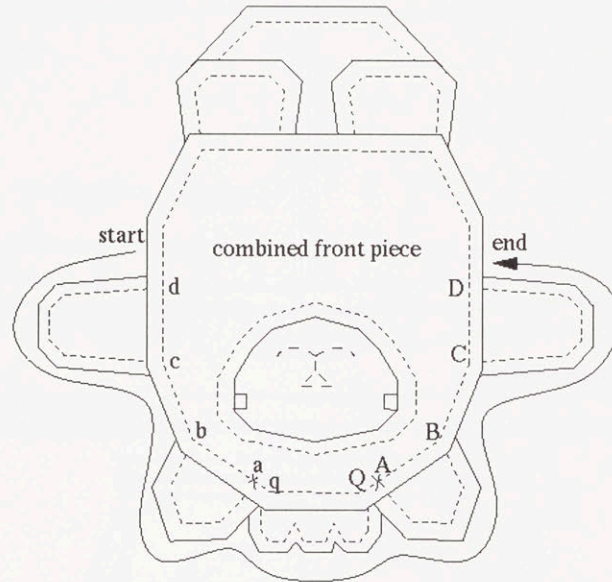


Figure 6.20: Guide to connecting the combined front piece to the combined back piece.

Continue to connect the combined back piece to the combined front piece by sewing from **d** to **k** to **e** and from **D** to **K** to **E** only. There will be a large opening from **e** to **G** to **E** of the combined back piece. See Figure 6.21.

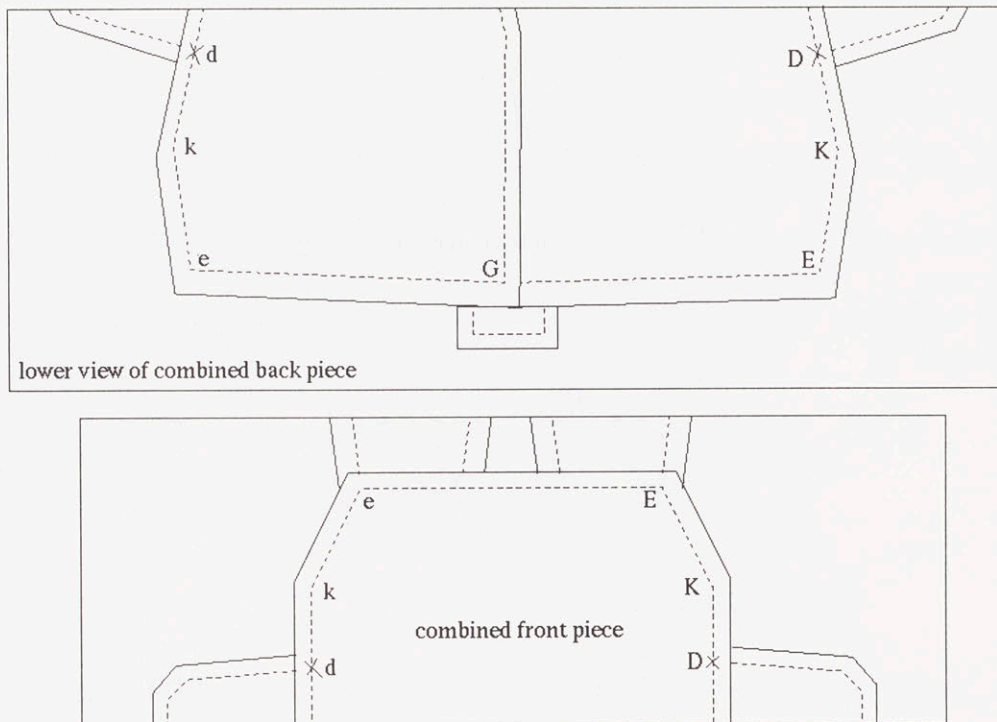


Figure 6.21: Guide to connecting the lower region of the combined back piece to the combined front piece.

Now sew together the bottom piece (from the combined front piece) to the combined back piece from **e** to **l** to **m** to **M** to **L** to **E** as shown in Figure 6.22. Now the only opening that is left is on the back from **i** to **H**. This is the hole that you will turn the lamb inside out.

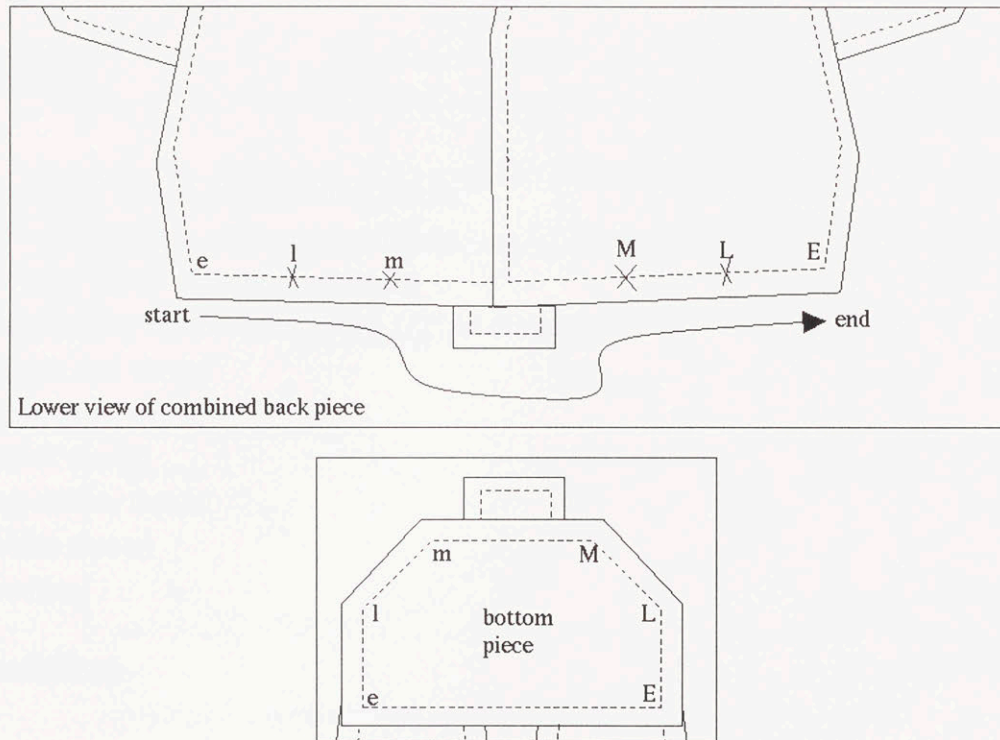


Figure 6.22: Guide to connecting the combined back piece to the bottom piece

Finishing

Turn the lamb inside out at the opening from **i** to **H**. Turn the hands, feet, ears, and tuft inside out as well. Stuff the hands, ears, feet, tuft, and body with polyester fiber to the level of firmness that you want. Close the opening in the back by lacing up the hole with thread.

Chapter 7: How to Sew Finster the Shark

Materials:

- 32" x 24" piece of bright teal fabric
- 24" x 18" piece of royal blue fabric
- 7" x 6" piece of light gray fabric
- black shiny button eyes about 1/2" in diameter
- bright teal thread
- light gray thread
- black thread
- royal blue thread
- white thread
- stuffing

Preparation

Wash and dry all of the fabric. This will remove any excess dye from the fabric, and will shrink the fabric so that it is easier to work with. Before marking down the pattern, make sure that you iron out any wrinkles in the fabric. Cut out the pattern and mark out the pieces on the fabric, leaving at least an inch of space between each and from the fabric's edge, as seen in Figures 7.1 and 7.2. Draw in the mouth, teeth and eyes of the shark on the wrong side of the fabric, using the pattern as a guide. Cut out the fabric so that there is a half inch of material surrounding each piece as seen in Figure 7.3.

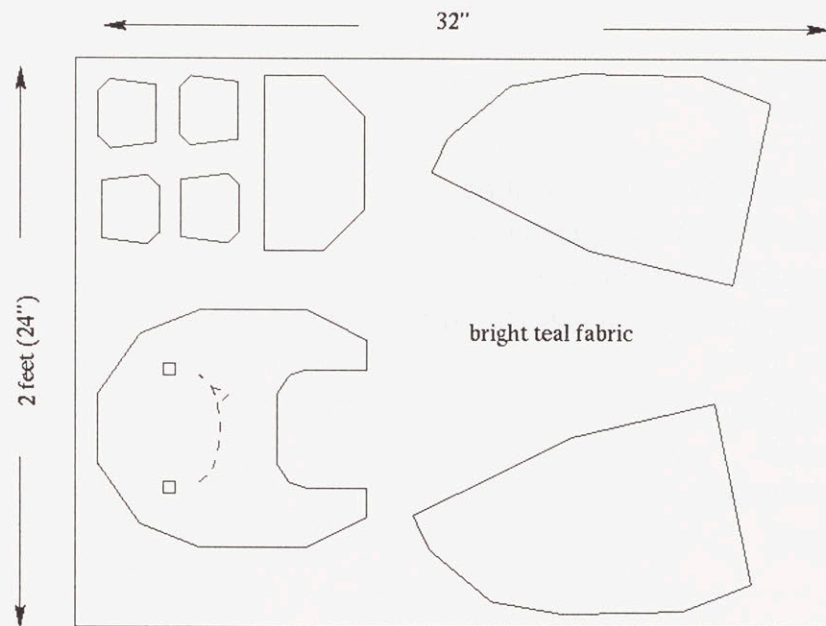


Figure 7.1: Arrangement of pieces for the bright teal fabric

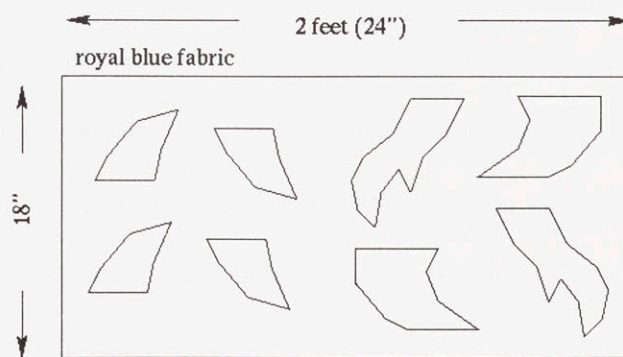


Figure 7.2: Arrangement of pieces for the royal blue fabric

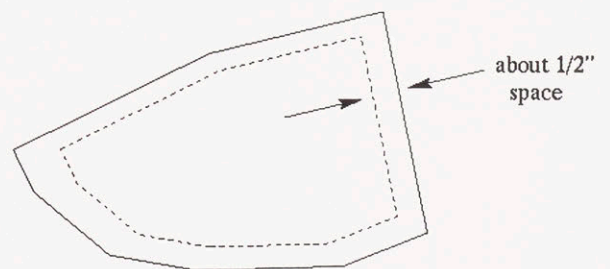
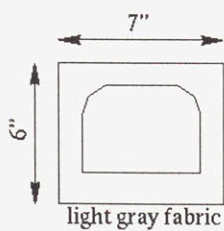


Figure 7.3: (l) Arrangement of pieces for the light gray fabric. (r) Example of cut piece.

Sewing

Draw in the diagonals on the “eye box” that you drew on the shark front piece. Where the diagonals intersect is where you will center the button eyes to sew. Backstitch in the mouth with black thread, and the teeth with white thread. Use black thread to sew on the eyes so that they appear on the Right side.

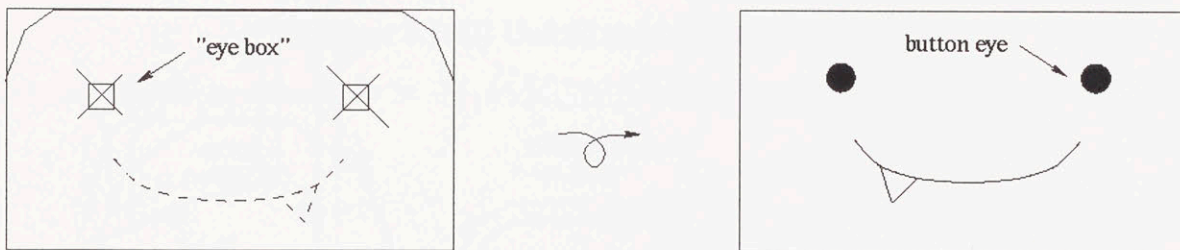


Figure 7.4: Attaching the eyes to the front piece

Sew on the tummy piece to the front piece starting from **N** and circling around to **O,P**, and ending at **Q**. Shown in Figure 7.5.

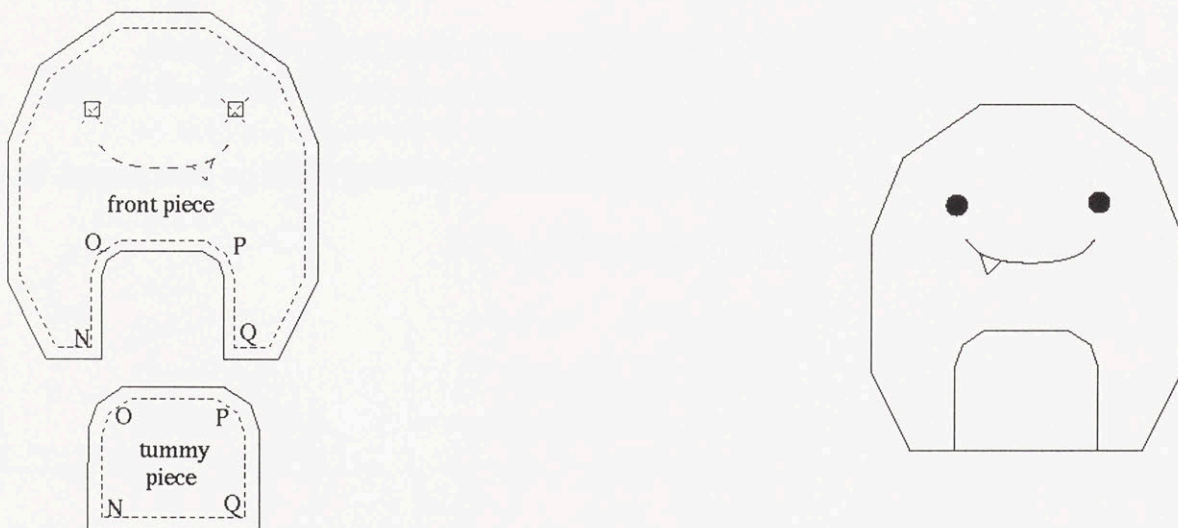


Figure 7.5: (l) Guide to sewing on tummy piece to front piece. (r) The Right side after sewing on tummy piece.

Sew on the hands to the front piece from **C** to **D**. Sew on the feet to the front piece from **E** to **F**. Shown in Figure 7.6.

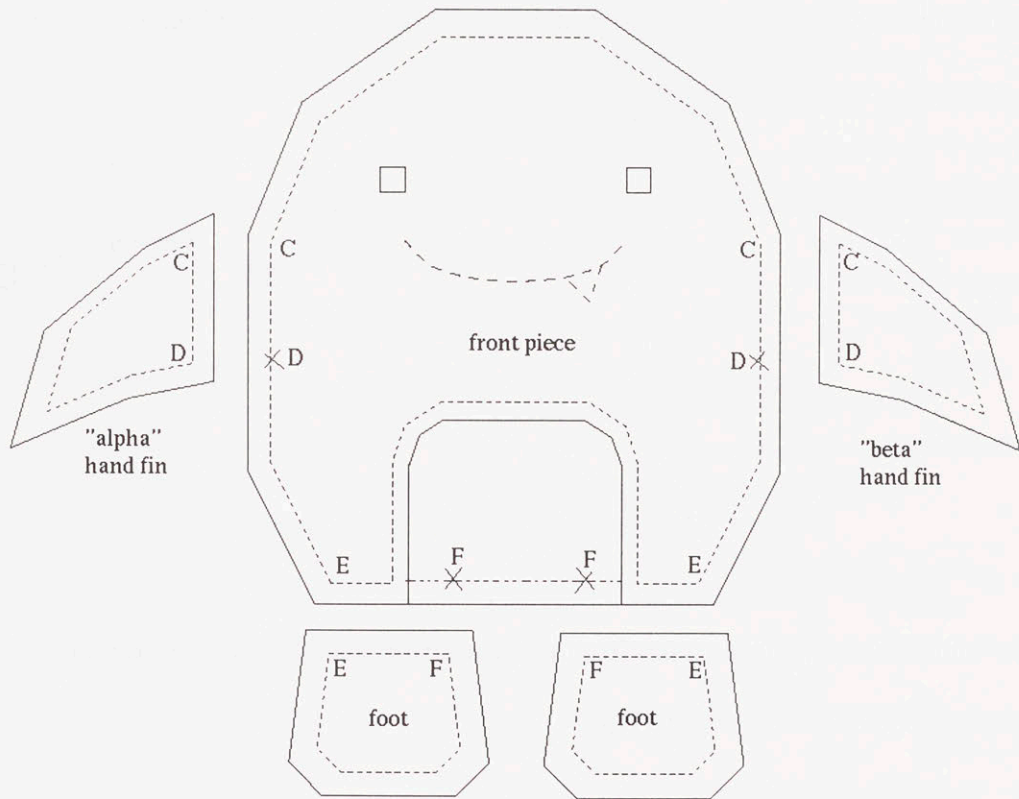


Figure 7.6: (1) Guide to sewing on hand fins and feet to front piece.

Unfold the hand fins and feet from the front piece, folding them on their seams. Iron the seams and pieces flat. Shown in Figures 7.7 and 7.8.

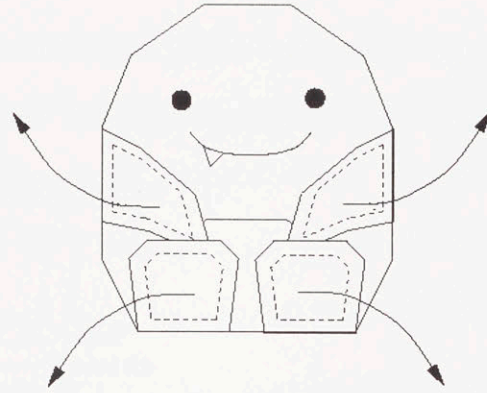


Figure 7.7: (l) Unfold and iron at the seams.

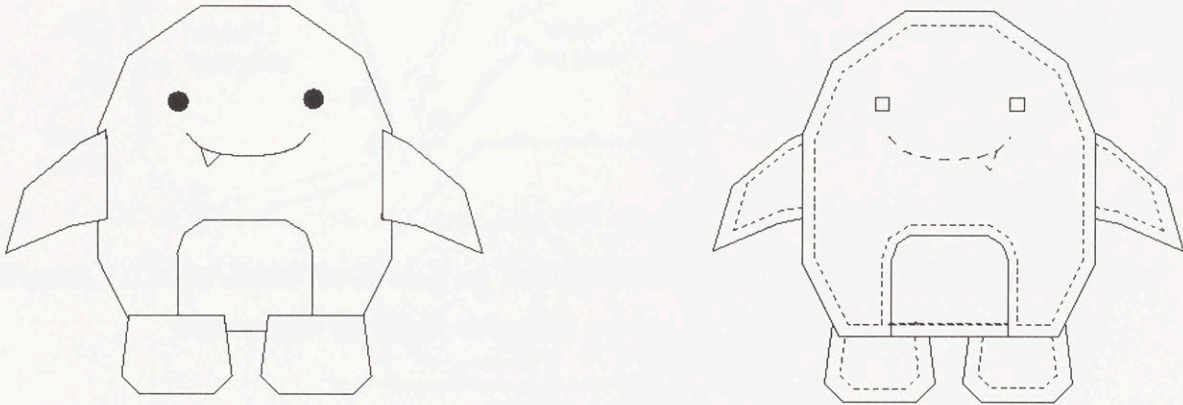


Figure 7.8: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on the feet to the bottom piece from points **E** to **F** as show in Figure 7.9.

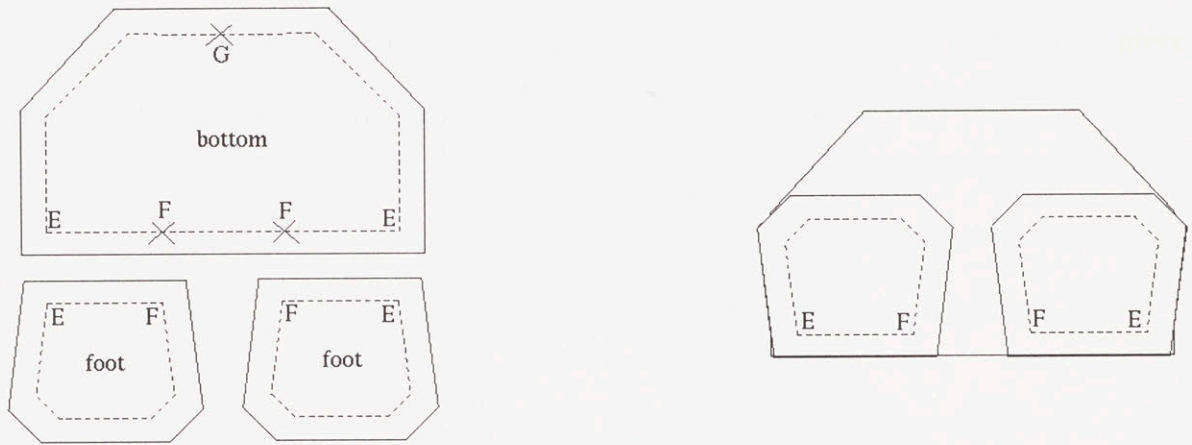


Figure 7.9: (l) Guide to sewing on the feet. (r) Right side of the bottom piece after sewing on feet.

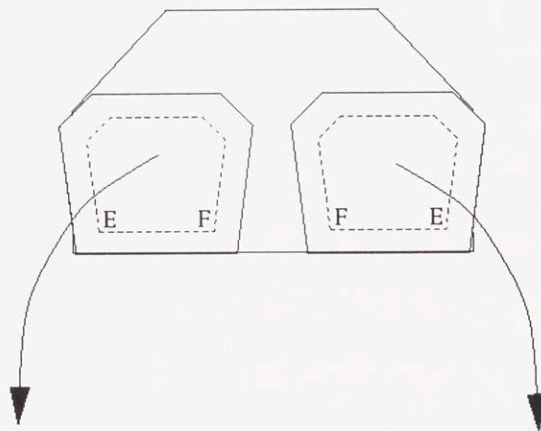


Figure 7.10: Unfold feet from bottom piece at the seams and iron flat.

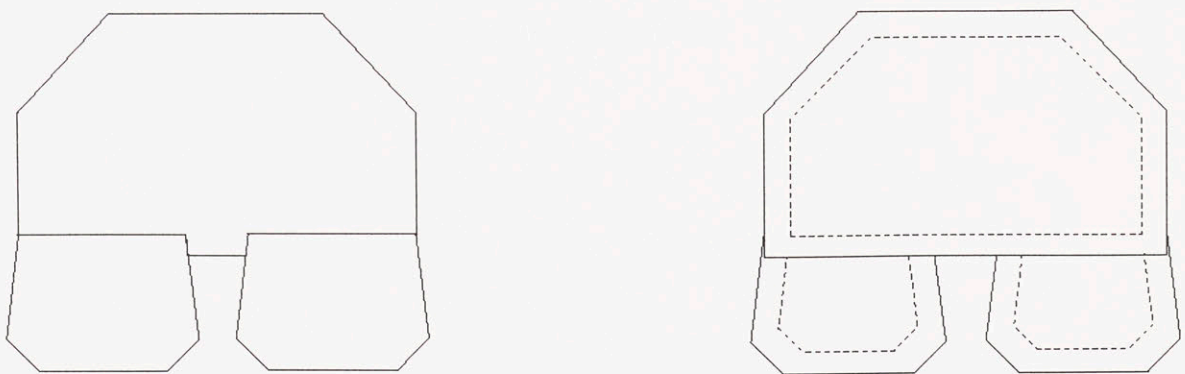


Figure 7.11: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on the “alpha” head fin to the “alpha” back piece from **J** to **R**, the “alpha” hand fin from **C** to **D**, and the “alpha” tail piece from **H** to **G** as shown in Figure 7.12. Unfold at seams and iron flat as shown in Figure 7.13.

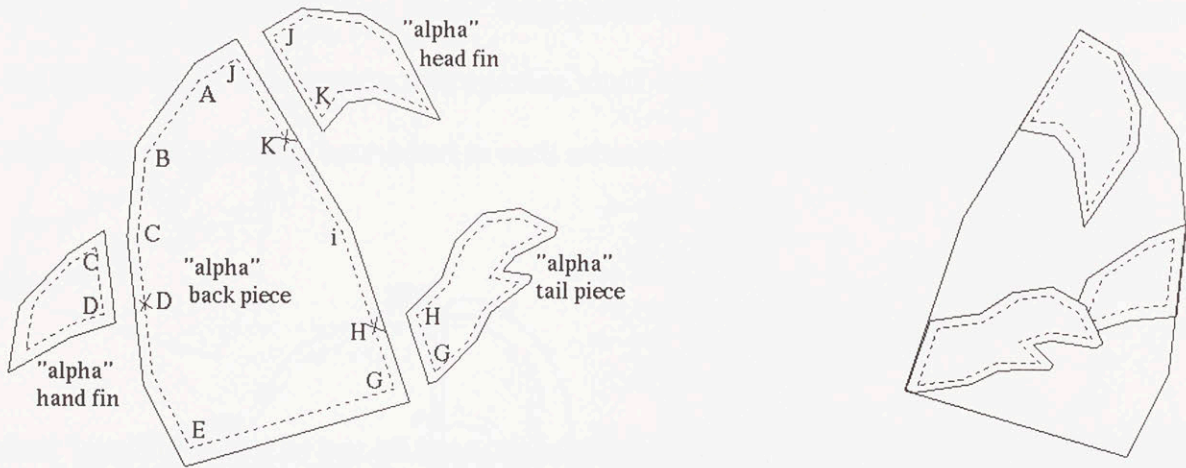


Figure 7.12: (l) Guide for sewing on “alpha” head fin, hand fin and tail piece to “alpha” back piece. (r) Right side after sewing on head fin, hand fin, and hand.

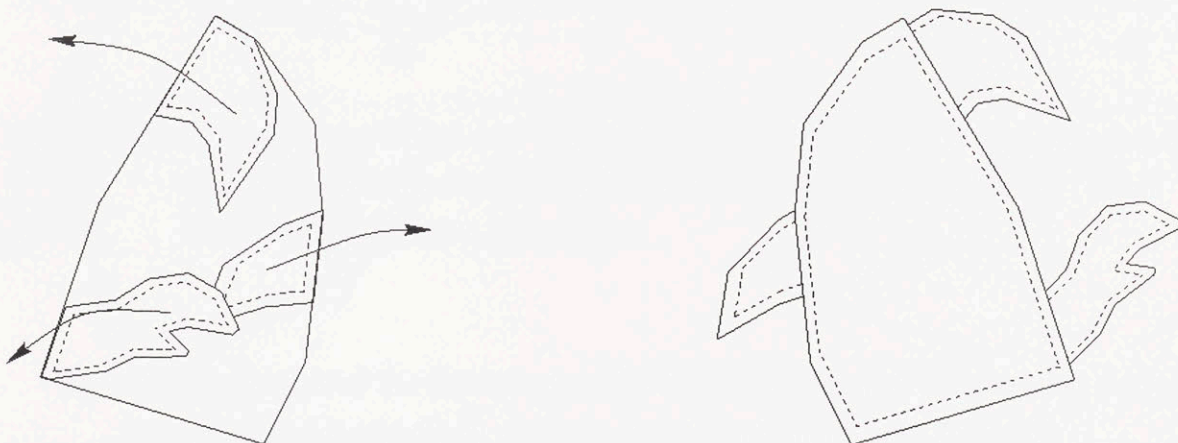


Figure 7.13: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Sew on the “beta” head fin to the “beta” back piece from **J** to **R**, the “beta” hand fin from **C** to **D**, and the “beta” tail piece from **H** to **G** as shown in Figure 7.14. Unfold at seams and iron flat as shown in Figure 7.15.

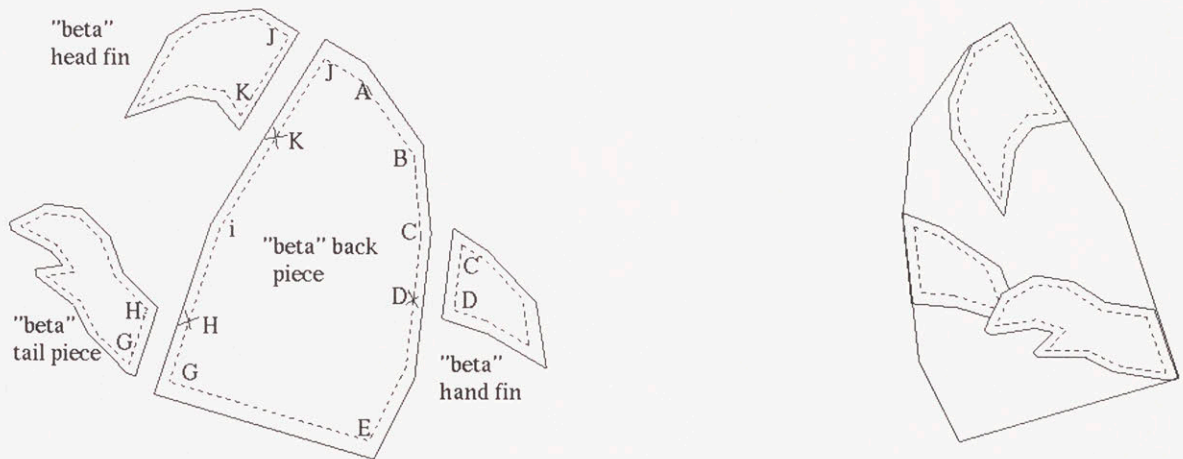


Figure 7.14: (l) Guide for sewing on “beta” head fin, hand fin and tail piece to “beta” back piece. (r) Right side after sewing on head fin, hand fin, and hand.

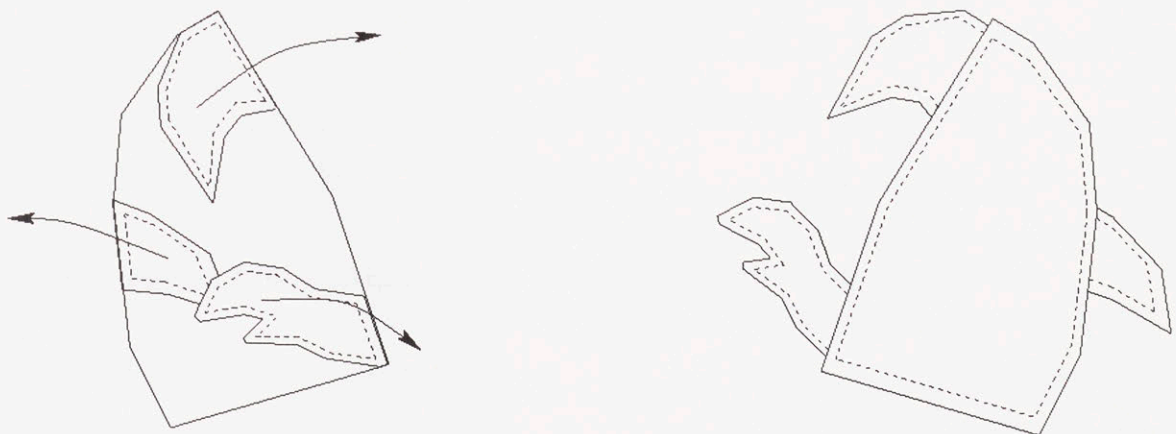


Figure 7.15: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Assembling

Sew the “alpha” and “beta” tail pieces together starting from **H**, by circling around the tail and ending at **G**. **H** is located at the midpoint of line **iG**. Sew the “alpha” head fin to the “beta” head fin together starting from **J** by circling around the head fin and ending at **R**. Sew together the “alpha” and “beta” back pieces from **R** to **i**. There will only be an opening from **i** to **H**. Do not sew this opening shut! Notice that the “alpha” and “beta” back pieces are only *directly* connected to each other from **K** to **i**. Shown in Figure 7.16.

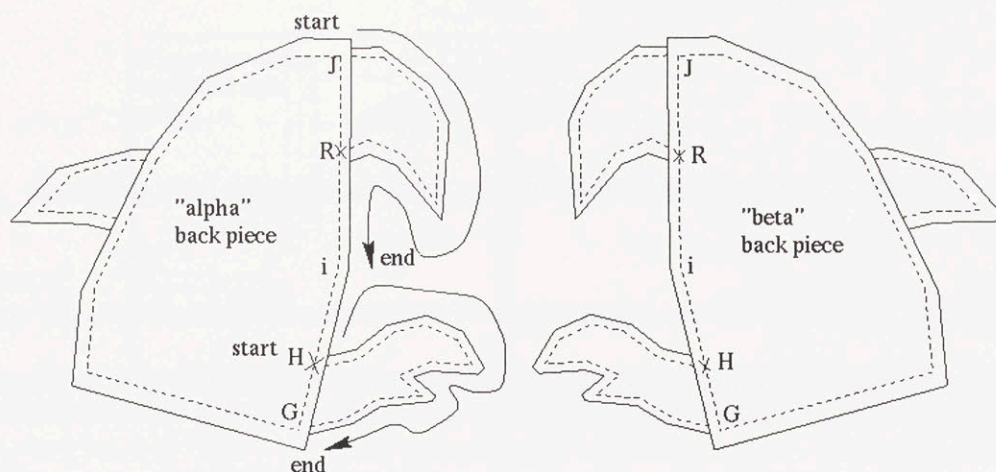


Figure 7.16: Sew together “alpha” and “beta” tail pieces starting from **H** and ending at **G** and the head fins starting from **J** and ending at **R**. Sew together the “alpha” and “beta” back pieces from **R** to **i**

Sew together the feet of the front piece to the bottom piece by circling around the feet from **e** to **f** and from **F** to **E** as shown in Figure 7.17. This will leave two openings at the base of the feet along **E** to **F** and **f** to **e**. Do not sew these openings shut! Notice that the front piece is only sewn *directly* to the bottom piece from **F** to **f**.

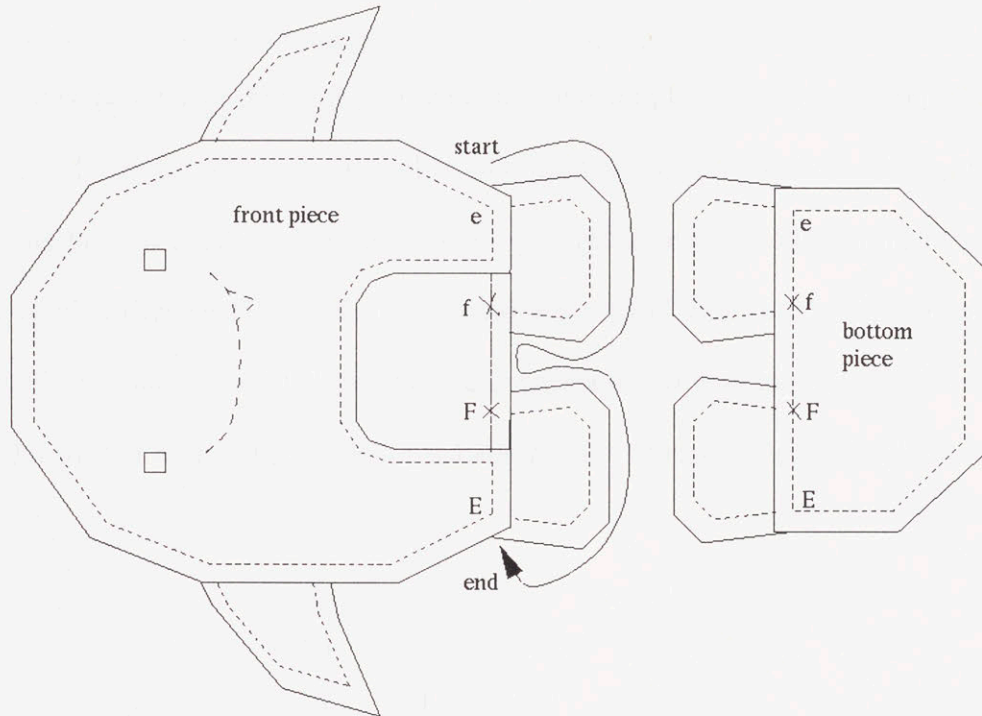


Figure 7.17: Guide to connecting the front piece to the bottom piece.

Following the arrow, sew the upper region of the combined back piece to the combined front piece, leaving openings at the base of the hand fins (**d** to **c** and **C** to **D**). See Figure 7.18.

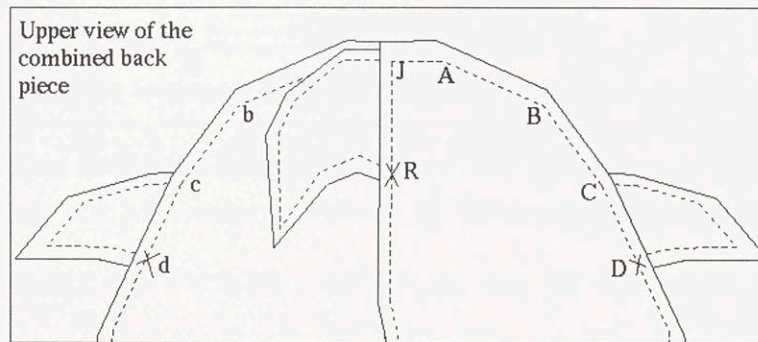
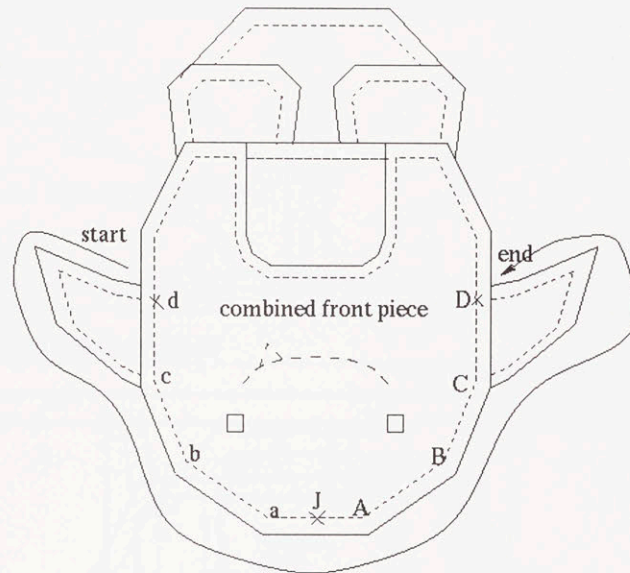


Figure 7.18: Guide to connecting the combined front piece to the combined back piece.

