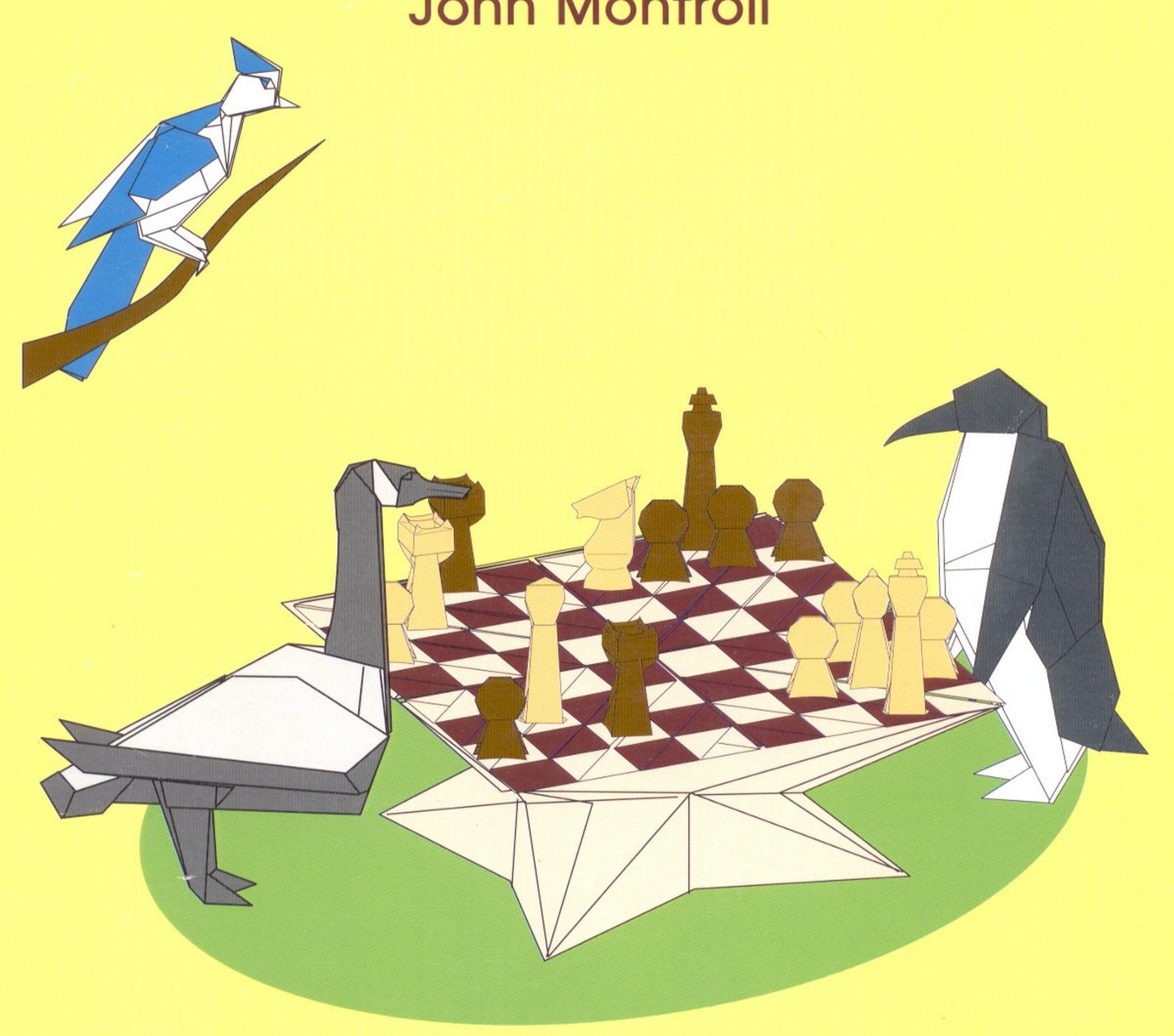
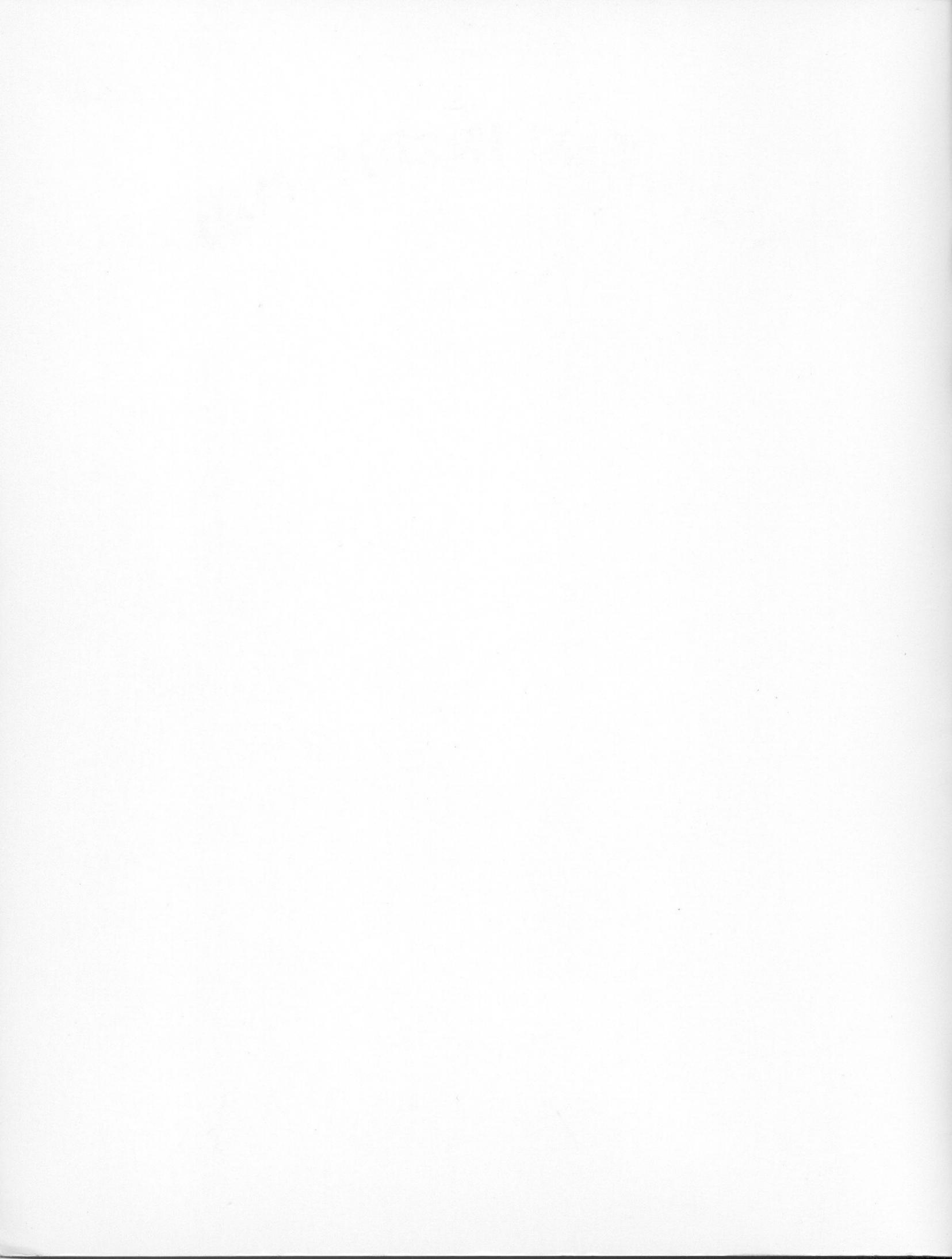
# ORIGAMI INSIDE-OUX

John Montroll





# ORIGAMI INSIDE-OUX

Original Sea Life by John Montest and Cherchines
Preliable Original Concents Concents and Cherchine Concents
Assisted Original for the Estimatest
Congrant for the Estimatest
Congrant for the Estimatest

Other books by John Montroll:

Origami Sculptures

Origami Sea Life by John Montroll and Robert Lang

Prehistoric Origami Dinosaurs and Other Creatures

African Animals in Origami

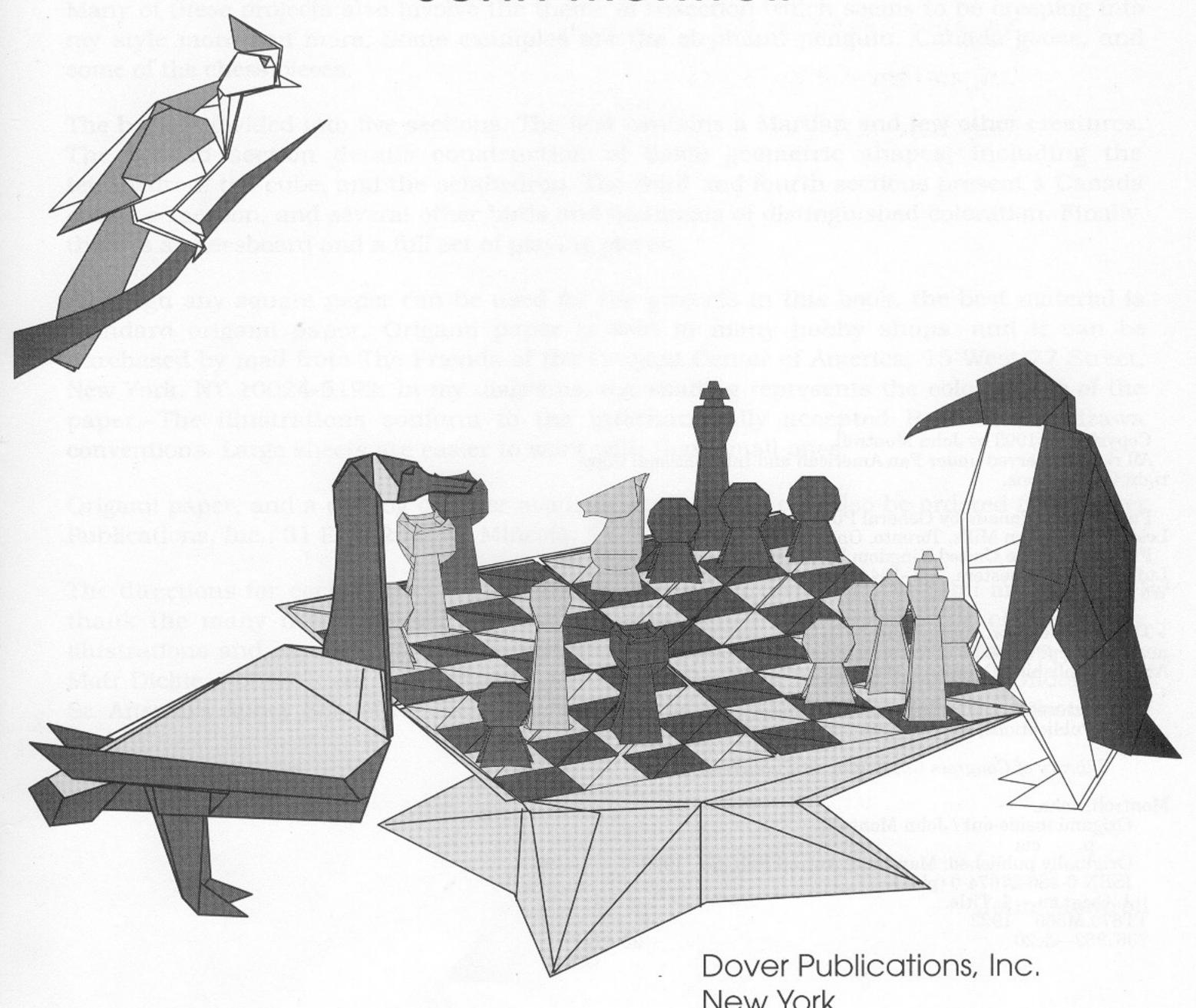
Animal Origami for the Enthusiast

Origami for the Enthusiast

**Easy Origami** 

# ORIGAMI INSIDE-OU,

John Montroll



New York

To Mayo, Naomi, Shelly, Han, Michele, and Alexander

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### Introduction

Traditional origami focuses on the structure of the folded work of art. Over the last several years, I have been designing projects which combine color patterns with structure. Such designs are possible because standard origami paper is colored on one side and white on the other. My recent book, *African Animals in Origami*, contained several examples of patterned origami, notably the zebra and the giraffe. In this book, I present you with a series of projects where the color patterns are formed by folding insideout.

Many of these projects also involve the theme of trisection which seems to be creeping into my style more and more. Some examples are the elephant, penguin, Canada goose, and some of the chess pieces.

The book is divided into five sections. The first contains a Martian and few other creatures. The second section details construction of basic geometric shapes, including the tetrahedron, the cube, and the octahedron. The third and fourth sections present a Canada goose, a raccoon, and several other birds and mammals of distinguished coloration. Finally, there is a chessboard and a full set of playing pieces.

Although any square paper can be used for the projects in this book, the best material is standard origami paper. Origami paper is sold in many hobby shops, and it can be purchased by mail from The Friends of the Origami Center of America, 15 West 77 Street, New York, NY 10024-5192. In my diagrams, the shading represents the colored side of the paper. The illustrations conform to the internationally accepted Randlett-Yoshizawa conventions. Large sheets are easier to work with than small ones.

Origami paper, and a catalog of other available craft books, can also be ordered from Dover Publications, Inc., 31 East 2nd St., Mineola, NY 11501.

The directions for each project have been submitted to experienced origami artists, and I thank the many friends whose suggestions have helped me improve the clarity of my illustrations and explanations. I wish to thank my friends Sascha Beiken, Husayn Moody, Matt Dickie, Robert Ross, Tim Getman, Jeremiah Helm, Jon Zeiders, and Paul Gilden from St. Anselm's Abbey School for their descriptions and poems of the models throughout this book.

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Basic Folds 118

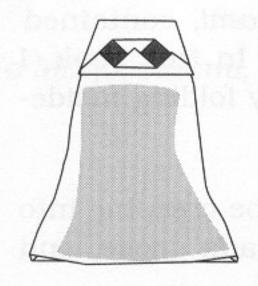
\* Simple

\*\* Intermediate

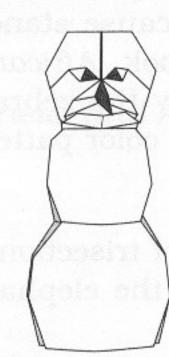
\*\*\* Complex

\*\*\* Very Complex

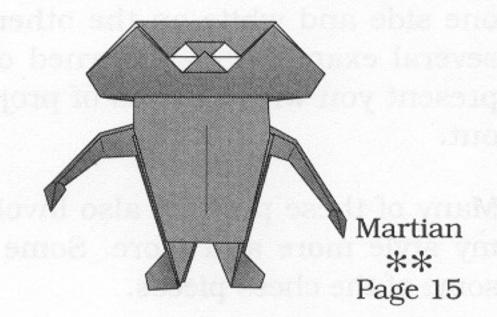
#### **Creatures**



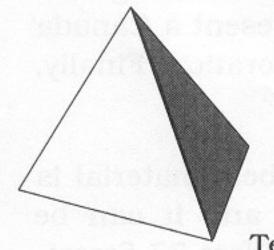
Ghost \* Page 9



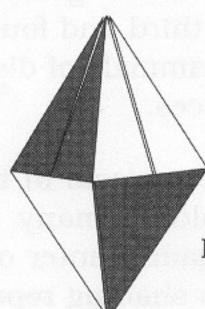
Snowman \*\* Page 11



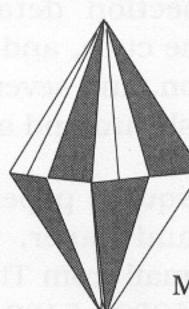
#### Geometrics



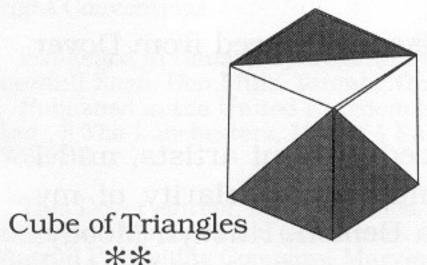
Tetrahedron \* Page 20



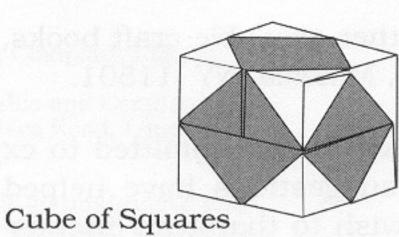
Diamond of Triangles \*\* Page 22



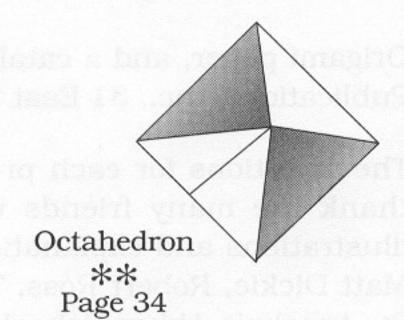
Diamond of Many Triangles \*\* Page 25



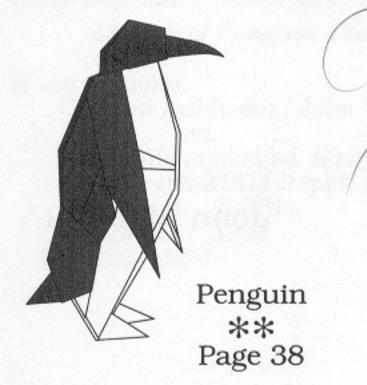
\*\*
Page 28

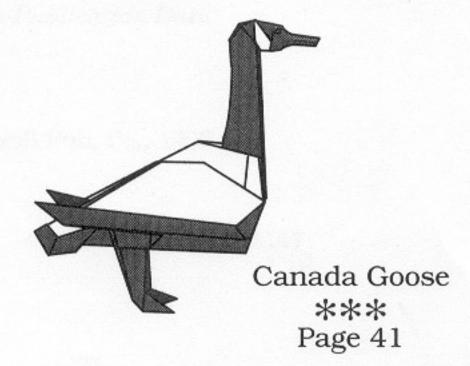


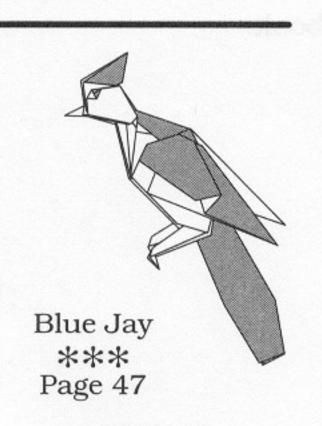
Cube of Square \*\* Page 31



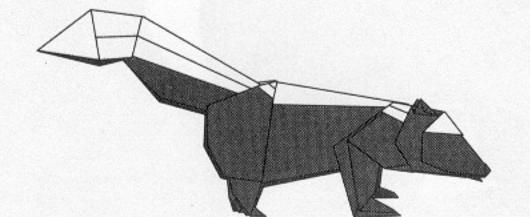
Birds



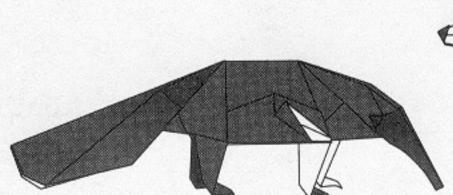




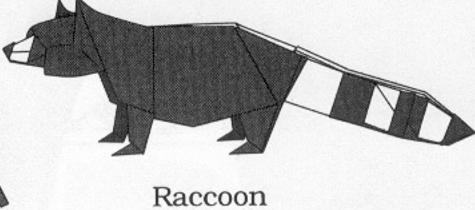
#### Mammals



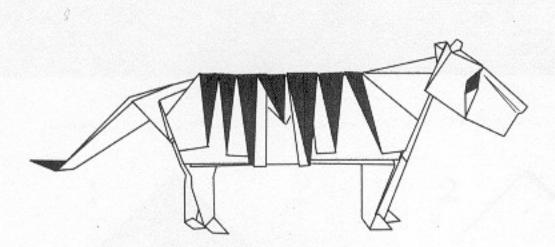
Skunk \*\*\* Page 53



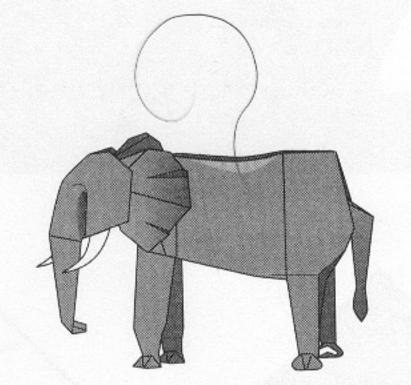
Anteater \*\*\* Page 58



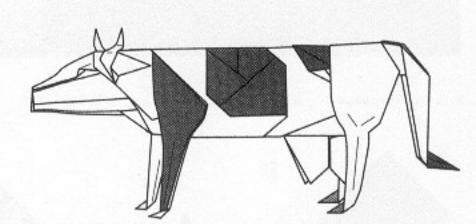
\*\*\* Page 64



Tiger \*\*\* Page 70

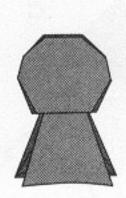


Elephant \*\*\* Page 75



Holstein Cow \*\*\*\* Page 83

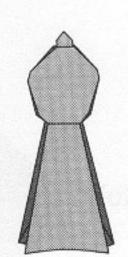
#### Chess



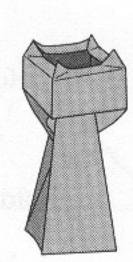
Pawn \*\* Page 93



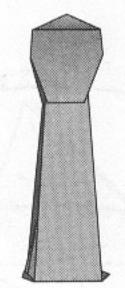
Knight \*\* Page 96



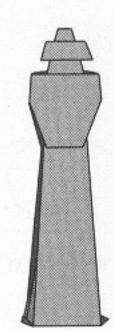
Bishop \*\* Page 98



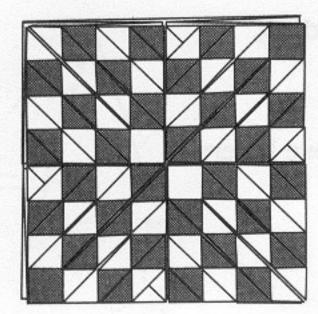
Rook \*\* Page 101



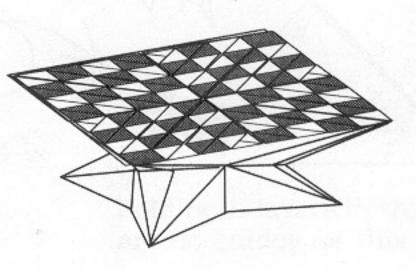
Queen \*\* Page 103



King \*\* Page 106



Chess Board & Chess Table \*\*\*\* Page 110



# Symbols

#### Lines

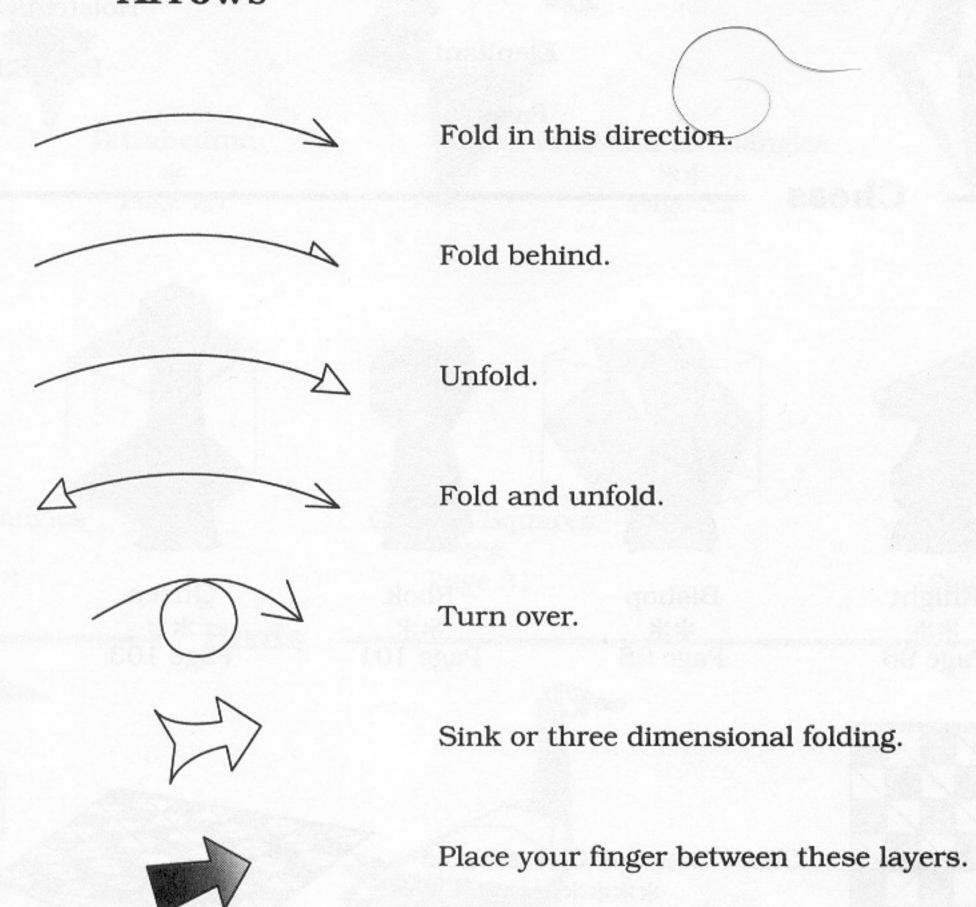
\_\_\_\_\_ Valley fold, fold in front.

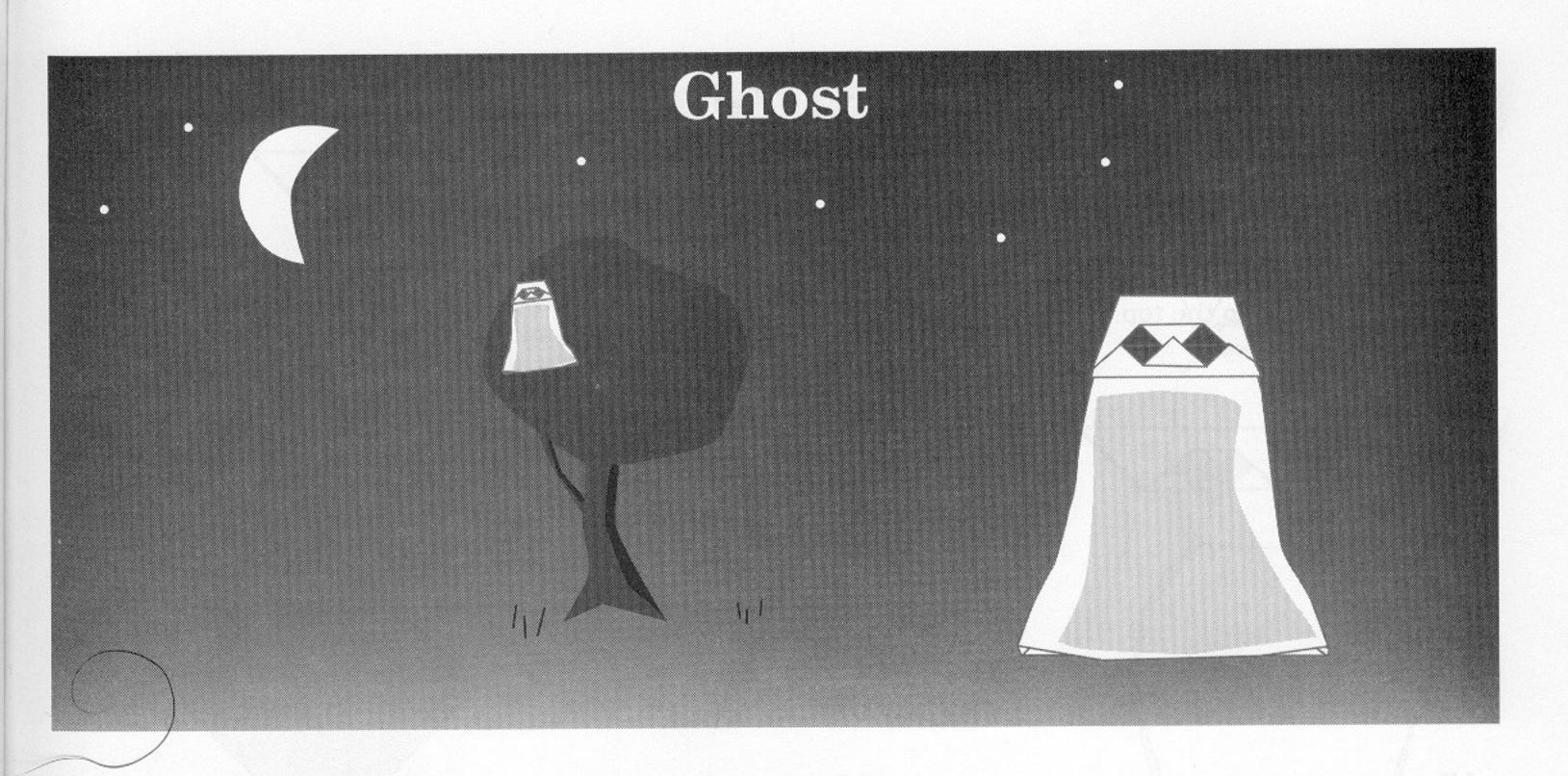
Mountain fold, fold behind.

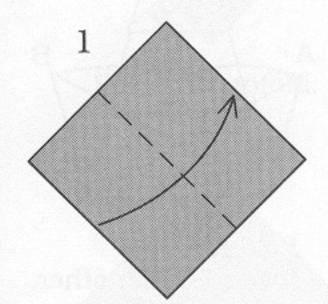
Crease line.

X-ray or guide line.

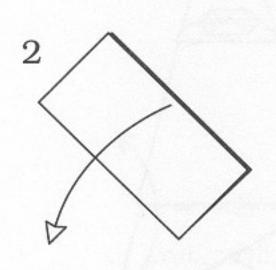
#### Arrows



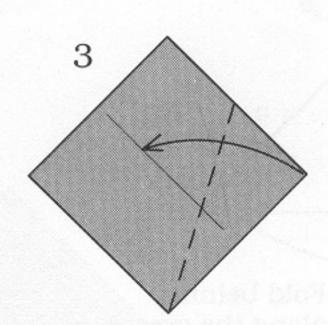




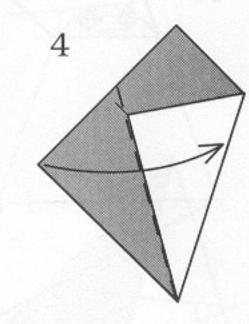
Fold in half.

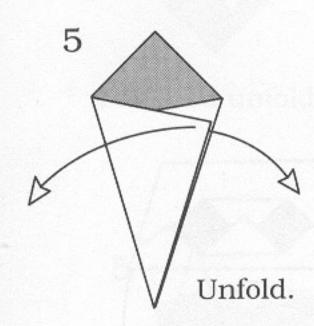


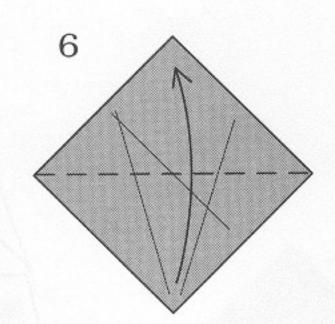
Unfold.

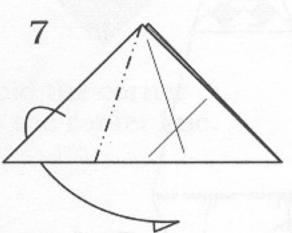


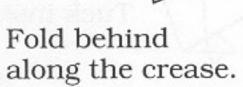
Fold the corner to the center line.

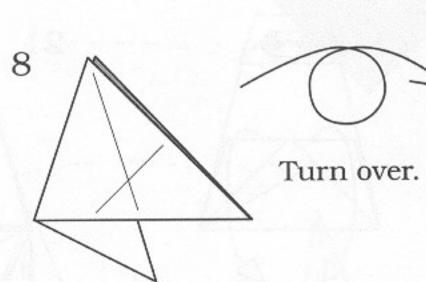


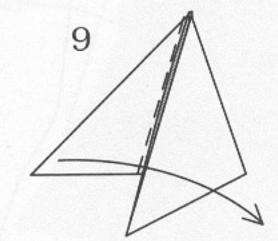


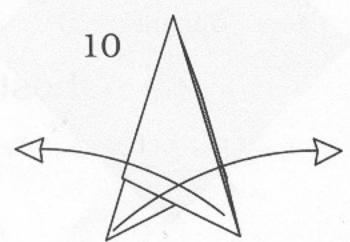


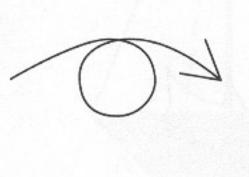


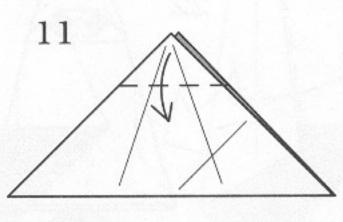






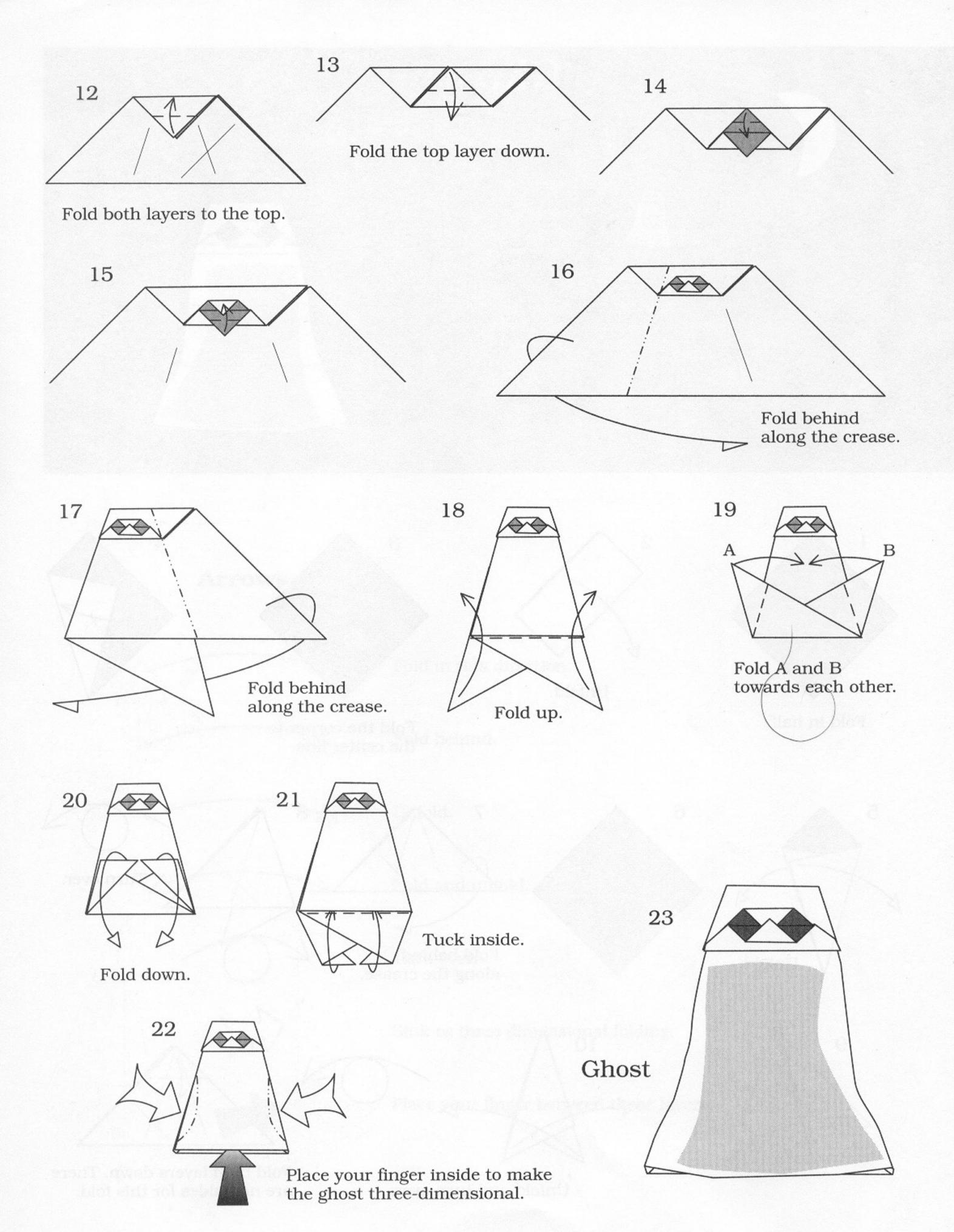






Unfold and turn over.

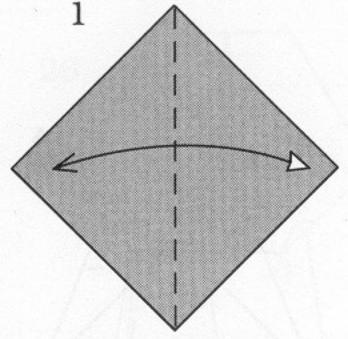
Fold both layers down. There are no guides for this fold.

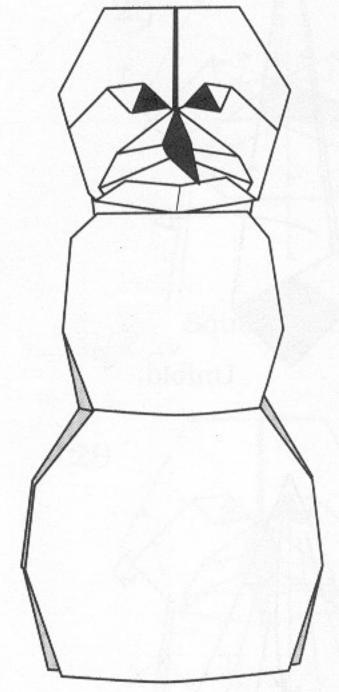


### Snowman

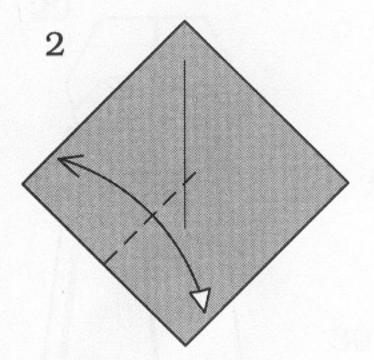
#### Ode to a Snowman

The snowman is such a trusty friend;
If it's cold he's in your yard for a week on end.
With his charcoal eyes and his carrot nose,
He only comes 'round when it really snows.
With white snow you build him up from the ground,
Unless of course the dog has been 'round.
He looks so regal ruling your place
'Til Mr. Sun comes about and melts him away.

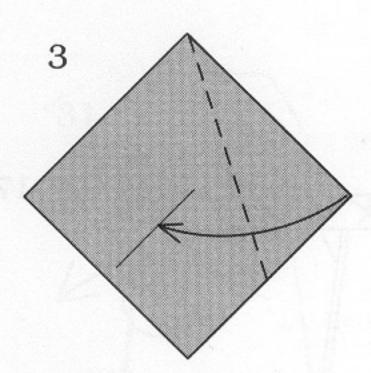




Fold and unfold.

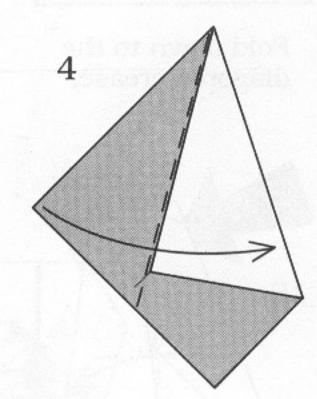


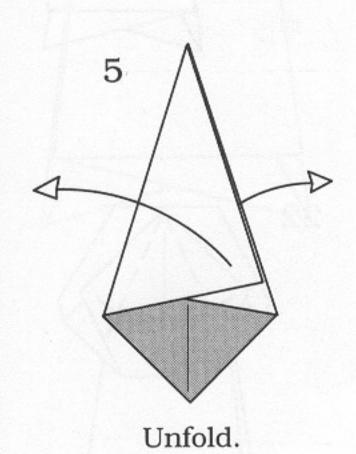
Fold and unfold.