Continue to connect the combined back piece to the combined front piece by sewing from **d** to **k** to **e** and from **D** to **K** to **E** only. There will be a large opening from **e** to **G** to **E** of the combined back piece. See Figure 7.19.

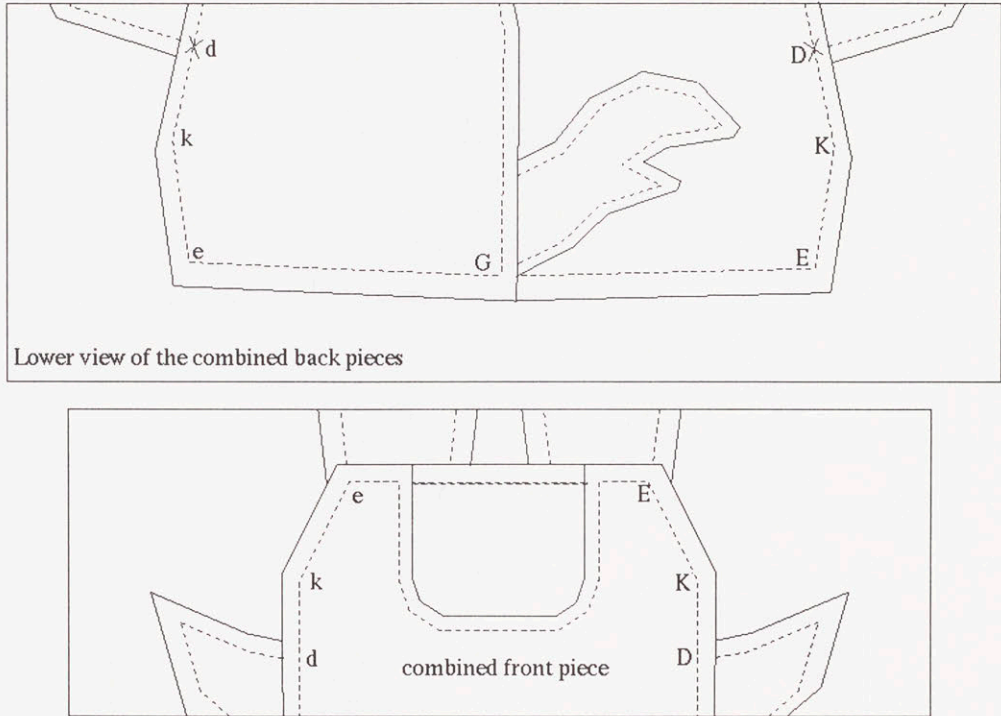


Figure 7.19: Guide to connecting the lower region of the combined back piece to the combined front piece.

Now sew together the bottom piece (from the combined front piece) to the combined back piece from **e** to **l** to **m** to **M** to **L** to **E** as shown in Figure 7.20. Now the only opening that is left is on the back from **i** to **H**. This is the hole that you will turn the bug inside out.

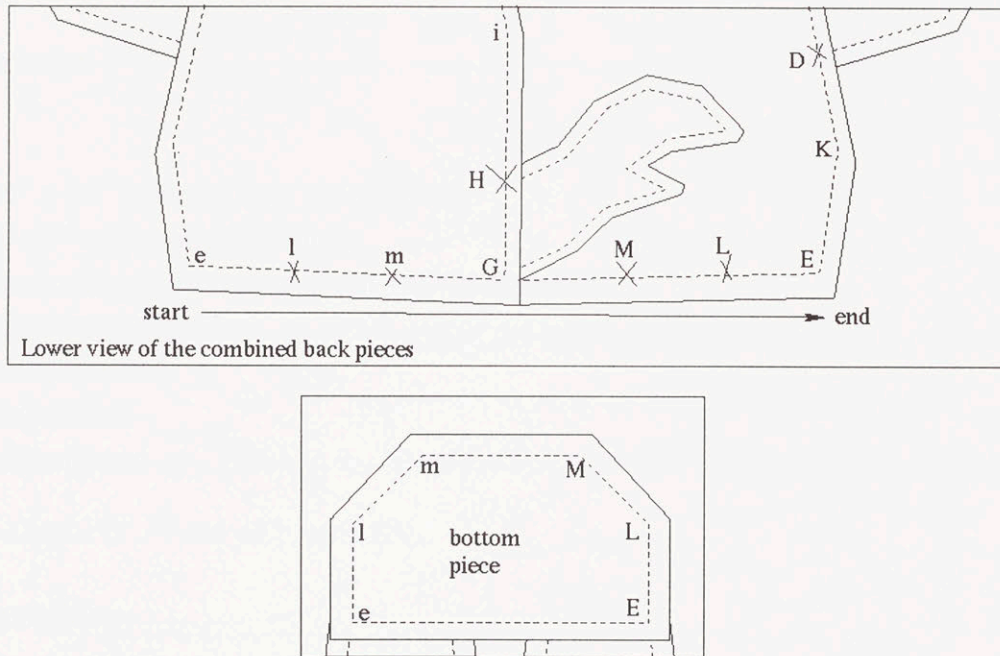


Figure 7.20: Guide to connecting the combined back piece to the bottom piece

Finishing

Turn the shark inside out at the opening from **i** to **H**. Turn the hand fins, feet, head fin, and tail inside out as well. Stuff the hand fins, feet, head fin, tail, and body with polyester fiber to the level of firmness that you want. Close the opening in the back by lacing up the hole with thread.

Chapter 8: How to Sew Hops the Bunny

Materials:

- 36" x 24" piece of light peach fabric
- 6" x 7" piece of white fabric
- black shiny button eyes about 1/2" in diameter
- light peach thread
- black thread
- pink thread
- white thread

Preparation

Wash and dry all of the fabric. This will remove any excess dye from the fabric, and will shrink the fabric so that it is easier to work with. Before marking down the pattern, make sure that you iron out any wrinkles in the fabric. Cut out the pattern and mark out the pieces on the fabric, leaving at least an inch of space between each and from the fabric's edge, as seen in Figures 8.1 and 8.2. Draw in the mouth, eyes, and nose of the bunny on the wrong side of the fabric, using the pattern as a guide. Cut out the fabric so that there is a half inch of material surrounding each piece as seen in Figure 8.2.

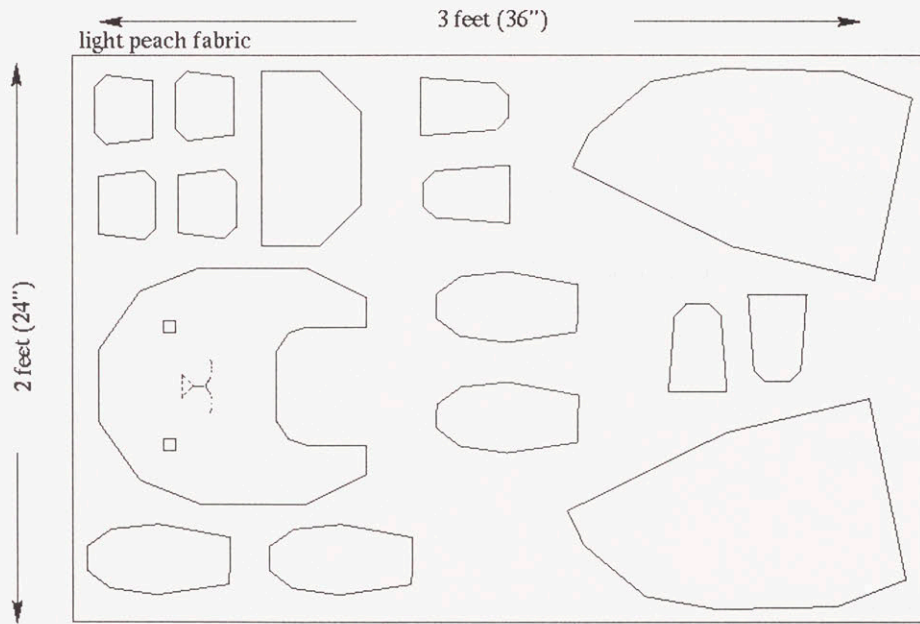


Figure 8.1: Arrangement of pieces for the light peach fabric.

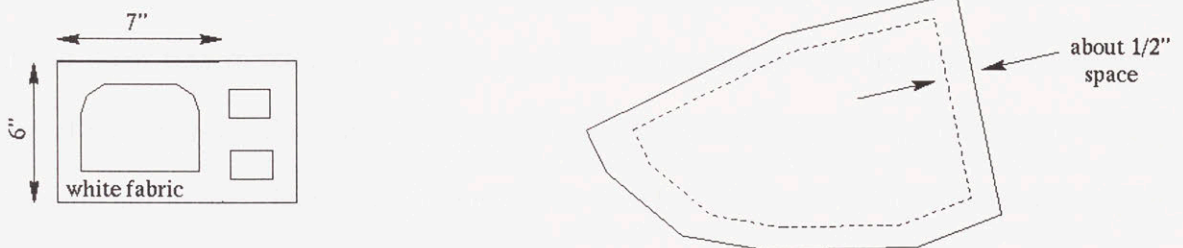


Figure 8.2: (l) Arrangement of pieces for the white fabric. (r) Example of cut piece.

Sewing

Draw in the diagonals on the “eye box” that you drew on the bunny front piece. Where the diagonals intersect is where you will center the button eyes to sew. Backstitch in the mouth with black thread, and the nose with pink thread. Sew on the eyes so that they appear on the Right side.



Figure 8.3: Attaching the eyes to the front piece

Sew on the tummy piece to the front piece starting from **N** and circling around to **O,P**, and ending at **Q**. Shown in Figure 8.4.



Figure 8.4: (l) Guide to sewing on tummy piece to front piece. (r) The Right side after sewing on tummy piece.

Sew on the bunny ears from **A** to **B** on the front piece. Sew on the hands to the front piece from **C** to **D**. Sew on the feet to the front piece from **E** to **F**. Shown in Figure 8.5.

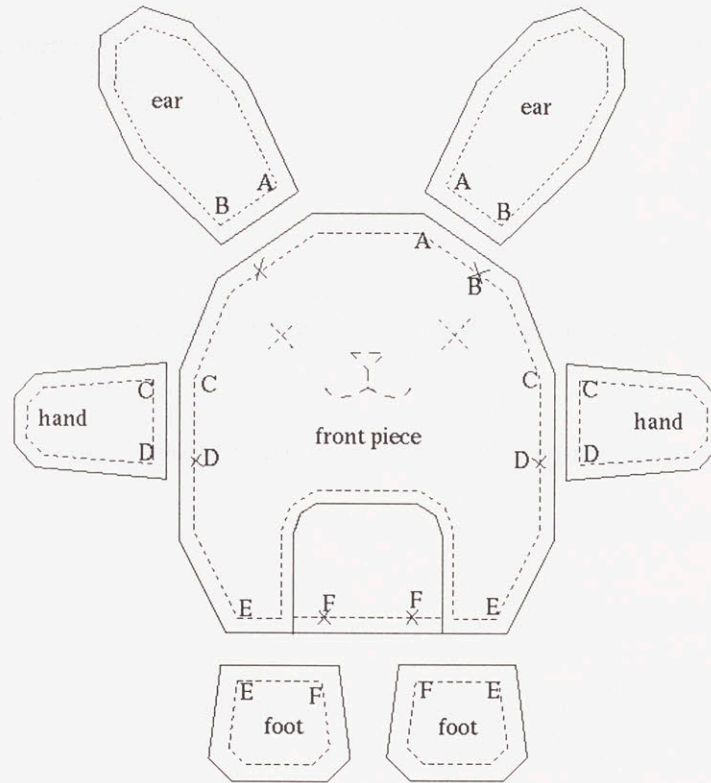


Figure 8.5: Guide to sewing on ears, hands, and feet to front piece

Unfold the ears, hands and feet from the front piece, folding them on their seams. Iron the seams and pieces flat. Shown in Figures 8.6 and 8.7.

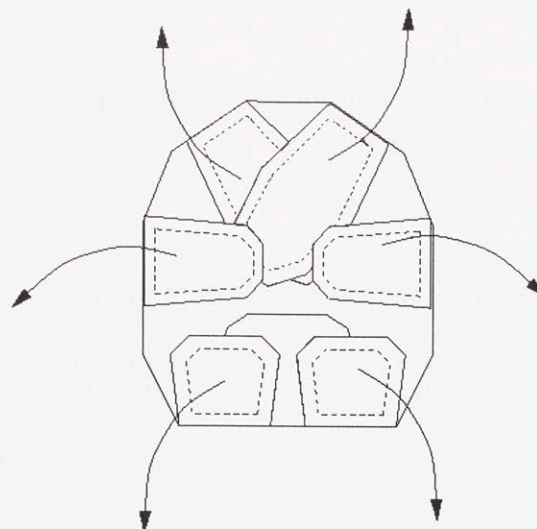


Figure 8.6: Unfold and iron at the seams.

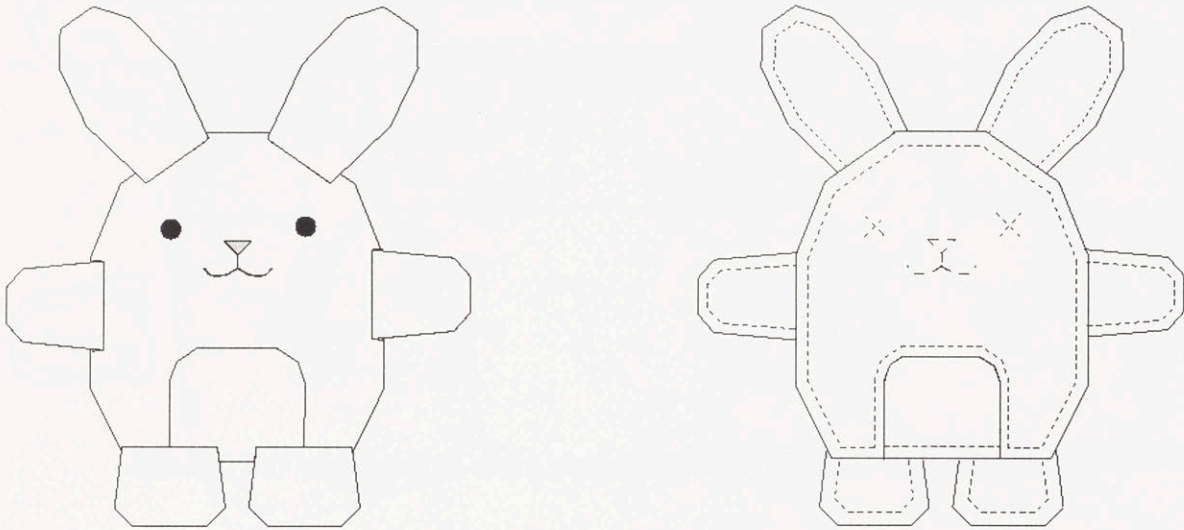


Figure 8.7: (l) Right side after ironing seams flat. (r) Wrong side.

Sew on the feet to the bottom piece from points **E** to **F** as show in Figure 8.8.

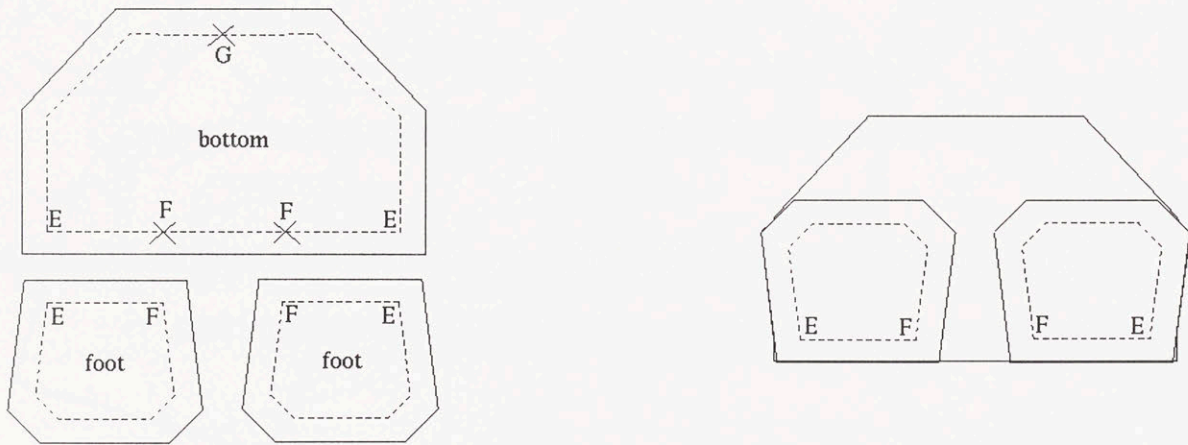


Figure 8.8: (l) Guide to sewing on the feet. (r) Right side of the bottom piece after sewing on feet.

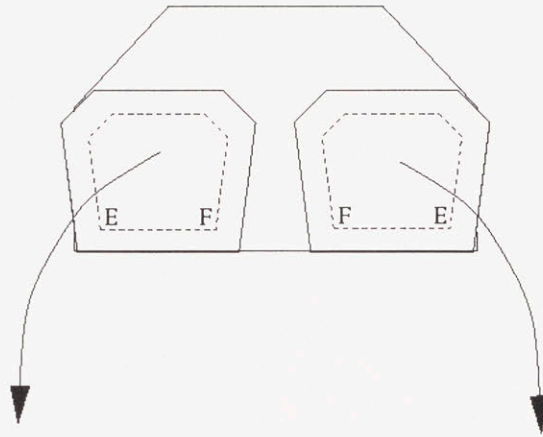


Figure 8.9: Unfold feet from bottom piece at the seams and iron flat.

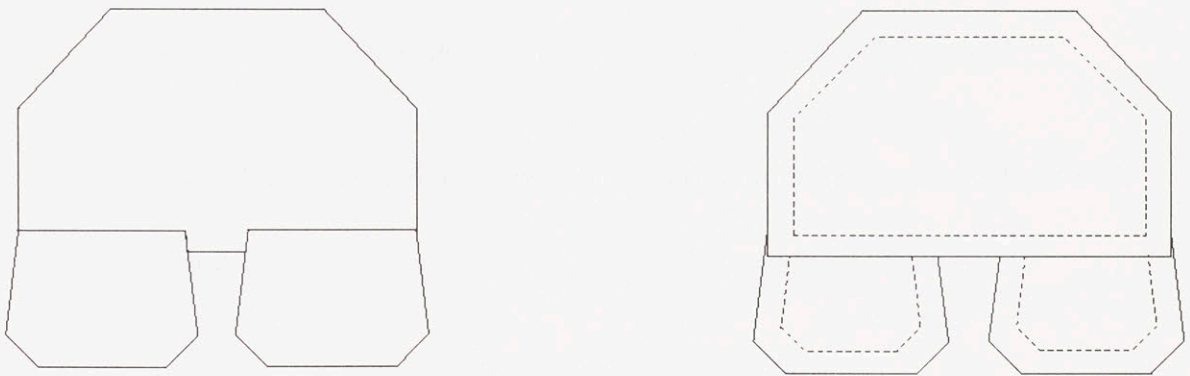


Figure 8.10: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on a bunny ear to the “alpha” back piece from **A** to **B**, and a hand from **C** to **D** as shown in Figure 8.11. Unfold at seams and iron flat as shown in Figure 8.12.

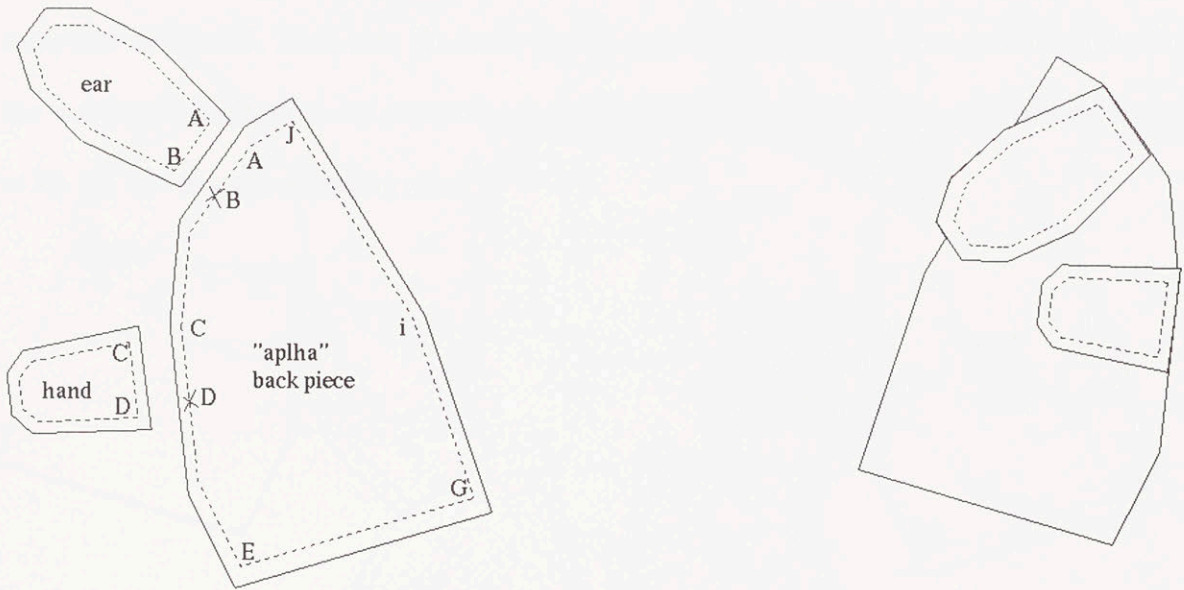


Figure 8.11: (l) Guide for sewing on bunny ear and hand to “alpha” back piece. (r) Right side after sewing on ear and hand.

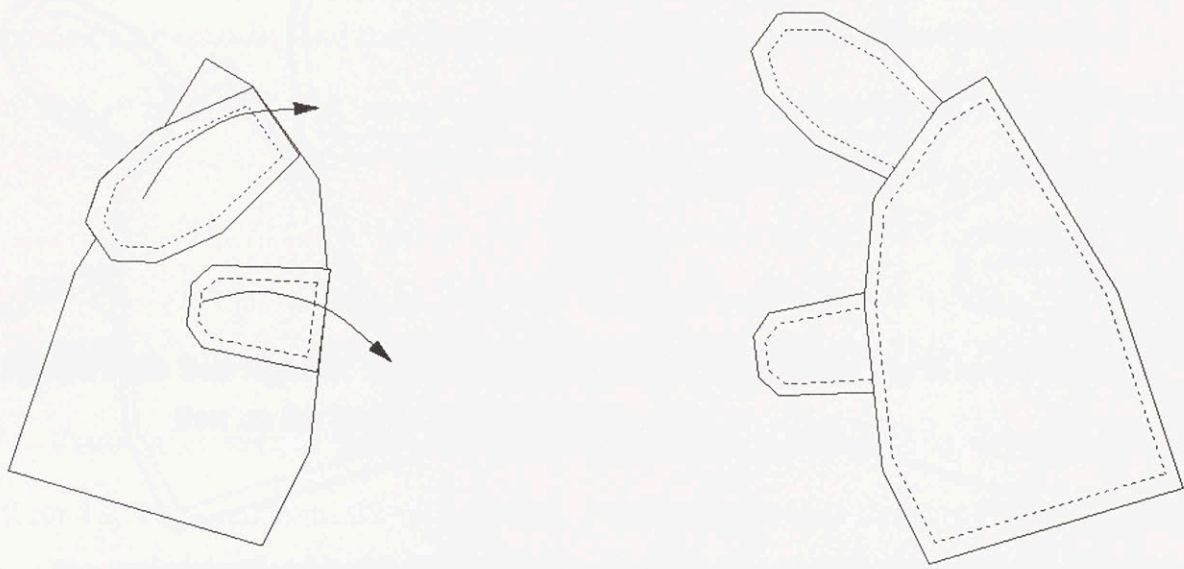


Figure 8.12: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Sew on a bunny ear to the “beta” back piece from **A** to **B**, and a hand from **C** to **D** as shown in Figure 8.13. Unfold at seams and iron flat as shown in Figure 8.14.

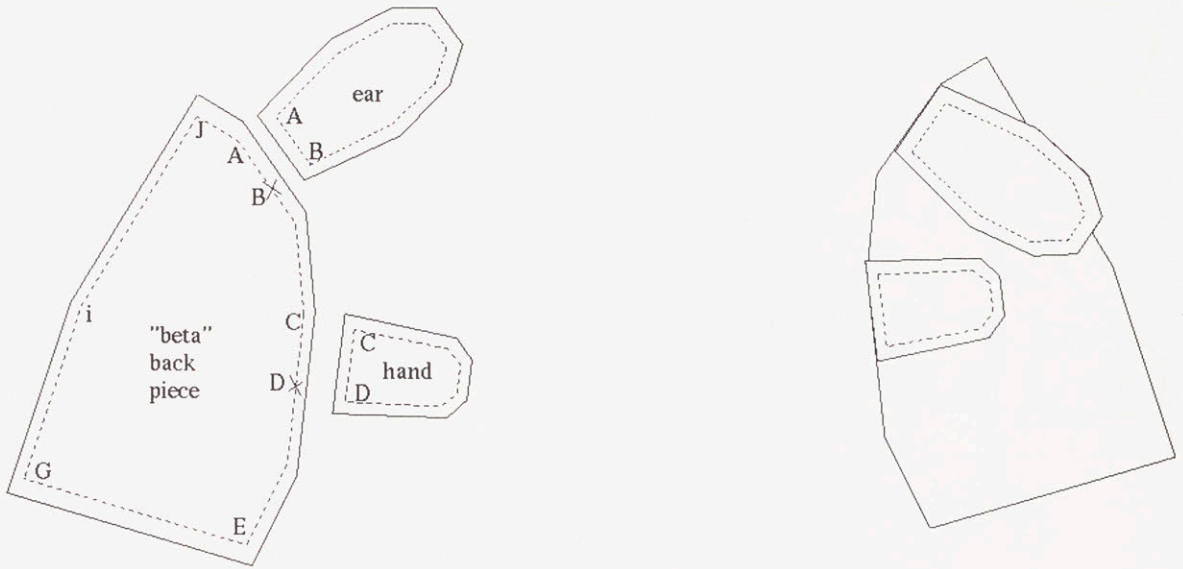


Figure 8.13: (l) Guide for sewing on bunny ear and hand to “beta” back piece. (r) Right side after sewing on ear and hand.

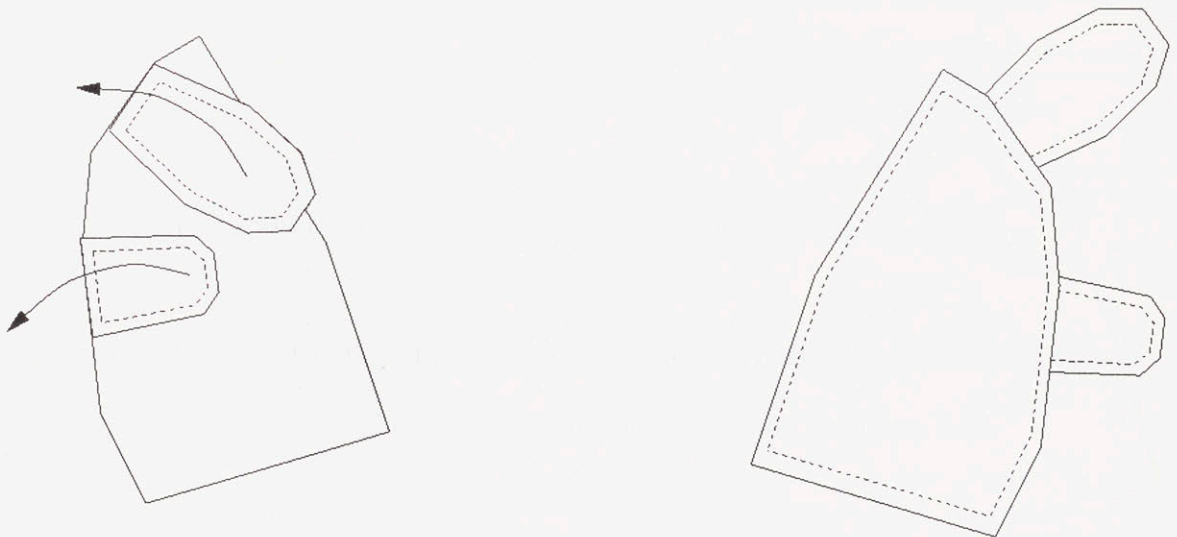


Figure 8.14: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Assembling

Connect the “alpha” and “beta” back pieces by sewing from **G** to **H**. **H** is located at the midpoint of line **iG**. Then sew the back pieces together from **i** to **J**. Sew on a bunny tail to the combined back piece by centering the tail on **G**. There will only be an opening from **i** to **H**. Do not sew this opening shut!

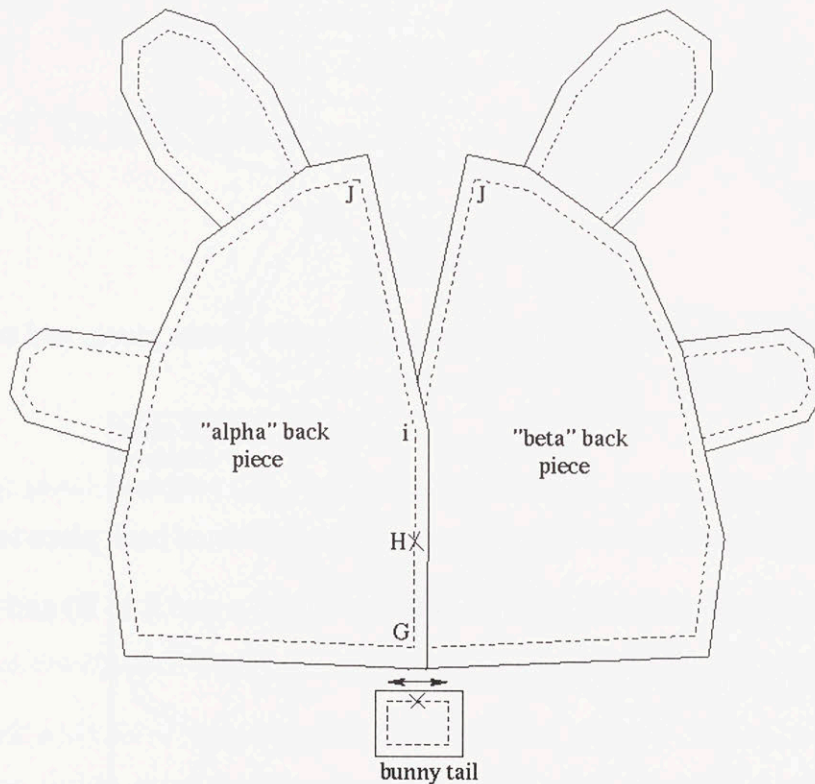


Figure 8.15: Sew together “alpha” and “beta” back pieces from **G** to **H** and from **i** to **J**. Sew on the bunny tail by centering at **G**.

Sew together the feet of the front piece to the bottom piece by circling around the feet from **e** to **f** and from **F** to **E** as shown in Figure 8.16. This will leave two openings at the base of the feet along **E** to **F** and **f** to **e**. Do not sew these openings shut! Notice that the front piece is only sewn *directly* to the bottom piece from **F** to **f**. Sew on a bunny tail to the bottom piece by centering the tail on **G**.

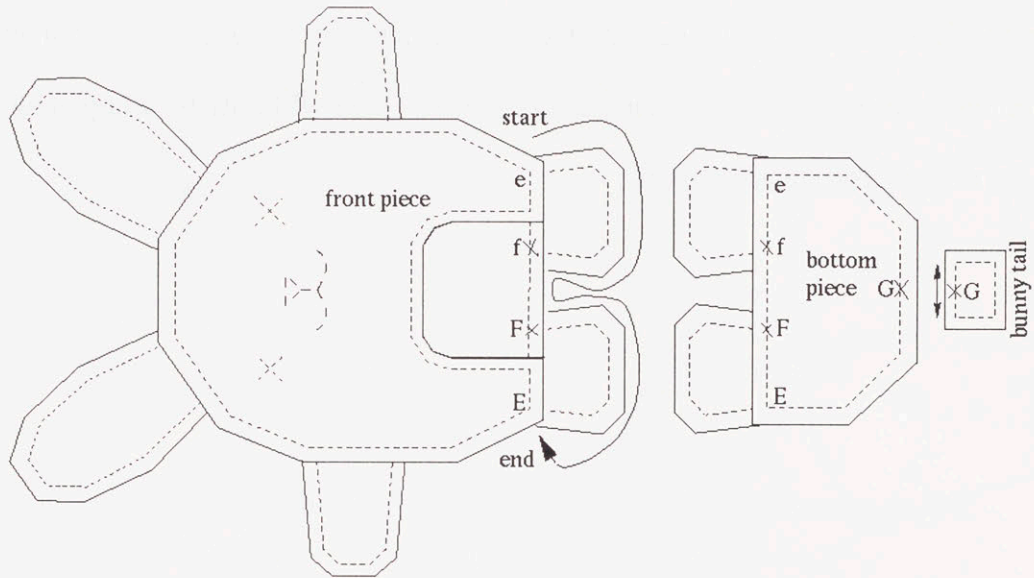


Figure 8.16: Guide to connecting the front piece to the bottom piece, and sewing on the bunny tail.

Following the arrow, sew the upper region of the combined back piece to the combined front piece, leaving openings at the base of the ears (b to **a** and **A** to **B**) and the base of the hands (**d** to **c** and **C** to **D**). See Figure 8.17.

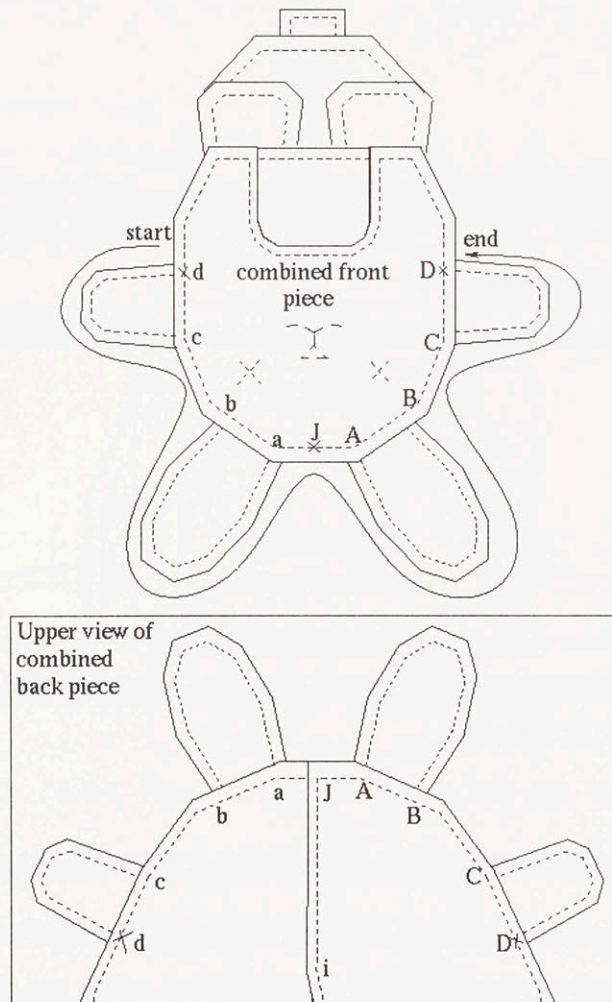


Figure 8.17: Guide to connecting the combined front piece to the combined back piece.

Continue to connect the combined back piece to the combined front piece by sewing from **d** to **k** to **e** and from **D** to **K** to **E** only. There will be a large opening from **e** to **G** to **E** of the combined back piece. See Figure 8.18.

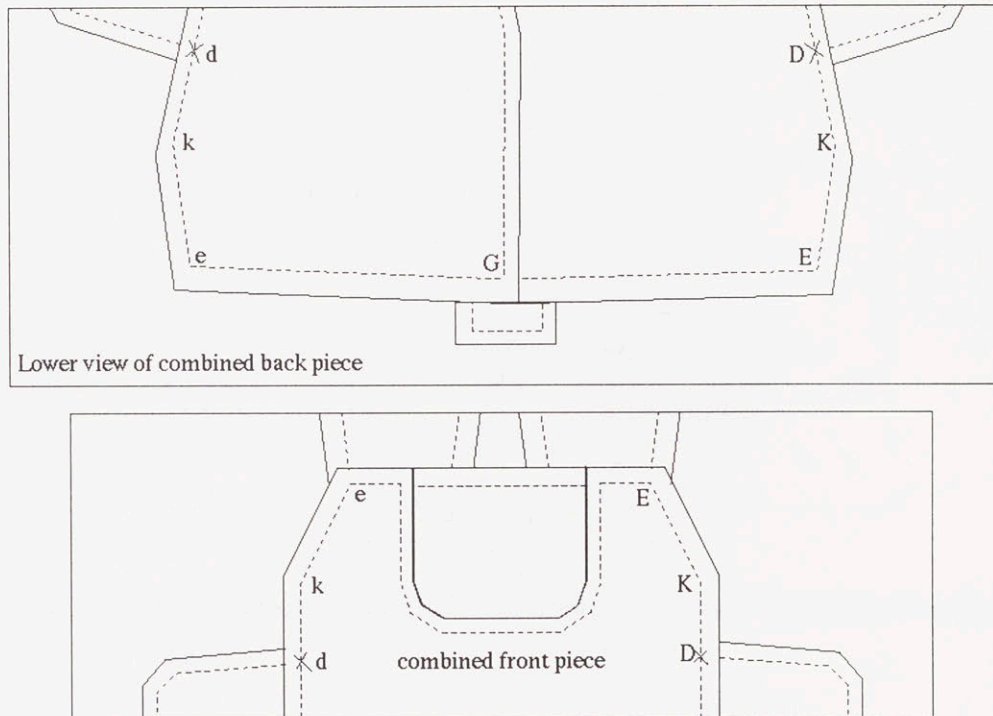


Figure 8.18: Guide to connecting the lower region of the combined back piece to the combined front piece.

Now sew together the bottom piece (from the combined front piece) to the combined back piece from **e** to **l** to **m** to **M** to **L** to **E** as shown in Figure 8.19. Now the only opening that is left is on the back from **i** to **H**. This is the hole that you will turn the bunny inside out.

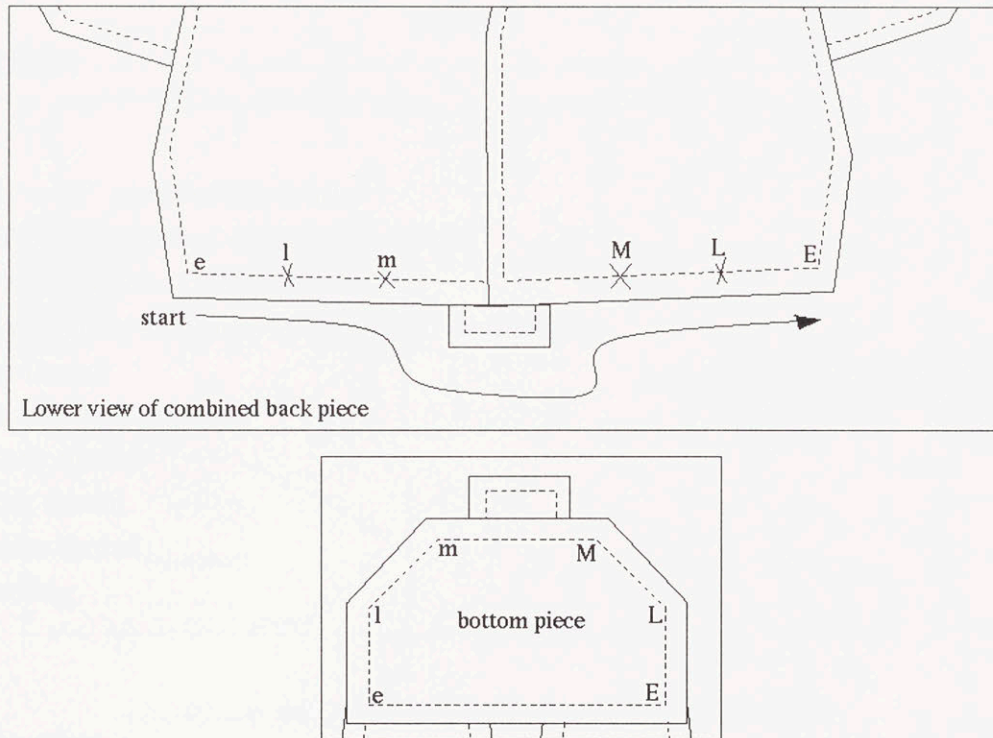


Figure 8.19: Guide to connecting the combined back piece to the bottom piece

Finishing

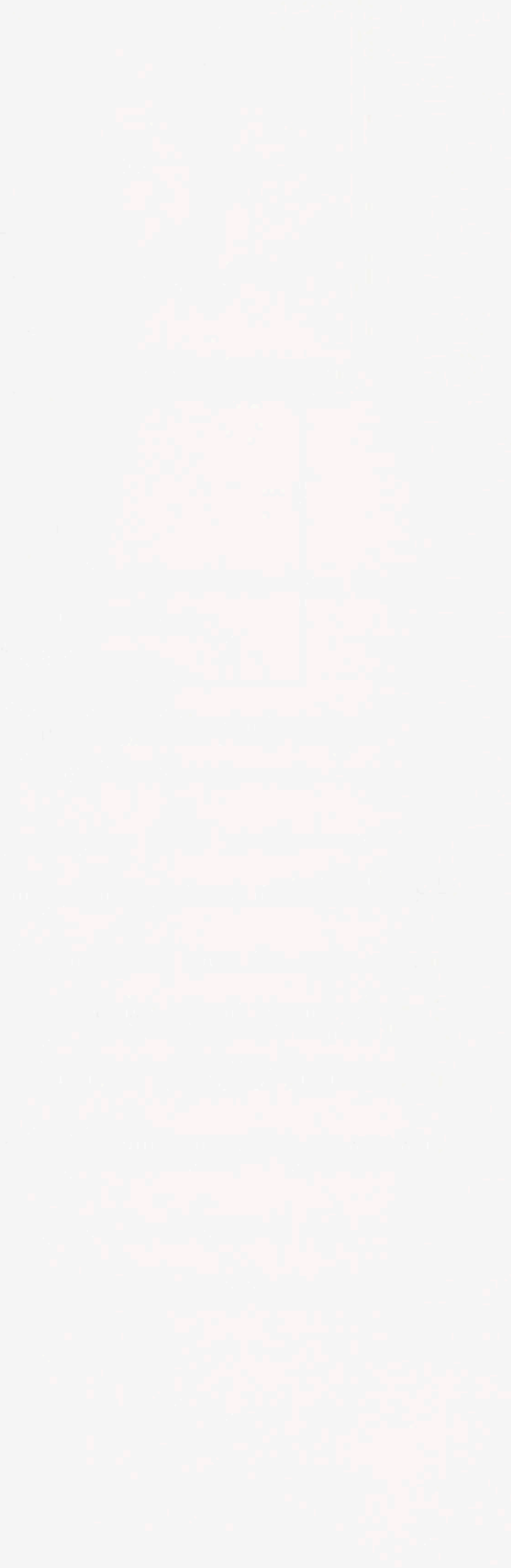
Turn the bunny inside out at the opening from **i** to **H**. Turn the hands, feet, ears, and tail inside out as well. Stuff the hands, ears, feet, tail, and body with polyester fiber to the level of firmness that you want. Close the opening in the back by lacing up the hole with thread.

1. *Phragmites australis* (Common reed)
 2. *Scirpus americanus* (Sedges)
 3. *Cyperus tenuiflorus* (Sedges)
 4. *Eleocharis acicularis* (Sedges)
 5. *Sagittaria arifolia* (Arrow arif)
 6. *Sparganium angustifolium* (Sparganium)
 7. *Alisma plantago-aquatica* (Alisma)
 8. *Najas* (Mosses)
 9. *Chara* (Charophytes)

10. *Potamogeton amplifolius* (Potamogeton)
 11. *Utricularia* (Utricularia)
 12. *Hydrocotyle* (Hydrocotyle)
 13. *Salvinia* (Salvinia)
 14. *Wolffia* (Wolffia)
 15. *Elodea canadensis* (Elodea)
 16. *Hydrilla* (Hydrilla)

17. *Chara* (Charophytes)
 18. *Utricularia* (Utricularia)
 19. *Hydrocotyle* (Hydrocotyle)
 20. *Salvinia* (Salvinia)
 21. *Wolffia* (Wolffia)
 22. *Elodea canadensis* (Elodea)
 23. *Hydrilla* (Hydrilla)

24. *Chara* (Charophytes)
 25. *Utricularia* (Utricularia)
 26. *Hydrocotyle* (Hydrocotyle)
 27. *Salvinia* (Salvinia)
 28. *Wolffia* (Wolffia)
 29. *Elodea canadensis* (Elodea)
 30. *Hydrilla* (Hydrilla)



Chapter 9: How to Sew Jules the Raccoon

Materials:

- 36" x 24" piece of tan fabric
- 10" x 10" piece of dark brown fabric
- 7" x 6" piece of white fabric
- black, shiny button eyes about 1/2" in diameter
- tan thread
- dark brown thread
- black thread
- pink thread
- white thread
- stuffing

Preparation

Wash and dry all of the fabric. This will remove any excess dye from the fabric, and will shrink the fabric so that it is easier to work with. Before marking down the pattern, make sure that you iron out any wrinkles in the fabric. Cut out the pattern and mark out the pieces on the fabric, leaving at least an inch of space between each and from the fabric's edge, as seen in Figures 9.1 and 9.2. Draw in the mouth, nose, and eyes of the raccoon on the wrong side of the fabric, using the pattern as a guide. Cut out the fabric so that there is a half inch of material surrounding each piece as seen in Figure 9.2.

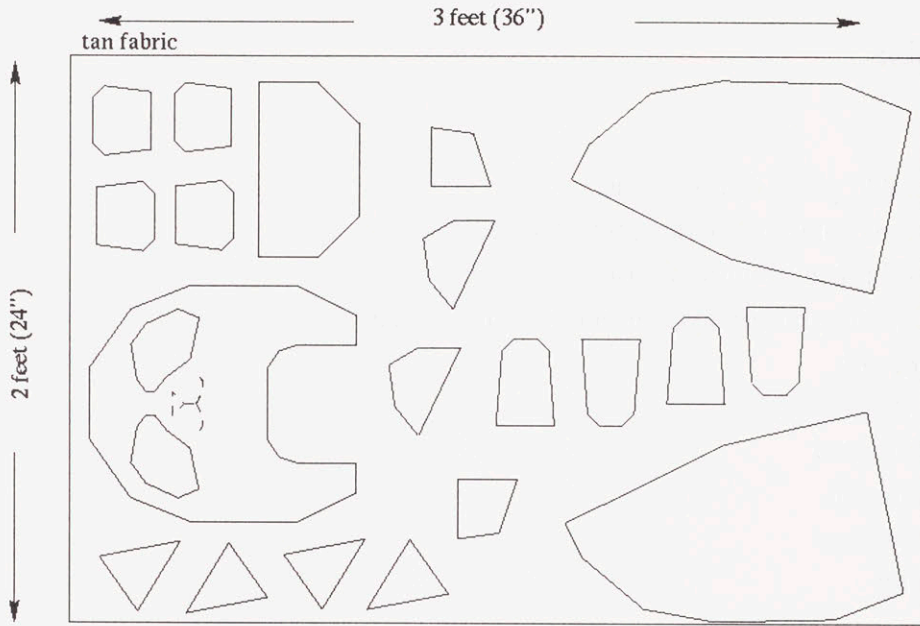


Figure 9.1: Arrangement of pieces for the tan fabric

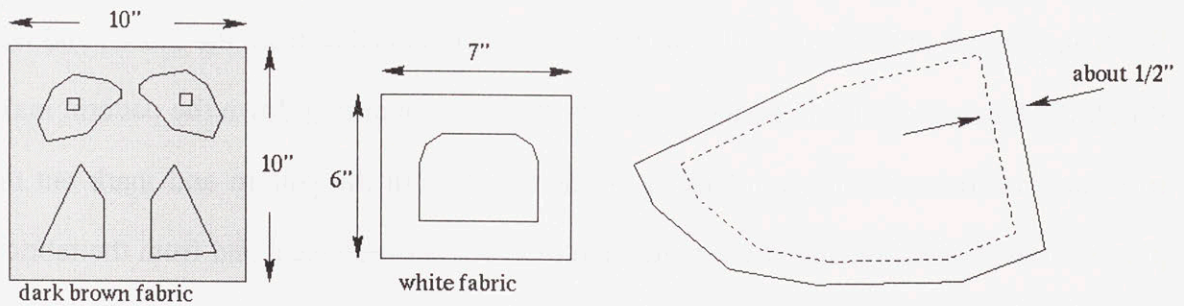


Figure 9.2: Arrangement of pieces for (l) the dark brown fabric and (m) the white fabric.
 (r) Example of cut piece.

Sewing

Sew the eye patches on to the front piece as shown in Figure 9.3.

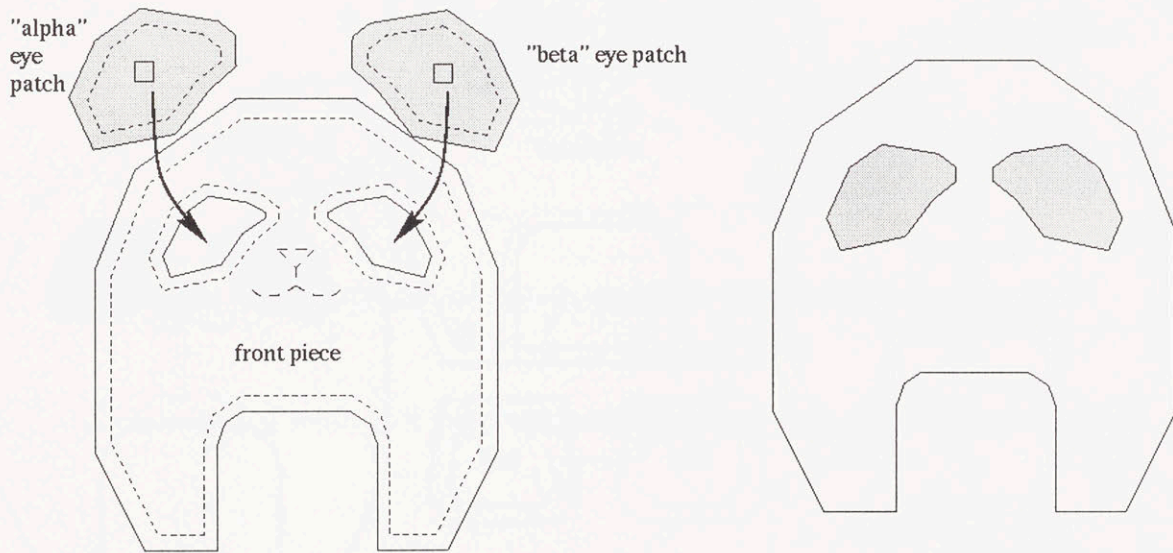


Figure 9.3: Guide to sewing on eye patches to front piece.

Draw in the diagonals on the “eye box” that you drew on the raccoon front piece. Where the diagonals intersect is where you will center the button eyes to sew. Backstitch in the mouth with black thread and the nose with pink thread. Use the black thread to sew on the eyes so that they appear on the Right side.



Figure 9.4: Attaching the eyes to the front piece

Attach the tummy to the front piece starting from **N** circling around to **O**, **P** and ending at **Q**, as shown in Figure 9.5.

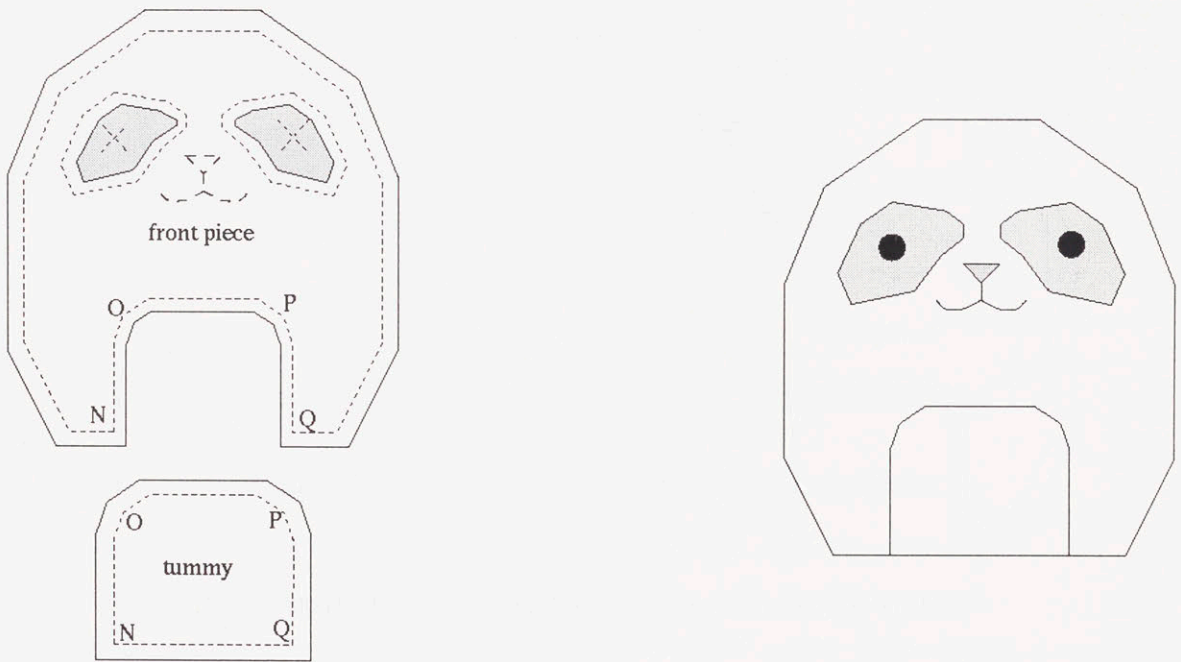


Figure 9.5: (l) Guide to sewing the tummy to the front piece. (r) Right side after sewing on the tummy

Sew on the raccoon ears from **A** to **B** on the front piece. Sew on the hands to the front piece from **C** to **D**. Sew on the feet to the front piece from **E** to **F**. Shown in Figure 9.6.

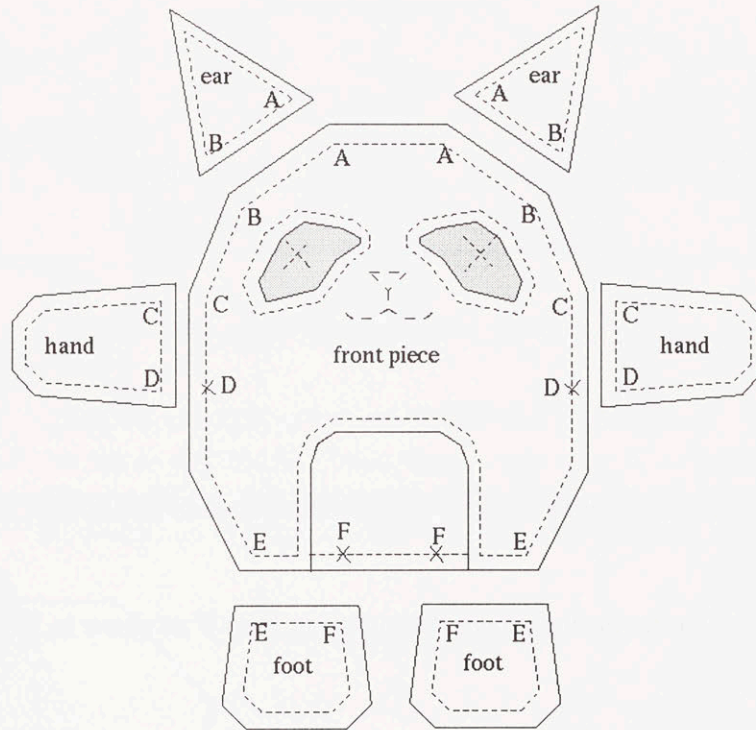


Figure 9.6: Guide to sewing on ears, hands, and feet to front piece

Unfold the ears, hands and feet from the front piece, folding them on their seams. Iron the seams and pieces flat. Shown in Figures 9.7 and 9.8.

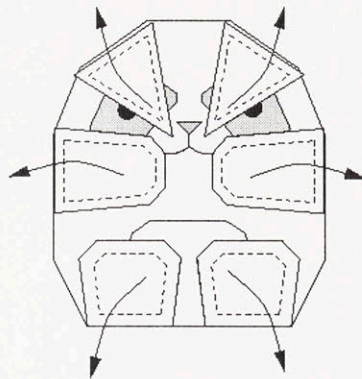


Figure 9.7: Unfold and iron at the seams.

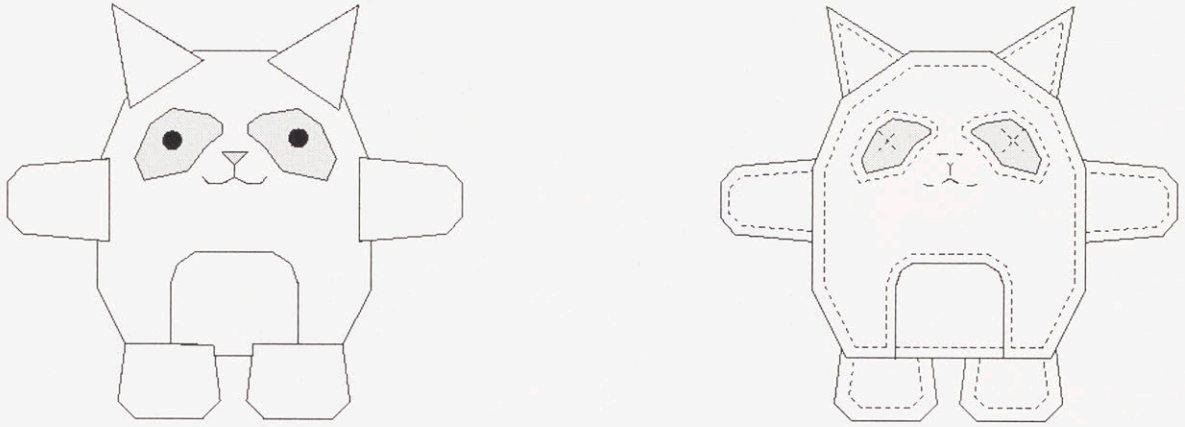


Figure 9.8: (l) Right side after ironing seams flat. (r) Wrong side after ironing

Sew on the feet to the bottom piece from points **E** to **F** as show in Figure 9.9.

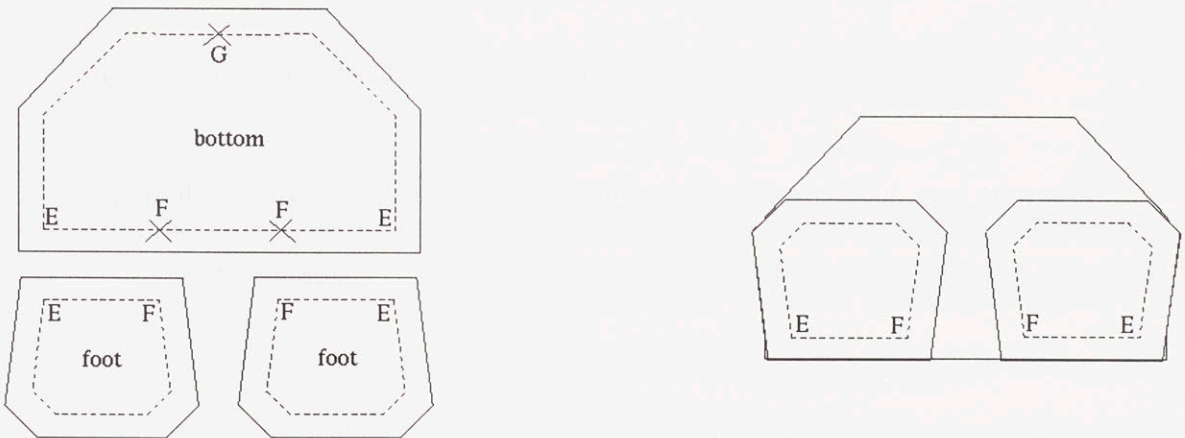


Figure 9.9: (l) Guide to sewing on the feet. (r) Right side of the bottom piece after sewing on feet.

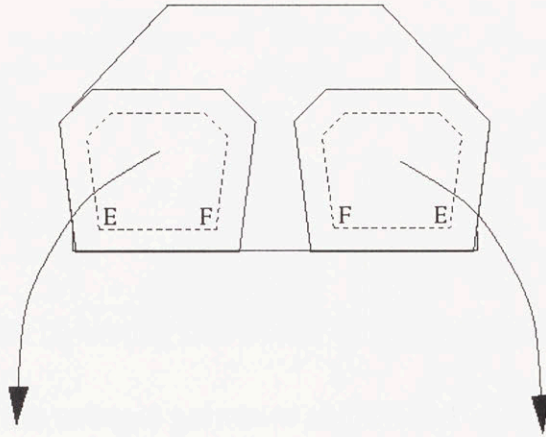


Figure 9.10: Unfold feet from bottom piece at the seams and iron flat.

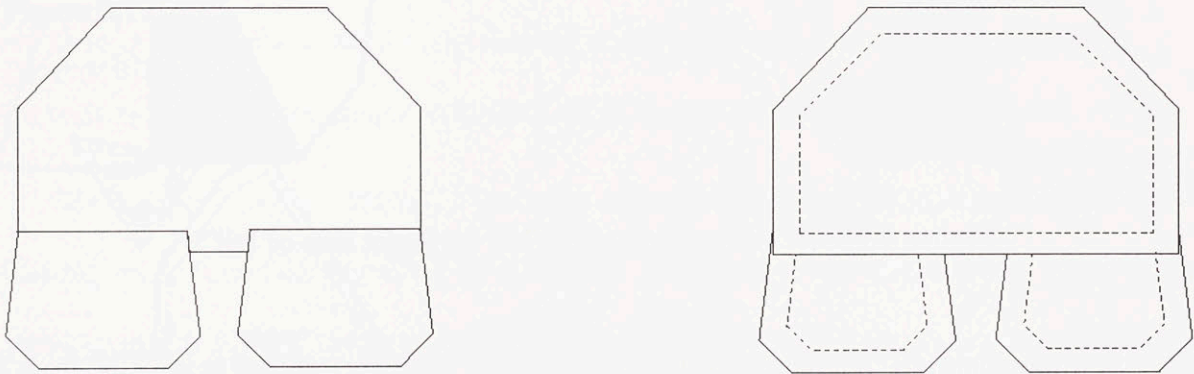


Figure 9.11: (l) Right side after ironing. (r) Wrong side after ironing.

Sew together tail1”a” to tail2”a” from **Z** to **Y**. Sew together tail2”a” to tail3”a” from **X** to **W**. This combined piece will now be referred to as tail”a”. See Figures 9.12 and 9.13.

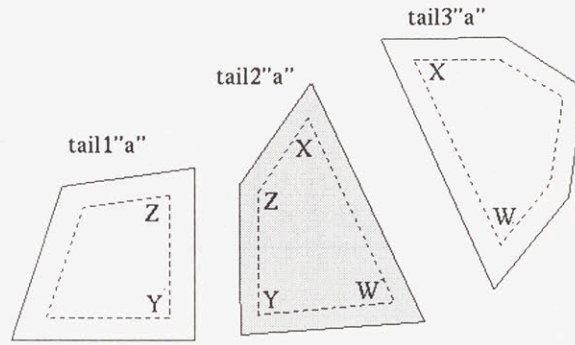


Figure 9.12: Guide to sewing together tail "a"



Figure 9.13: (l) Wrong side of tail "a". (r) Right side of tail "a".

Sew together tail 1 "b" to tail 2 "b" from Z to Y. Sew together tail 2 "b" to tail 3 "b" from X to W. This combined piece will now be referred to as tail "b". See Figures 9.14 and 9.15.

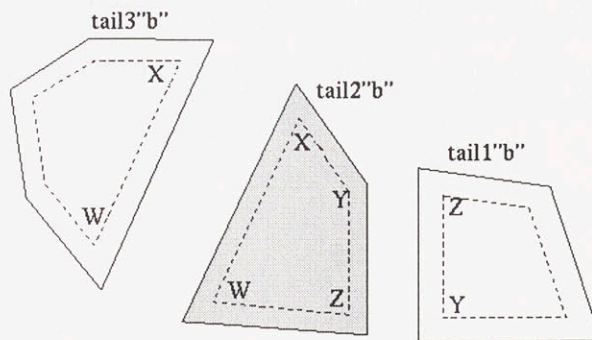


Figure 9.14: Guide to sewing together tail "b"

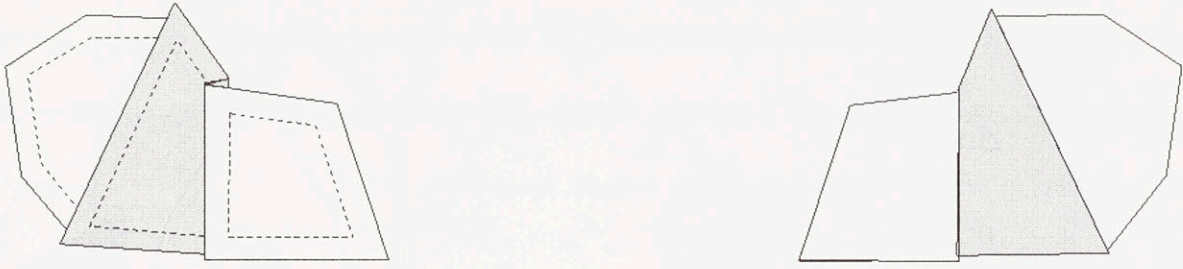


Figure 9.15: (l) Wrong side of tail "b". (r) Right side of tail "b".

Sew on a raccoon ear to the "alpha" back piece from **A** to **B**, a hand from **C** to **D**, and tail "a" from **G** to **H**, as shown in Figure 9.16. Unfold at seams and iron flat as shown in Figure 9.17.

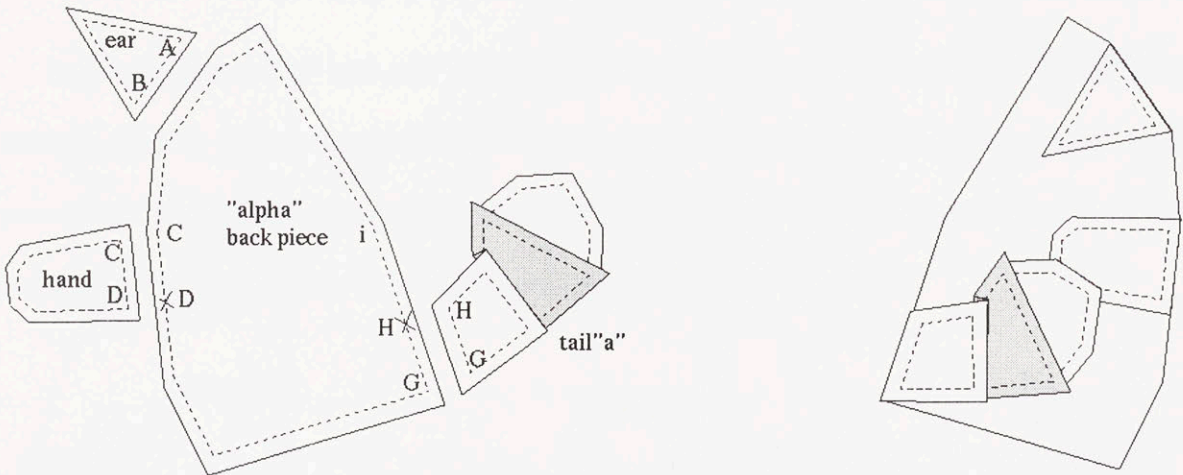


Figure 9.16: (l) Guide for sewing on raccoon ear, hand and tail "a" to "alpha" back piece. (r) Right side after sewing on ear, hand, and tail.

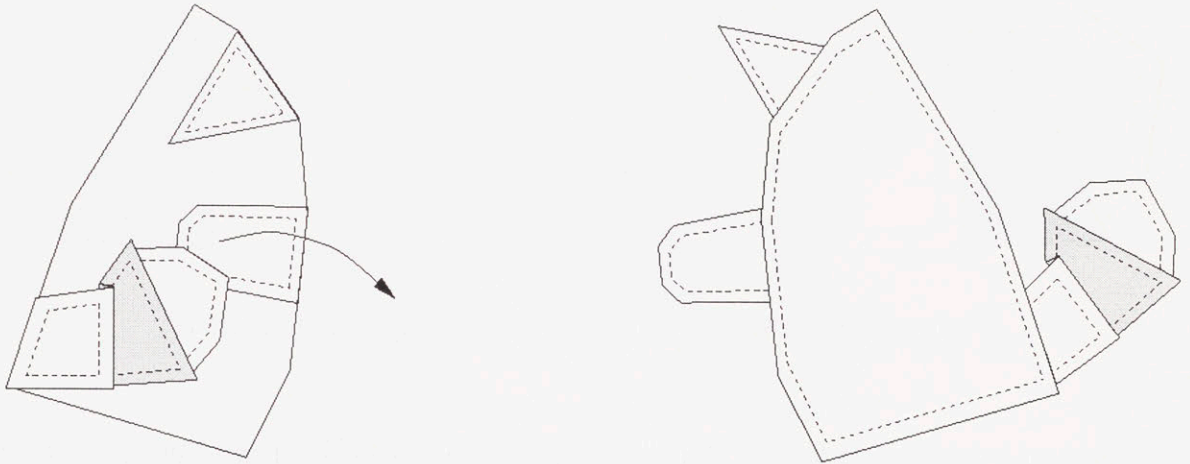


Figure 9.17: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Sew on a raccoon ear to the “beta” back piece from **A** to **B**, a hand from **C** to **D**, and tail”b” from **G** to **H**, as shown in Figure 9.18. Unfold at seams and iron flat as shown in Figure 9.19.

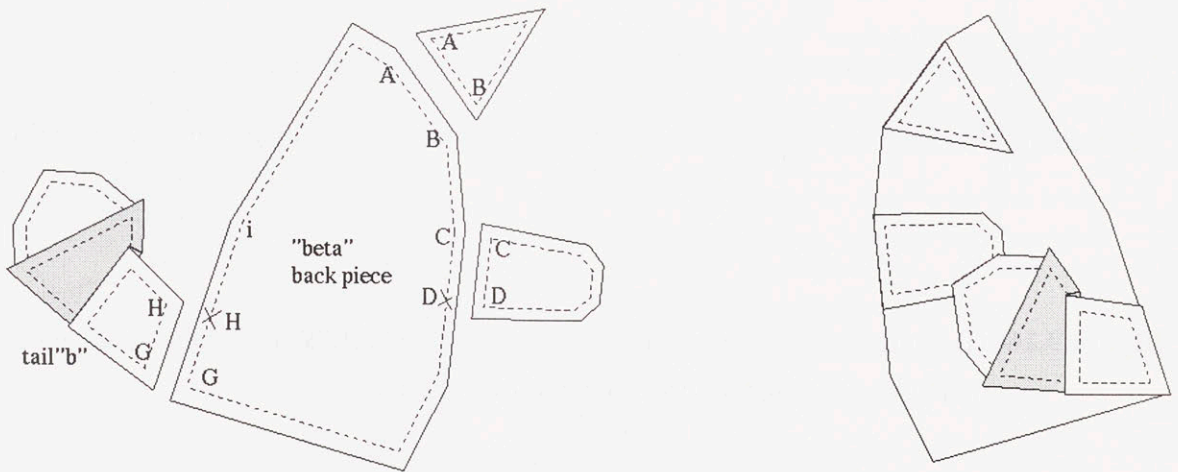


Figure 9.18: (l) Guide for sewing on raccoon ear, hand, and tail”b” to “beta” back piece. (r) Right side after sewing on ear, hand, and tail.

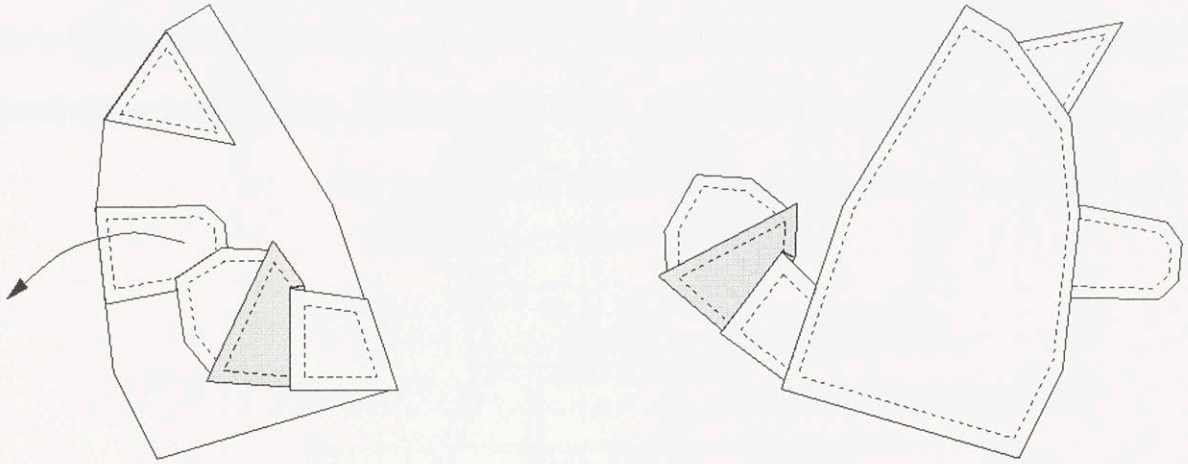


Figure 9.19: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Assembling

Sew together tail "a" and tail "b" to each other by following the arrow in Figure 9.20, starting from **H** and ending at **G**. Sew together the "alpha" back piece to the "beta" back piece from **i** to **J**. Now the only openings on the combined back pieces is from **i** to **H** and at the base of the tail from **G** to **H**. Do not sew these openings shut!