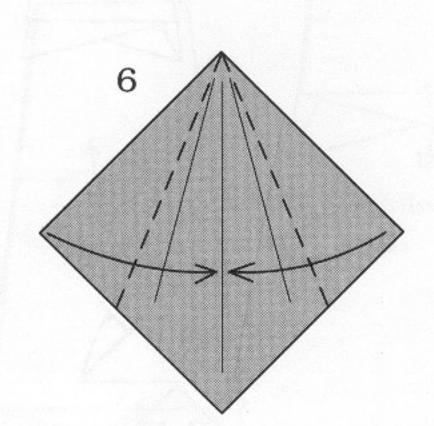


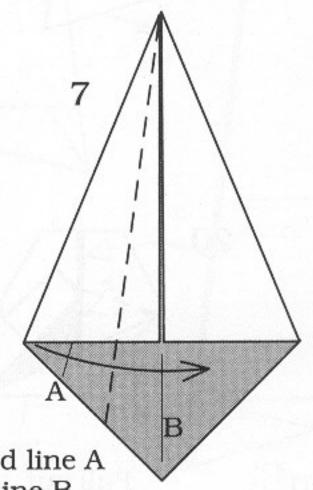
Tim Getman

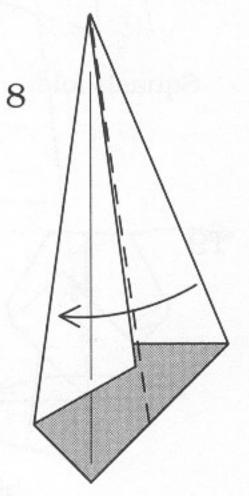
Fold the corner to the center line.



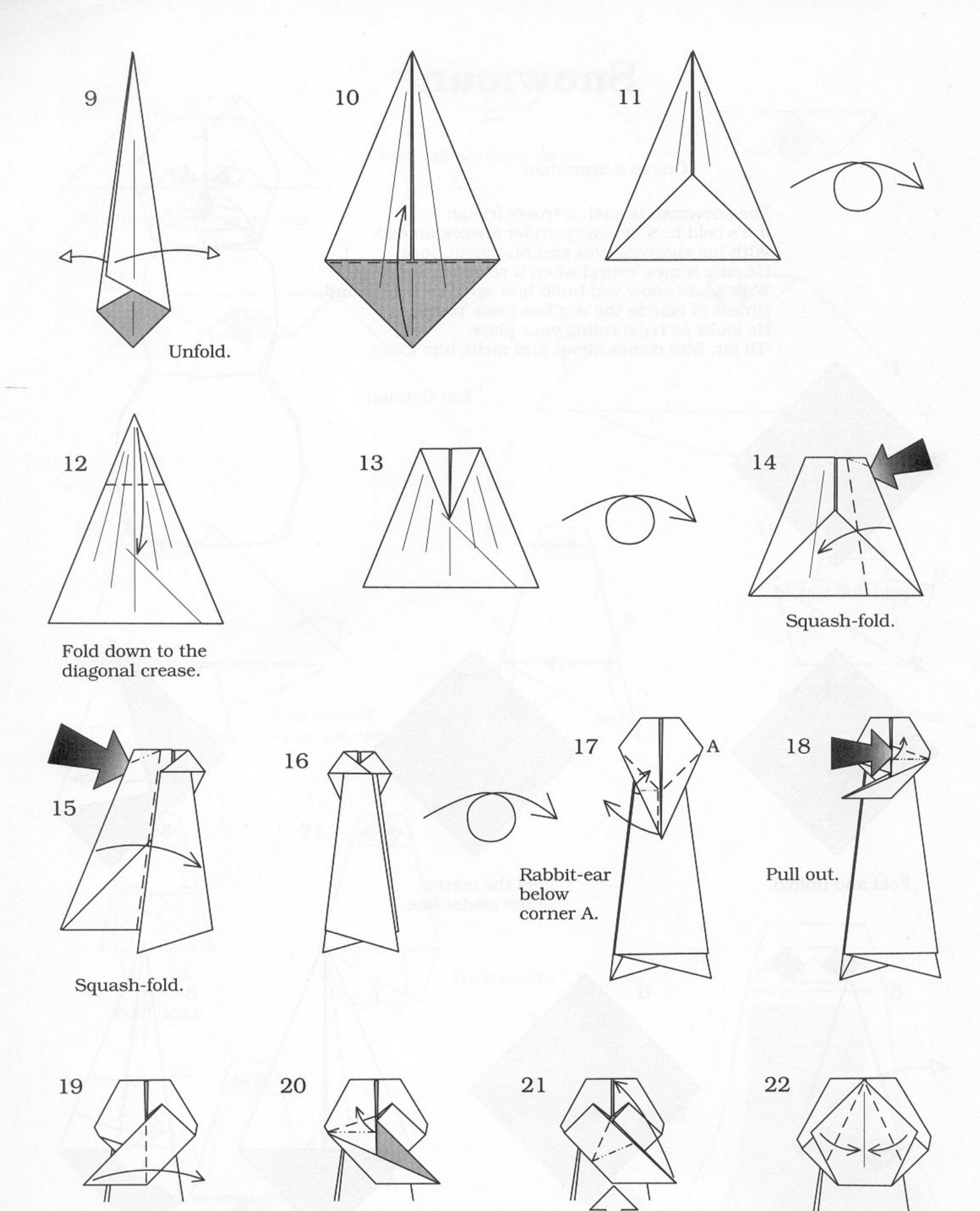






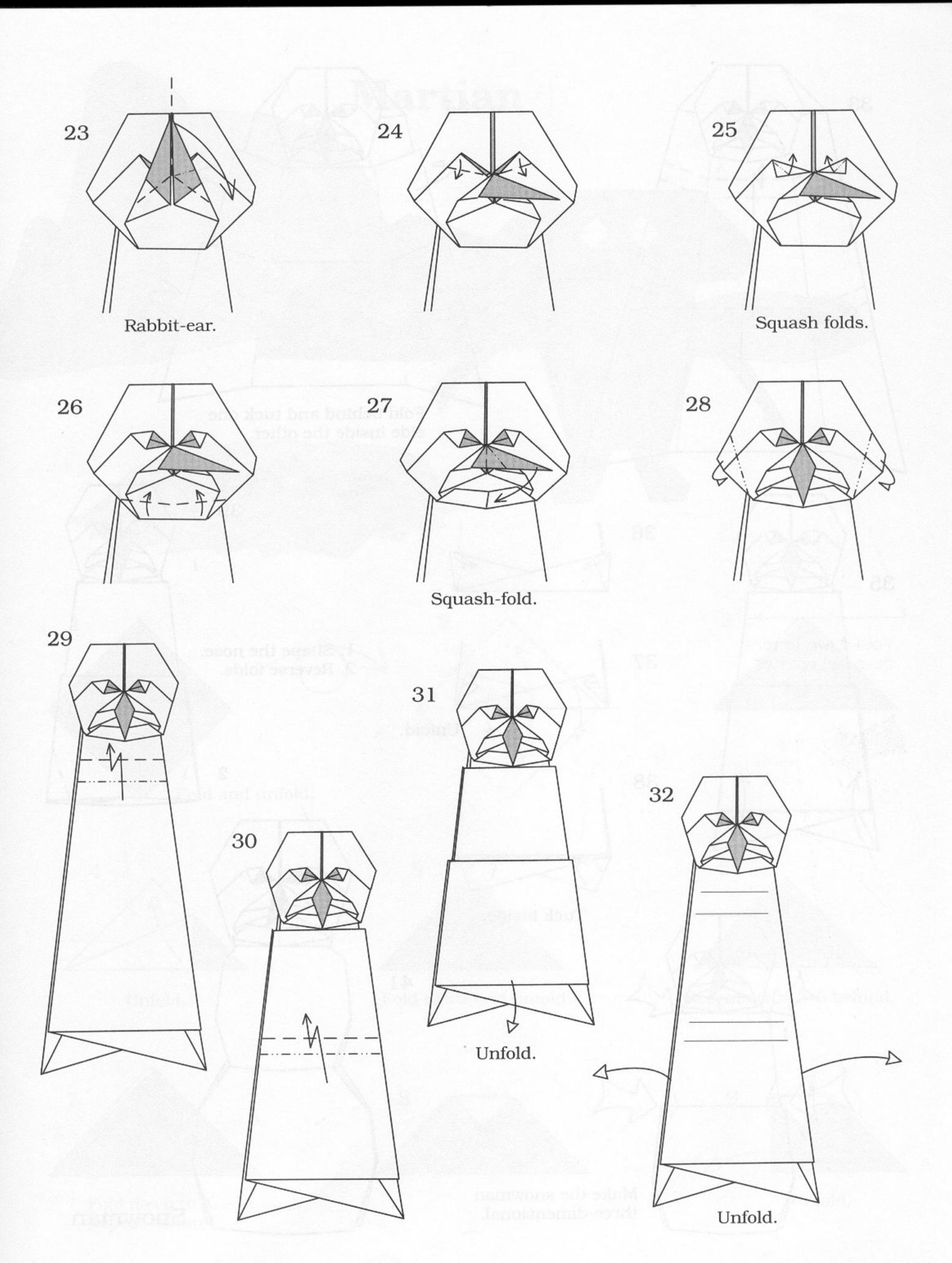


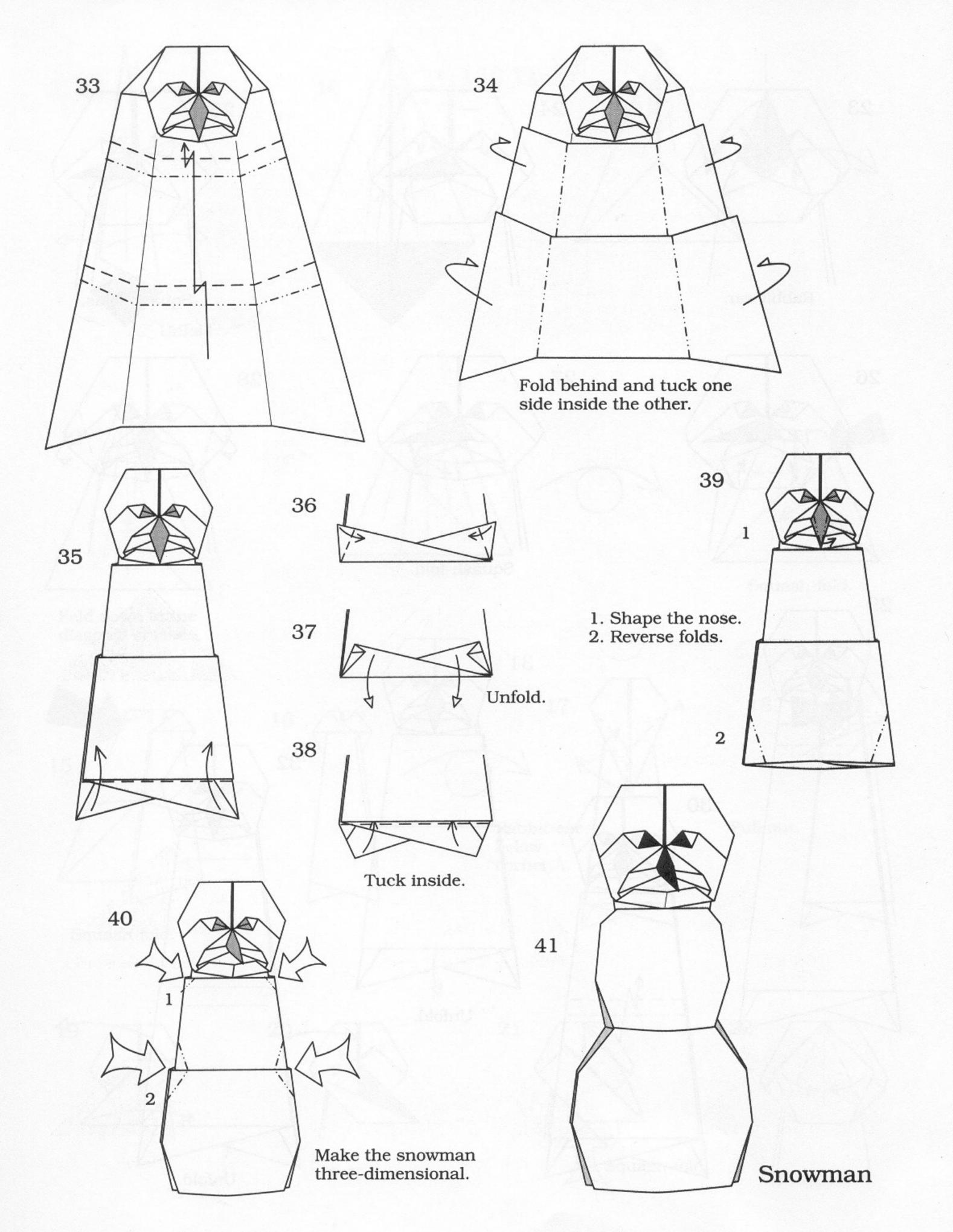
Fold line A to line B.

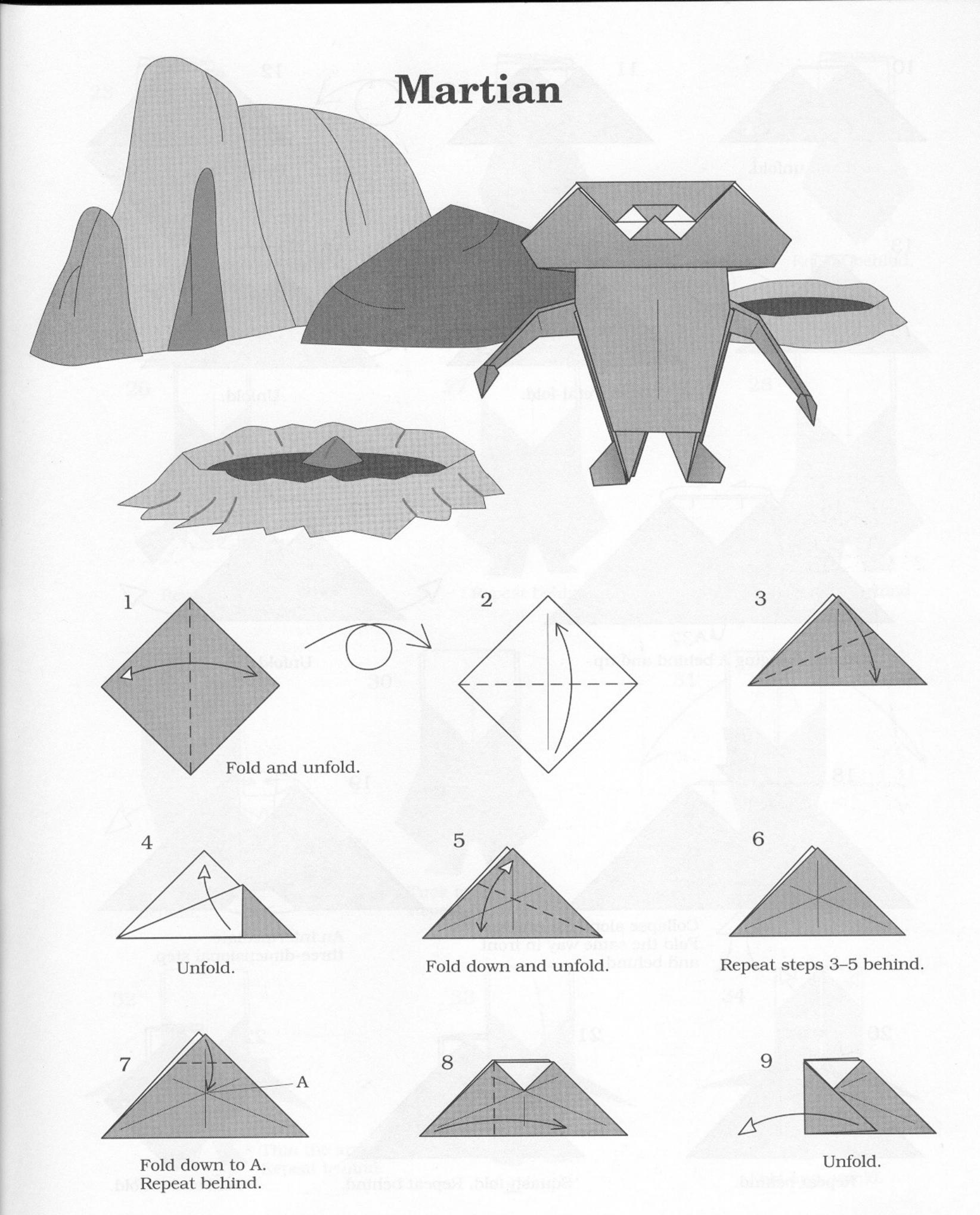


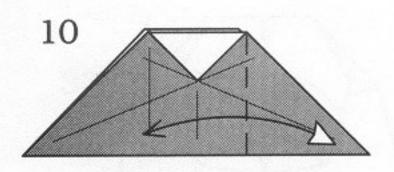
Squash-fold.

Pull out.

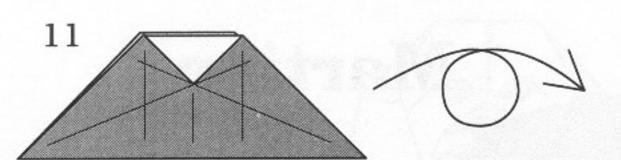






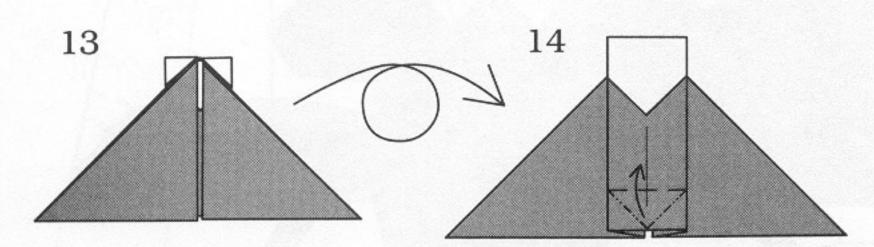


Fold and unfold.

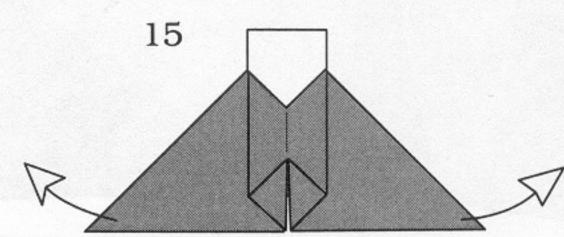


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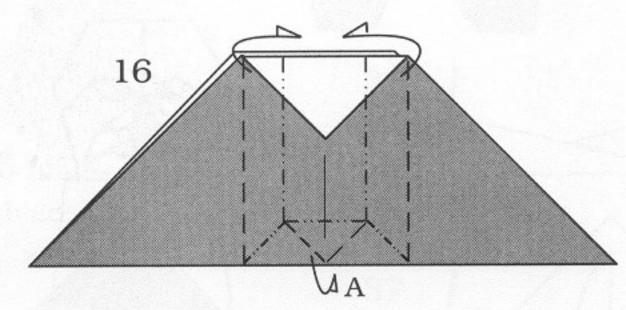
Unfold. Repeat behind.



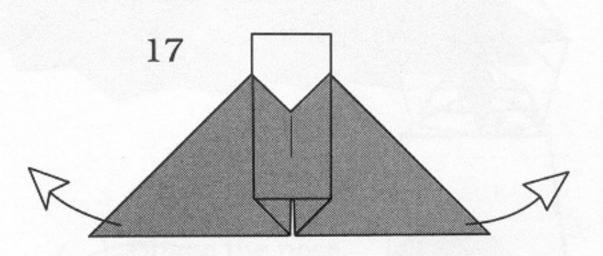
Petal-fold.



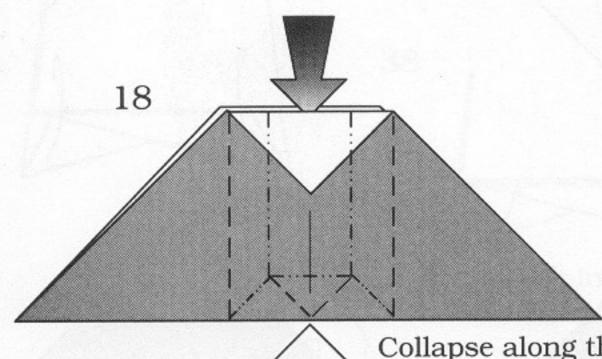
Unfold.



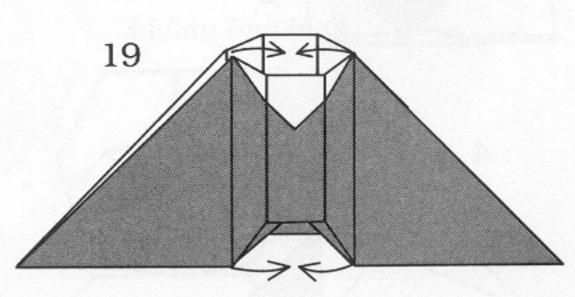
Refold bringing A behind and up.



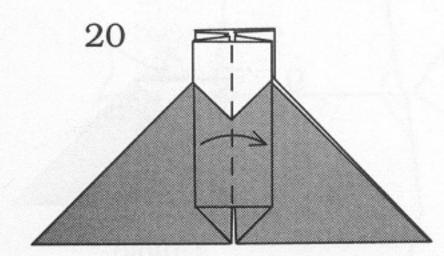
Unfold.



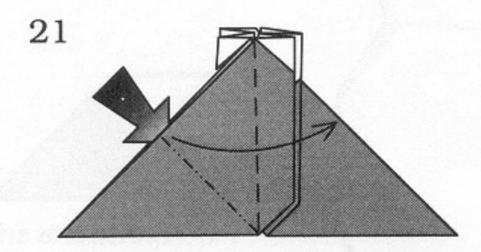
Collapse along the creases. Fold the same way in front and behind.



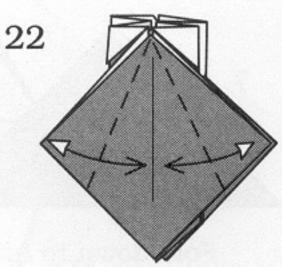
An intermediate three-dimensional step.



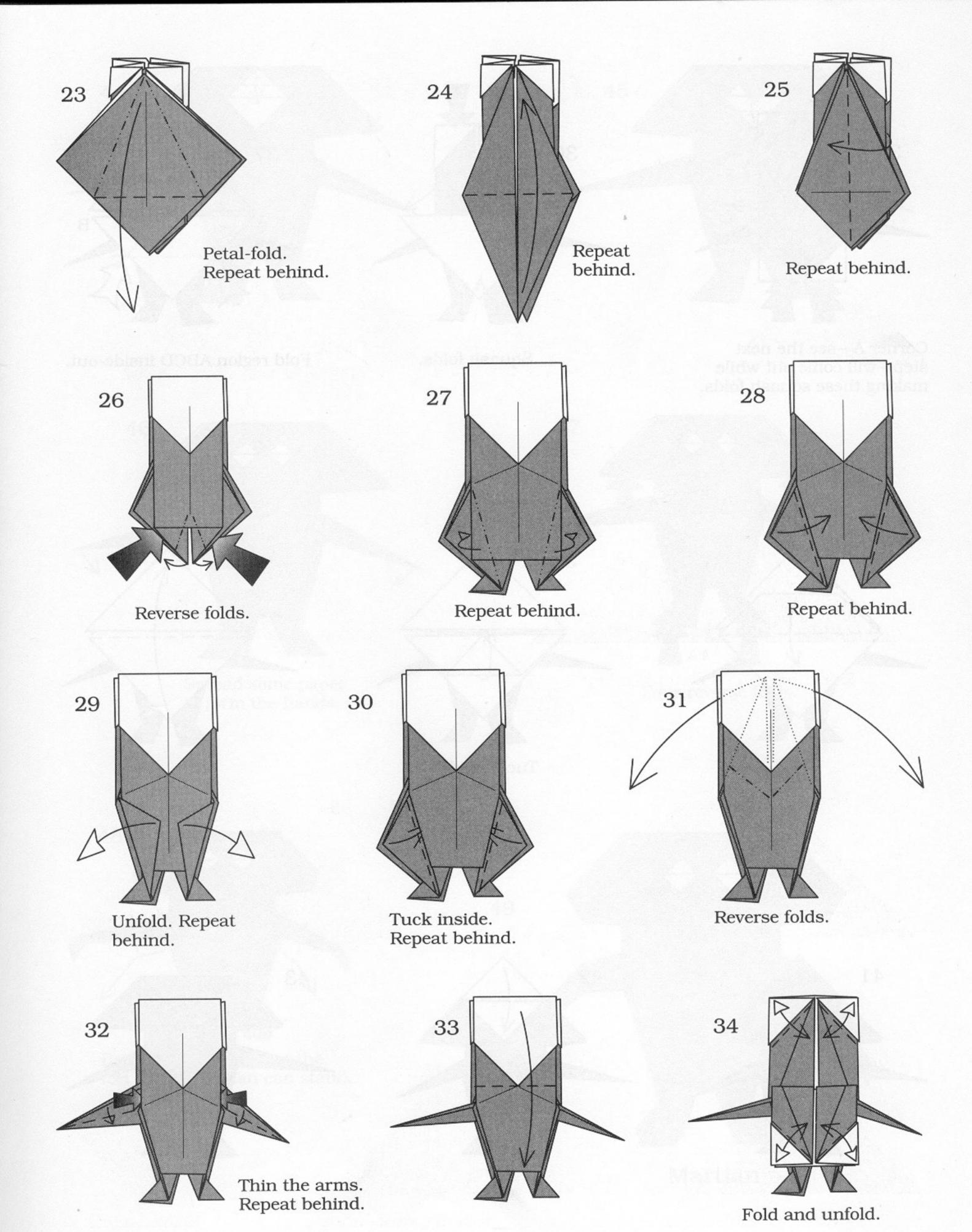
Repeat behind.

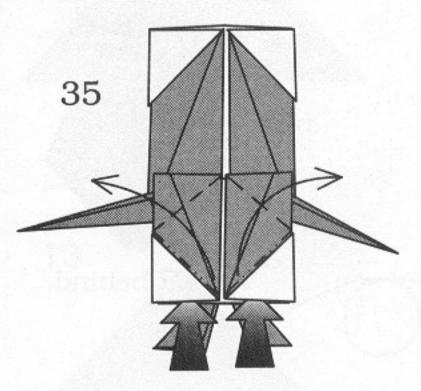


Squash-fold. Repeat behind.

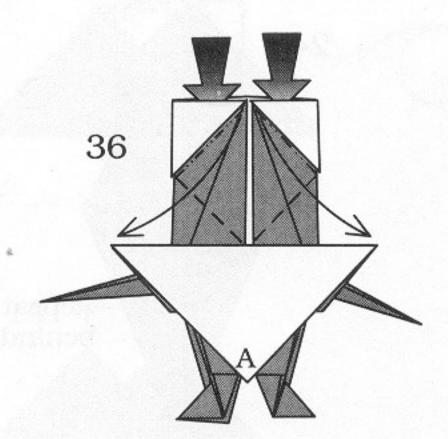


Fold and unfold.

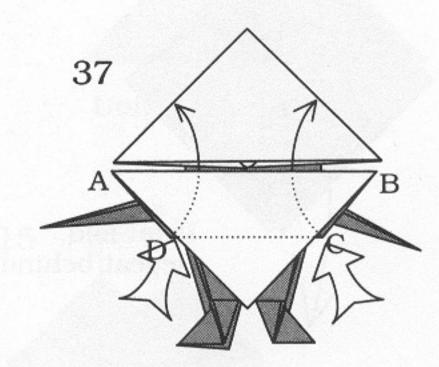




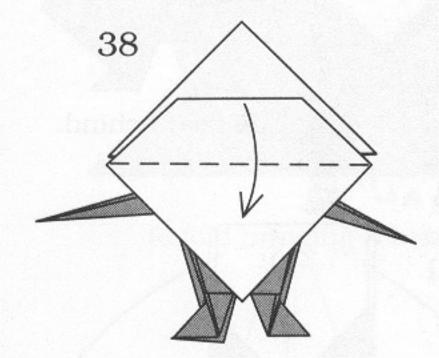
Corner A—see the next step—will come out while making these squash folds.

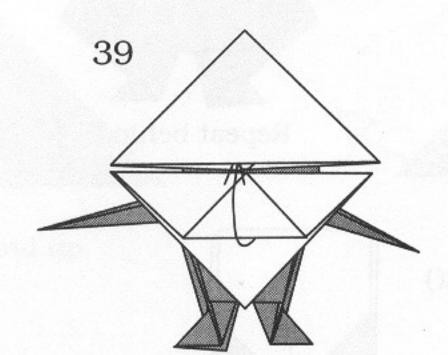


Squash folds.

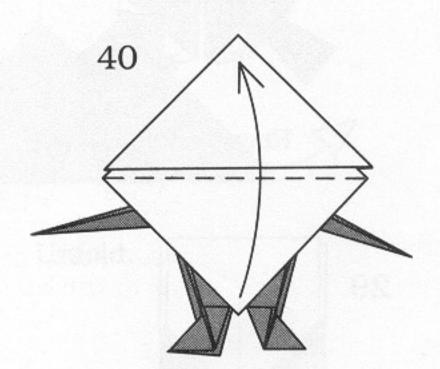


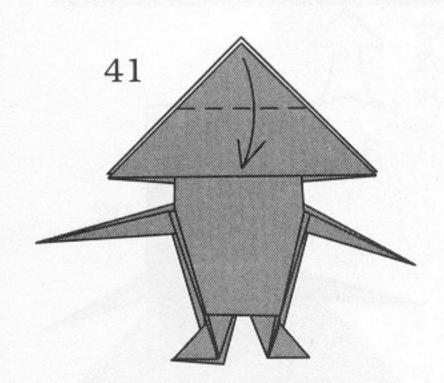
Fold region ABCD inside-out.

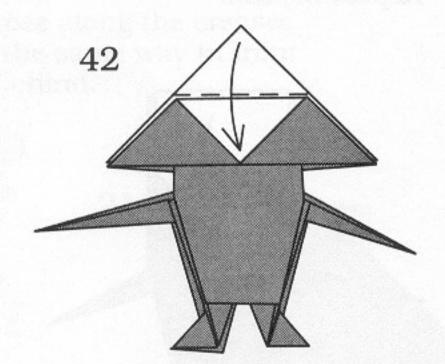


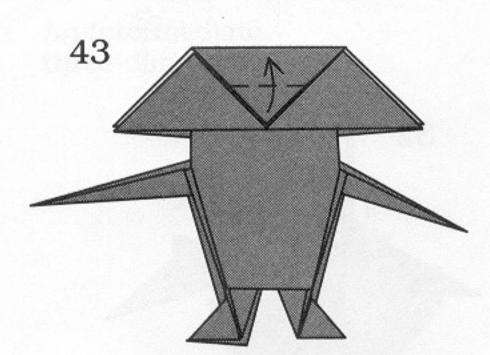


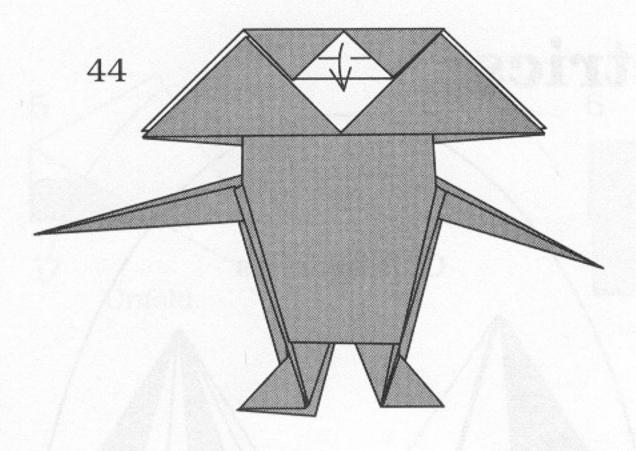
Tuck inside.

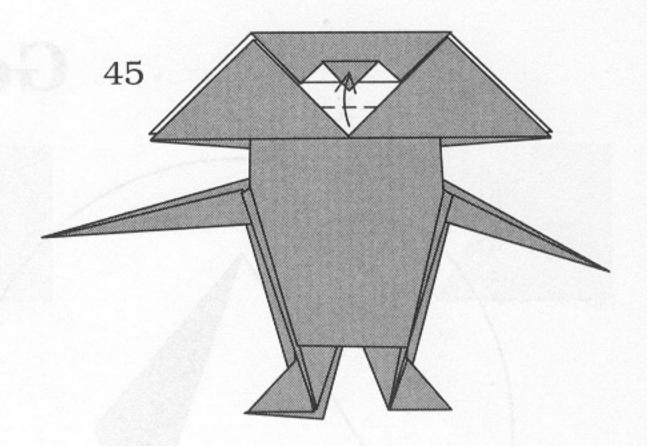


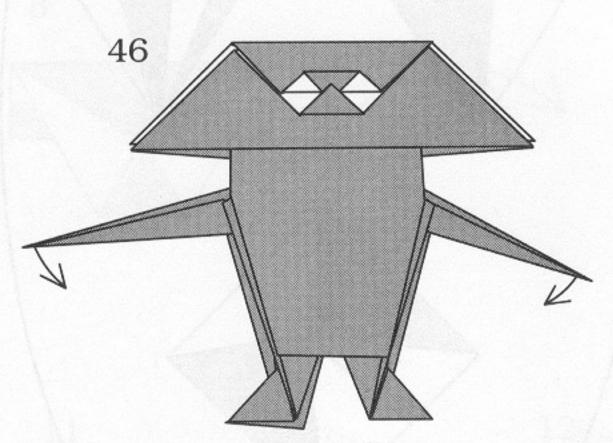




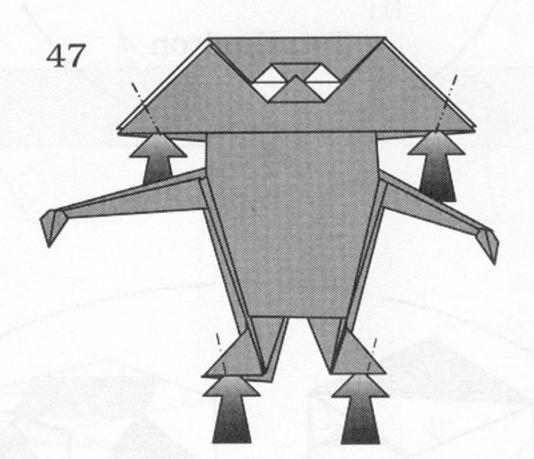




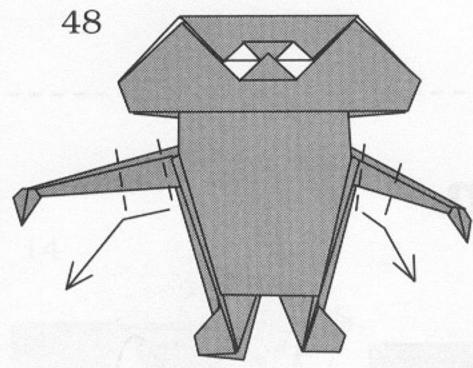




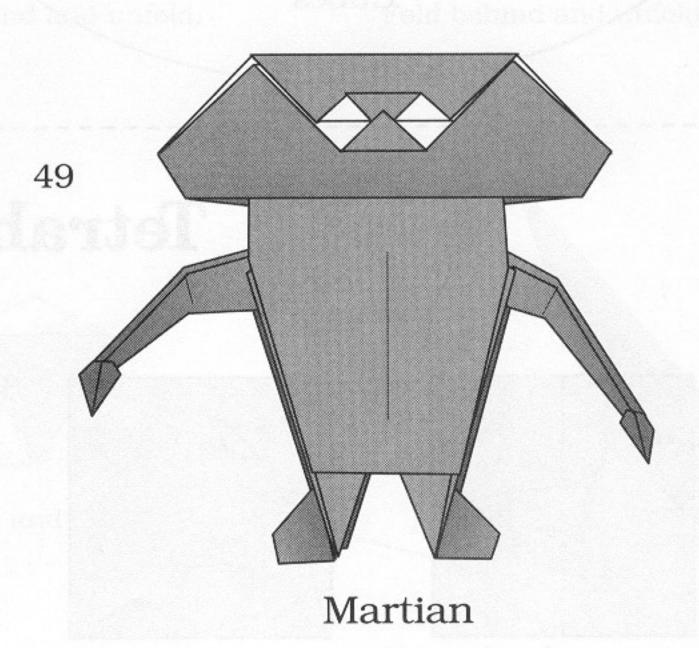
Spread some paper to form the hands.



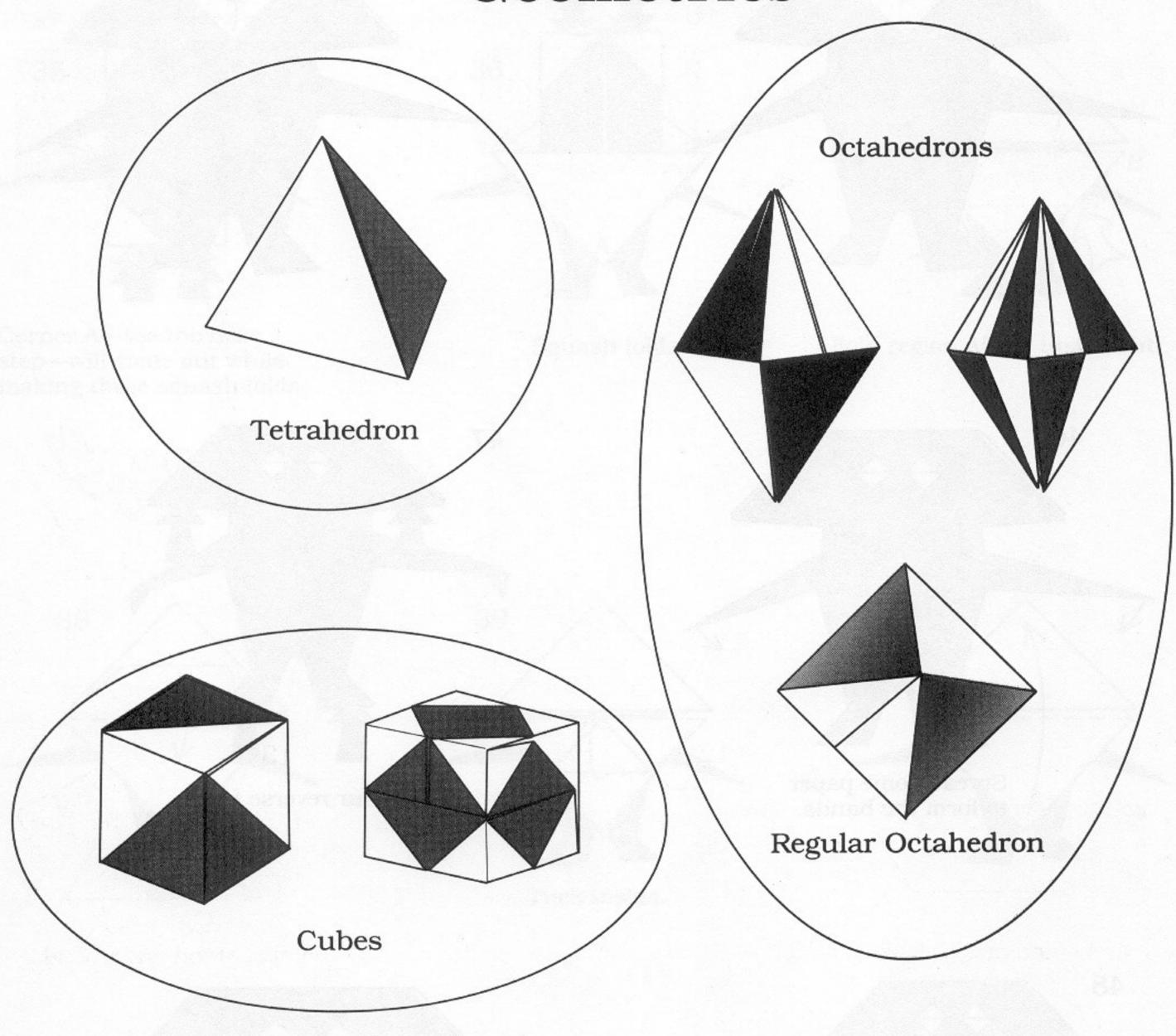
Four reverse folds.