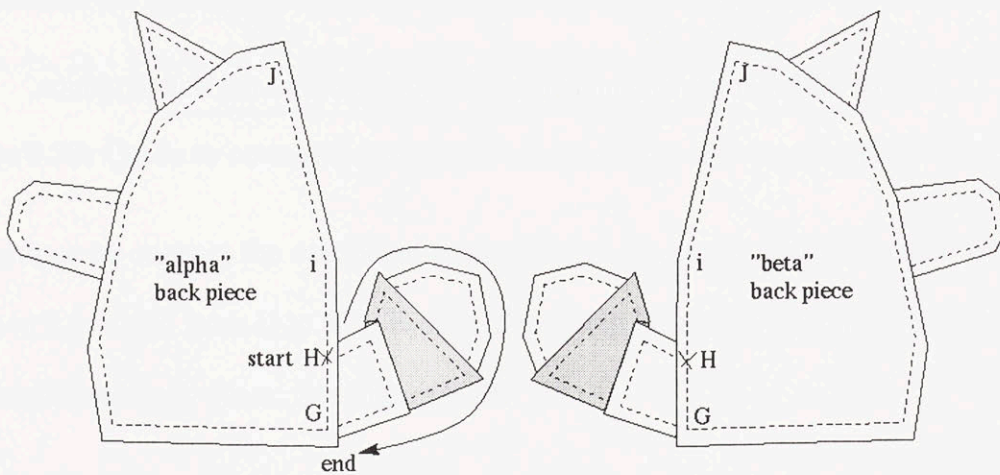


Figure 9.20: Guide to sewing the tail together and combining the back pieces.

Sew together the feet of the front piece to the bottom piece by circling around the feet from **e** to **f** and from **F** to **E** as shown in Figure 9.21. This will leave two openings at the base of the feet along **E** to **F** and **f** to **e**. Do not sew these openings shut! Notice that the front piece is only sewn *directly* to the bottom piece from **F** to **f**.

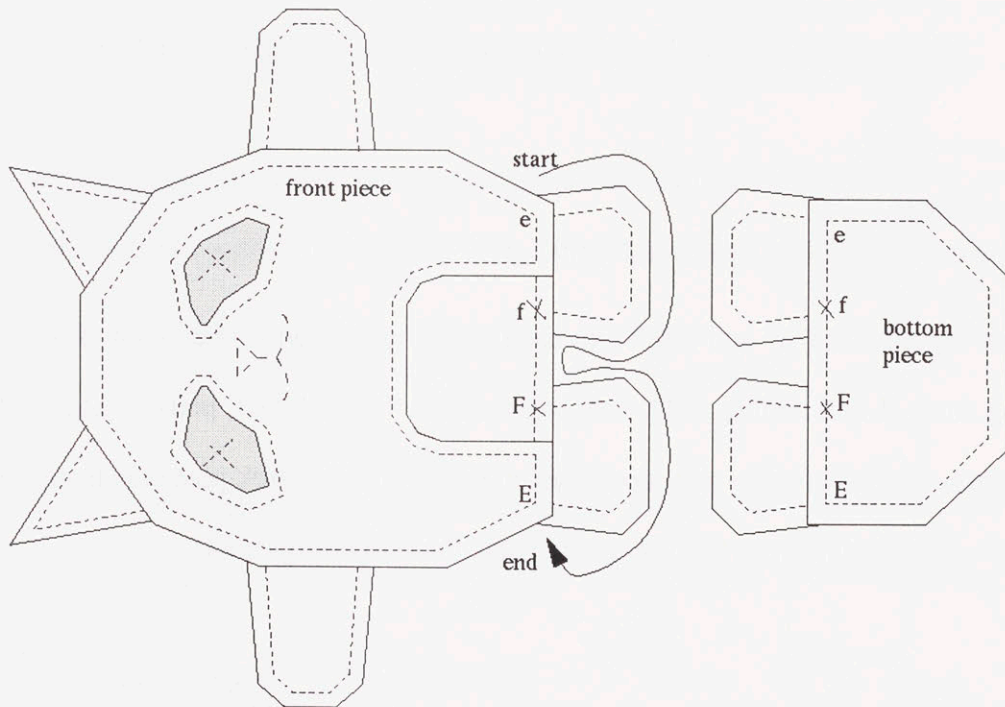


Figure 9.21: Guide to connecting the front piece to the bottom piece.

Following the arrow, sew the upper region of the combined back piece to the combined front piece, leaving openings at the base of the ears (b to a and A to B) and the base of the hands (d to c and C to D). See Figure 9.22.

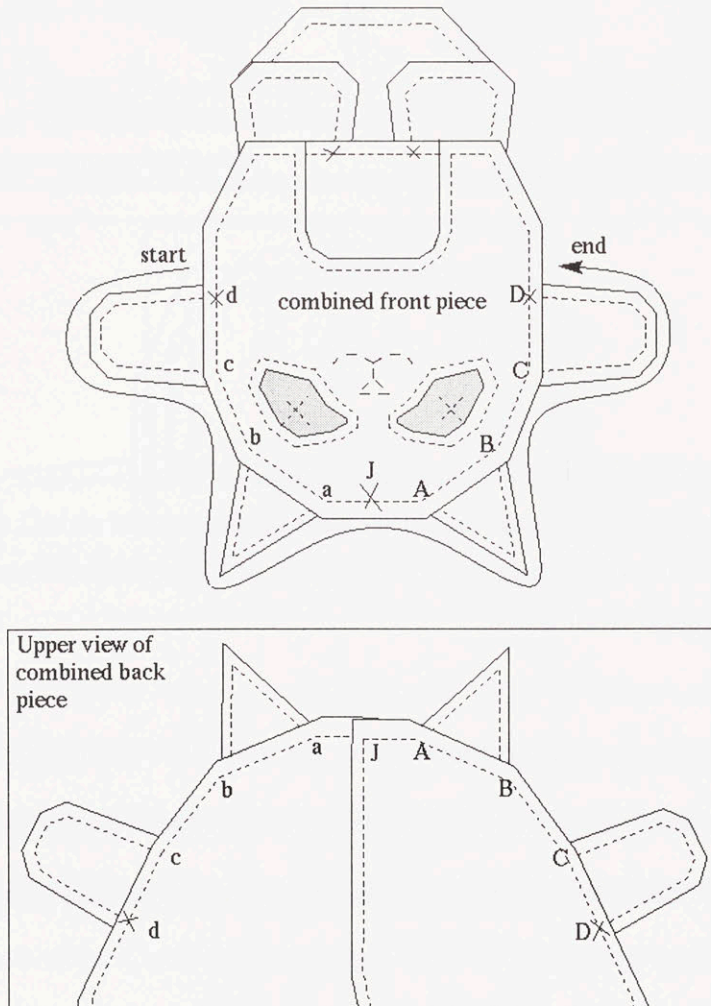


Figure 9.22: Guide to connecting the combined front piece to the combined back piece.

Continue to connect the combined back piece to the combined front piece by sewing from **d** to **k** to **e** and from **D** to **K** to **E** only. There will be a large opening from **e** to **G** to **E** of the combined back piece. See Figure 9.23.

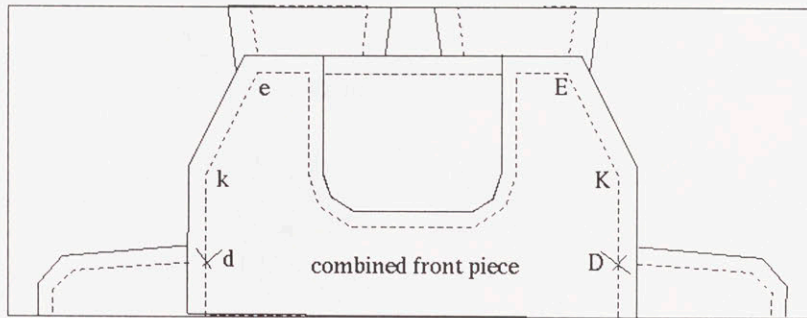
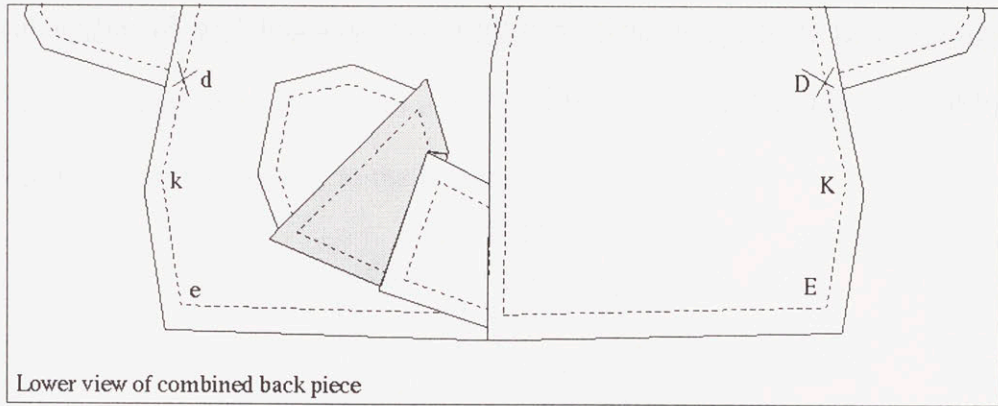


Figure 9.23: Guide to connecting the lower region of the combined back piece to the combined front piece.

Now sew together the bottom piece (from the combined front piece) to the combined back piece from **e** to **l** to **m** to **M** to **L** to **E** as shown in Figure 9.24. Now the only opening that is left is on the back from **i** to **H**. This is the hole that you will turn the raccoon inside out.

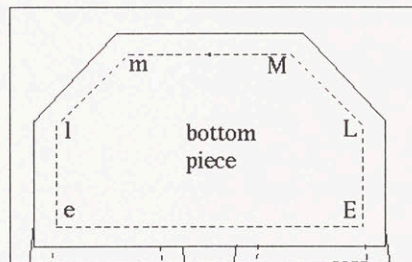
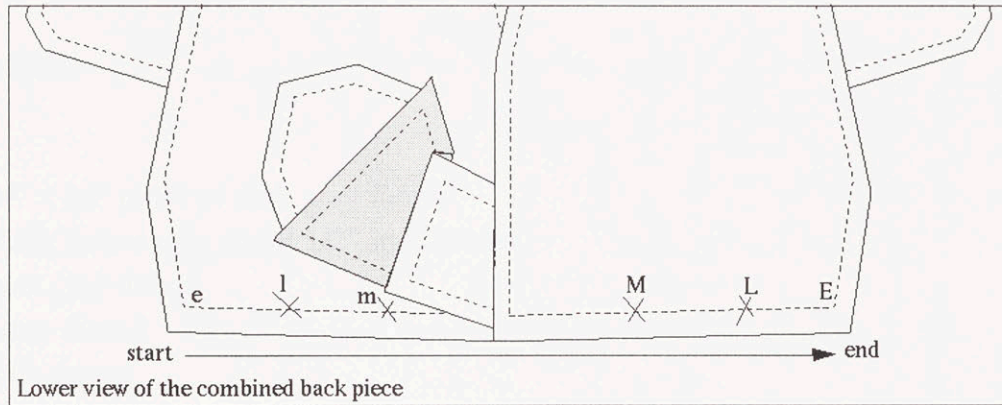


Figure 9.24: Guide to connecting the combined back piece to the bottom piece

Finishing

Turn the raccoon inside out at the opening from **i** to **H**. Turn the hands, feet, ears, and tail inside out as well. Stuff the hands, ears, feet, tail, and body with polyester fiber to the level of firmness that you want. Close the opening in the back by lacing up the hole with thread.

1. *Pharmaceutical Innovation and the Role of Patents*

2. *The Impact of Patent Law on Drug Development*

3. *Patent Protection and the Burden of Disease*

4. *Patent Law and the Allocation of Resources*

5. *Patent Law and the Role of the State*

6. *Patent Law and the Role of the Courts*

7. *Patent Law and the Role of the Legislature*

8. *Patent Law and the Role of the Executive*

9. *Patent Law and the Role of the Judiciary*

10. *Patent Law and the Role of the Public*

11. *Patent Law and the Role of the Private Sector*

12. *Patent Law and the Role of the Non-Profit Sector*

13. *Patent Law and the Role of the Government*

14. *Patent Law and the Role of the International Community*

15. *Patent Law and the Role of the Future*

16. *Patent Law and the Role of the Past*

17. *Patent Law and the Role of the Present*

18. *Patent Law and the Role of the Future*

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48. *Patent Law and the Role of the Future*

49. *Patent Law and the Role of the Future*

Chapter 10: Nip the Cat

Materials:

- 24" x 36" piece of dark gray fabric
- black button eyes about 1/2" in diameter
- dark gray thread
- black thread
- pink thread
- stuffing

Preparation

Wash and dry all of the fabric. This will remove any excess dye from the fabric, and will shrink the fabric so that it is easier to work with. Before marking down the pattern, make sure that you iron out any wrinkles in the fabric. Cut out the pattern and mark out the pieces on the fabric, leaving at least an inch of space between each and from the fabric's edge, as seen in Figure 10.1. Draw in the mouth, nose, and eyes of the cat on the wrong side of the fabric, using the pattern as a guide. Cut out the fabric so that there is a half inch of material surrounding each piece as seen in Figure 10.2.

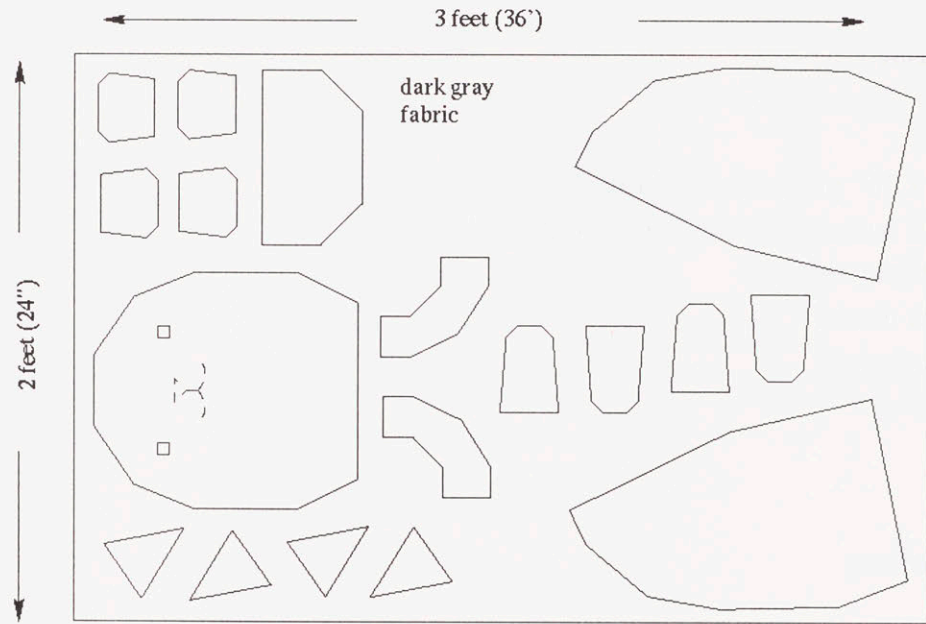


Figure 10.1: Arrangement of pieces for the cat.

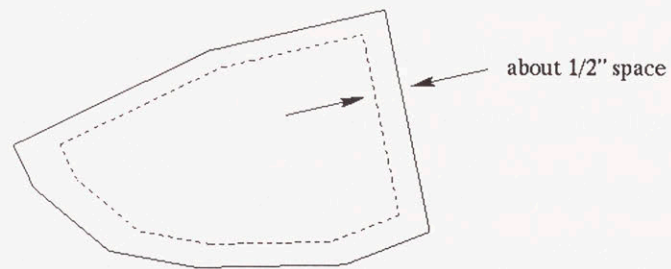


Figure 10.2: Example of cut piece

Sewing

Draw in the diagonals on the “eye box” that you drew on the cat front piece. Where the diagonals intersect is where you will center the button eyes to sew. Backstitch in the mouth with black thread and the nose with pink thread. Sew on the eyes so that they appear on the Right side.



Figure 10.3: Attaching the eyes to the front piece

Sew on the cat ears from **A** to **B** on the front piece. Sew on the hands to the front piece from **C** to **D**. Sew on the feet to the front piece from **E** to **F**. Shown in Figure 10.4.

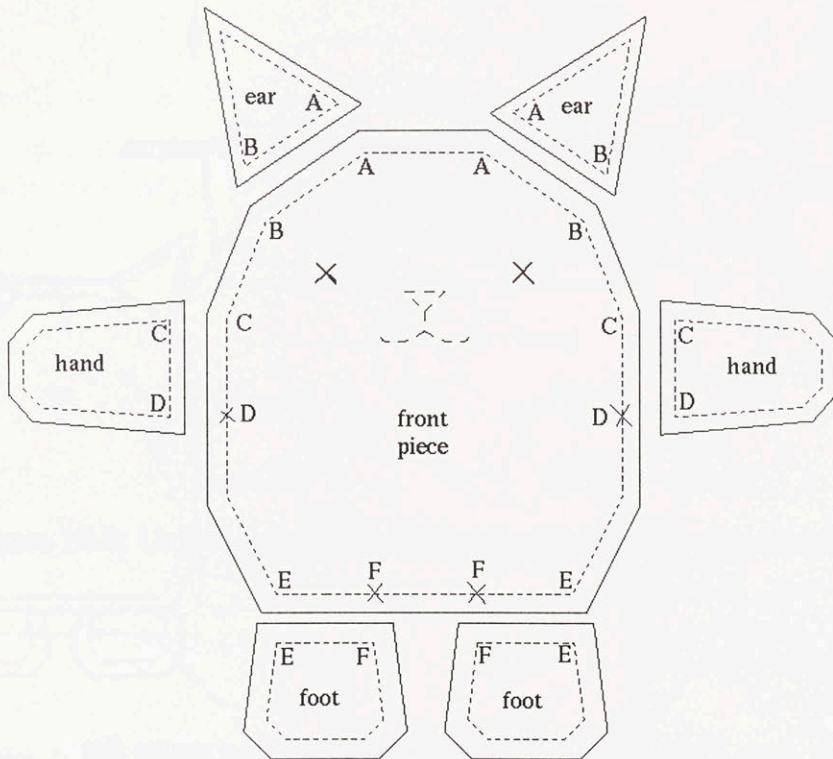


Figure 10.4: Guide to sewing on ears, hands, and feet to front piece

Unfold the ears, hands and feet from the front piece, folding them on their seams. Iron the seams and pieces flat. Shown in Figures 10.5 and 10.6.

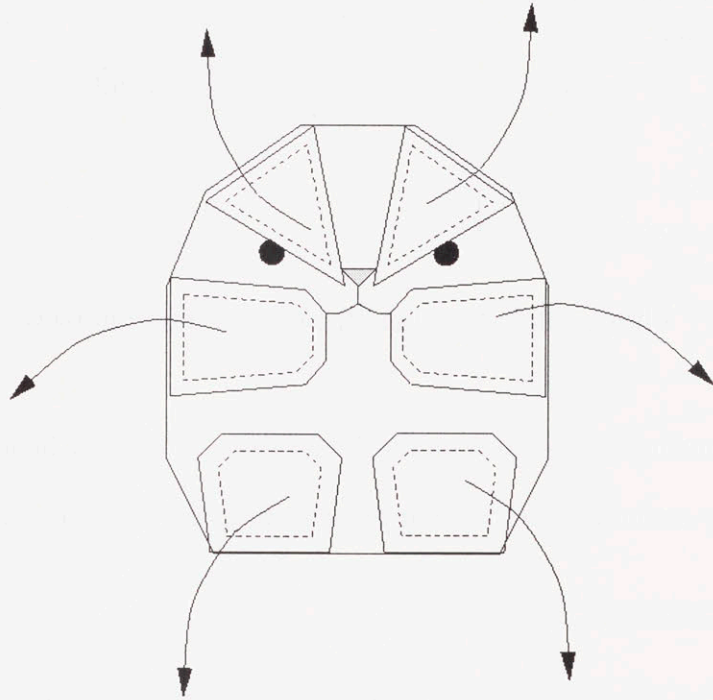


Figure 10.5: Unfold and iron at the seams.

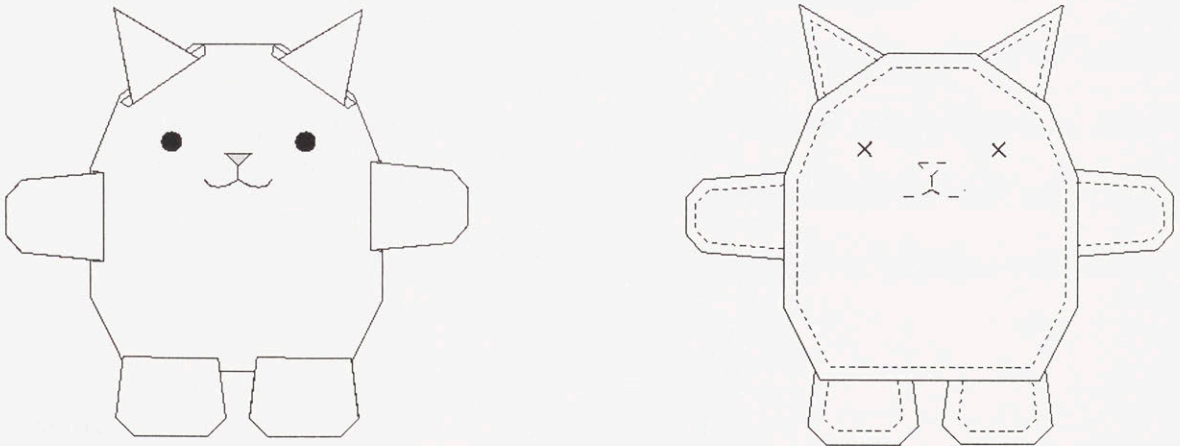


Figure 10.6: Wrong side after ironing seams flat

Sew on the feet to the bottom piece from points **E** to **F** as show in Figure 10.7.

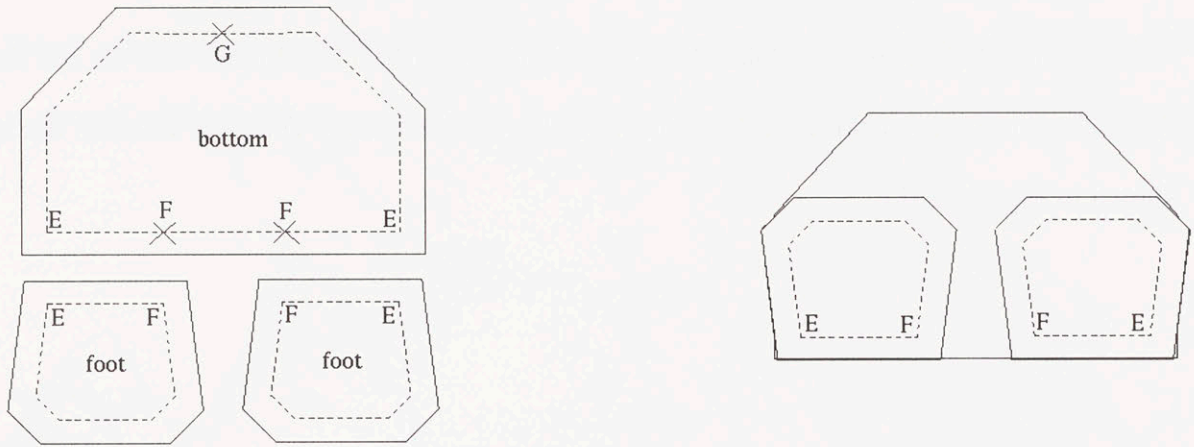


Figure 10.7: (l) Guide to sewing on the feet. (r) Right side of the bottom piece after sewing on feet.

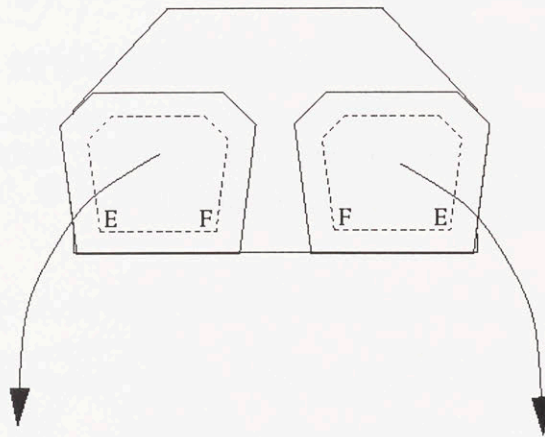


Figure 10.8: Unfold feet from bottom piece at the seams and iron flat.

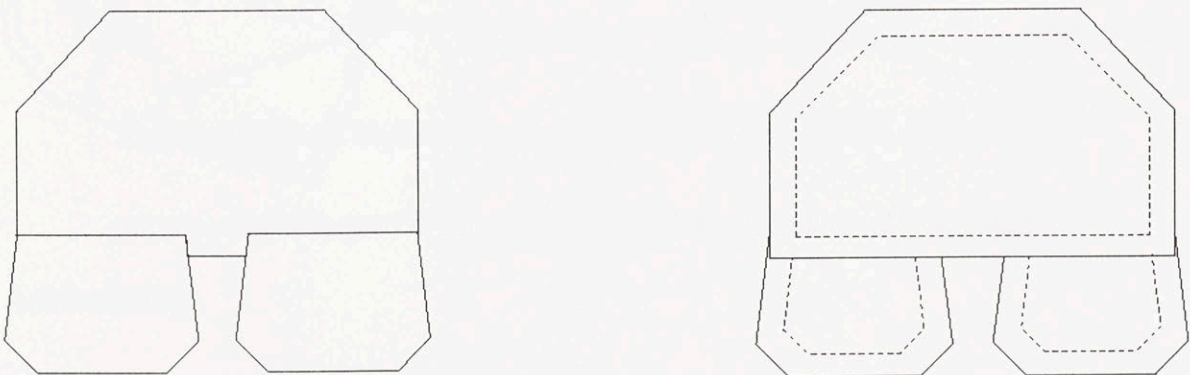


Figure 10.9: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on a cat ear to the “alpha” back piece from **A** to **B**, a hand from **C** to **D**, and the “alpha” cat tail piece from **H** to **G** as shown in Figure 10. Unfold at seams and iron flat as shown in Figure 10.11.

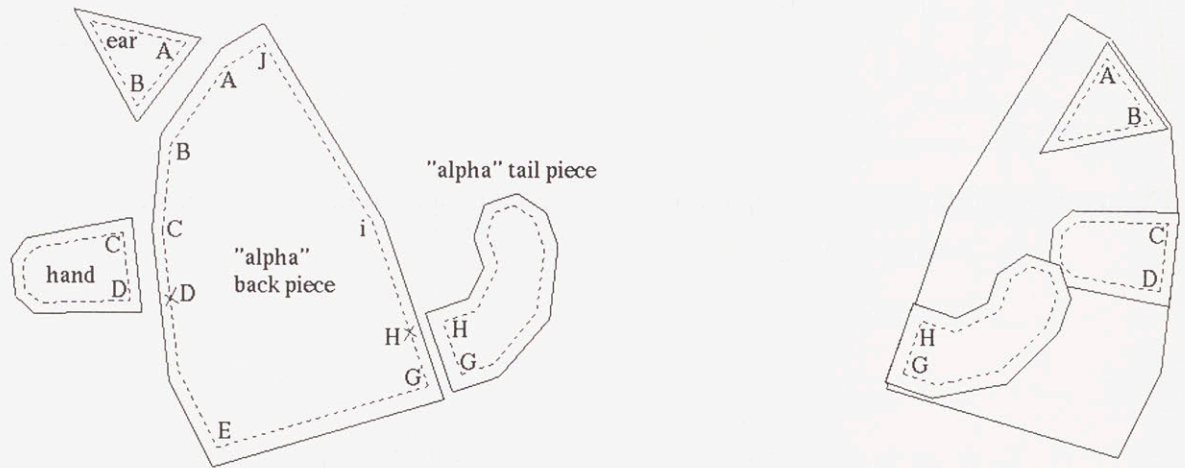


Figure 10.10: (l) Guide for sewing on ear, hand and tail to “alpha” back piece. (r) Right side after sewing on ear, hand and tail.

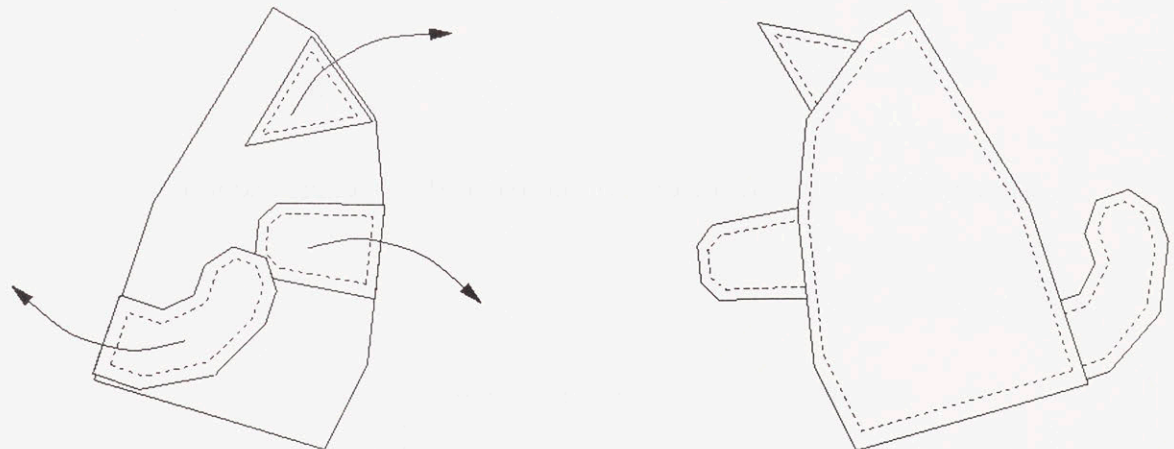


Figure 10.11: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Sew on a cat ear to the “beta” back piece from **A** to **B**, a hand from **C** to **D**, and the “beta” cat tail piece from **H** to **G** as shown in Figure 10.12. Unfold at seams and iron flat as shown in Figure 10.13.

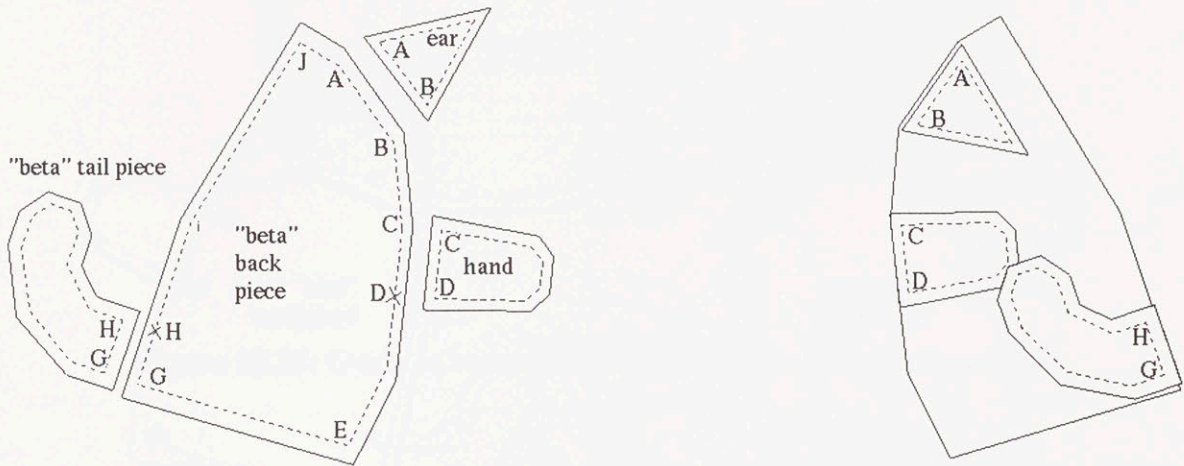


Figure 10.12: (l) Guide for sewing on ear, hand, and tail to “beta” back piece. (r) Right side after sewing on ear, hand, and tail.

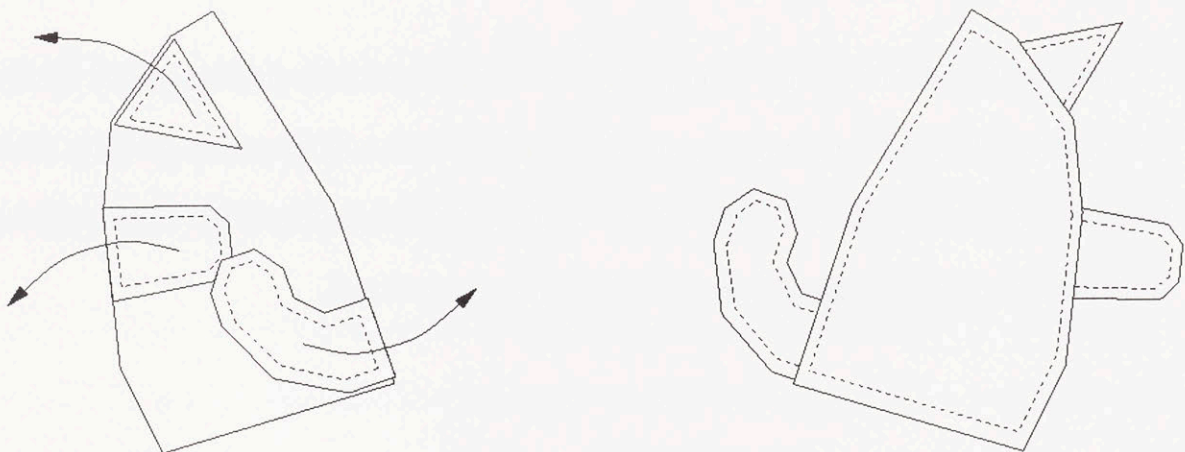


Figure 10.13: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Assembling

Sew the “alpha” and “beta” tail pieces together by starting from **H** and circling around the

tail to **G** as shown in Figure 10.14. There should be an opening to the tail from **H** to **G**. Do not sew this opening shut! Continue to connect the “alpha” and “beta” back pieces by sewing from **J** to **i**. Do not sew from **i** to **H**!

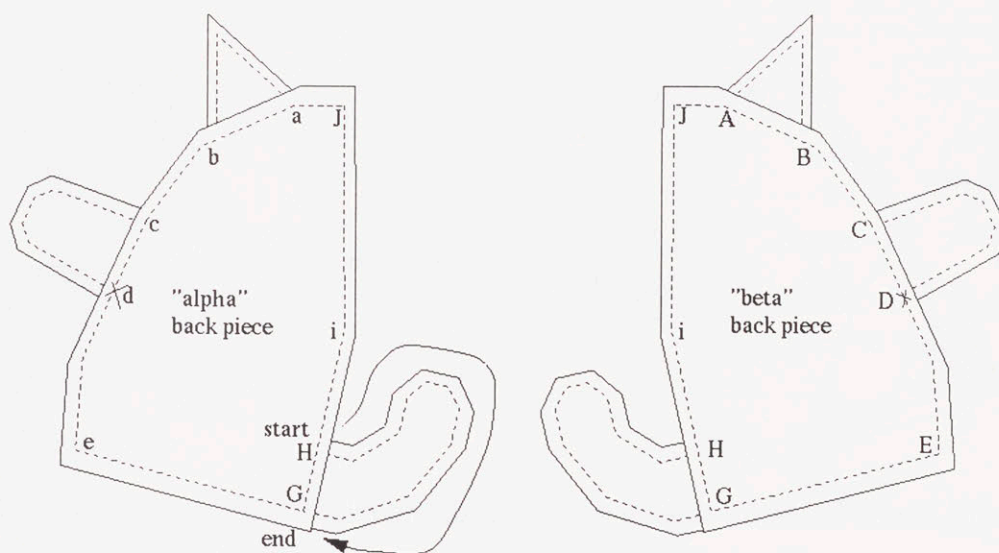


Figure 10.14: Sew together “alpha” and “beta” tail pieces.

Sew together the feet of the front piece to the bottom piece by circling around the feet from **e** to **f** and from **F** to **E** as shown in Figure 10.15. This will leave two openings at the base of the feet along **E** to **F** and **f** to **e**. Do not sew these openings shut! Notice that the front piece is only sewn *directly* to the bottom piece from **F** to **f**.

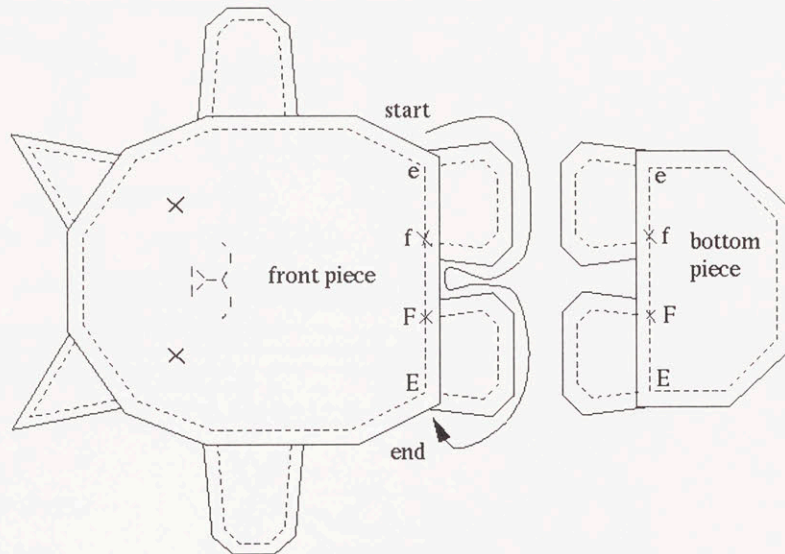


Figure 10.15: Guide to connecting the front piece to the bottom piece.

Following the arrow, sew the upper region of the combined back piece to the combined front piece, leaving openings at the base of the ears (**b** to **a** and **A** to **B**) and the base of the hands (**d** to **c** and **C** to **D**). See Figure 10.16.

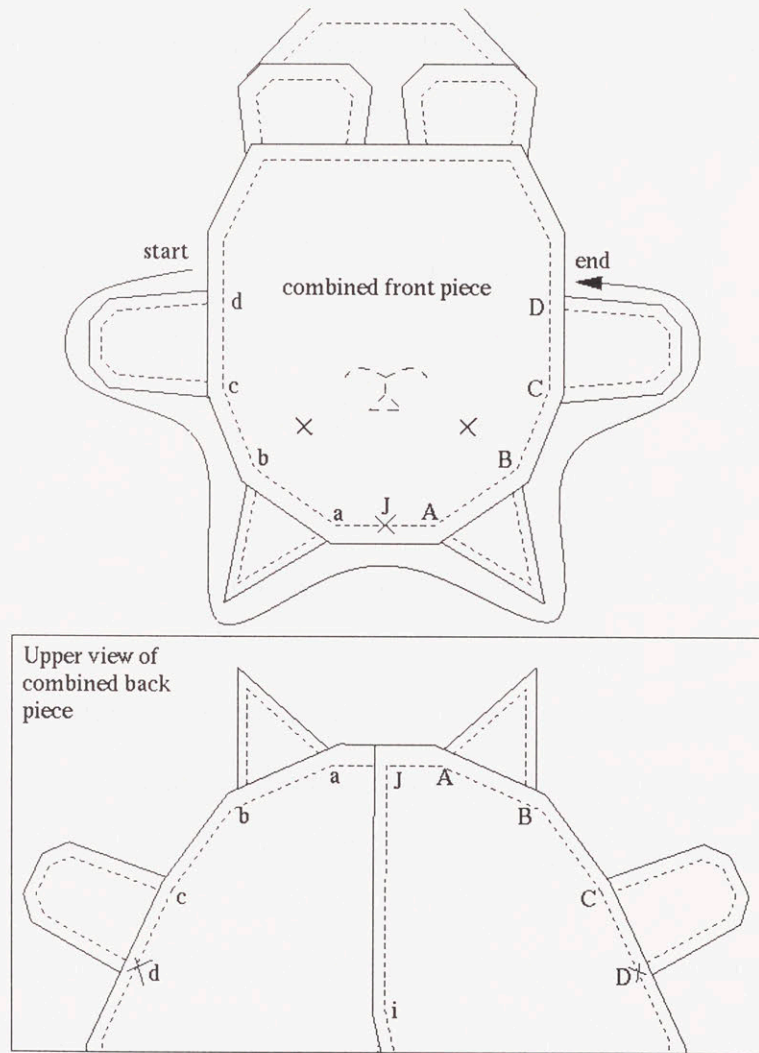


Figure 10.16: Guide to connecting the combined front piece to the combined back piece.

Continue to connect the combined back piece to the combined front piece by sewing from **d** to **k** to **e** and from **D** to **K** to **E** only. There will be a large opening from **e** to **G** to **E** of the combined back piece. See Figure 10.17.

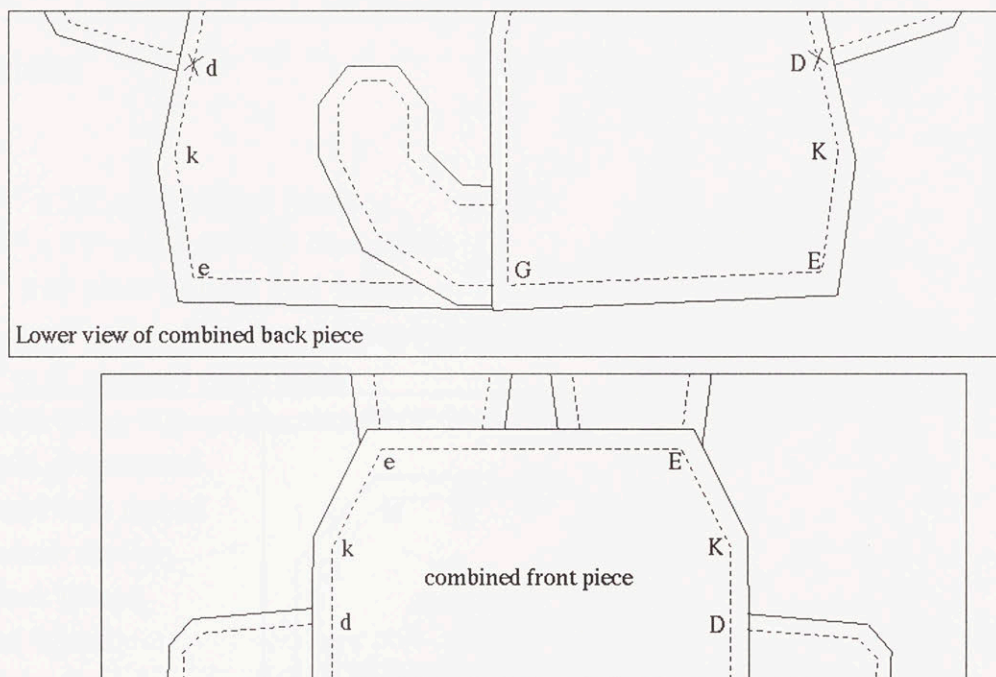


Figure 10.17: Guide to connecting the combined back piece to the combined front piece.

Now sew together the bottom piece (from the combined front piece) to the combined back piece from **e** to **l** to **m** to **G** to **M** to **L** to **E** as shown in Figure 10.18. Now the only opening that is left is on the back from **i** to **H**. This is the hole that you will turn the cat inside out.

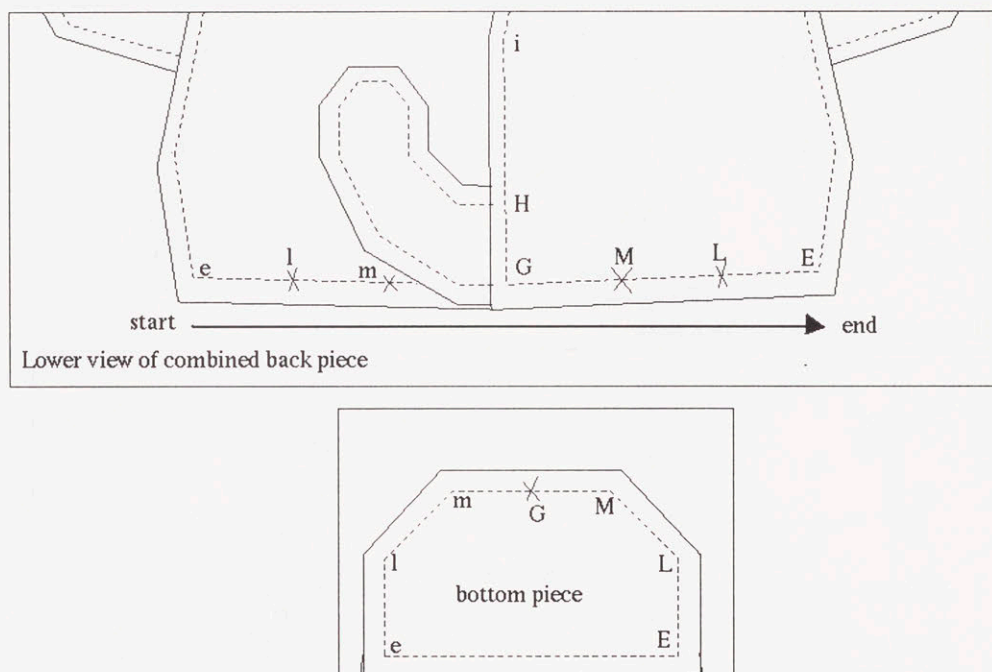


Figure 10.18: Guide to connecting the combined back piece to the bottom piece.

Finishing

Turn the cat inside out at the opening from **i** to **H**. Turn the hands, feet, and ears and tail inside out as well. Stuff the hands, ears, feet, tail, and body with polyester fiber to the level of firmness that you want. Close the opening in the back by lacing up the hole with thread.

Chapter 11: How to Sew Pahja the Parrot

Materials:

- 27" x 18" piece of red fabric
- 11" x 15" piece of royal blue fabric
- 9" x 9" piece of light gray fabric
- 12" x 7" piece of yellow fabric
- 7" x 6" piece of white fabric
- black shiny button eyes about 1/2" in diameter
- light gray thread
- royal blue thread
- yellow thread
- black thread
- red thread
- white thread
- stuffing

Preparation

Wash and dry all of the fabric. This will remove any excess dye from the fabric, and will shrink the fabric so that it is easier to work with. Before marking down the pattern, make sure that you iron out any wrinkles in the fabric. Cut out the pattern and mark out the pieces on the fabric, leaving at least an inch of space between each and from the fabric's edge, as seen in Figures 11.1, 11.2, and 11.3. Draw in eyes of the parrot on the wrong side of the fabric, using the pattern as a guide. Cut out the fabric so that there is a half inch of material surrounding each piece as seen in Figure 11.3.

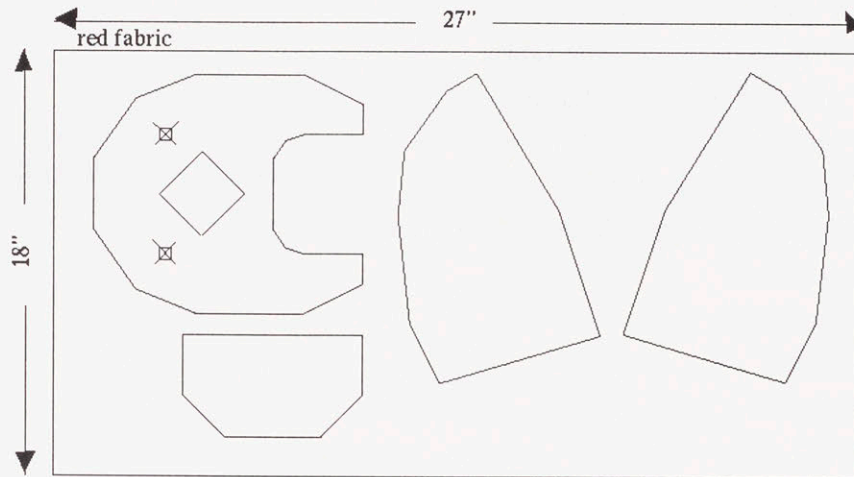


Figure 11.1: Arrangement of pieces for the red fabric

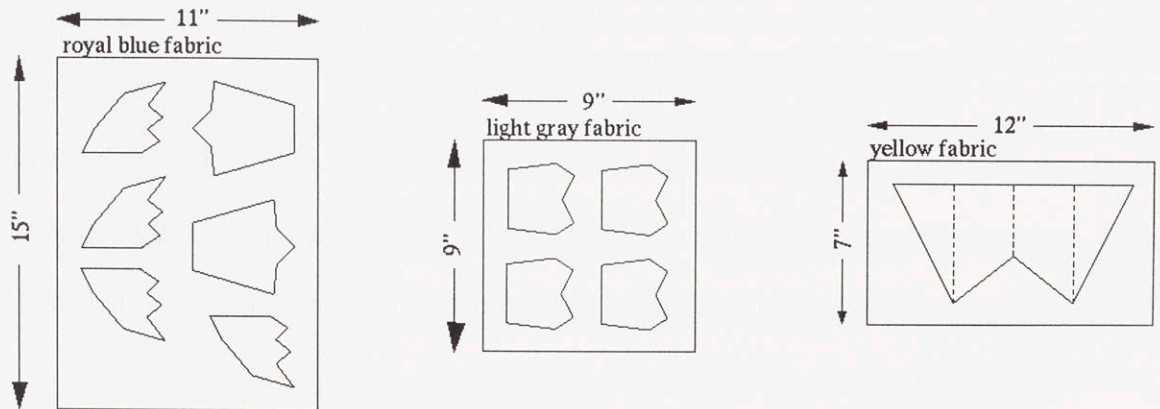


Figure 11.2: Arrangement of pieces for the (l) royal blue fabric, (m) light gray fabric, and (r) the yellow fabric

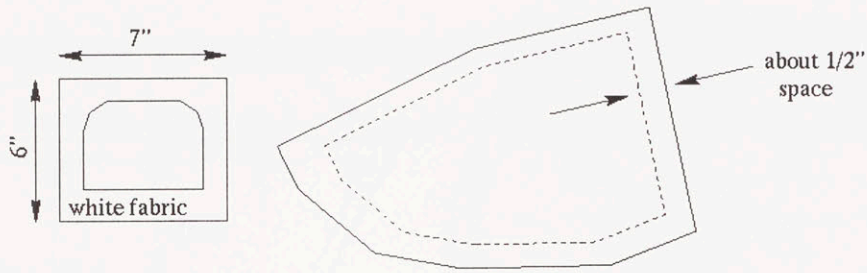


Figure 11.3: (l) Arrangement of pieces on white fabric (r) Example of cut piece.

Sewing

Draw in the diagonals on the “eye box” that you drew on the parrot front piece. Where the diagonals intersect is where you will center the button eyes to sew. Use black thread to sew on the eyes so that they appear on the Right side.

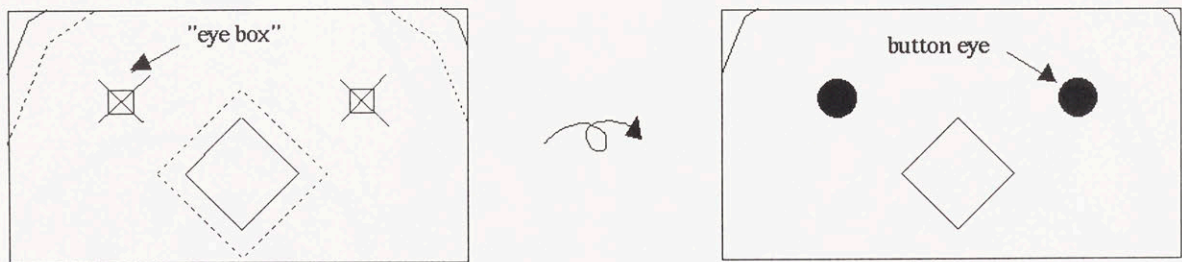


Figure 11.4: Attaching the eyes to the front piece

Sew together the beak by folding it in half along line **SY**, and sew from **U** to **W**, and from **W** to **Y**. Attach the beak to the front piece by sewing, starting from **S** to **T** to **U** to **t** and ending back at **S**, as shown in Figure 11.5.

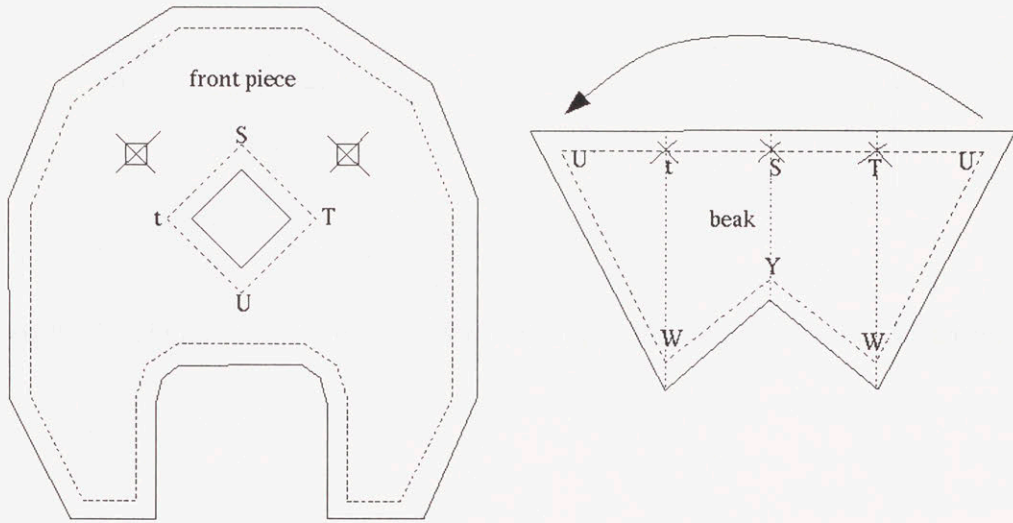


Figure 11.5: Guide to making the beak and attaching it to the front piece.

Attach the tummy to the front piece starting from **N** circling around to **O**, **P** and ending at **Q**, as shown in Figure 11.6.

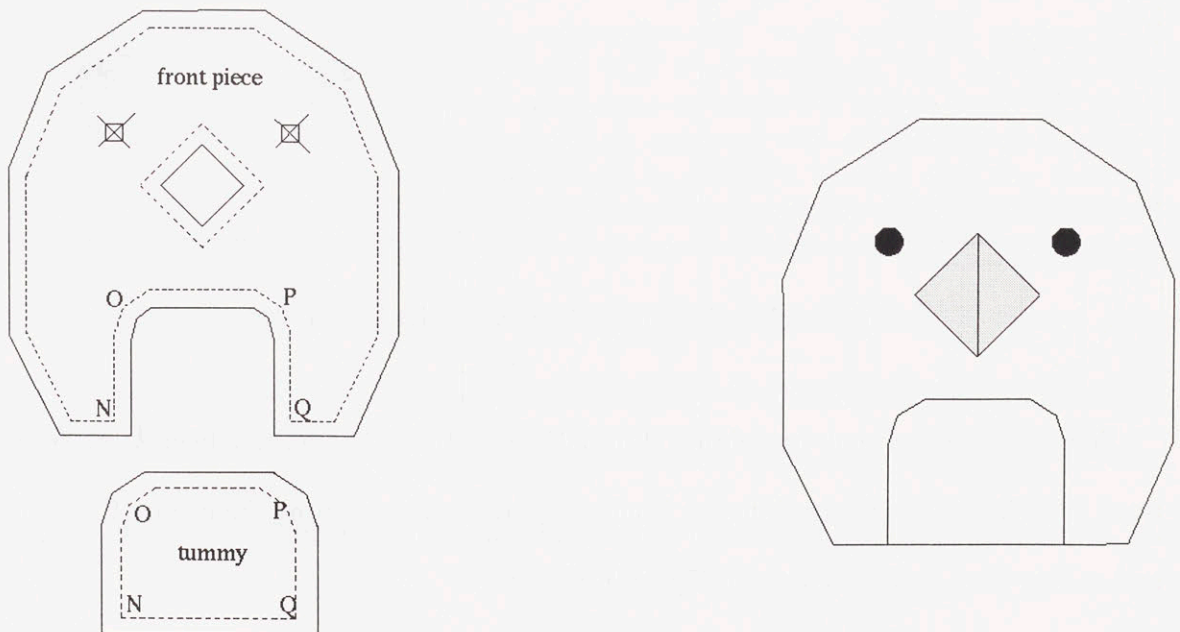


Figure 11.6: (l) Guide to sewing the tummy to the front piece. (r) Right side after sewing on the tummy

Sew on the wings to the front piece from **C** to **D**. Sew on the feet to the front piece from **E** to **F**. Shown in Figure 11.7.

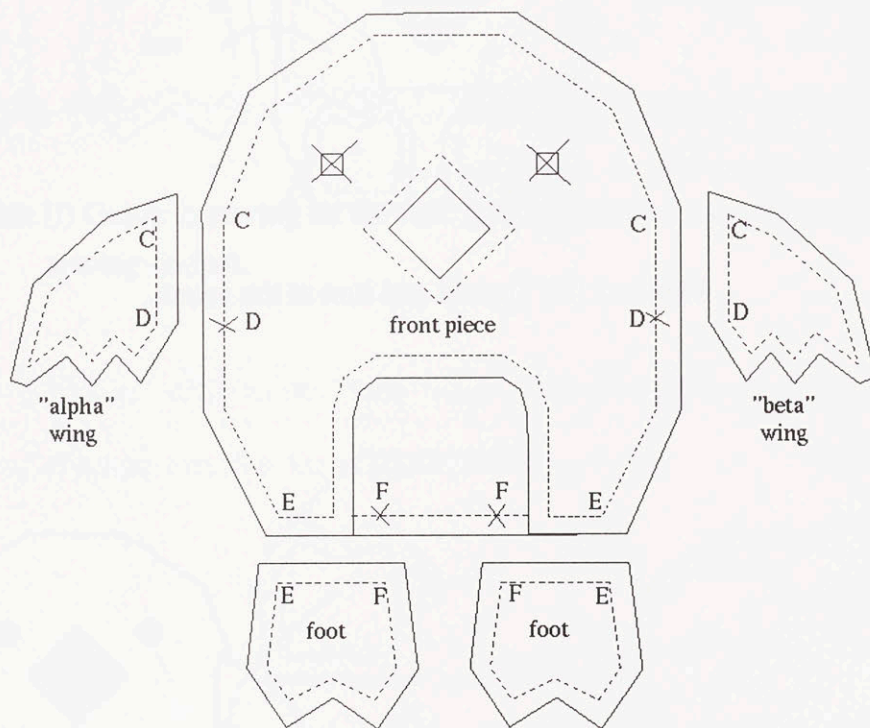


Figure 11.7: Guide to sewing on wings and feet to front piece.

Unfold the wings and feet from the front piece, folding them on their seams. Iron the seams and pieces flat. Shown in Figures 11.8 and 11.9.

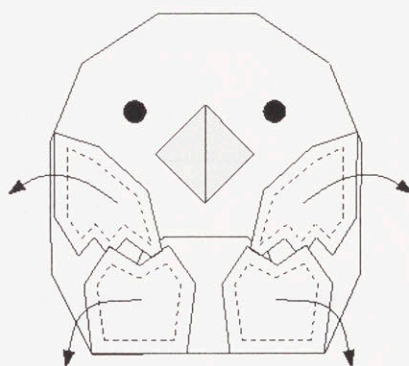


Figure 11.8: Unfold and iron at the seams.

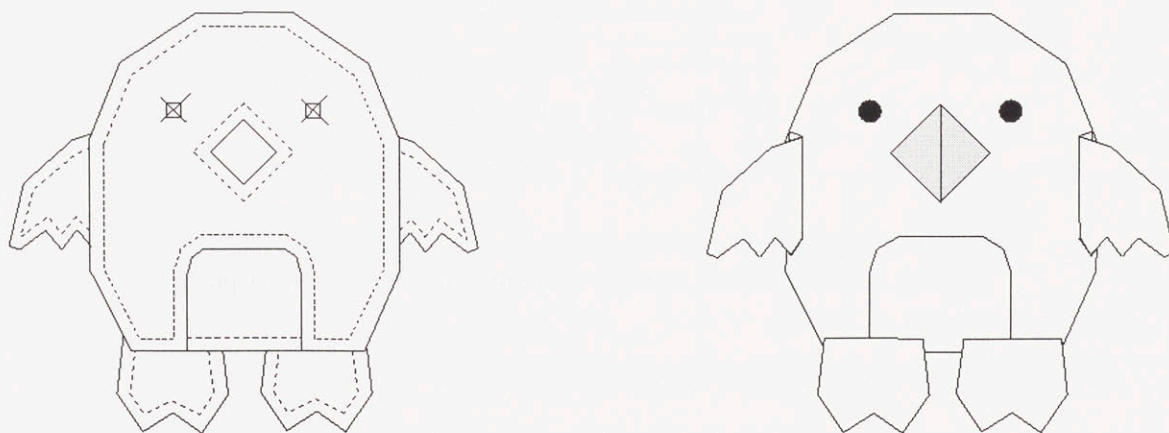


Figure 11.9: (l) Wrong side after ironing. (r) Right side after ironing.

Sew on the feet to the bottom piece from points **E** to **F** as show in Figure 11.10.

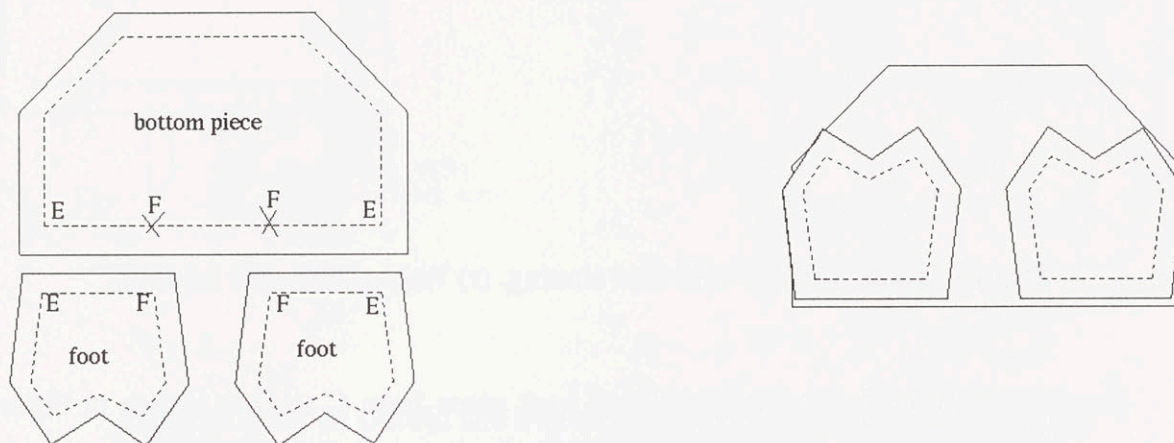


Figure 11.10: (l) Guide to sewing on the feet. (r) Right side of the bottom piece after sewing on feet.

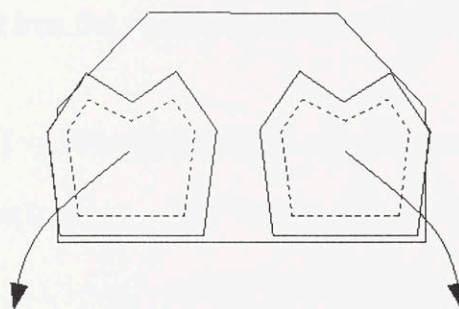


Figure 11.11: Unfold feet from bottom piece at the seams and iron flat.

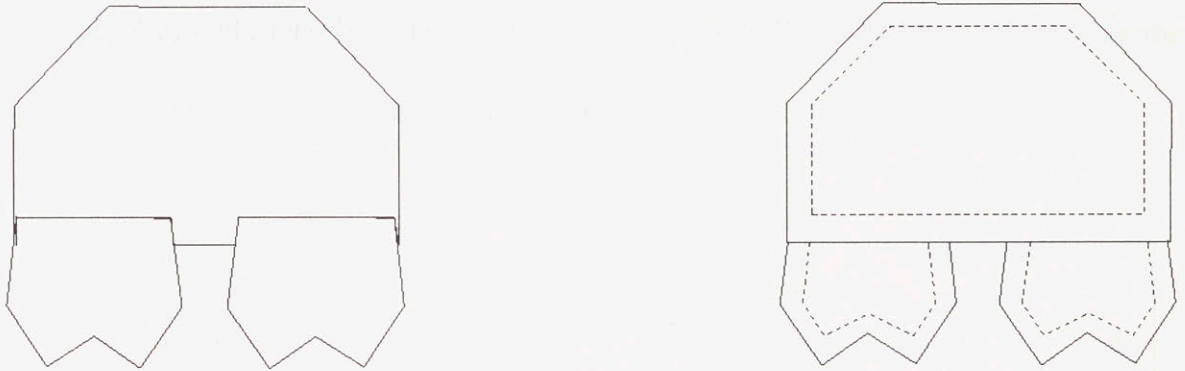


Figure 11.12: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on the “alpha” wing to the “alpha” back piece from **C** to **D** as shown in Figure 11.13. Unfold at seams and iron flat as shown in Figure 11.14.

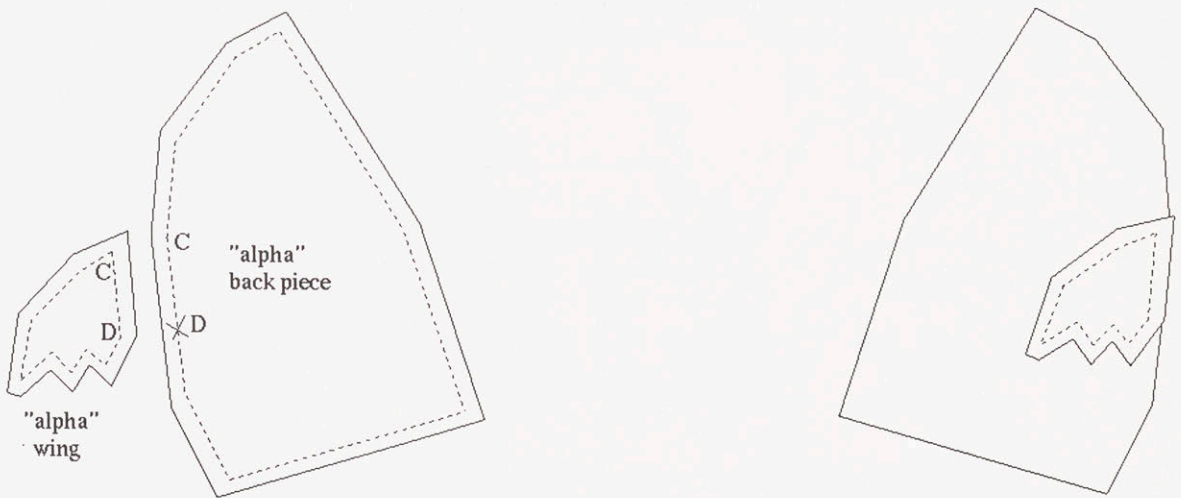


Figure 11.13: (l) Guide to sewing on “alpha” wing to “alpha” back piece. (r) Right side after sewing on wing.

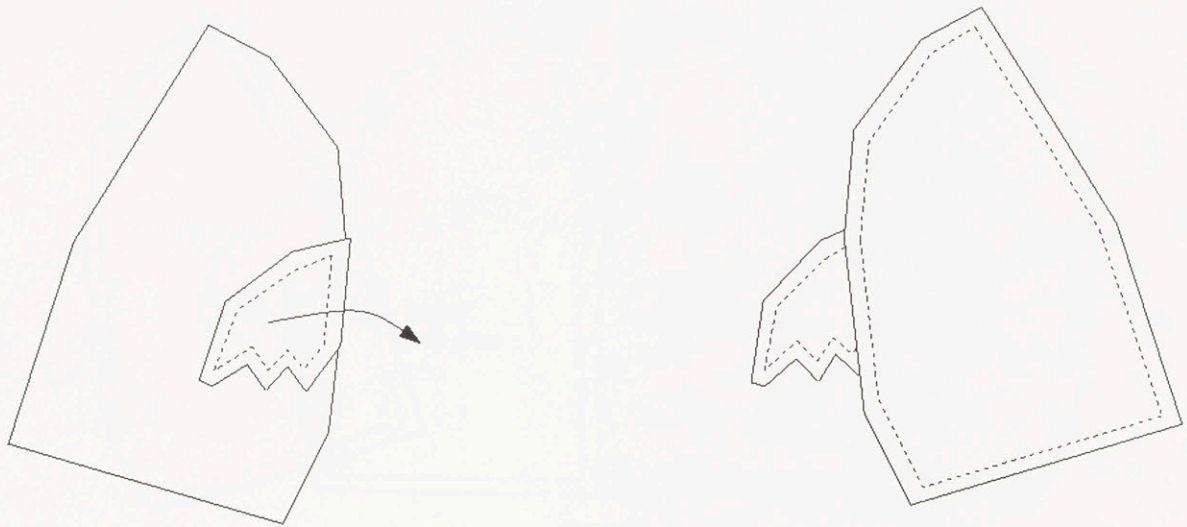


Figure 11.14: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Sew on the “beta” wing to the “beta” back piece from **C** to **D** as shown in Figure 11.15. Unfold at seams and iron flat as shown in Figure 11.16.

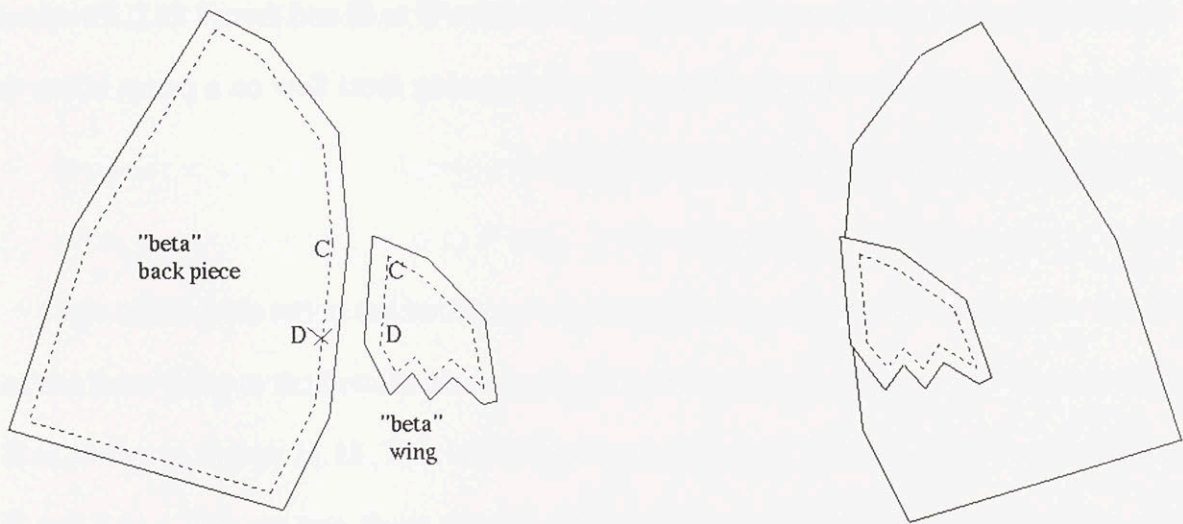


Figure 11.15: (l) Guide for sewing on “beta” wing to “beta” back piece. (r) Right side after sewing on wing.

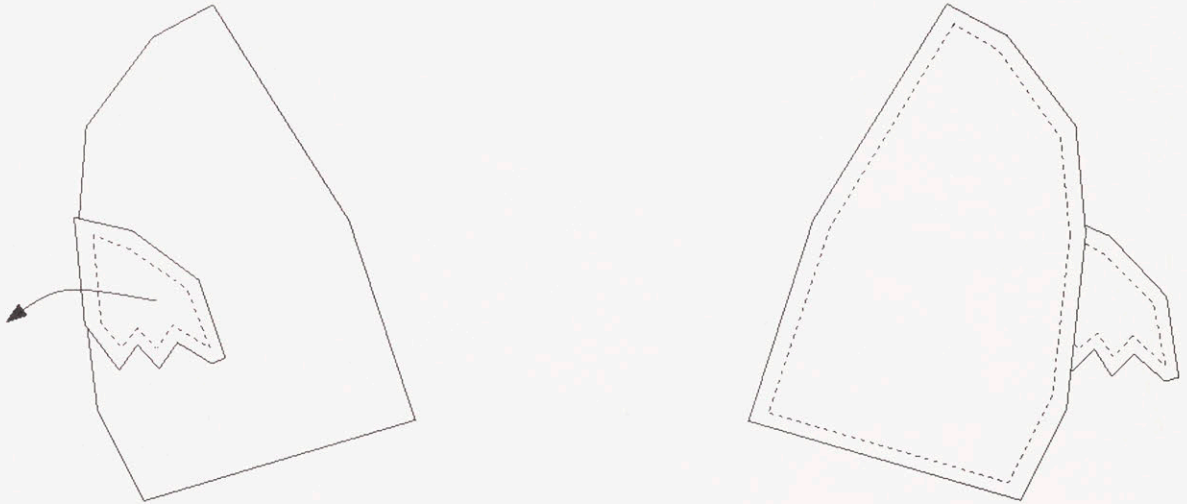


Figure 11.16: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Assembling

Sew together the “alpha” and “beta” back pieces from **G** to **H** and from **i** to **J**. There will only be an opening from **i** to **H**. Do not sew this opening shut! Sew on a parrot tail to the combined back piece by centering the tail on **G**.

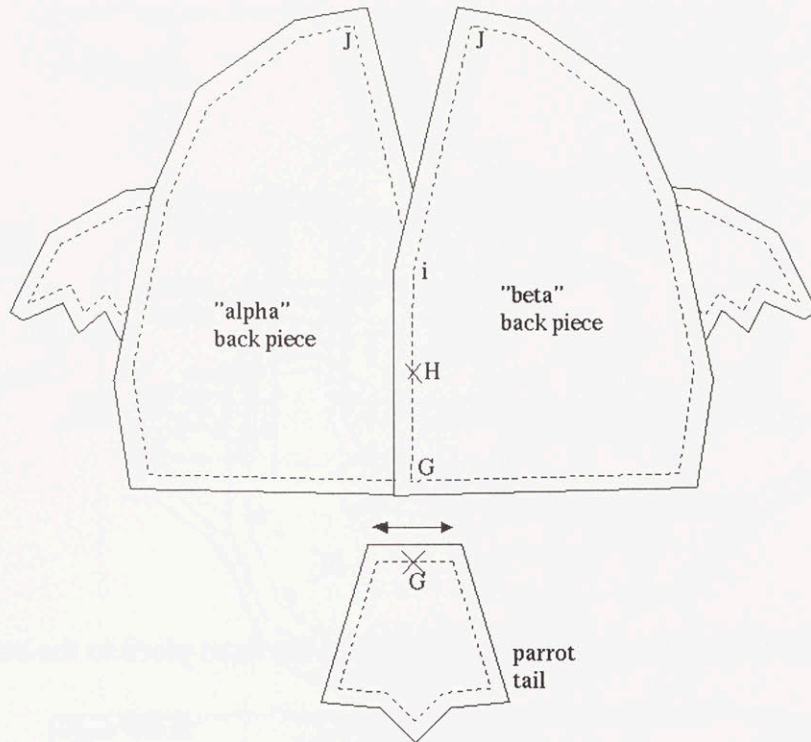


Figure 11.17: Guide to sewing the “alpha” and “beta” back pieces together and sewing on the parrot tail to the combined back piece.

Sew on a parrot tail to the bottom piece, centering the tail on **G**. Sew together the feet of the front piece to the bottom piece by circling around the feet from **e** to **f** and from **F** to **E** as shown in Figure 11.18. This will leave two openings at the base of the feet along **E** to **F** and **f** to **e**. Do not sew these openings shut! Notice that the front piece is only sewn *directly* to the bottom piece from **F** to **f**.