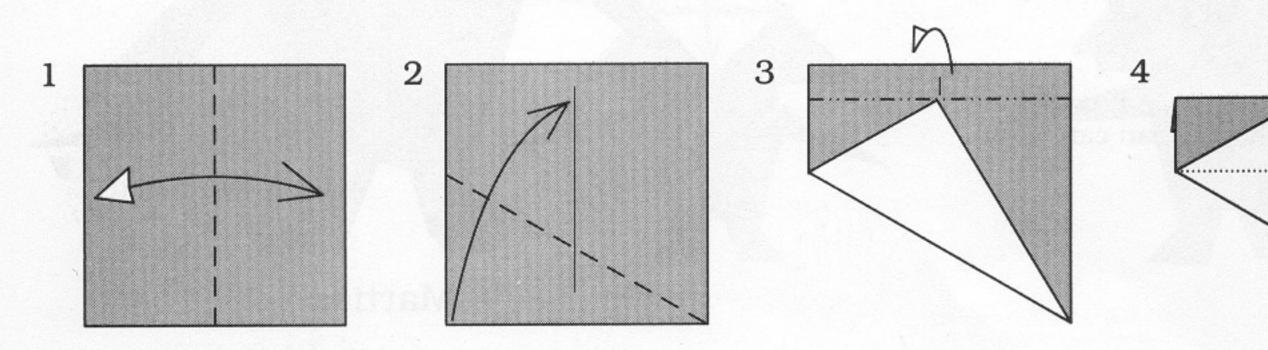
Bend the arms. Adjust the feet so the Martian can stand.



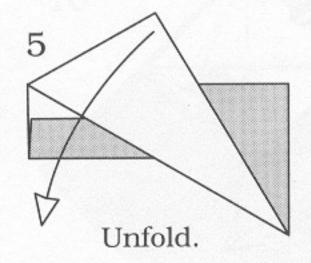
# Geometrics

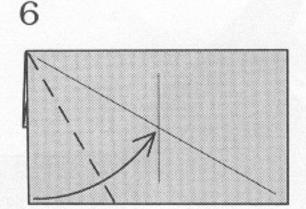


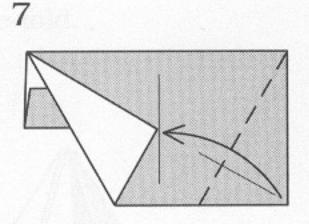
# Tetrahedron

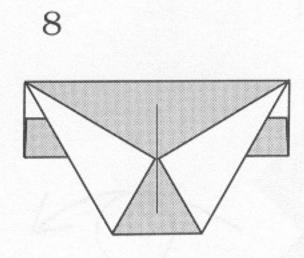


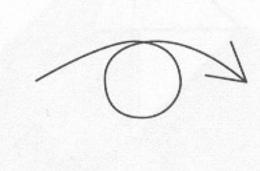
Fold and unfold.

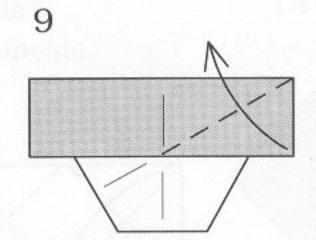


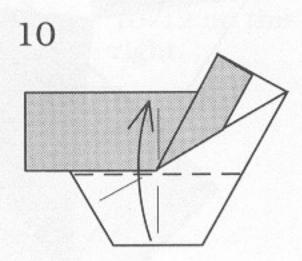


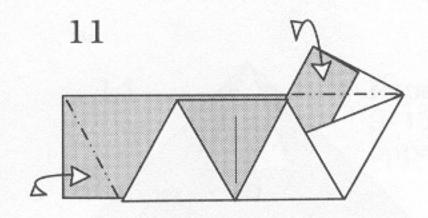




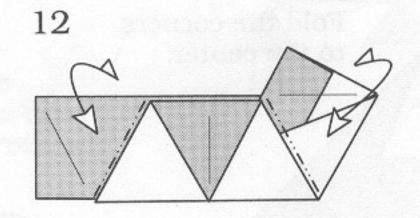




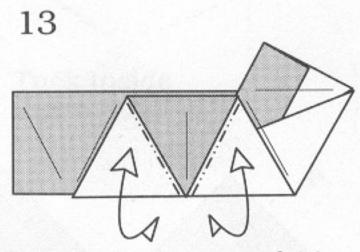




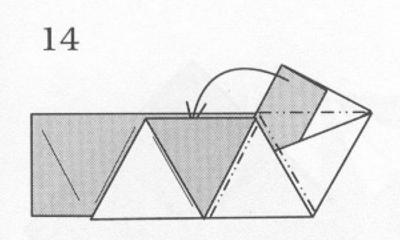
Fold behind and unfold.



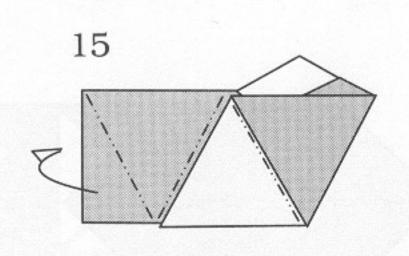
Fold behind and unfold.



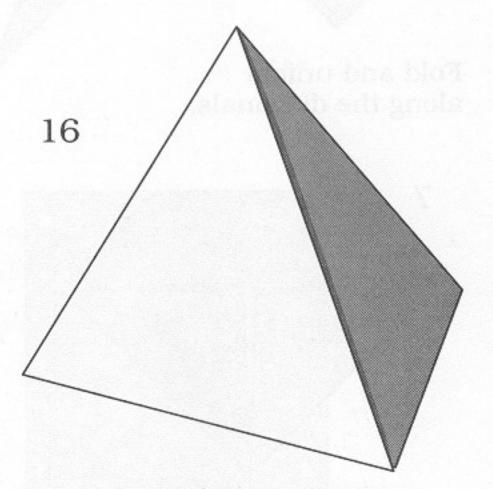
Fold behind and unfold.



Tuck inside.

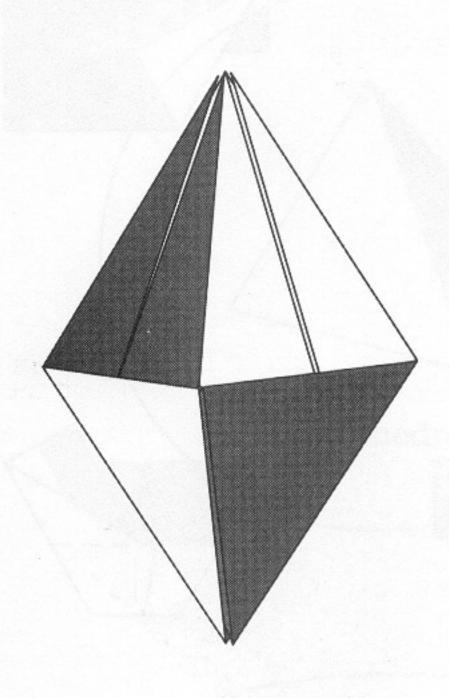


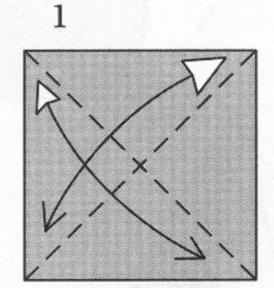
Wrap around and tuck inside.

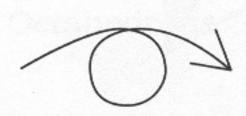


Tetrahedron

# Diamond of Triangles

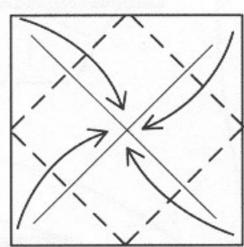






Fold and unfold along the diagonals.

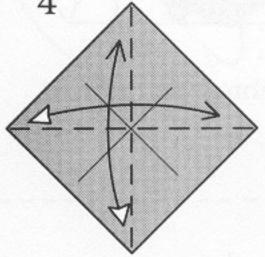




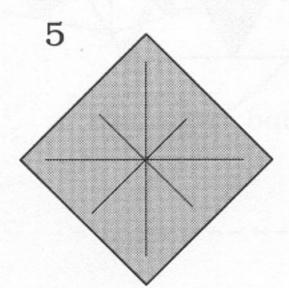
3

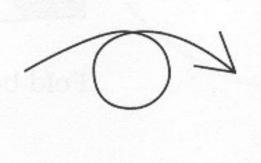
Fold the corners to the center.

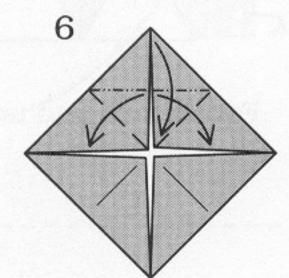
4



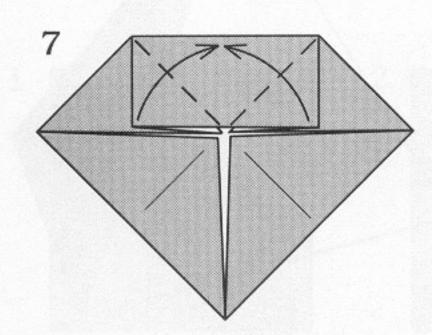
Fold and unfold along the diagonals.

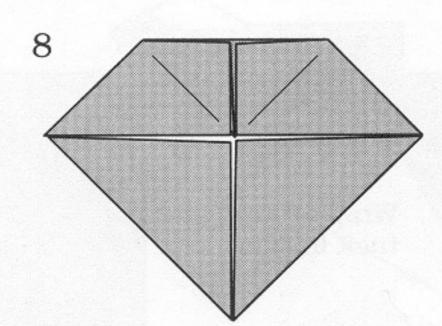




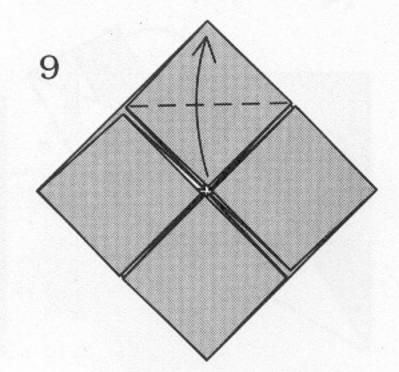


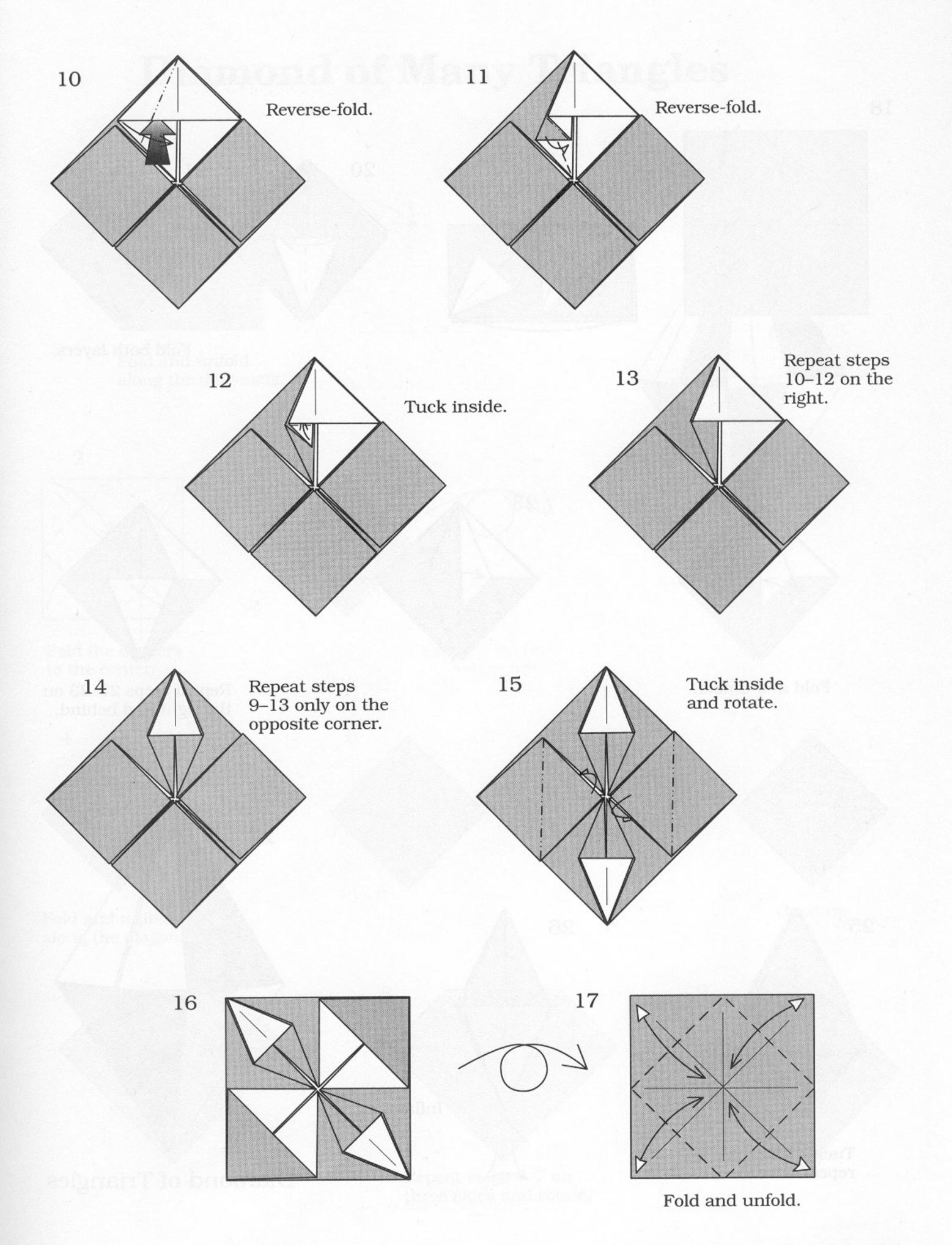
Open up.



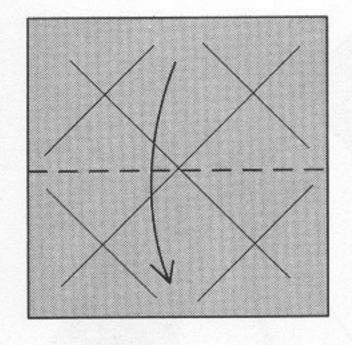


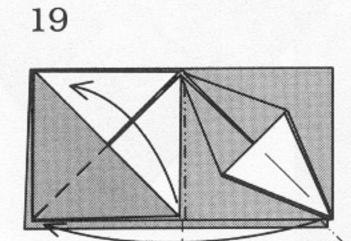
Repeat steps 6–7 on three sides and rotate.

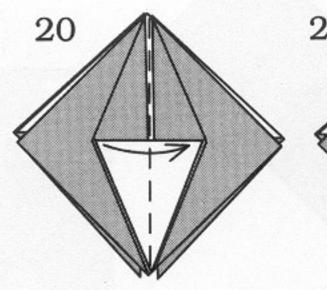


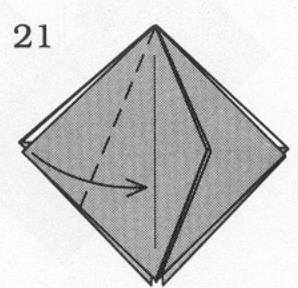


Diamond of Triangles 23

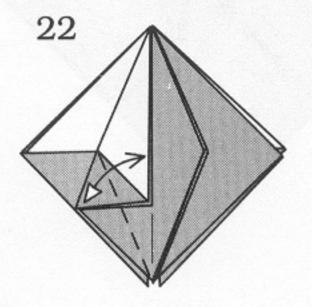




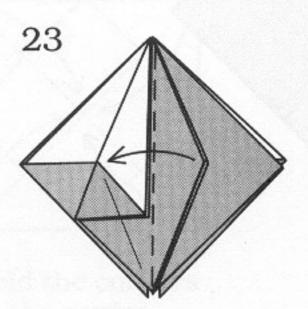


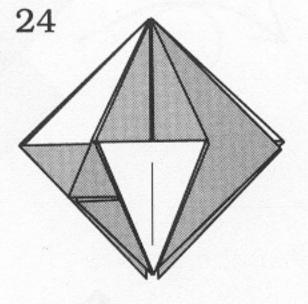


Fold both layers.

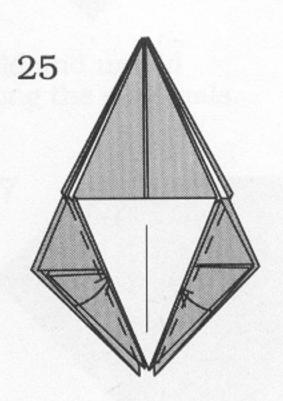


Fold and unfold.

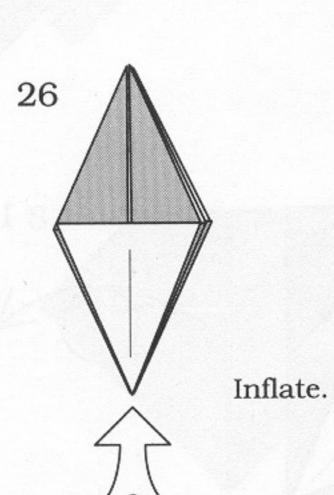


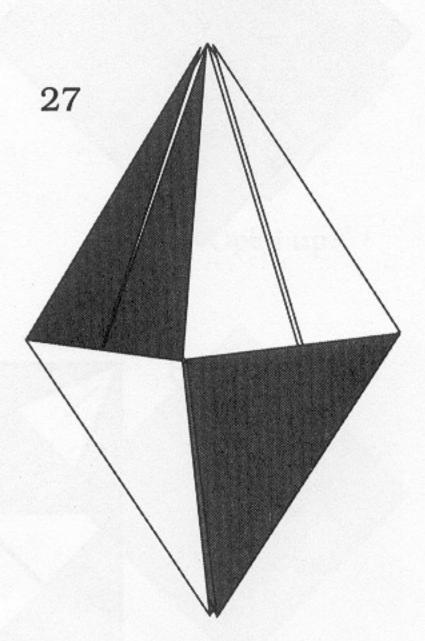


Repeat steps 20–23 on the right and behind.



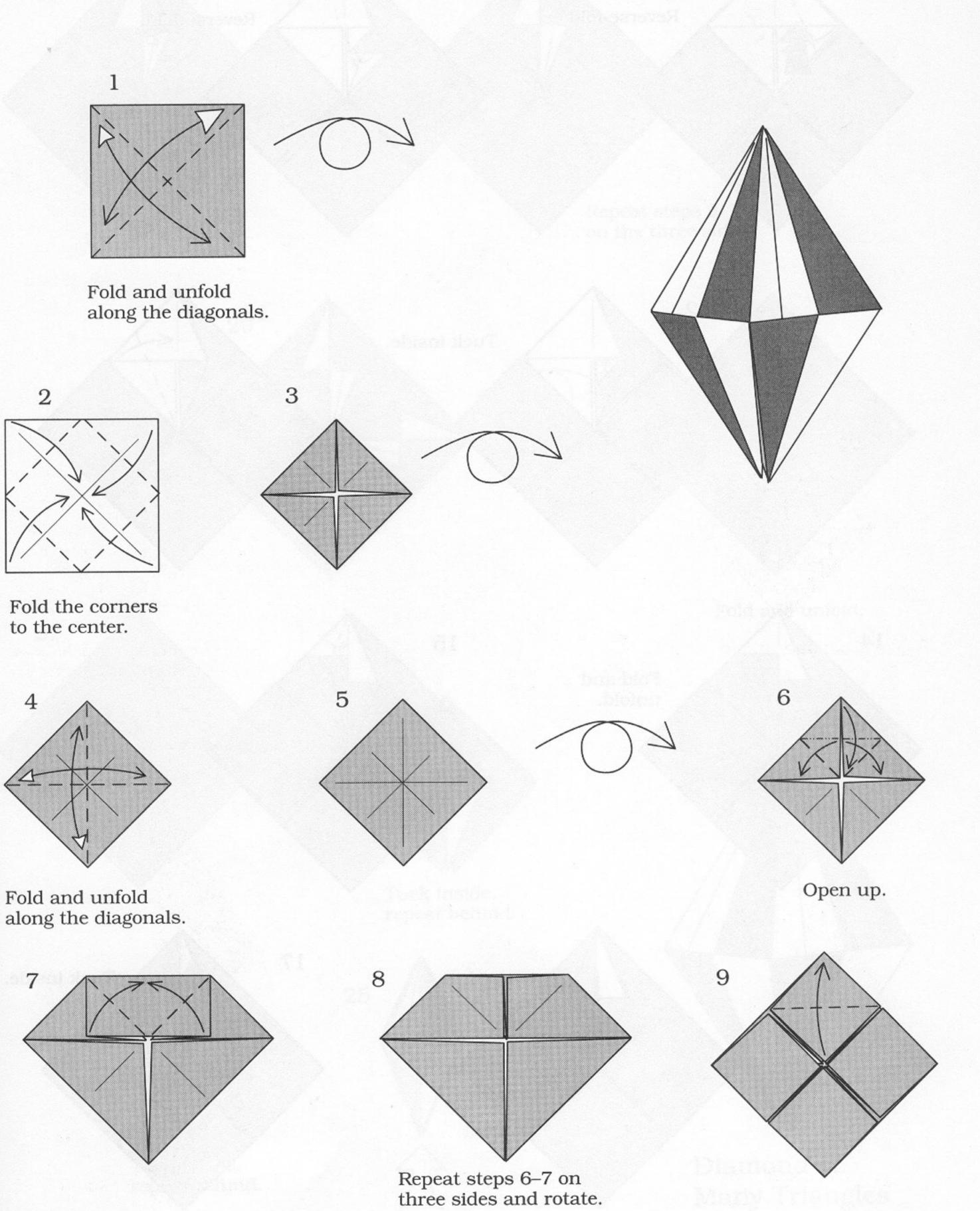
Tuck inside, repeat behind.