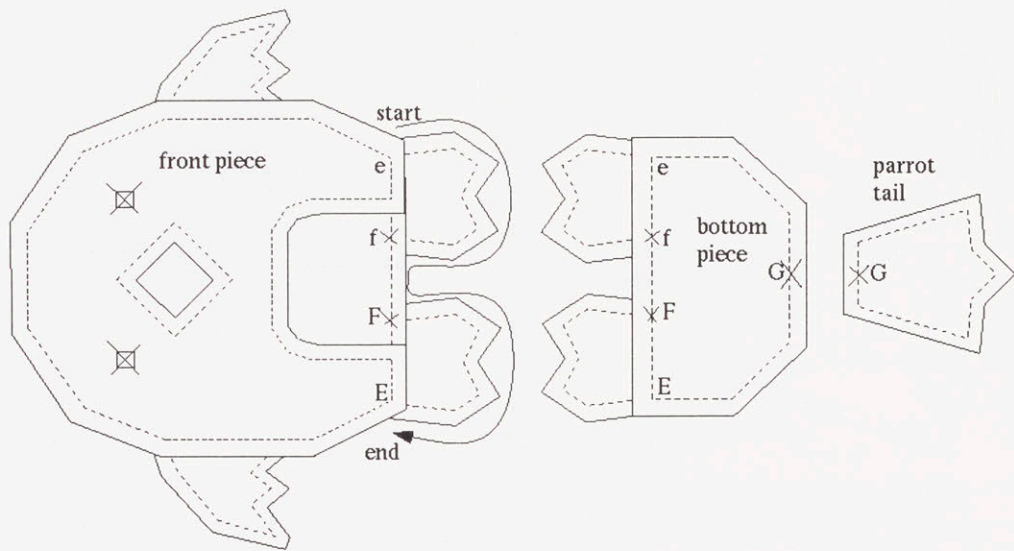


Figure 11.18: Guide to connecting the tail and the front piece to the bottom piece.

Following the arrow, sew the upper region of the combined back piece to the combined front piece, leaving openings at the base of the wings (**d** to **c** and **C** to **D**). See Figure 11.19.

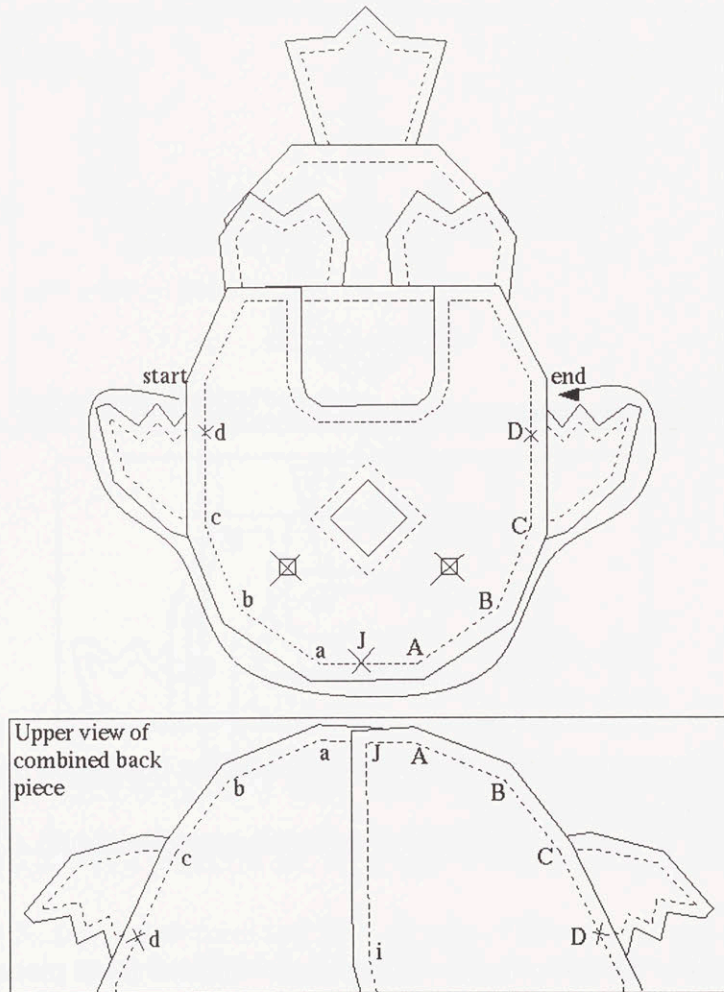


Figure 11.19: Guide to connecting the combined front piece to the combined back piece.

Continue to connect the combined back piece to the combined front piece by sewing from **d** to **k** to **e** and from **D** to **K** to **E** only. There will be a large opening from **e** to **G** to **E** of the combined back piece. See Figure 11.20.

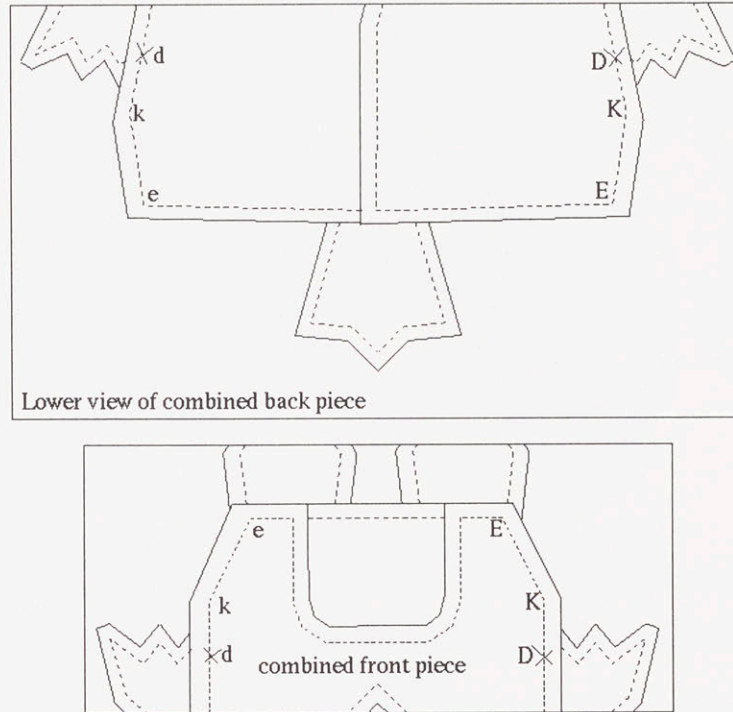


Figure 11.20: Guide to connecting the lower region of the combined back piece to the combined front piece.

Now sew together the bottom piece (from the combined front piece) to the combined back piece from **e** to **l** to **m** to **M** to **L** to **E** following the arrow while sewing together the parrot tail, as shown in Figure 11.21. There will be an opening at the base of the tail. Do not sew this shut! Now the only opening that is left is on the back from **i** to **H**. This is the hole that you will turn the parrot inside out.

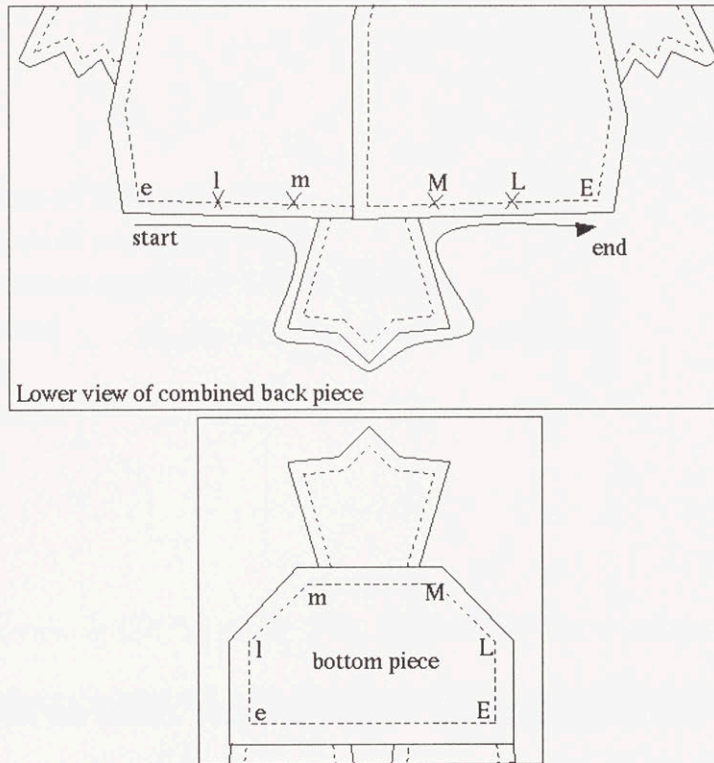


Figure 11.21: Guide to connecting the combined back piece to the bottom piece

Finishing

Turn the parrot inside out at the opening from **i** to **H**. Turn the wings, feet, beak and tail inside out as well. Stuff the wings, feet, tail, beak, and body with polyester fiber to the level of firmness that you want. Close the opening in the back by lacing up the hole with thread.

The following text is a scan of a document page, likely a page from a book or a manuscript. The text is extremely faint and difficult to read, appearing as a series of horizontal lines and indistinct shapes. It seems to contain several paragraphs of text, but the content is illegible due to the low contrast and quality of the scan.

Chapter 12: How to Sew StingRu,TM the Stingray

Materials:

- 20" x 18" piece of light gray fabric
- 32" x 18" piece of royal blue fabric
- black shiny button eyes about 1/2" in diameter
- light gray thread
- black thread
- royal blue thread
- white thread
- stuffing

Preparation

Wash and dry all of the fabric. This will remove any excess dye from the fabric, and will shrink the fabric so that it is easier to work with. Before marking down the pattern, make sure that you iron out any wrinkles in the fabric. Cut out the pattern and mark out the pieces on the fabric, leaving at least an inch of space between each and from the fabric's edge, as seen in Figures 12.1 and 12.2. Draw in the mouth, teeth and eyes of the stingray on the wrong side of the fabric, using the pattern as a guide. Cut out the fabric so that there is a half inch of material surrounding each piece as seen in Figure 12.3.

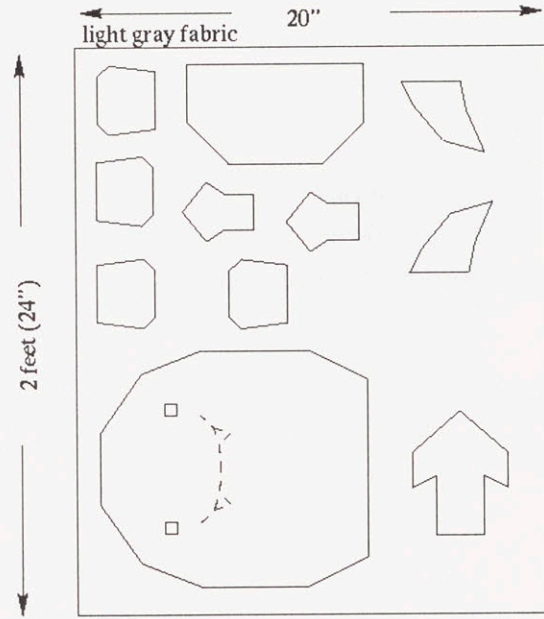


Figure 12.1: Arrangement of pieces for the bright teal fabric

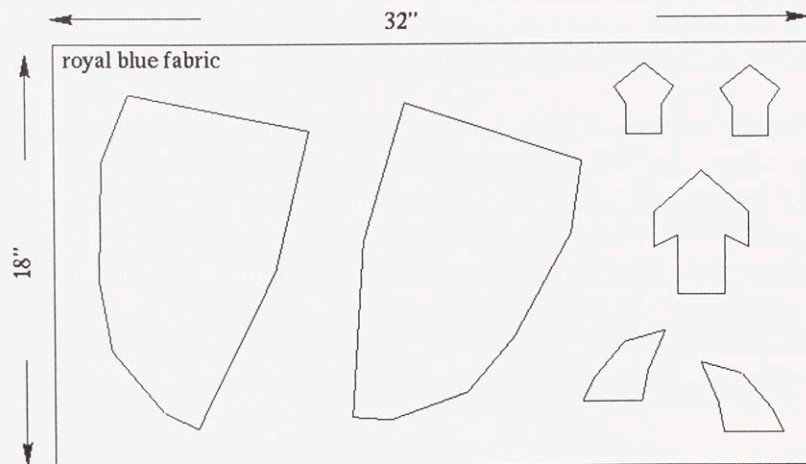


Figure 12.2: Arrangement of pieces for the royal fabric

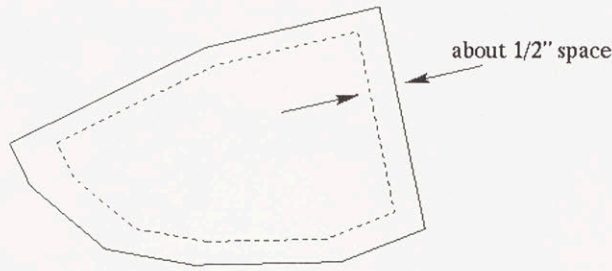


Figure 12.3: Example of cut piece.

Sewing

Draw in the diagonals on the “eye box” that you drew on the stingray front piece. Where the diagonals intersect is where you will center the button eyes to sew. Backstitch in the mouth with black thread, and the teeth with white thread. Use black thread to sew on the eyes so that they appear on the Right side.

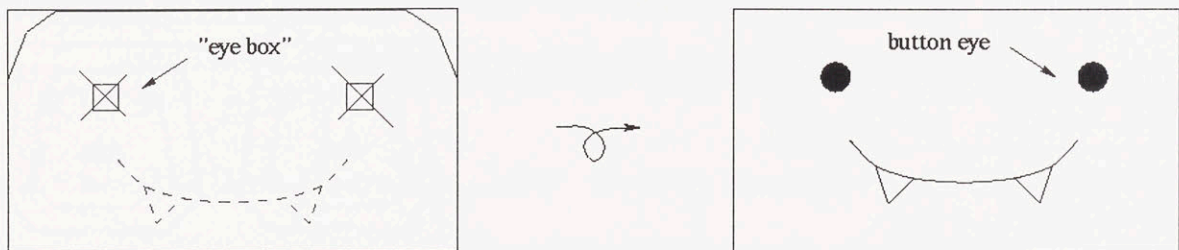


Figure 12.4: Attaching the eyes to the front piece

Sew on the gray stingray ears from **A** to **B**. Sew on the hands to the front piece from **C** to **D**. Sew on the feet to the front piece from **E** to **F**. Shown in Figure 12.5.

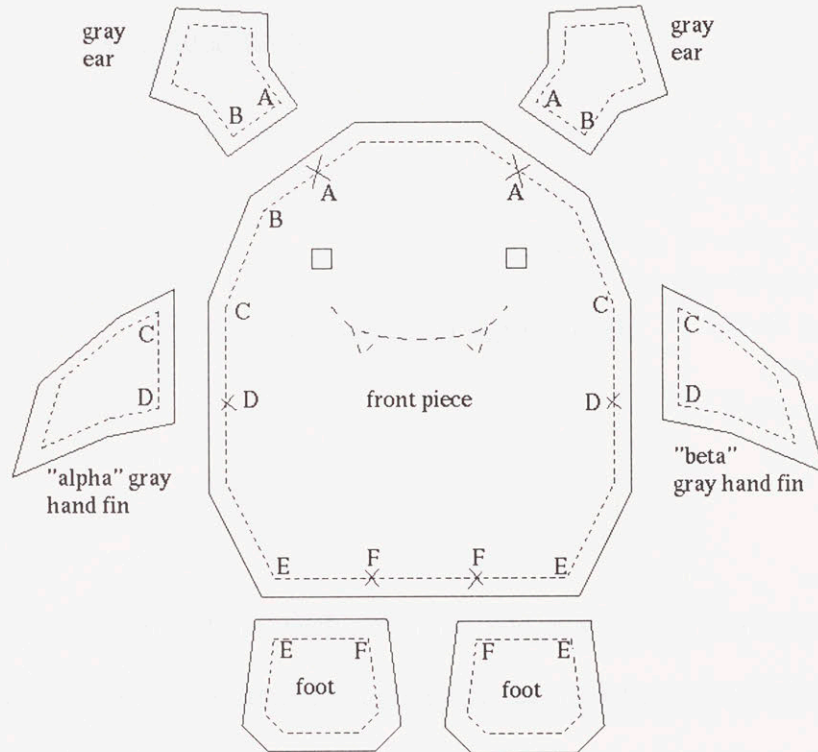


Figure 12.5: Guide to sewing on ears, hand fins and feet to front piece.

Unfold the ears, hand fins and feet from the front piece, folding them on their seams. Iron the seams and pieces flat. Shown in Figures 12.6 and 12.7.

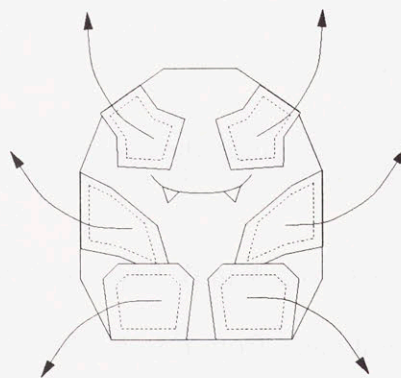


Figure 12.6: Unfold and iron at the seams.

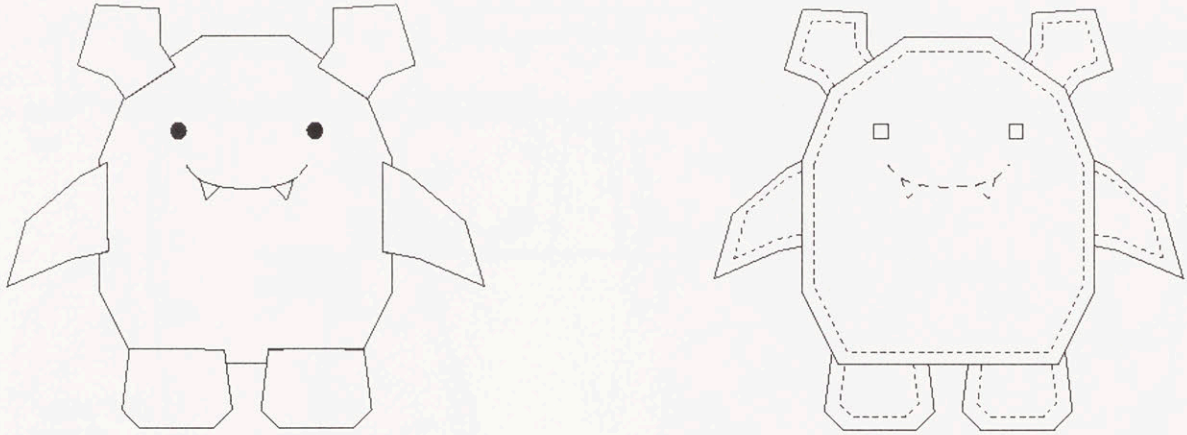


Figure 12.7: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on the feet to the bottom piece from points **E** to **F** as show in Figure 12.8.

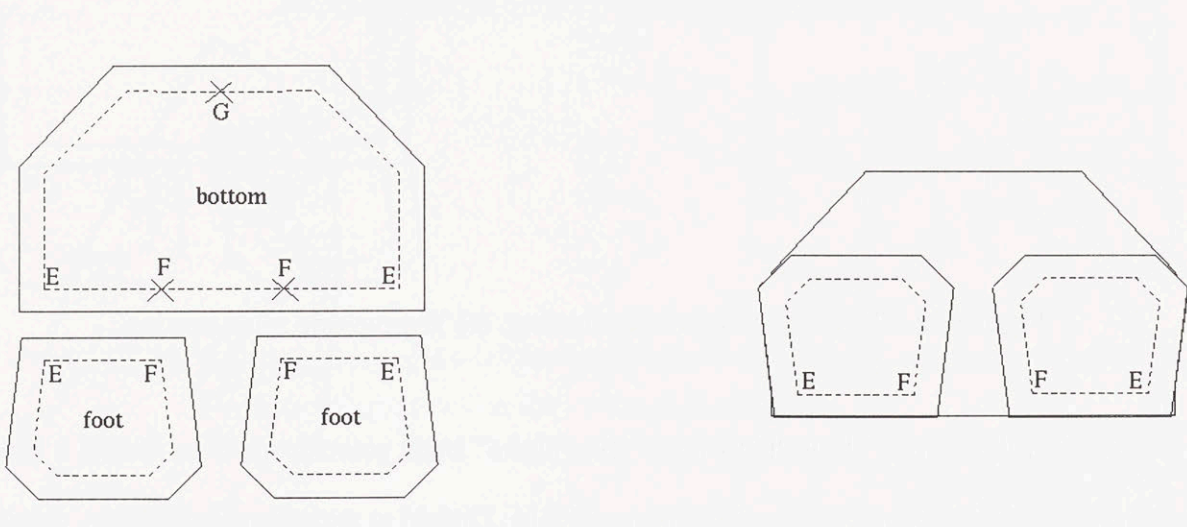


Figure 12.8: (l) Guide to sewing on the feet. (r) Right side of the bottom piece after sewing on feet.

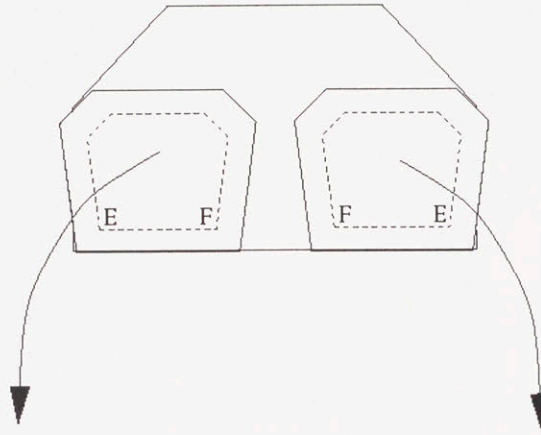


Figure 12.9: Unfold feet from bottom piece at the seams and iron flat.

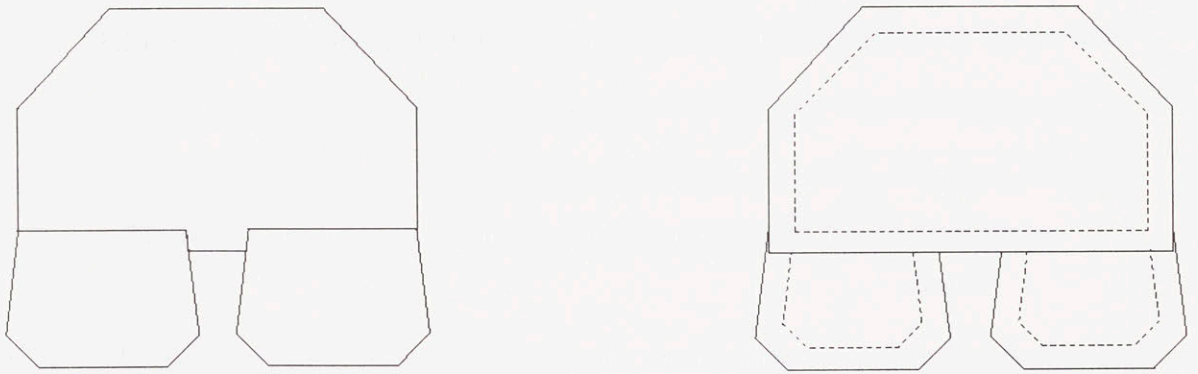


Figure 12.10: (l) Right side after ironing. (r) Wrong side after ironing.

Sew on the “alpha” blue hand fin to the “alpha” back piece from **C** to **D** and a blue stingray ear from **A** to **B**, as shown in Figure 12.11. Unfold at seams and iron flat as shown in Figure 12.12.

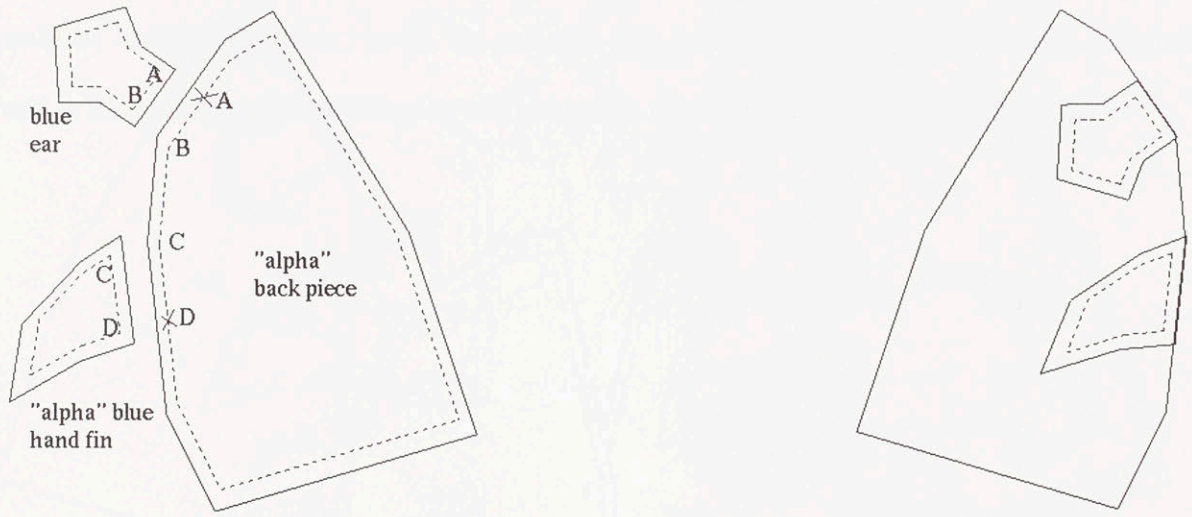


Figure 12.11: (l) Guide for sewing on “alpha” blue hand fin and blue ear to “alpha” back piece. (r) Right side after sewing on hand fin, and ear.

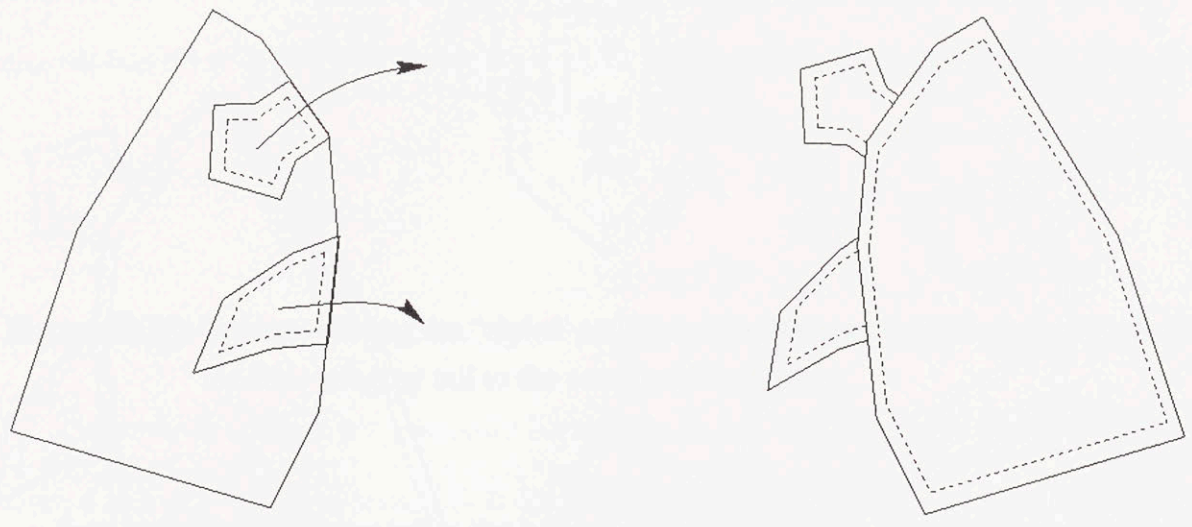


Figure 12.12: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Sew on the “beta” blue hand fin to the “beta” back piece from **C** to **D** and a blue stingray ear from **A** to **B**, as shown in Figure 12.13. Unfold at seams and iron flat as shown in Figure 12.14.

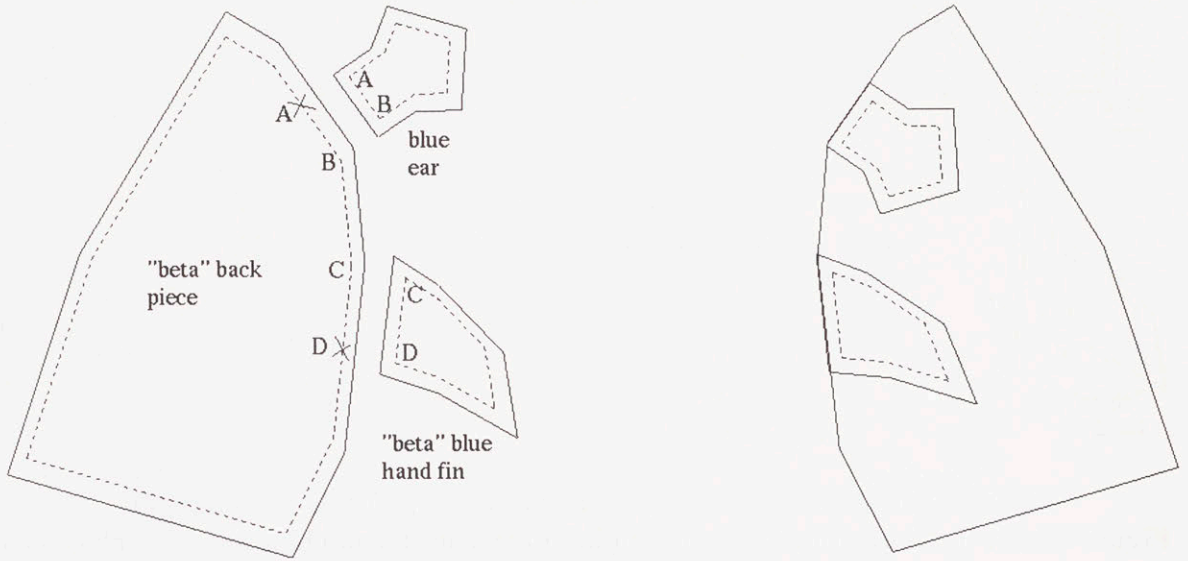


Figure 12.13: (l) Guide for sewing on "beta" blue hand fin and blue ear to "beta" back piece. (r) Right side after sewing on hand fin, and ear.

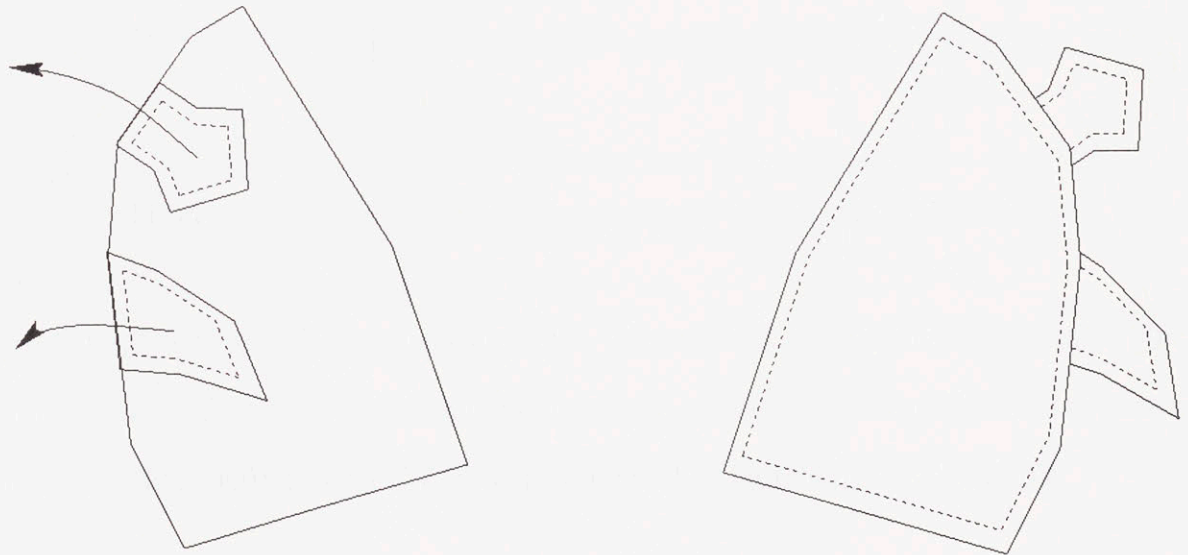


Figure 12.14: (l) Unfold and iron at seams. (r) Wrong side after ironing.

Assembling

Sew together the “alpha” and “beta” back pieces from **G** to **H** and from **i** to **J**. There will only be an opening from **i** to **H**. Do not sew this opening shut! Sew on the blue stingray tail to the combined back piece by centering the tail on **G**, as shown in Figure 12.15.

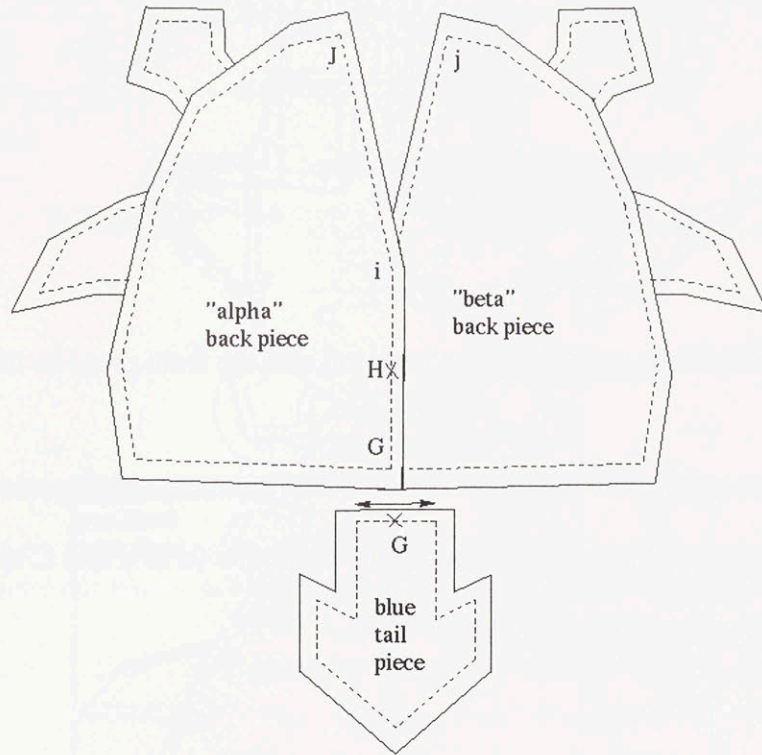


Figure 12.15: Guide to sewing the “alpha” and “beta” back pieces together and sewing on the blue stingray tail to the combined back piece.

Sew on the gray stingray tail to the bottom piece, centering on **G**. Sew together the feet of the front piece to the bottom piece by circling around the feet from **e** to **f** and from **F** to **E** as shown in Figure 12.16. This will leave two openings at the base of the feet along **E** to **F** and **f** to **e**. Do not sew these openings shut! Notice that the front piece is only sewn *directly* to the bottom piece from **F** to **f**.

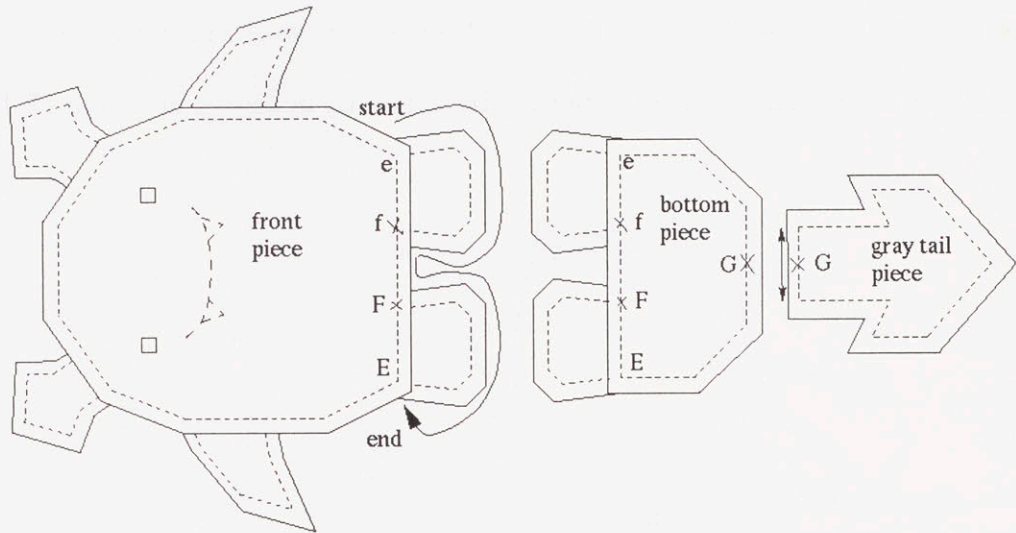


Figure 12.16: Guide to connecting the gray tail and the front piece to the bottom piece.

Following the arrow, sew the upper region of the combined back piece to the combined front piece, leaving openings at the base of the hand fins (**d** to **c** and **C** to **D**) and the stingray ears (**b** to **a** and **A** to **B**). See Figure 12.17.