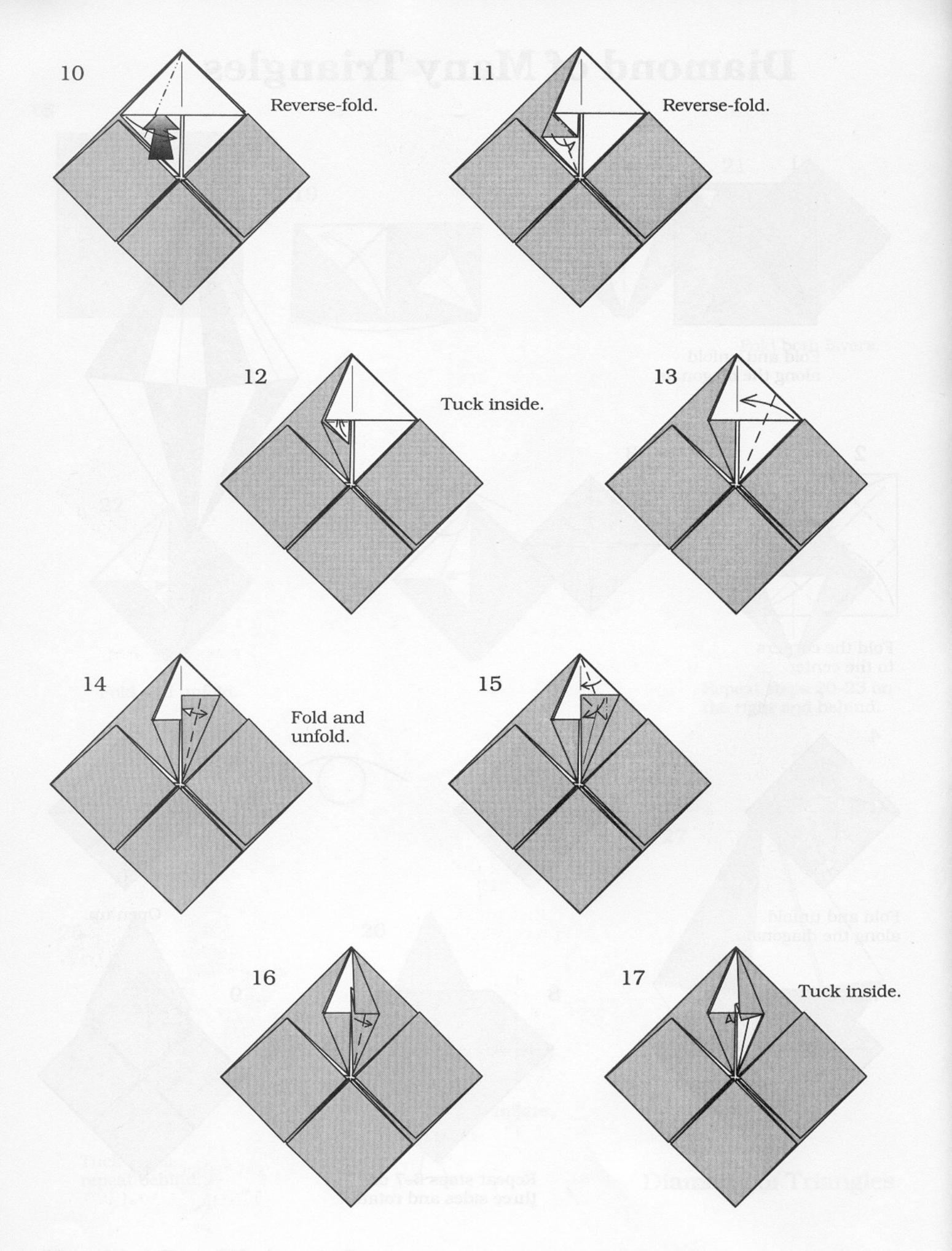


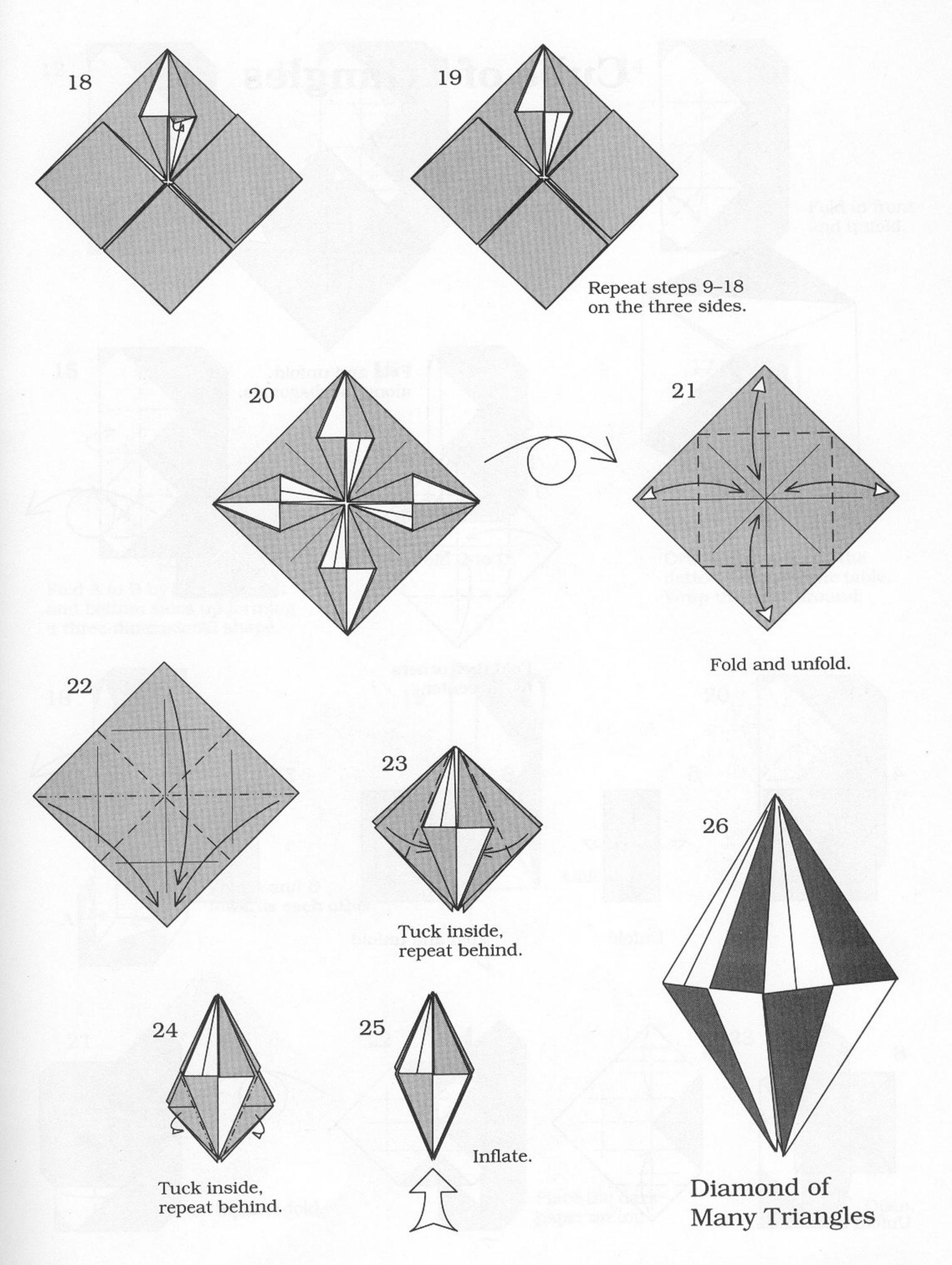


Diamond of Triangles

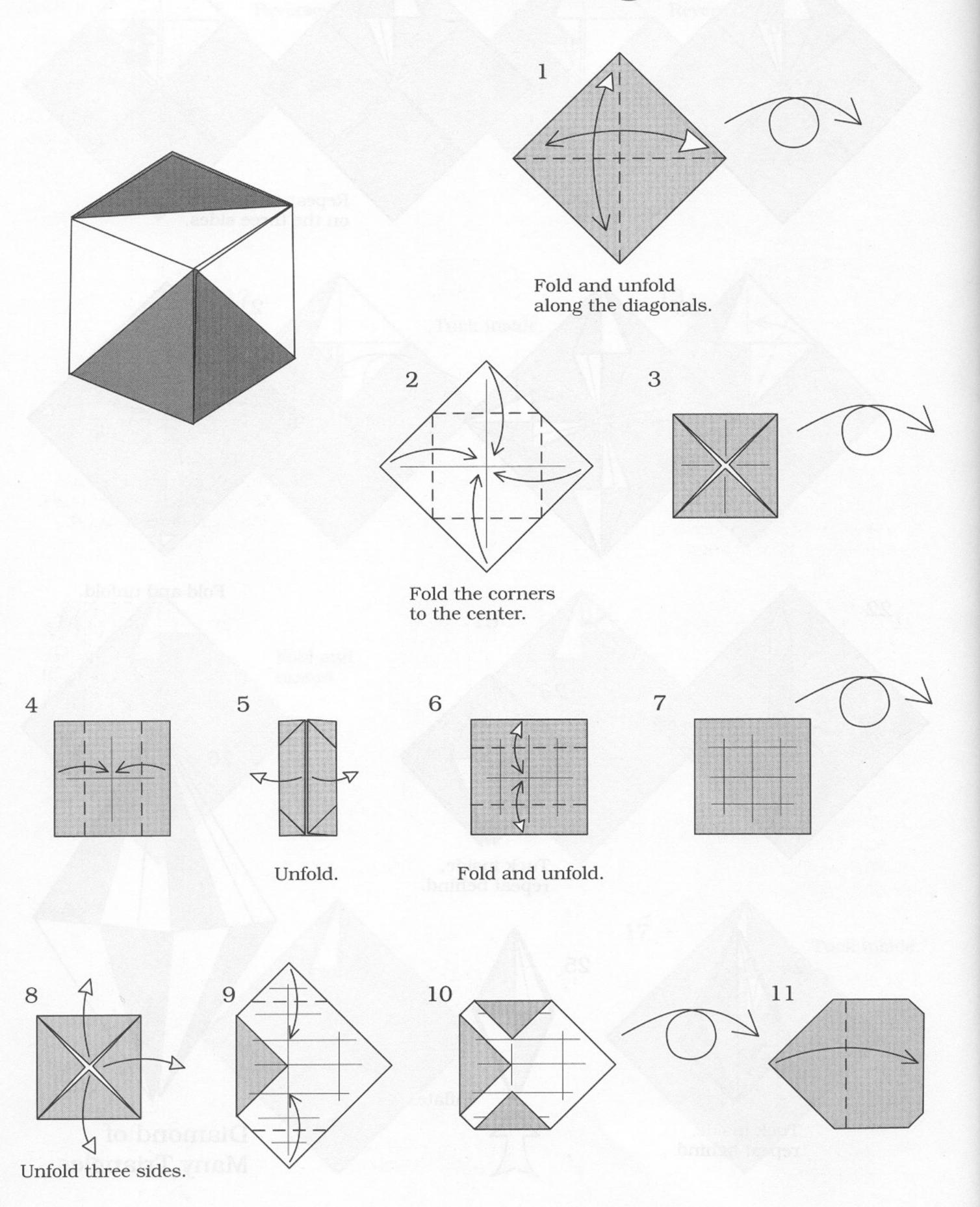
# Diamond of Many Triangles

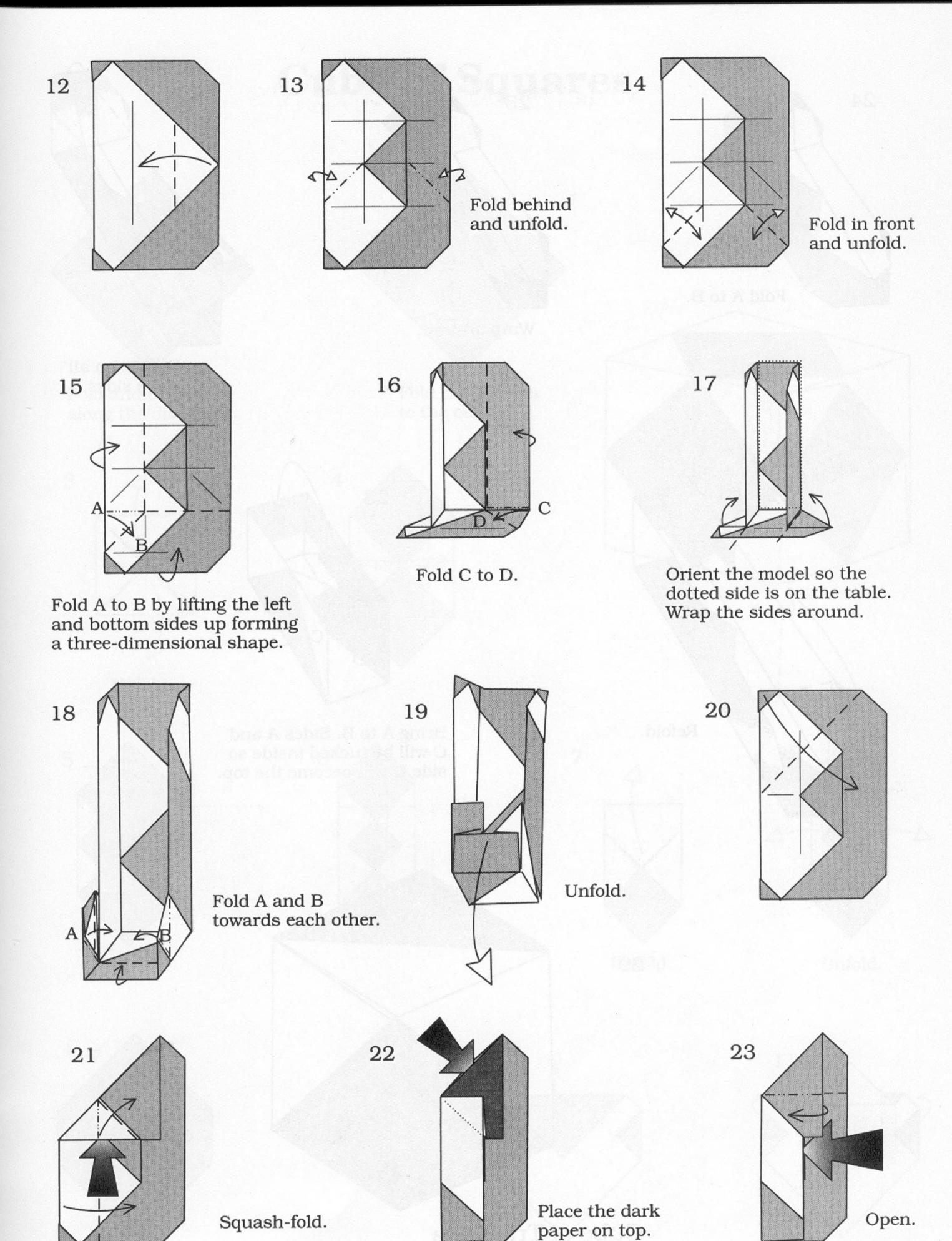


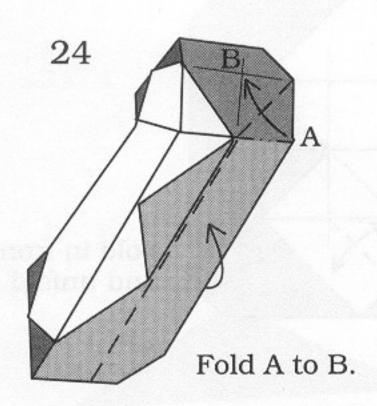


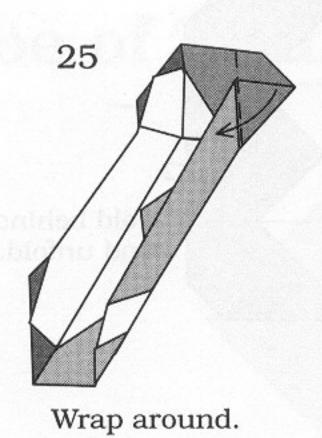


# **Cube of Triangles**



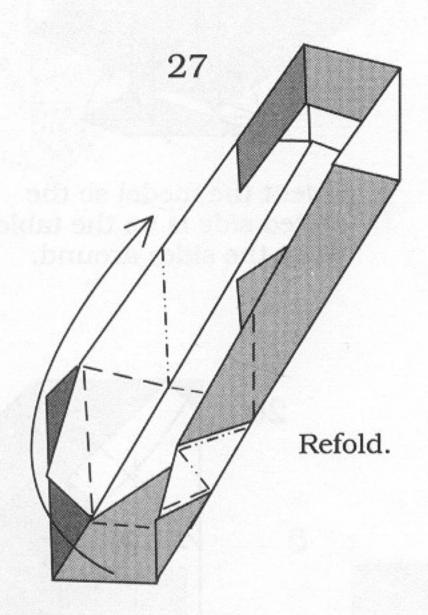


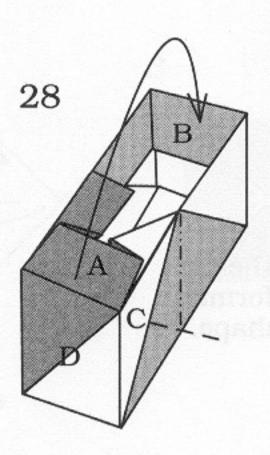




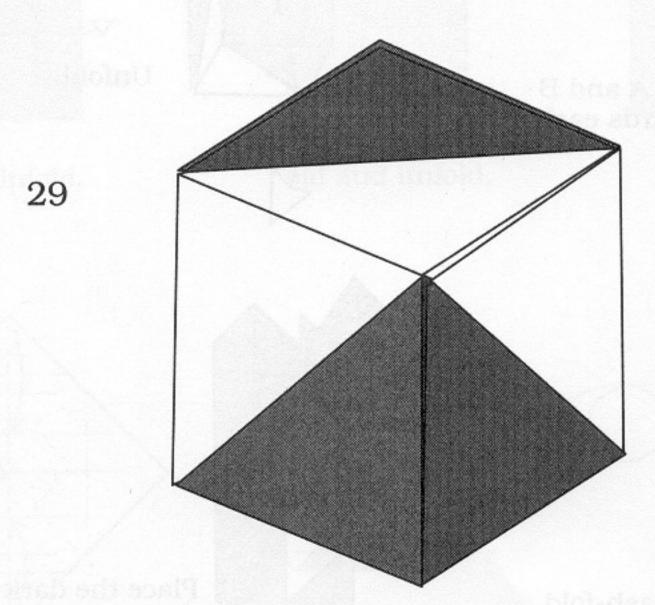
26

Fold in on all three sides.



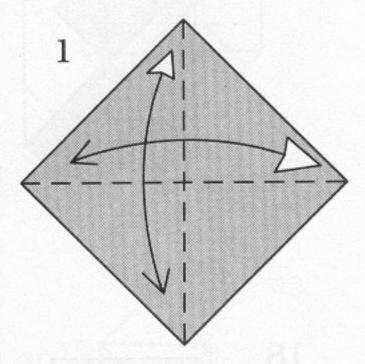


Bring A to B. Sides A and C will be tucked inside so side D will become the top.