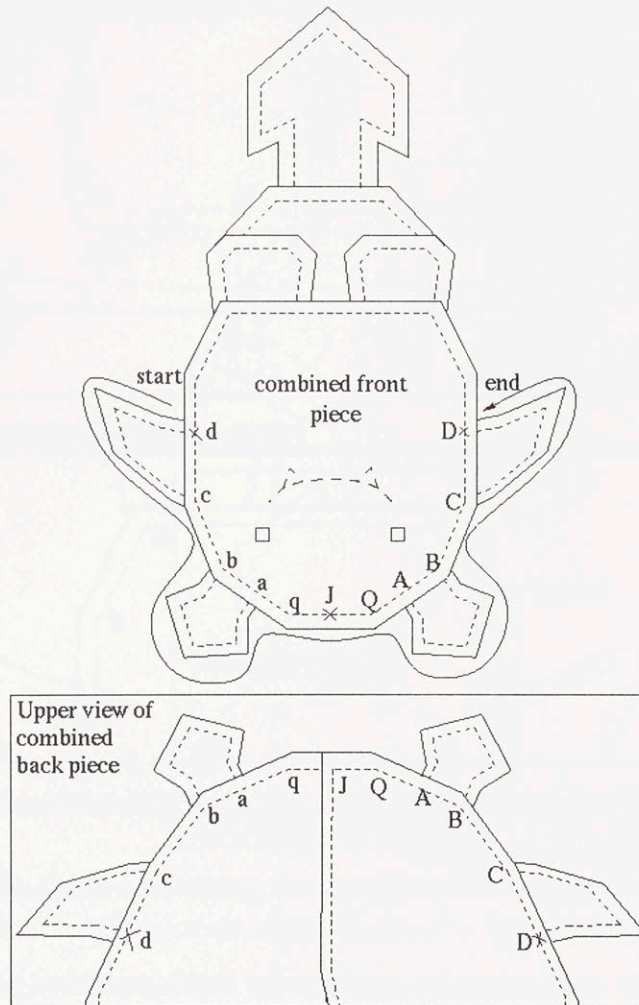


Figure 12.17: Guide to connecting the combined front piece to the combined back piece.

Continue to connect the combined back piece to the combined front piece by sewing from **d** to **k** to **e** and from **D** to **K** to **E** only. There will be a large opening from **e** to **G** to **E** of the combined back piece. See Figure 12.18.

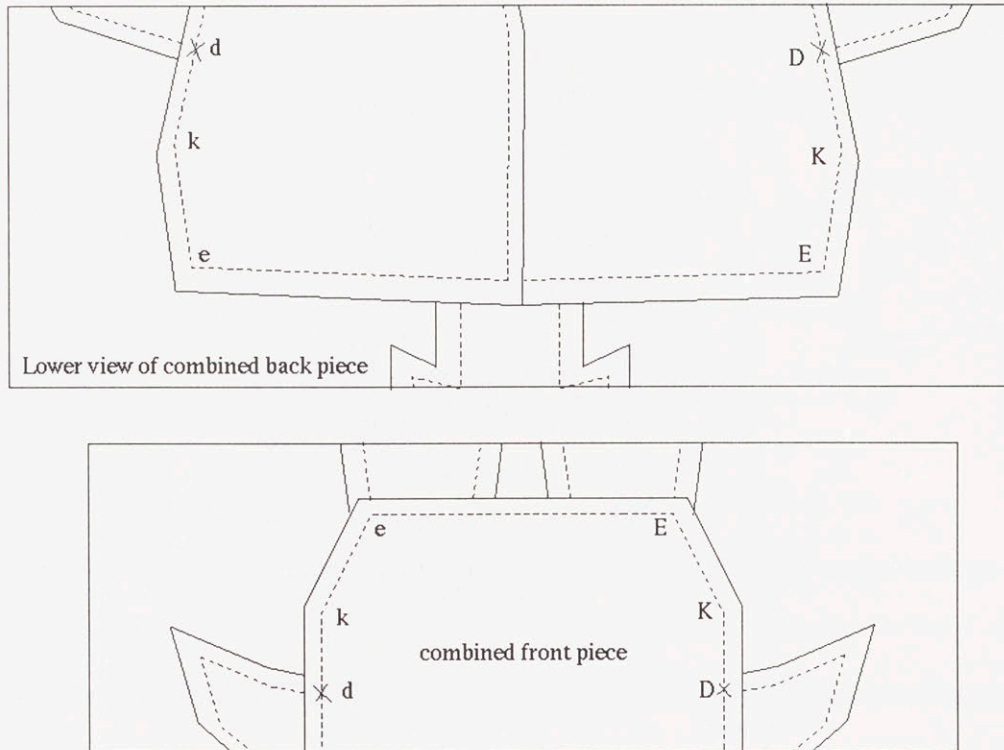


Figure 12.18: Guide to connecting the lower region of the combined back piece to the combined front piece.

Now sew together the bottom piece (from the combined front piece) to the combined back piece from **e** to **l** to **m** to **M** to **L** to **E**, following the arrow while sewing together the stingray tail as shown in Figure 12.19. There will be an opening at the base of the tail. Do not sew this shut! Now the only other opening that is left is on the back from **i** to **H**. This is the hole that you will turn the stingray inside out.

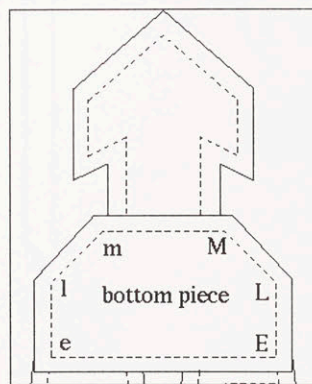
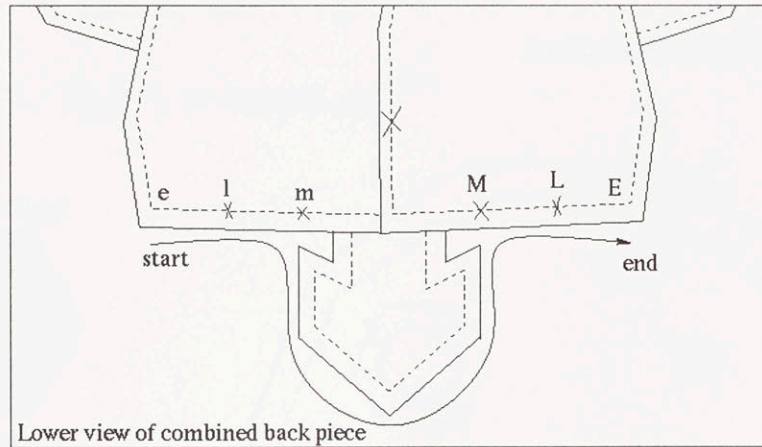


Figure 12.19: Guide to connecting the combined back piece to the bottom piece

Finishing

Turn the stingray inside out at the opening from **i** to **H**. Turn the hands, feet, ears, and tail inside out as well. Stuff the hands, ears, feet, tail, and body with polyester fiber to the level of firmness that you want. Close the opening in the back by lacing up the hole with thread.

Alternate Face

In order to make the StingRu' instead of the normal stingray, you need to use a different front piece. Sew on the StingRu' eye patch to the StingRu' front piece, as shown in

Figure 12.20. Then follow the directions for the stingray but using the StingRu' front piece instead of the stingray front piece.

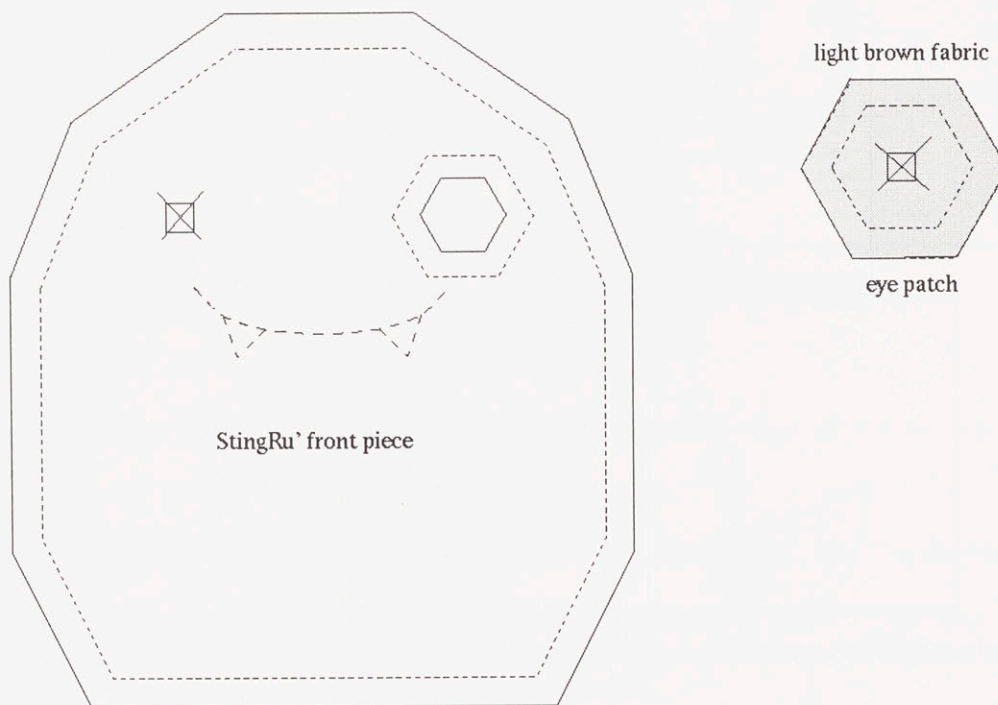


Figure 12.20: Guide to sewing on eye patch to StingRu' front piece

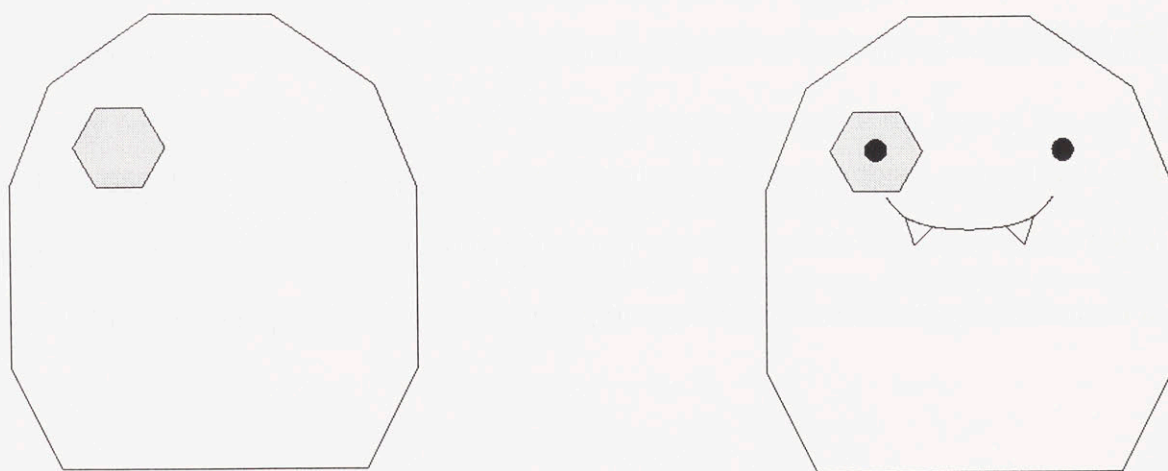


Figure 12.21: (l) Right side after sewing on eye patch. (r) Right side after completing the face and sewing on the eyes.

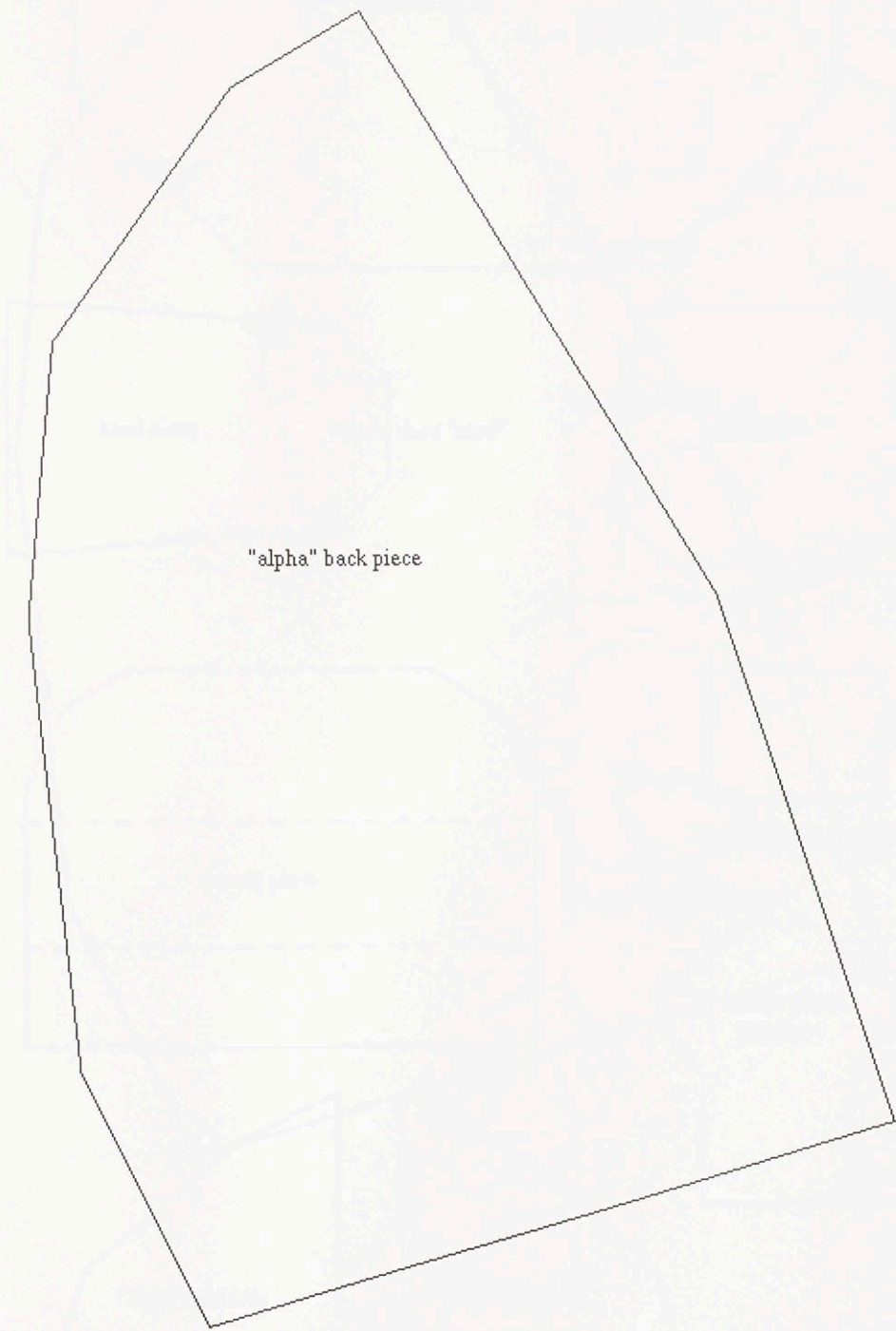
PLATE 1

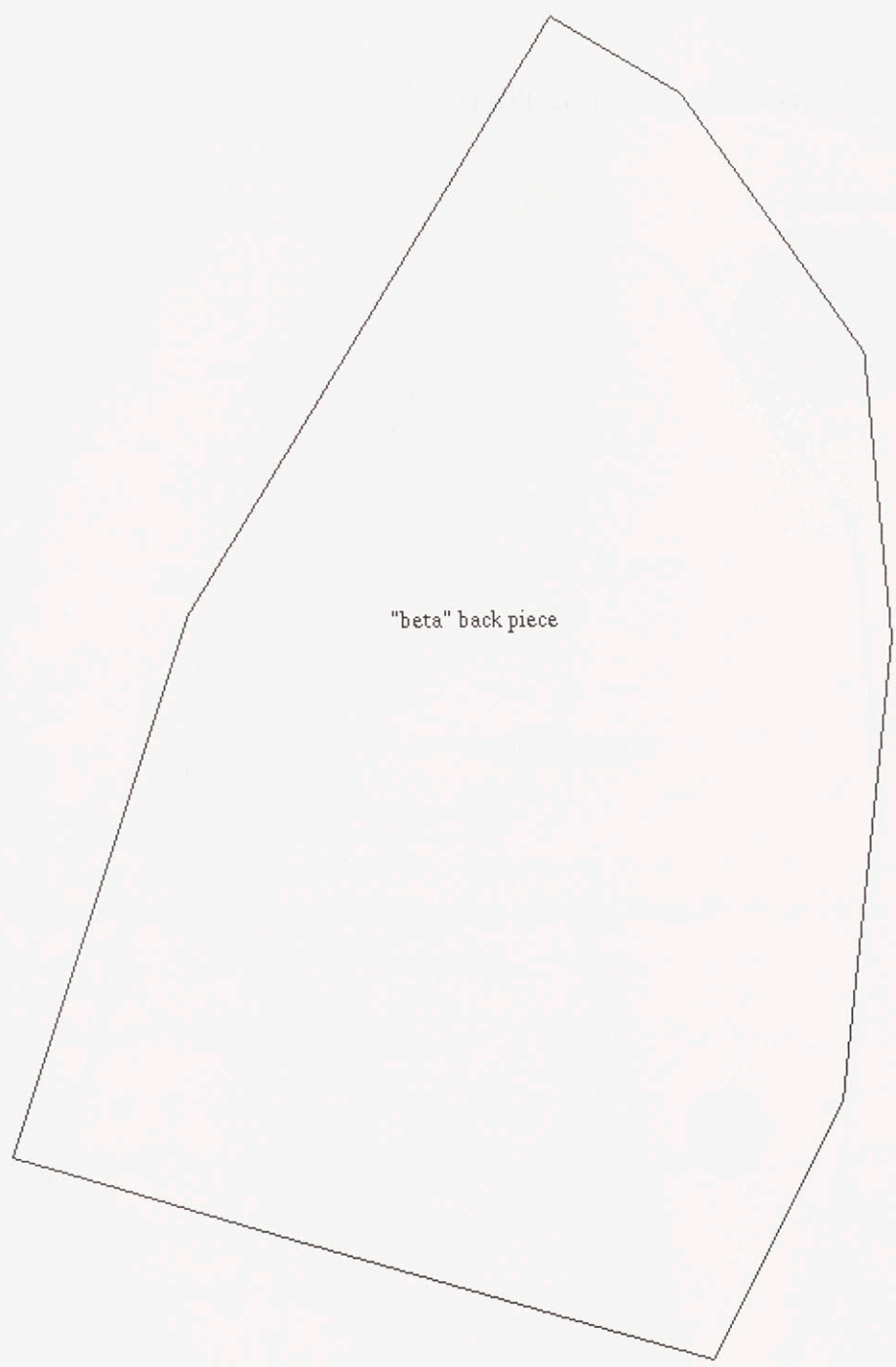
THE GREAT HALL



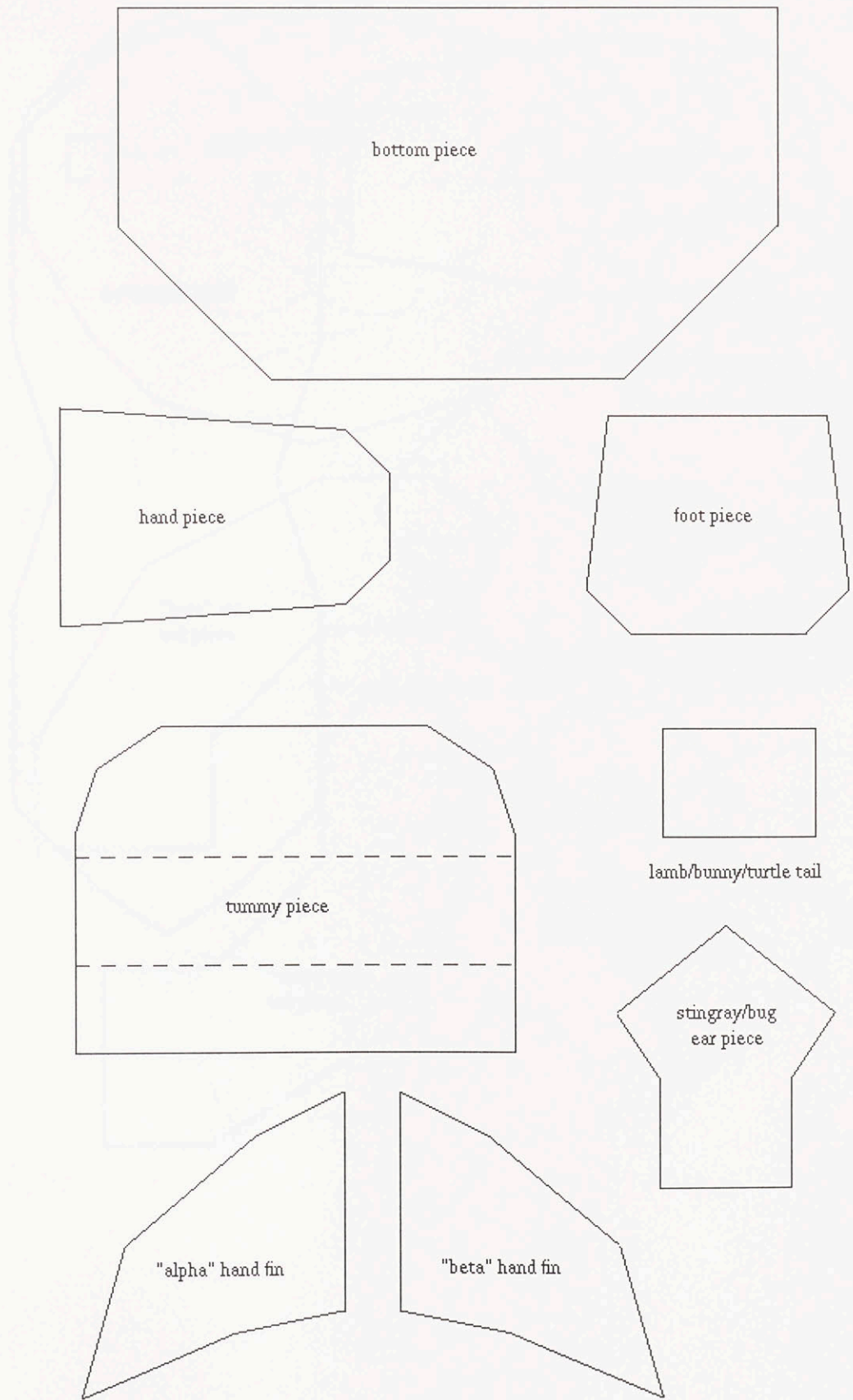
Appendix A

Patterns for the Animaroos™





"beta" back piece



bottom piece

hand piece

foot piece

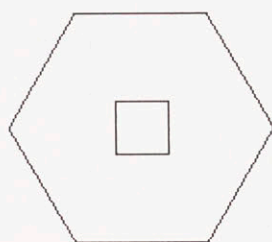
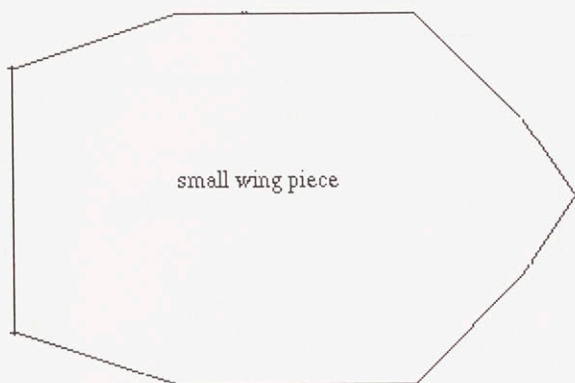
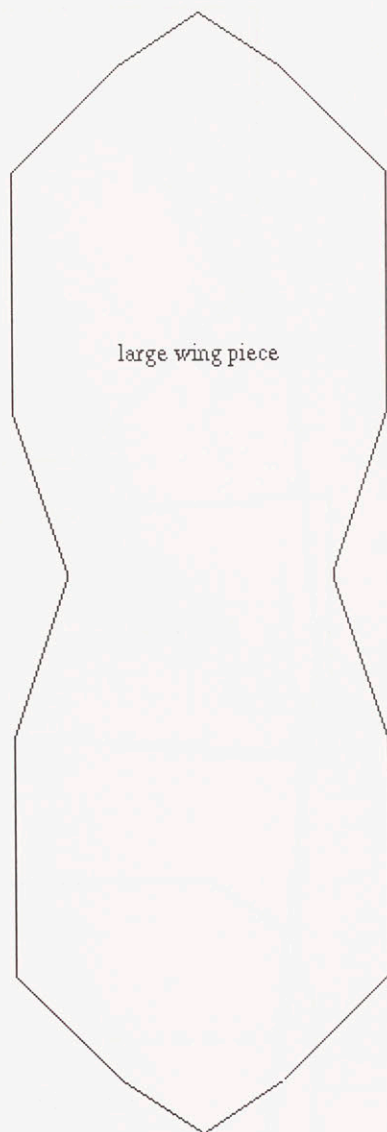
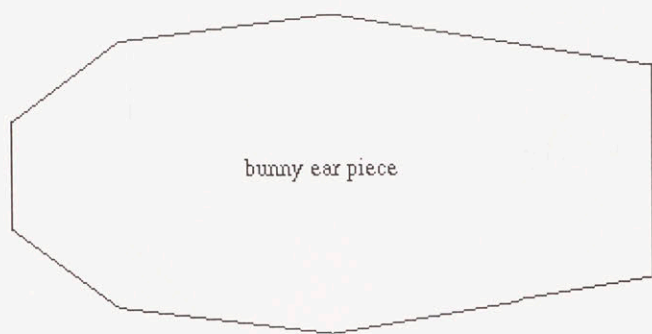
tummy piece

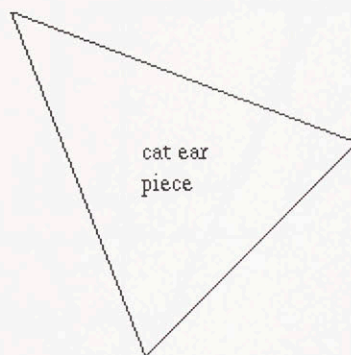
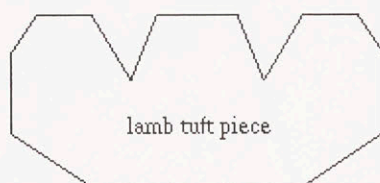
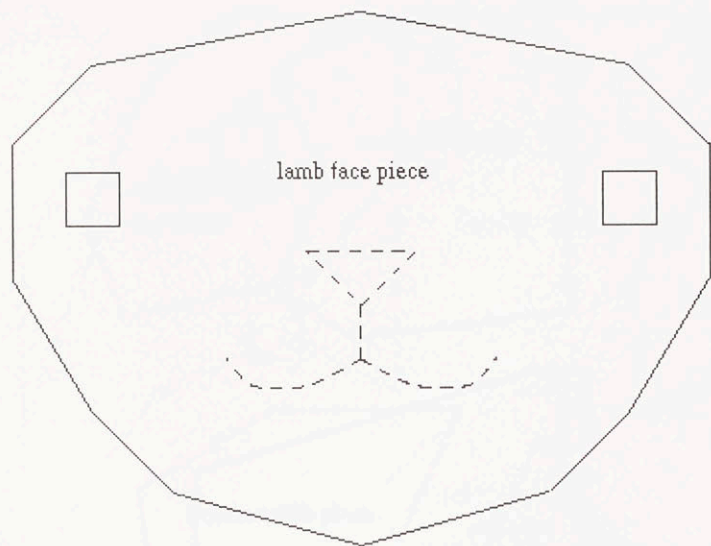
lamb/bunny/turtle tail

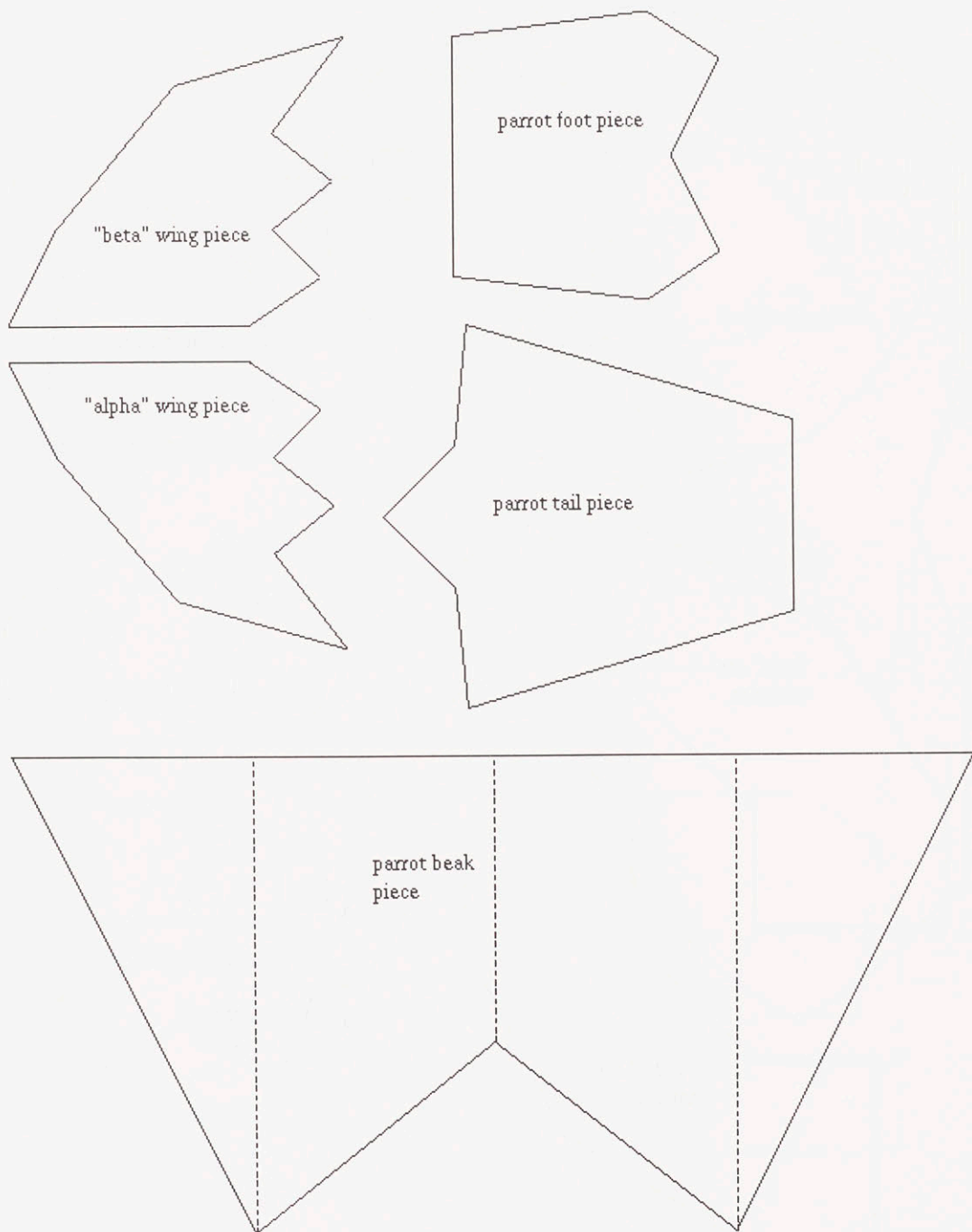
stingray/bug
ear piece

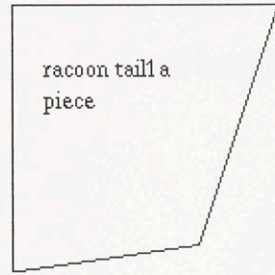
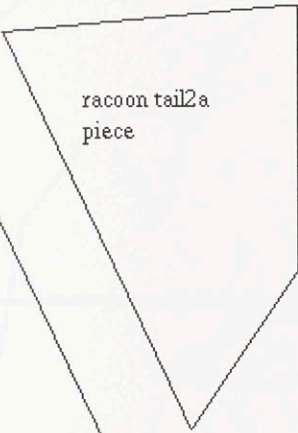
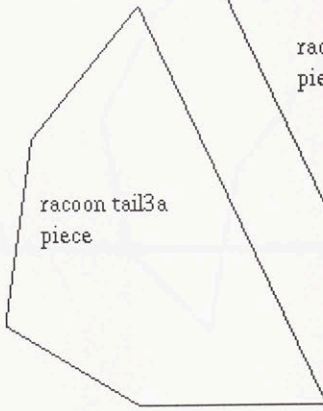
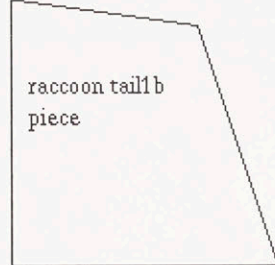
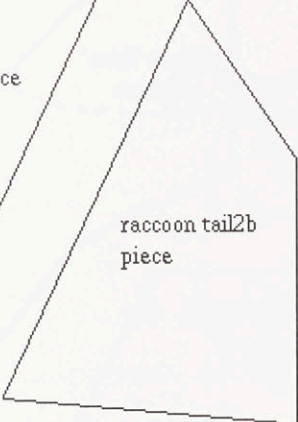
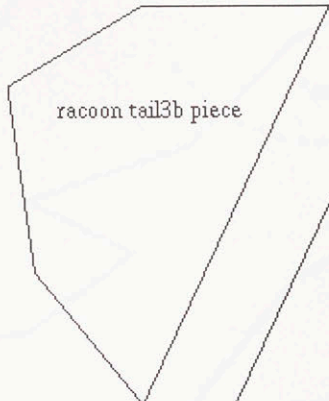
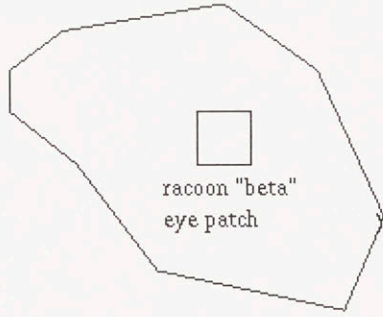
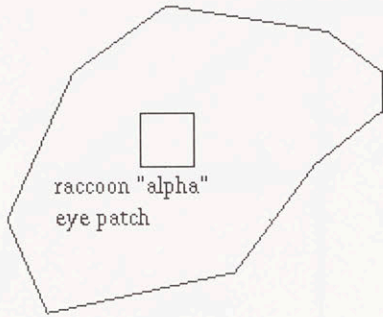
"alpha" hand fin