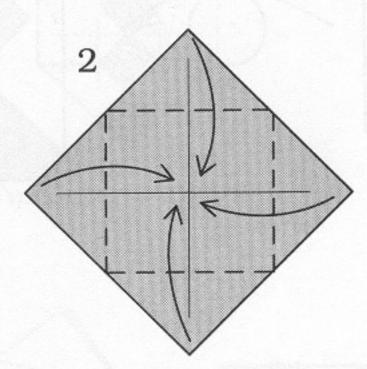


Cube of Triangles

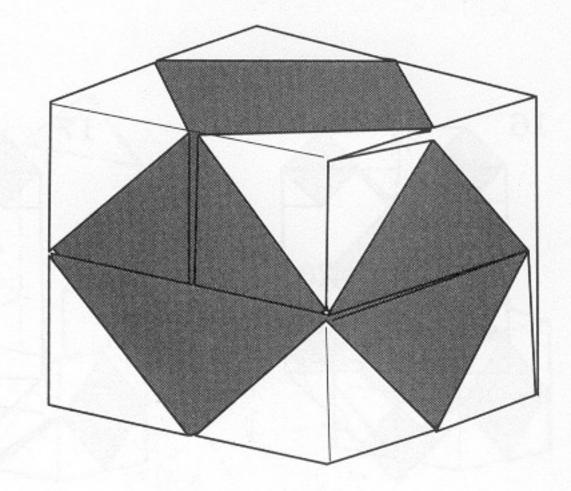
# Cube of Squares



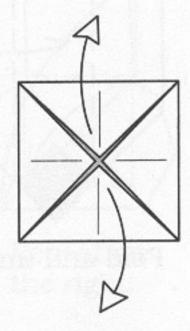
Fold and unfold along the diagonals.



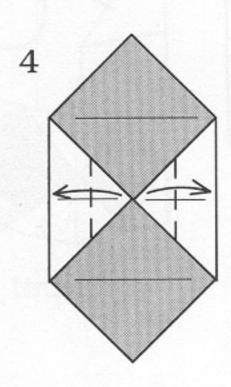
Fold the corners to the center.

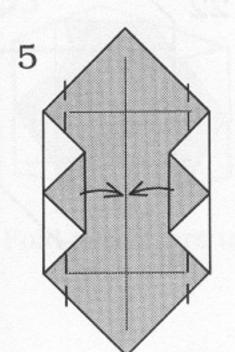


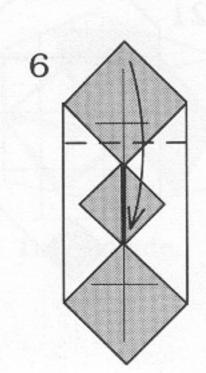
3

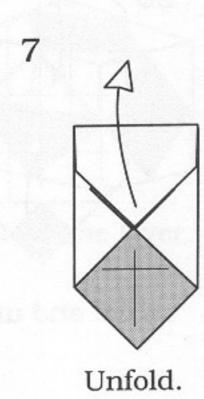


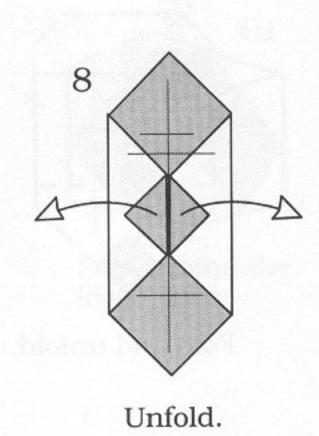
Unfold.

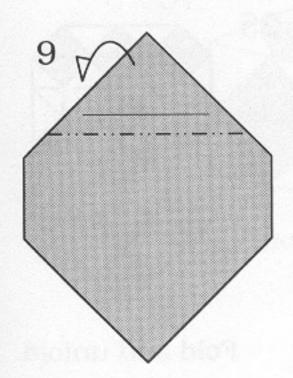


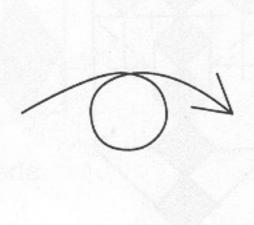


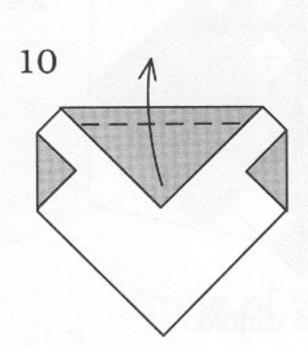


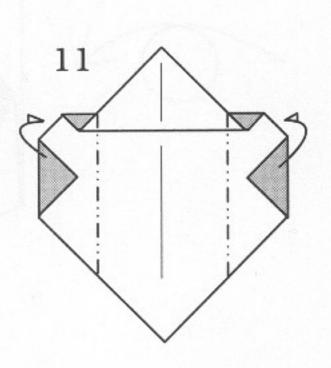


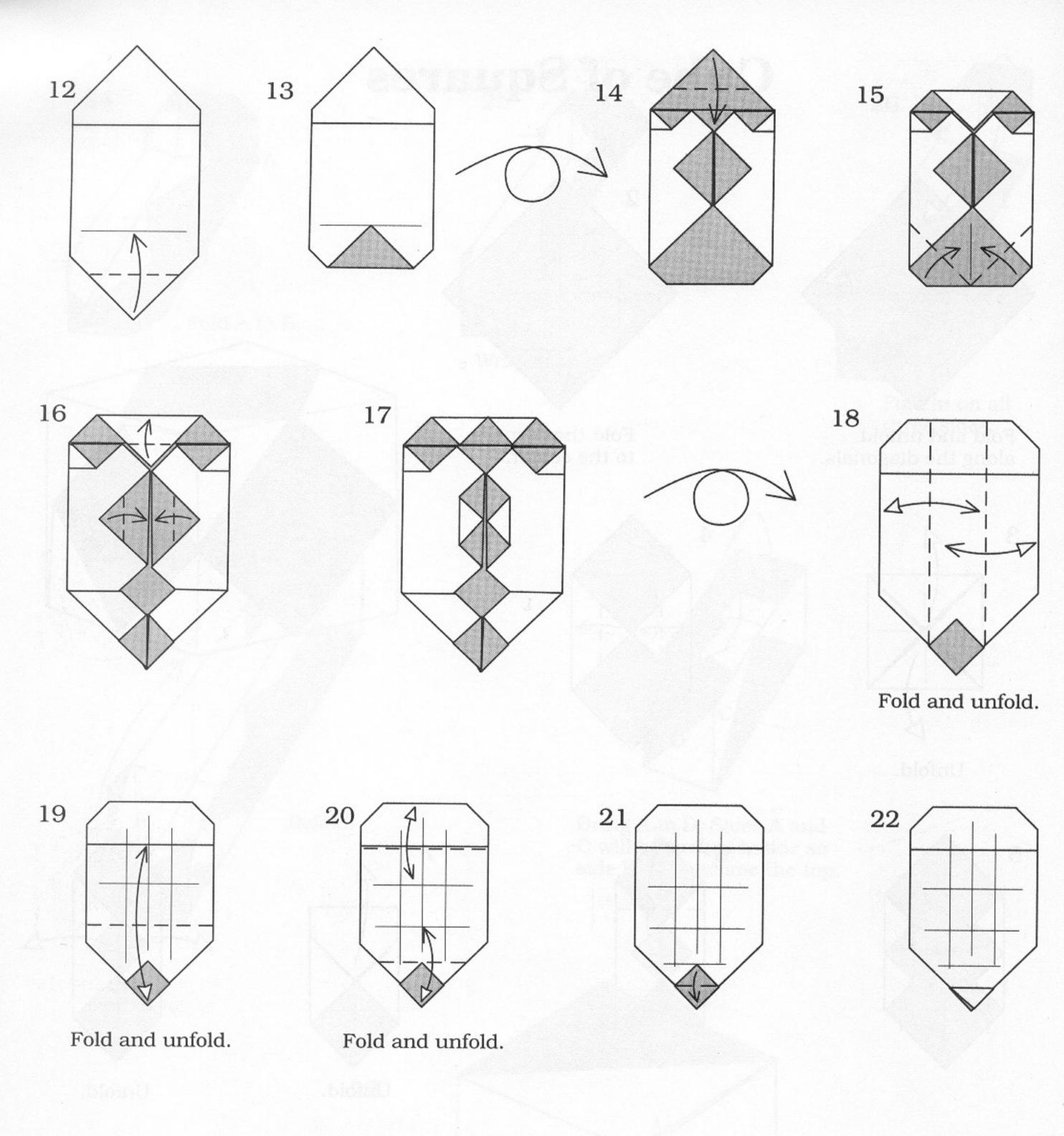


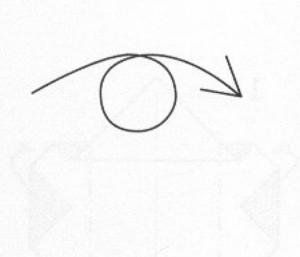






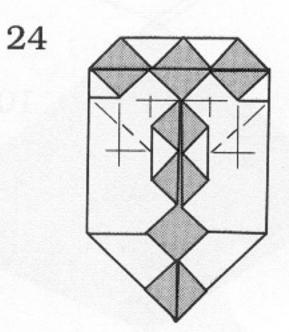




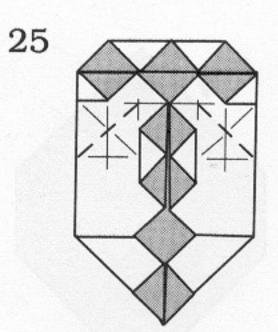


23

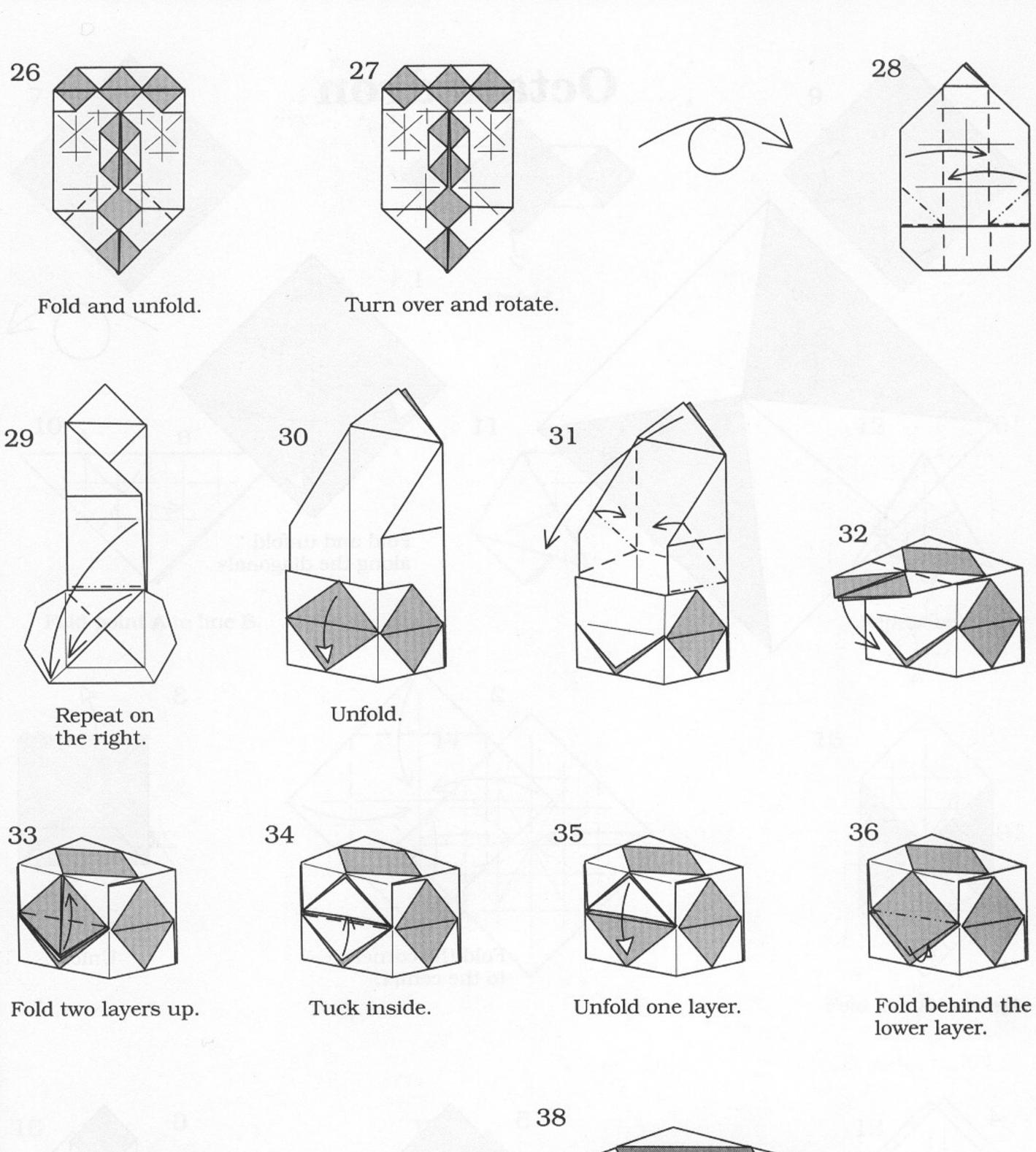
Fold and unfold.

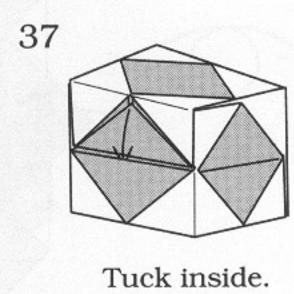


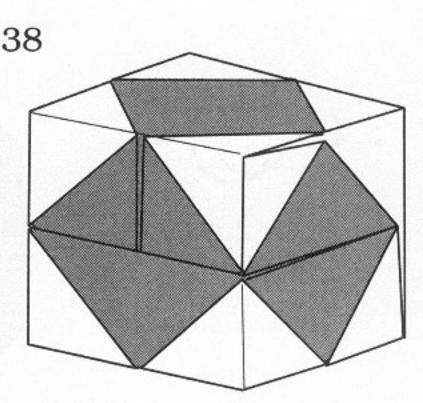
Fold and unfold.



Fold and unfold.

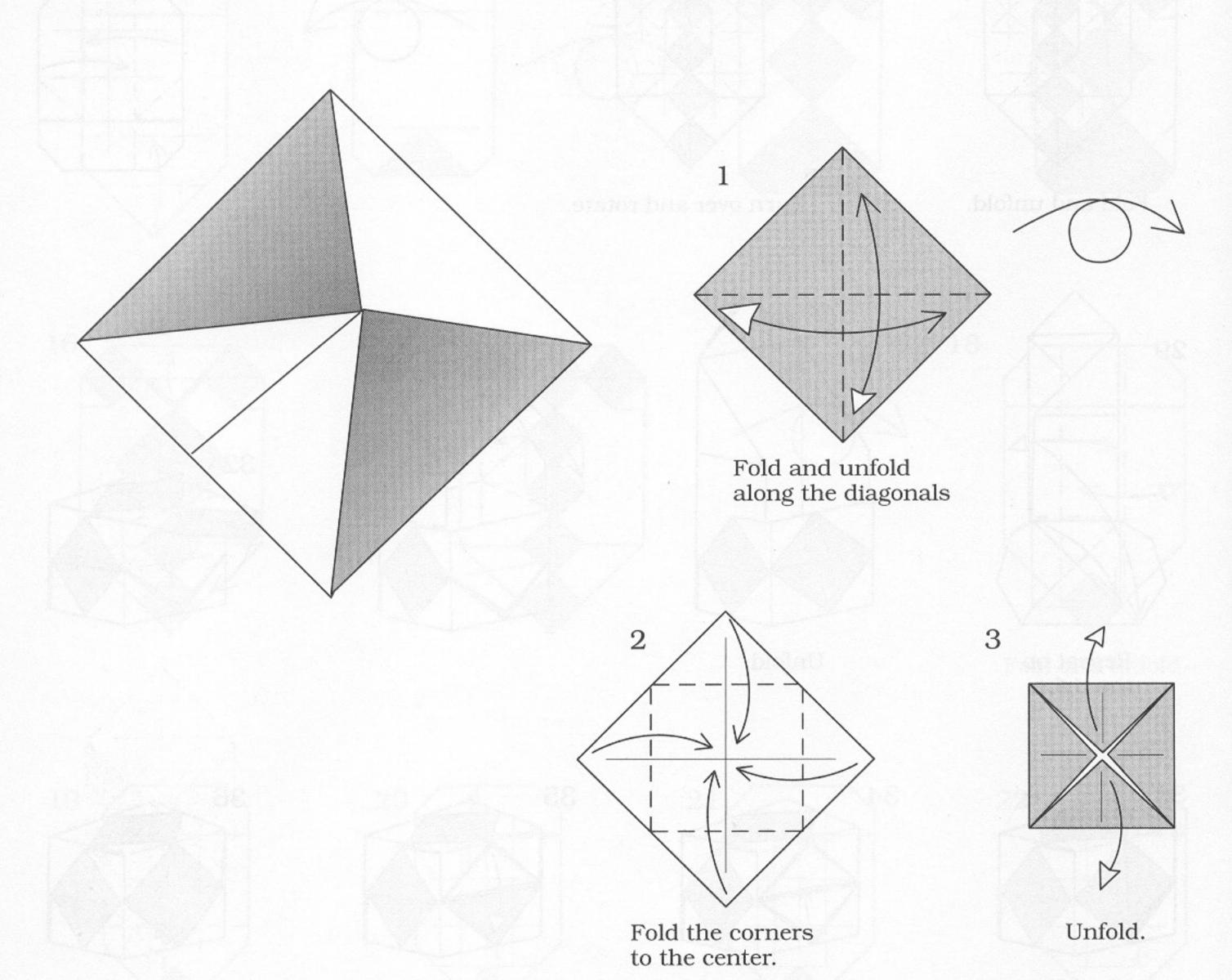


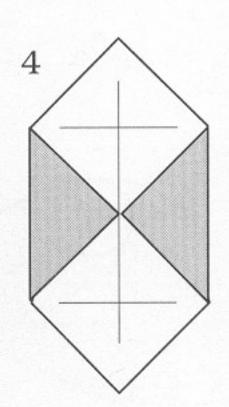


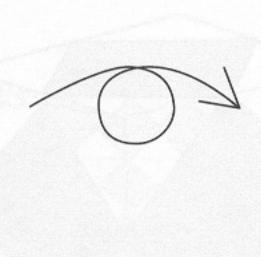


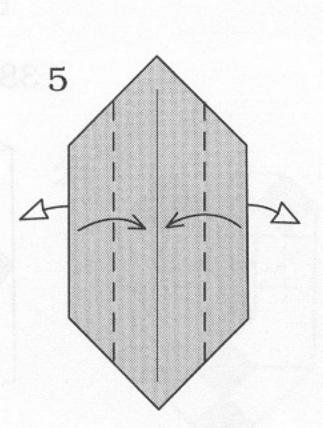
Cube of Squares

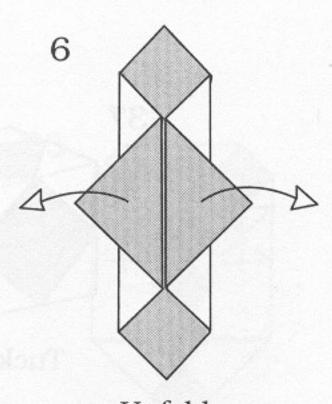
# Octahedron



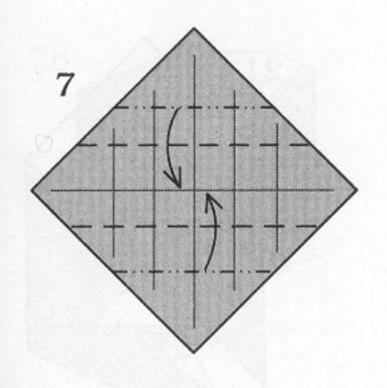


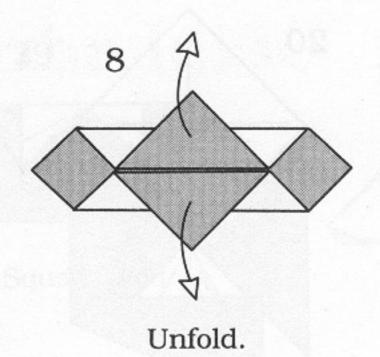


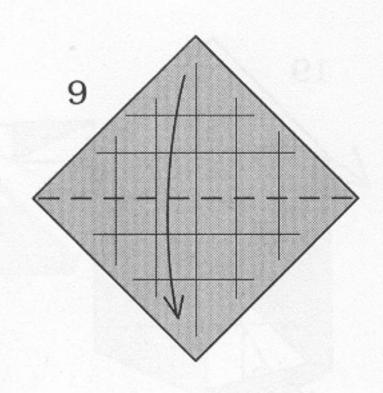


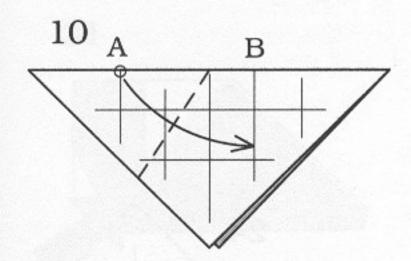


Unfold.