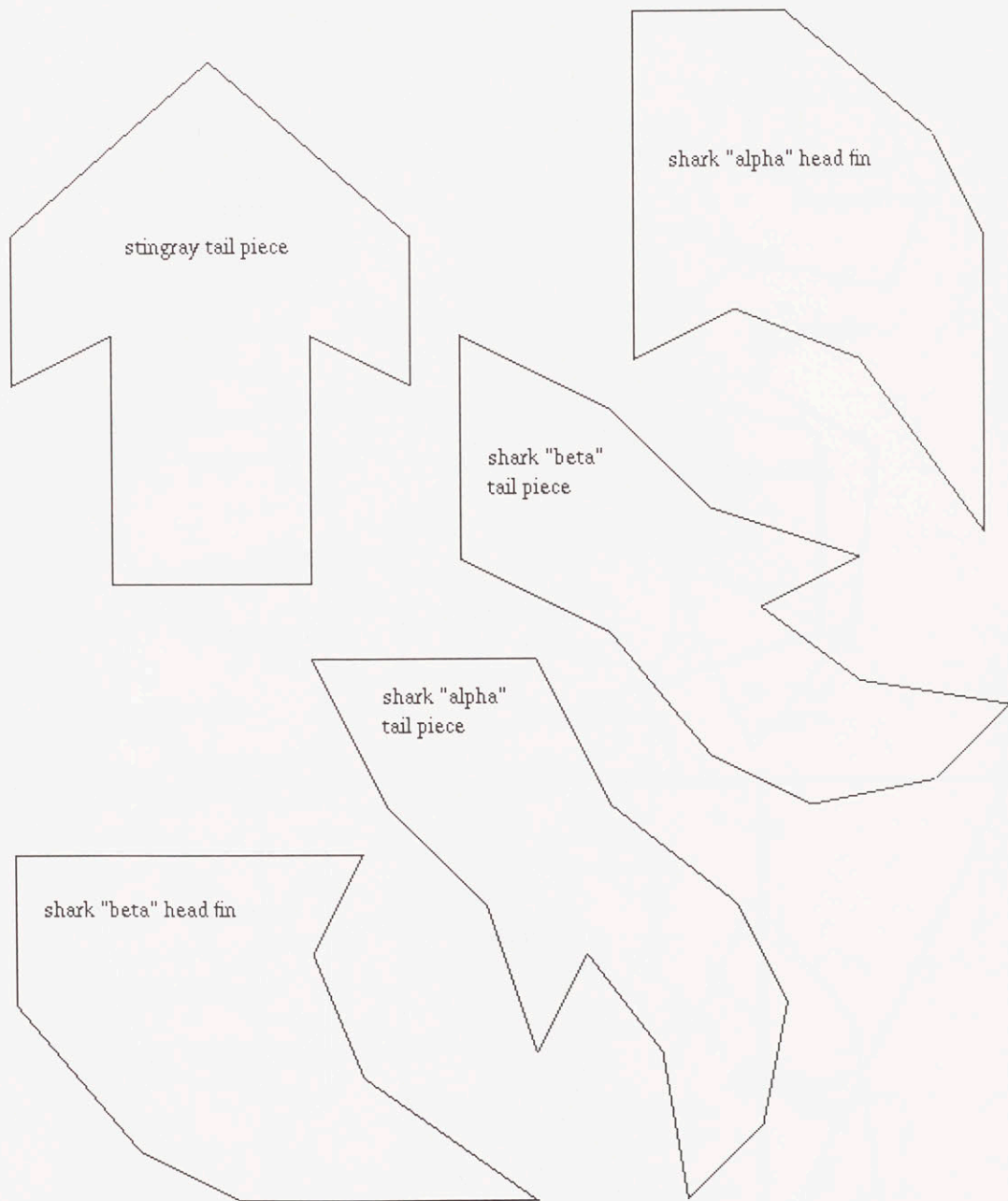
"beta" hand fin

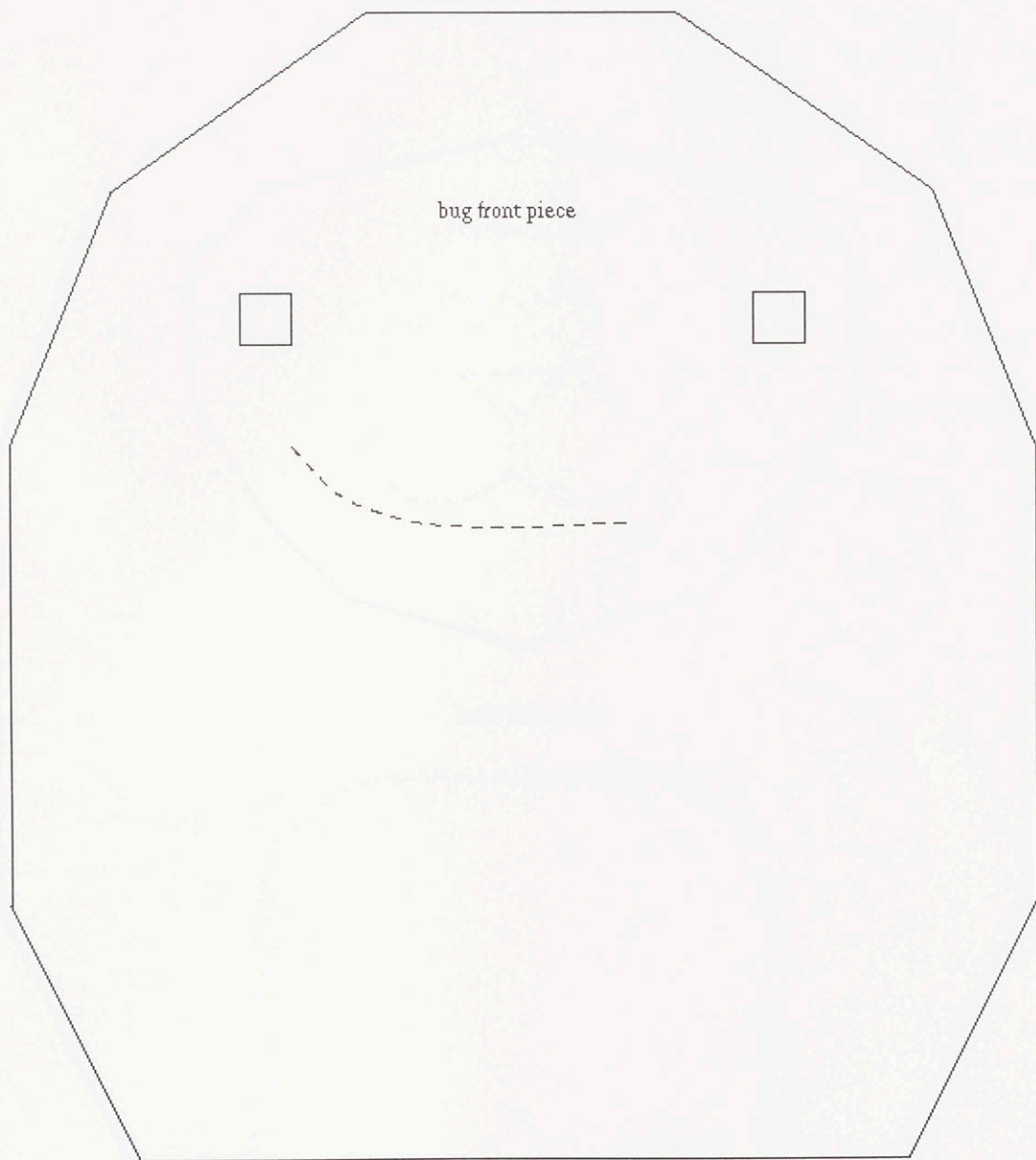


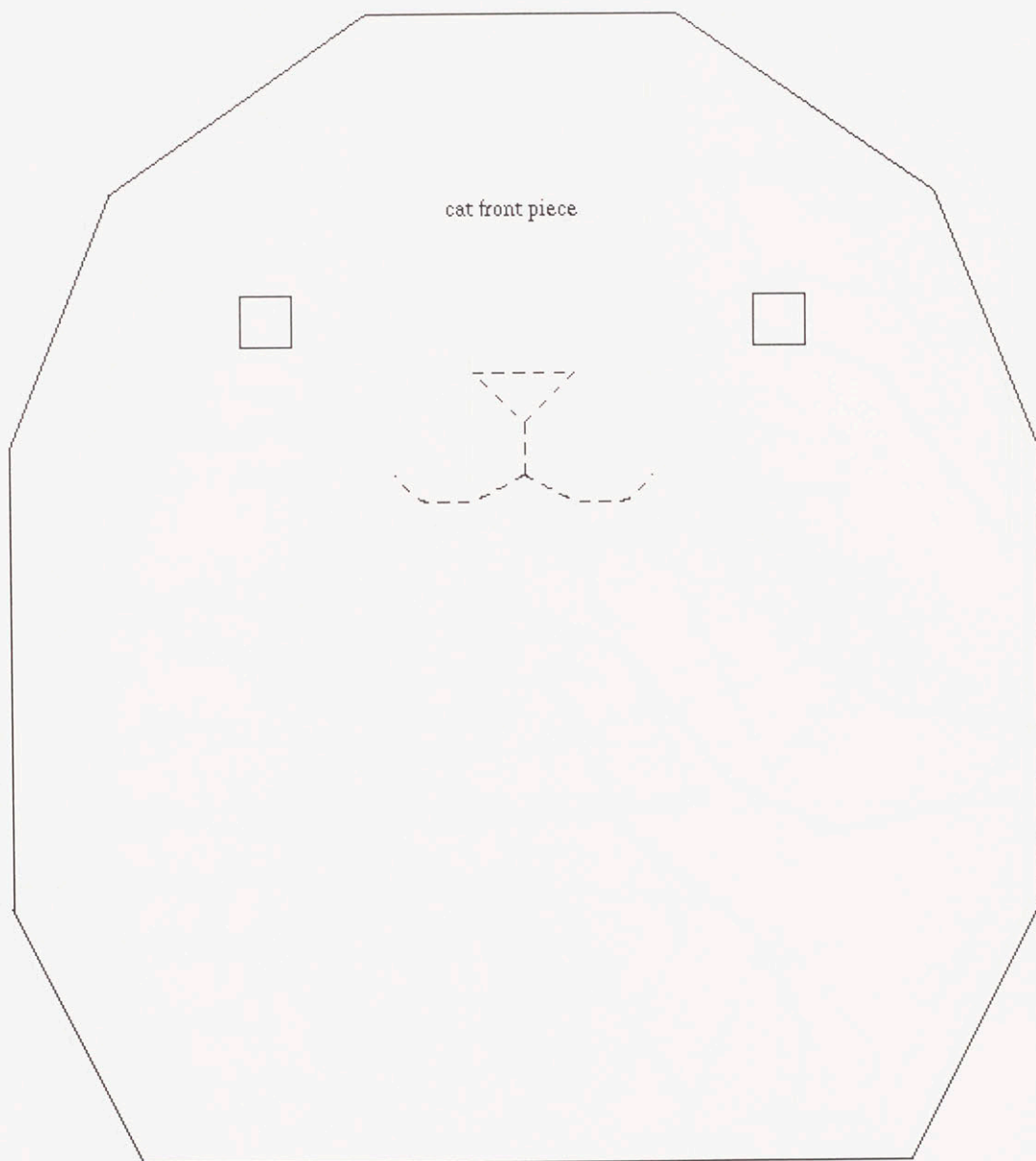




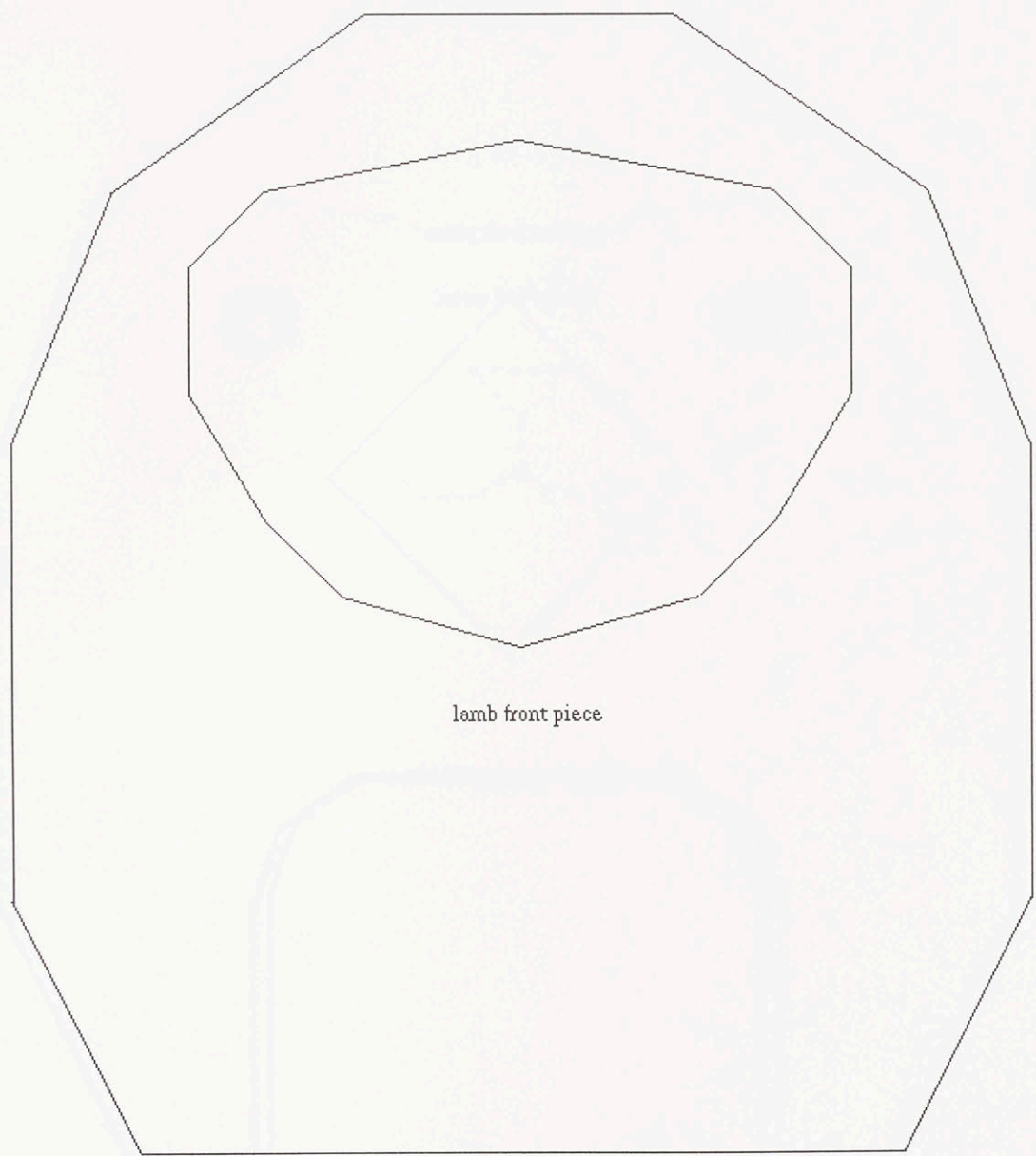




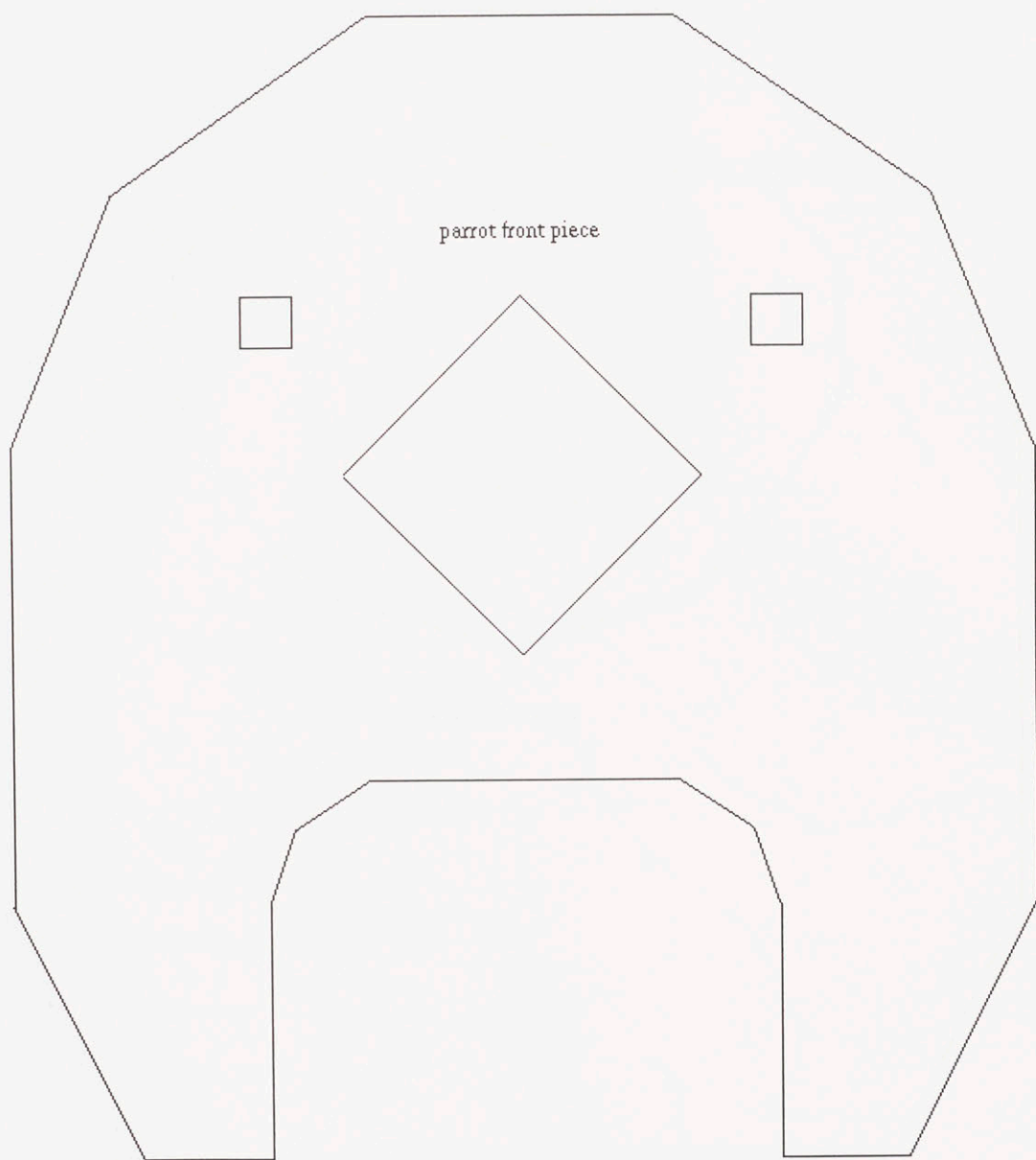


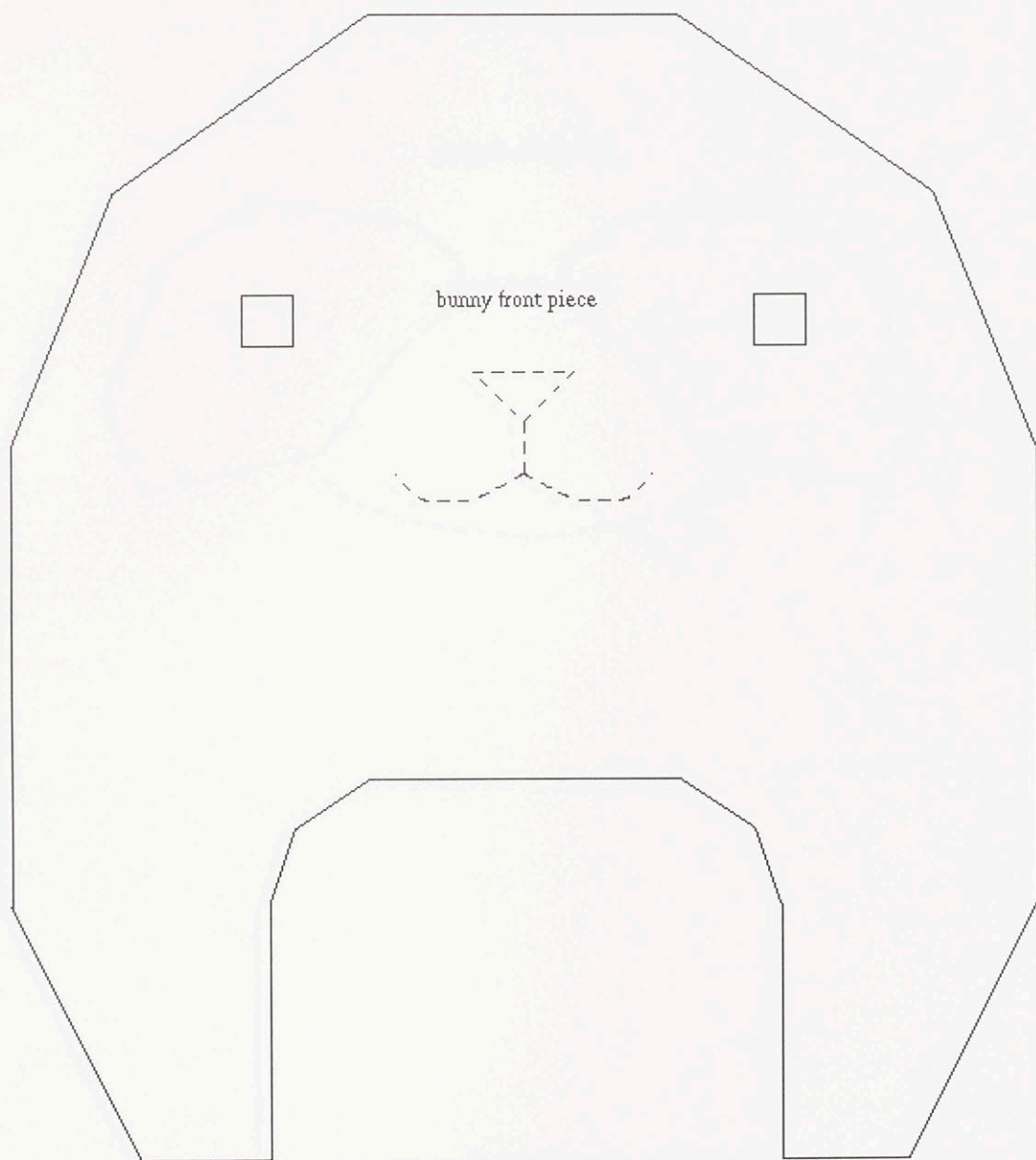


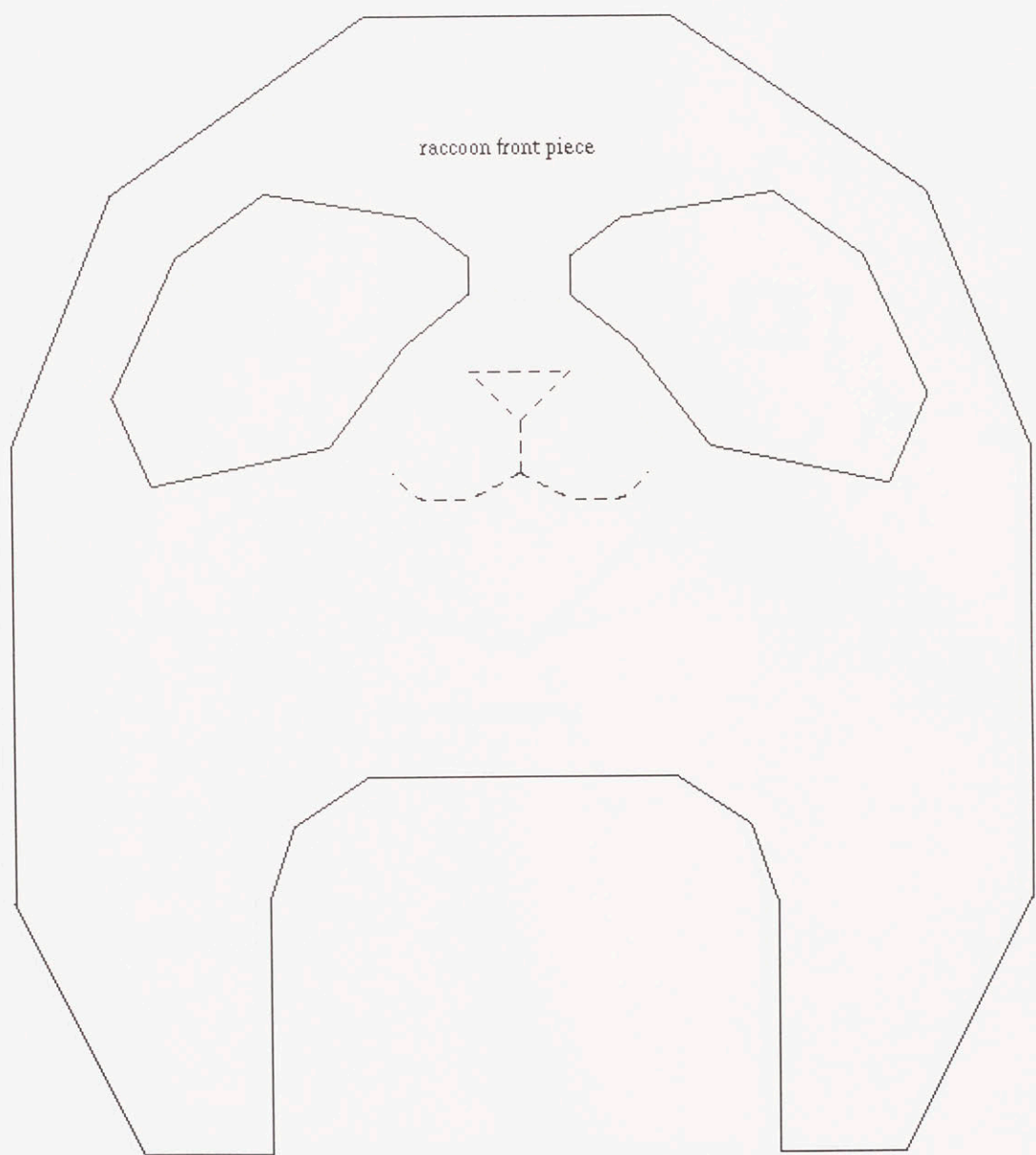
cat front piece



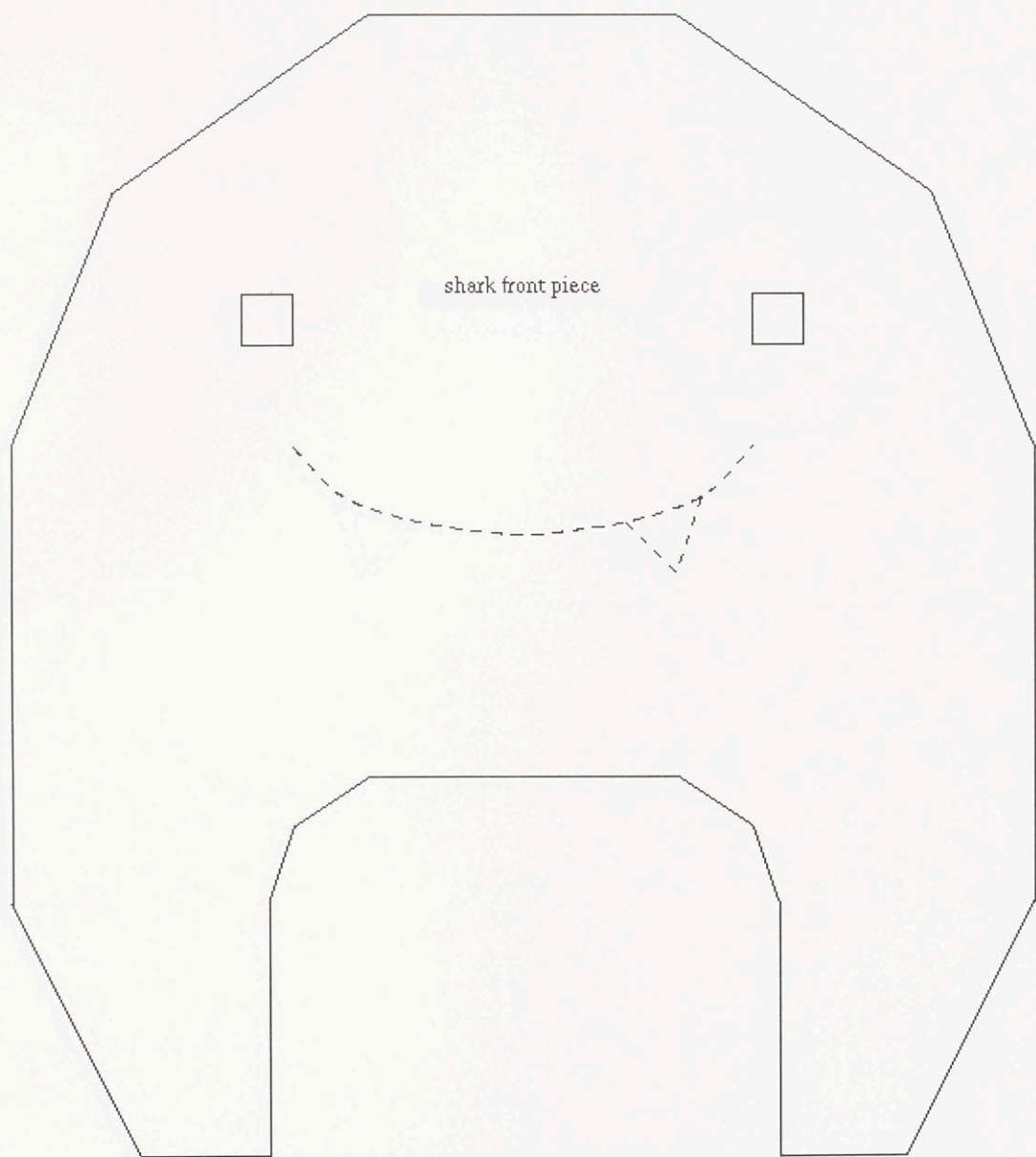
lamb front piece

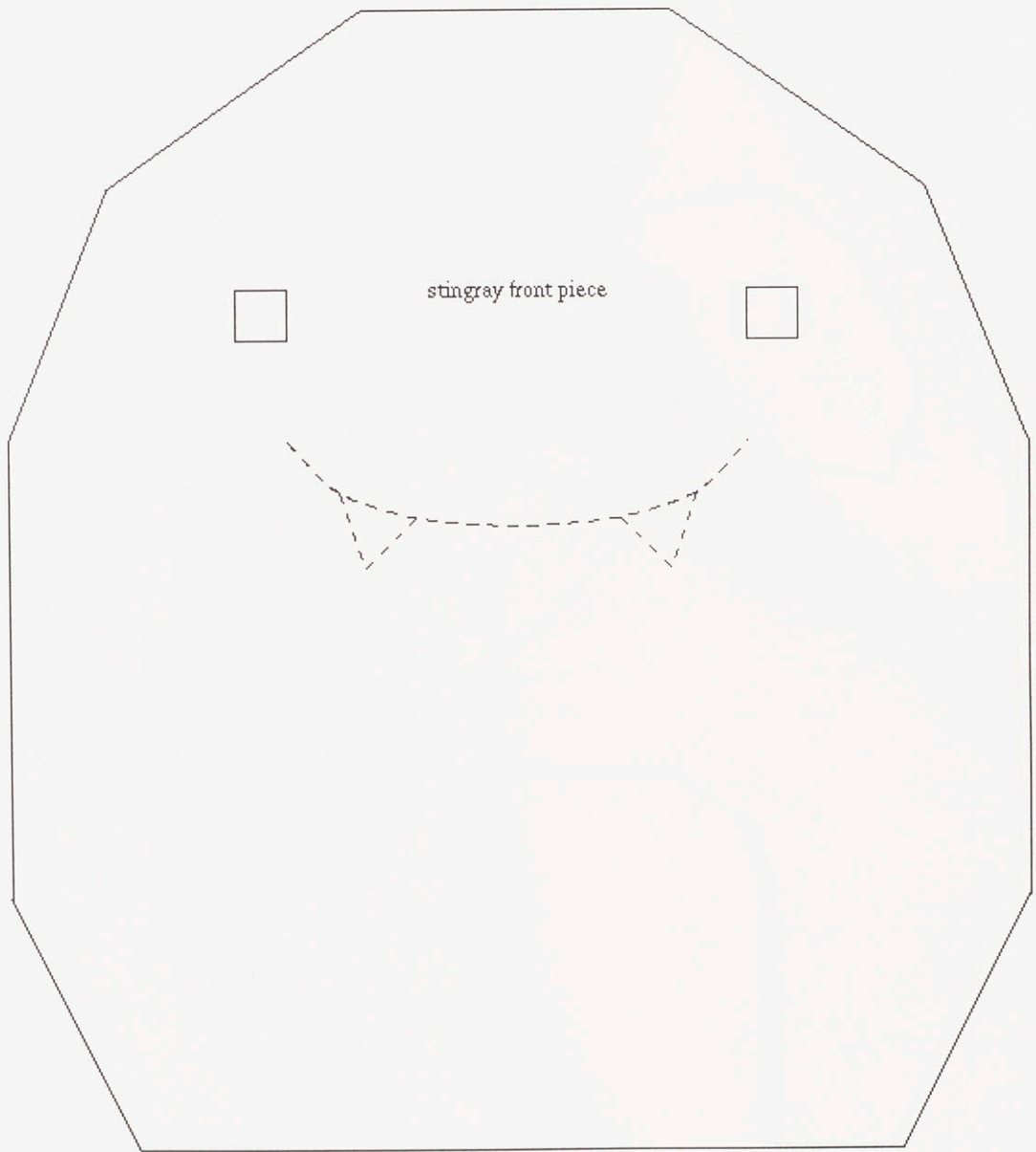


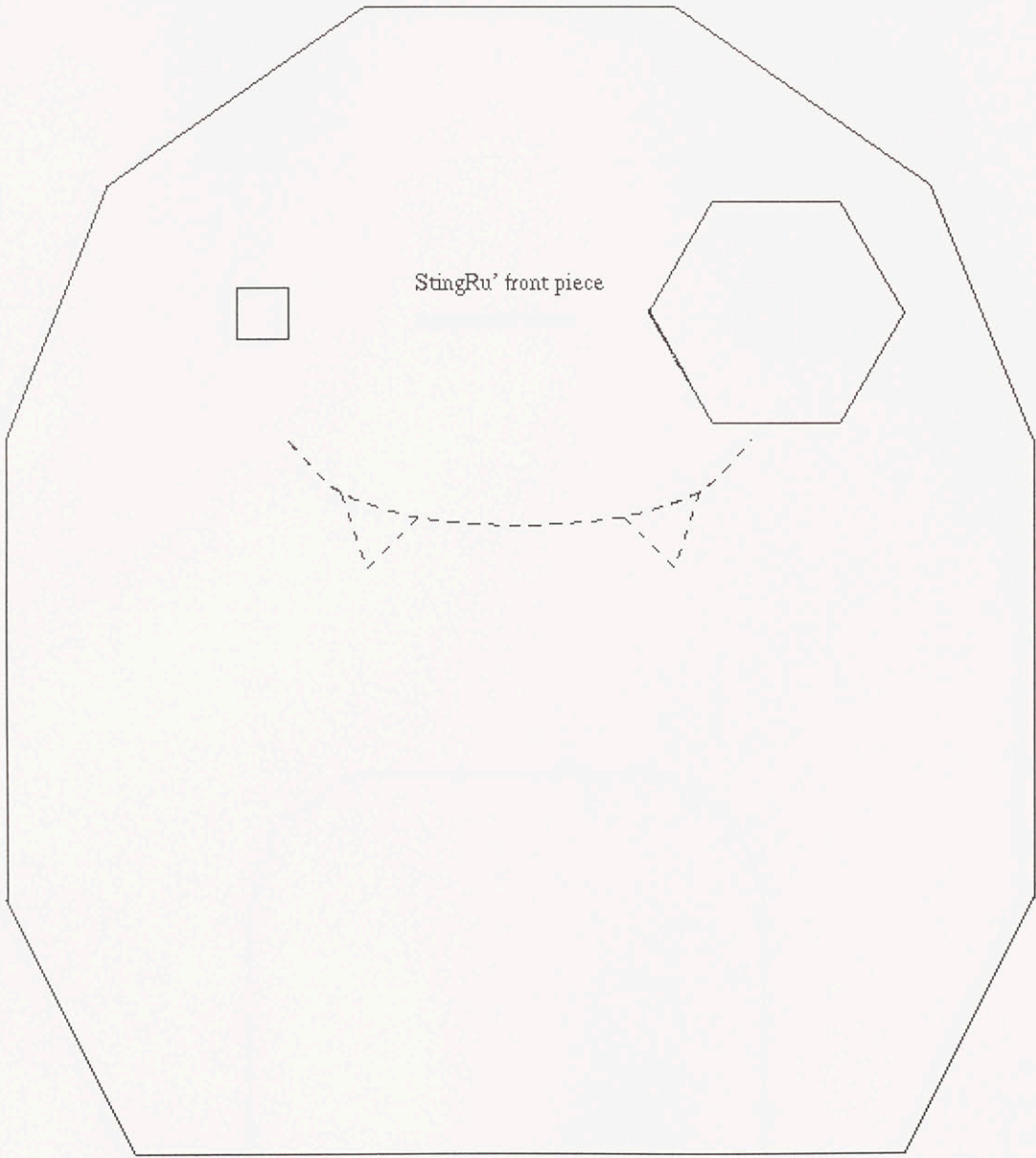


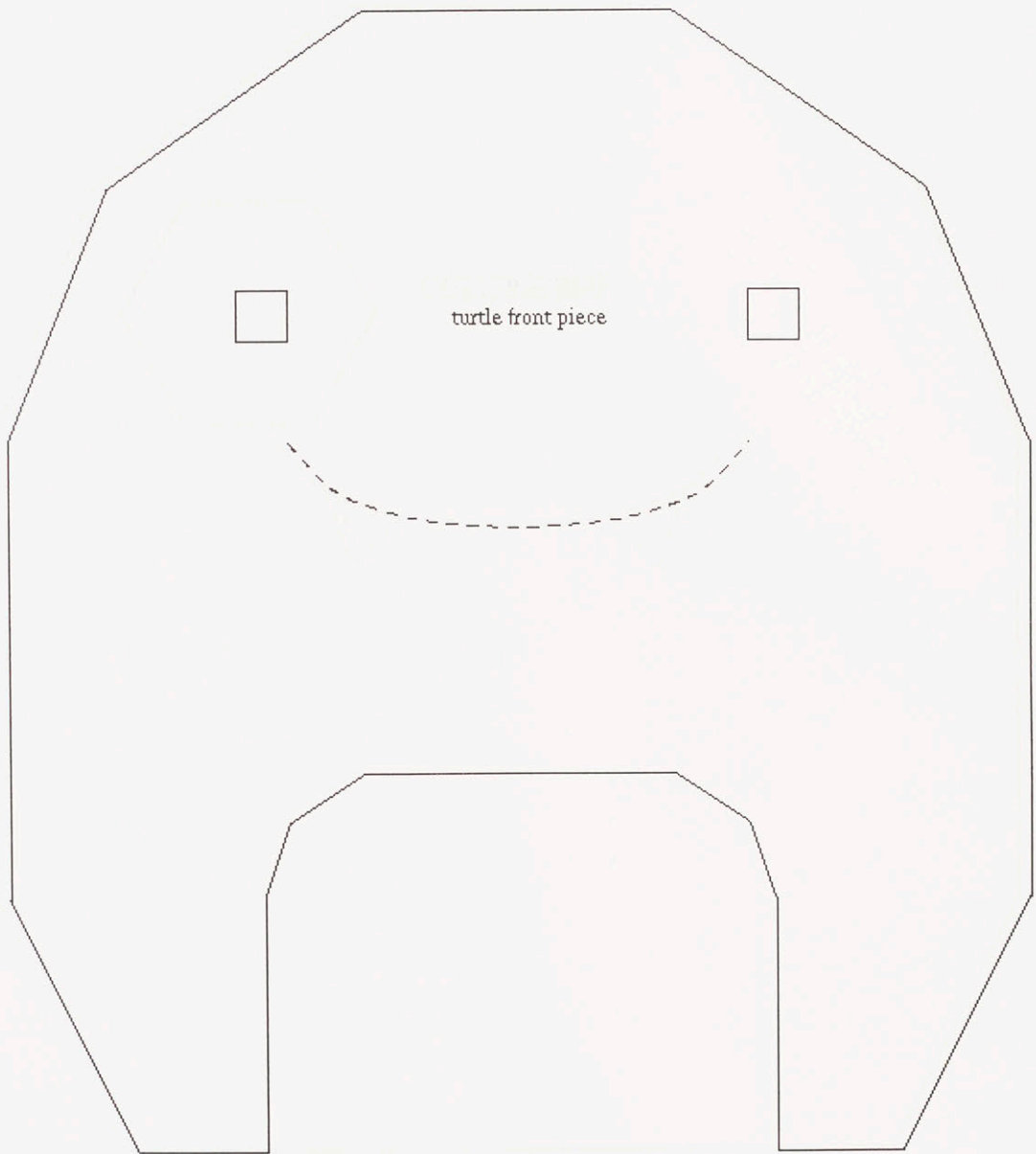


raccoon front piece









turtle front piece

6099-55