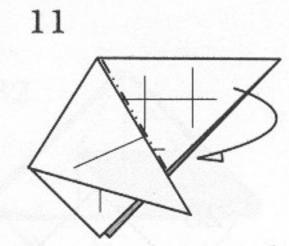




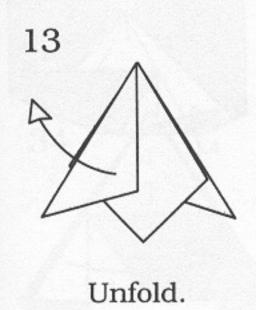


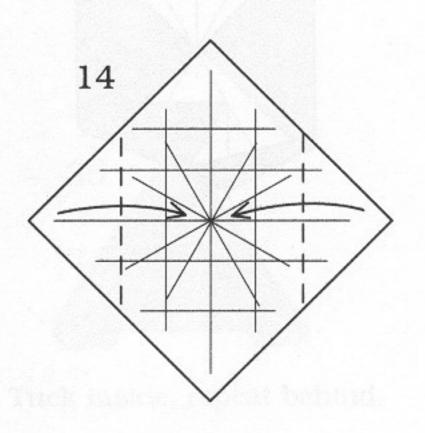


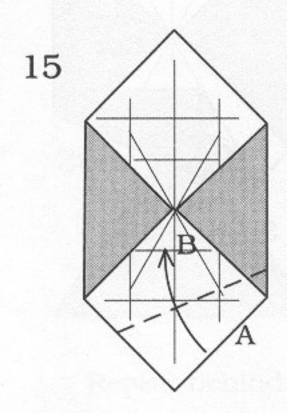
Fold point A to line B.



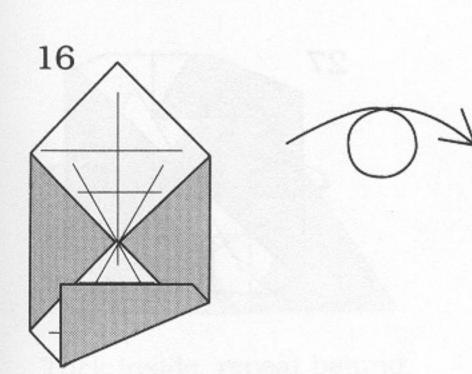
Repeat behind.

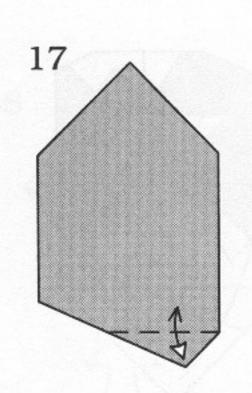




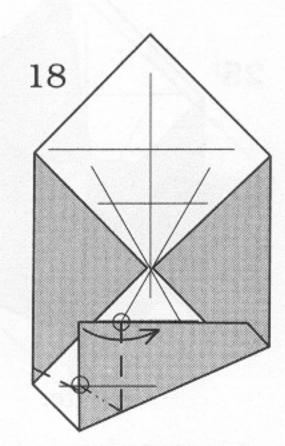


Fold line A to line B.

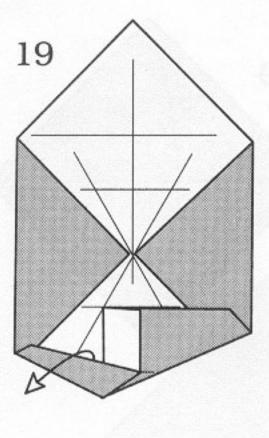




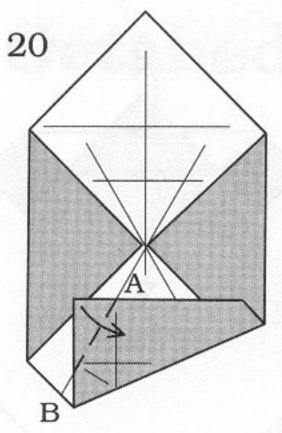
Fold up and unfold along the crease.



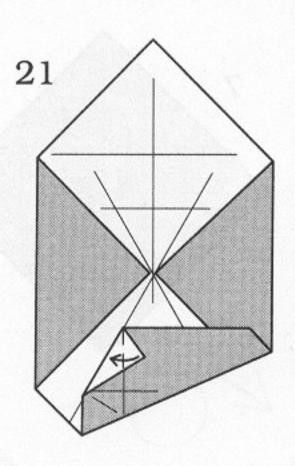
Squash-fold.



Unfold.

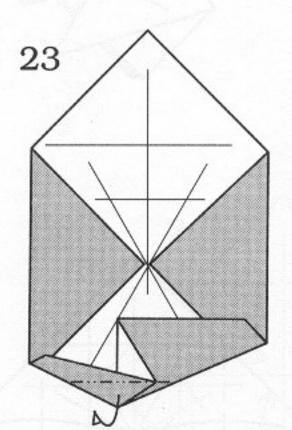


Fold along line A–B.

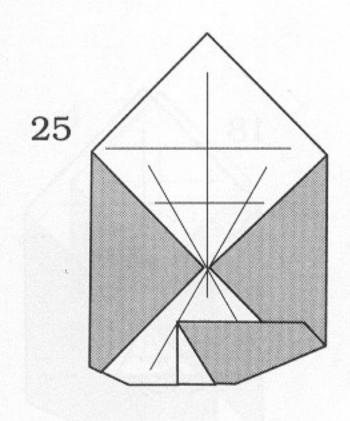


22

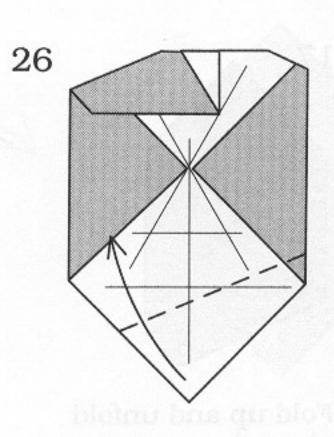
Squash-fold.



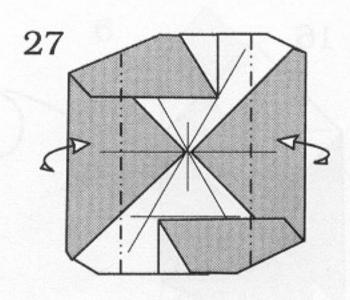
24

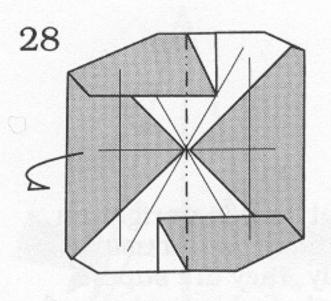


Rotate.

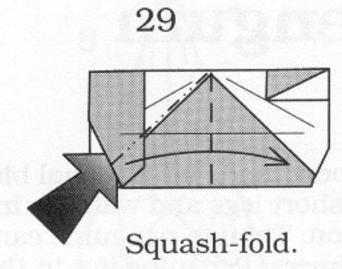


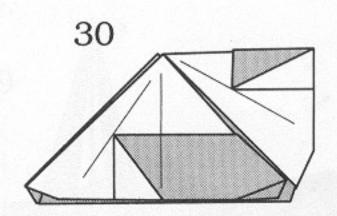
Repeat steps 15-24.

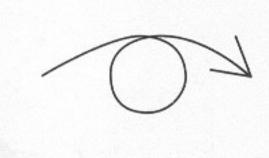




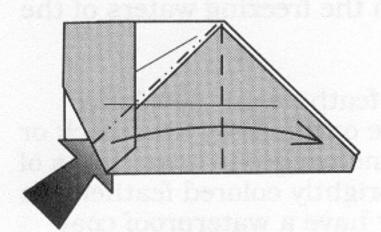
Rotate.



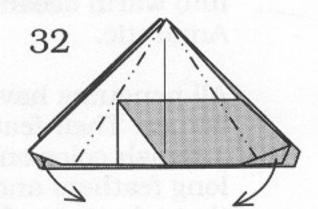




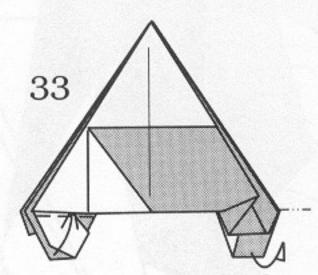




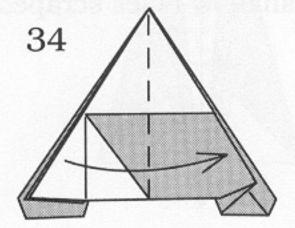
Squash-fold.



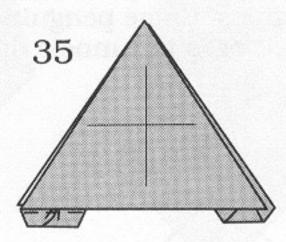
Reverse-folds, repeat behind.



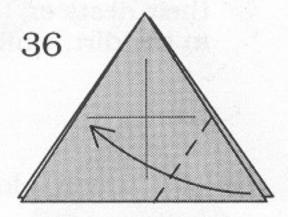
Tuck inside, repeat behind.



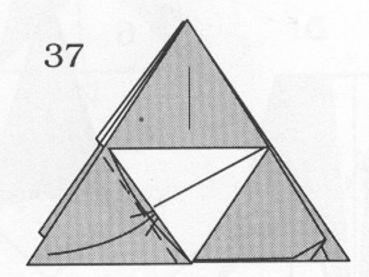
Repeat behind.



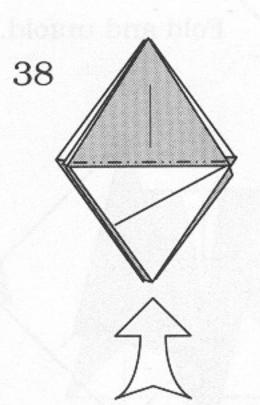
Tuck inside, repeat behind.



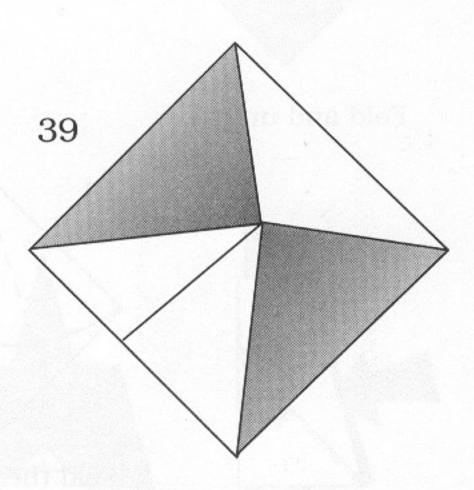
Repeat behind.



Tuck inside, repeat behind.

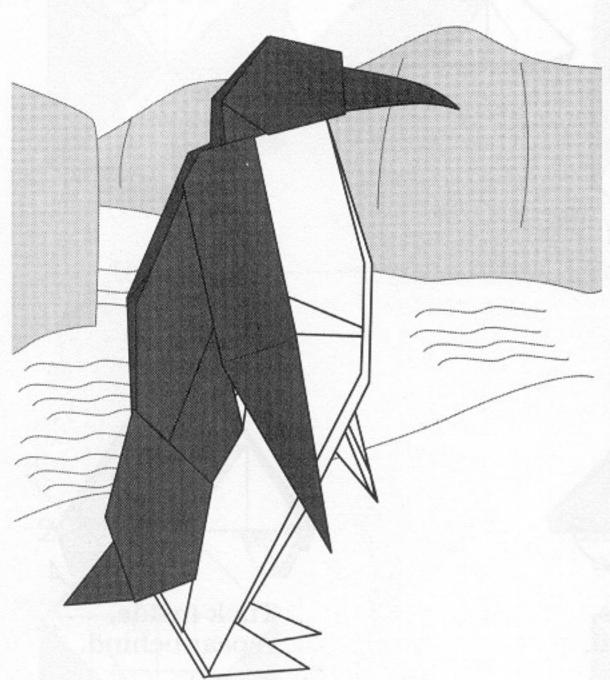


Blow into the bottom.



Octahedron

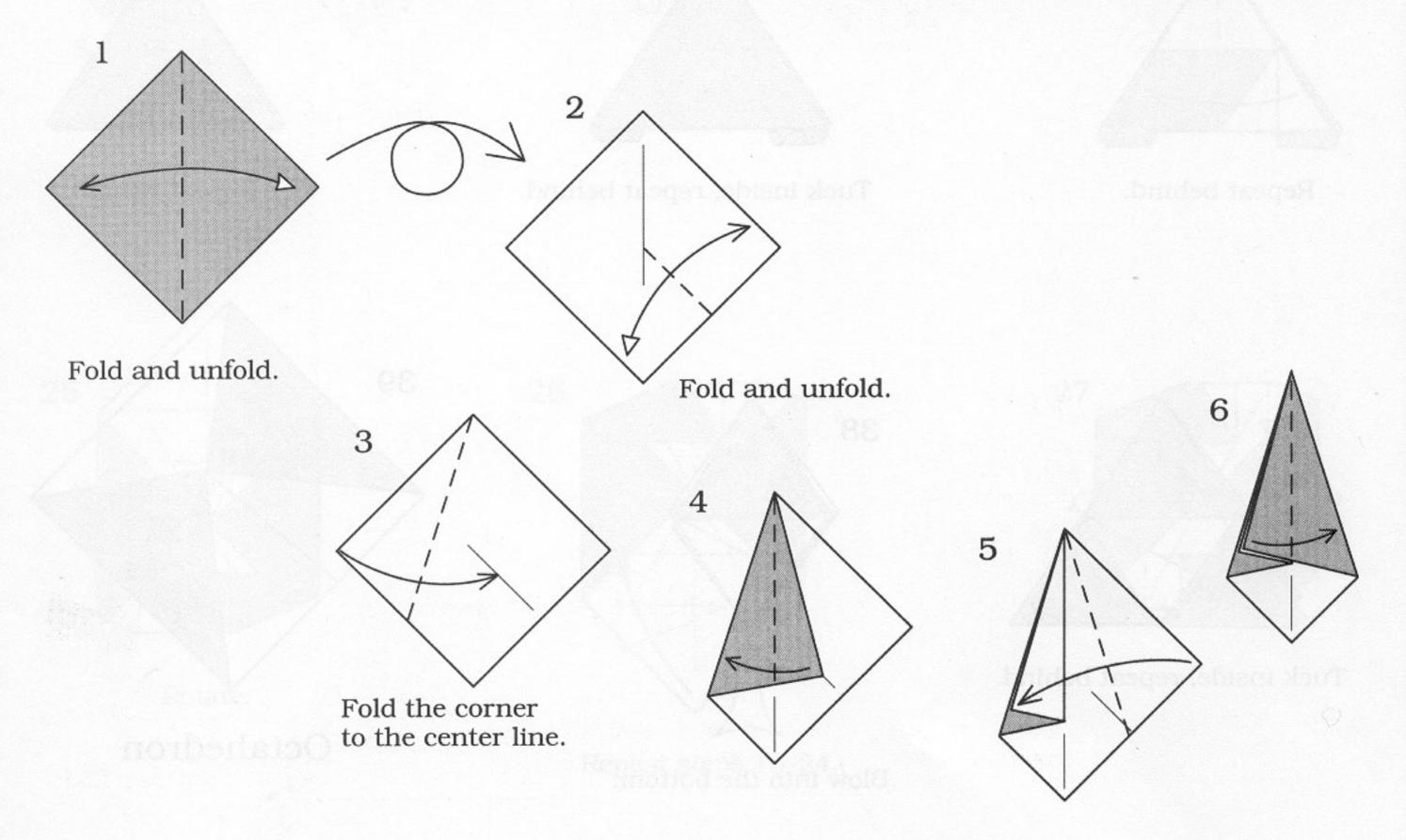
## Penguin

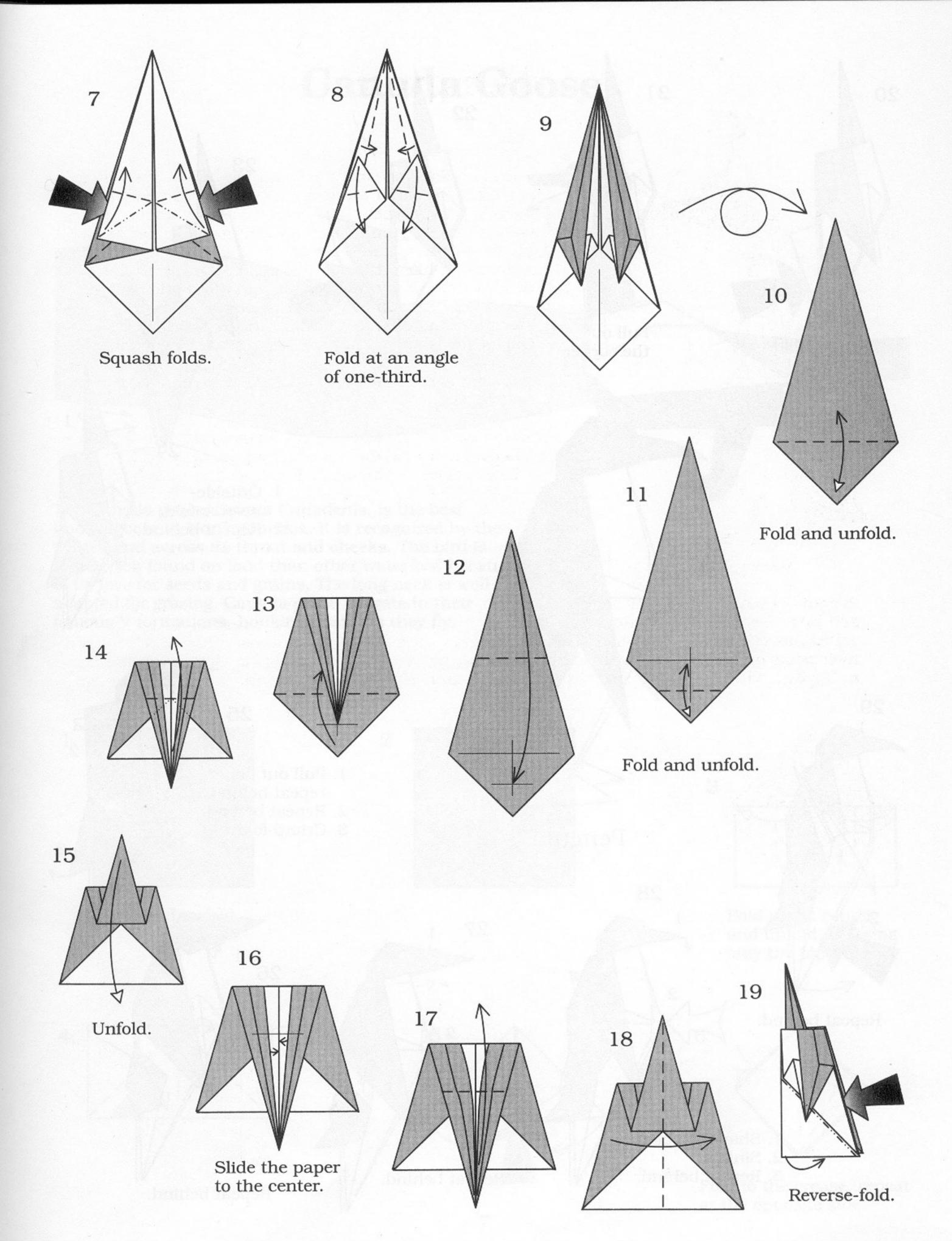


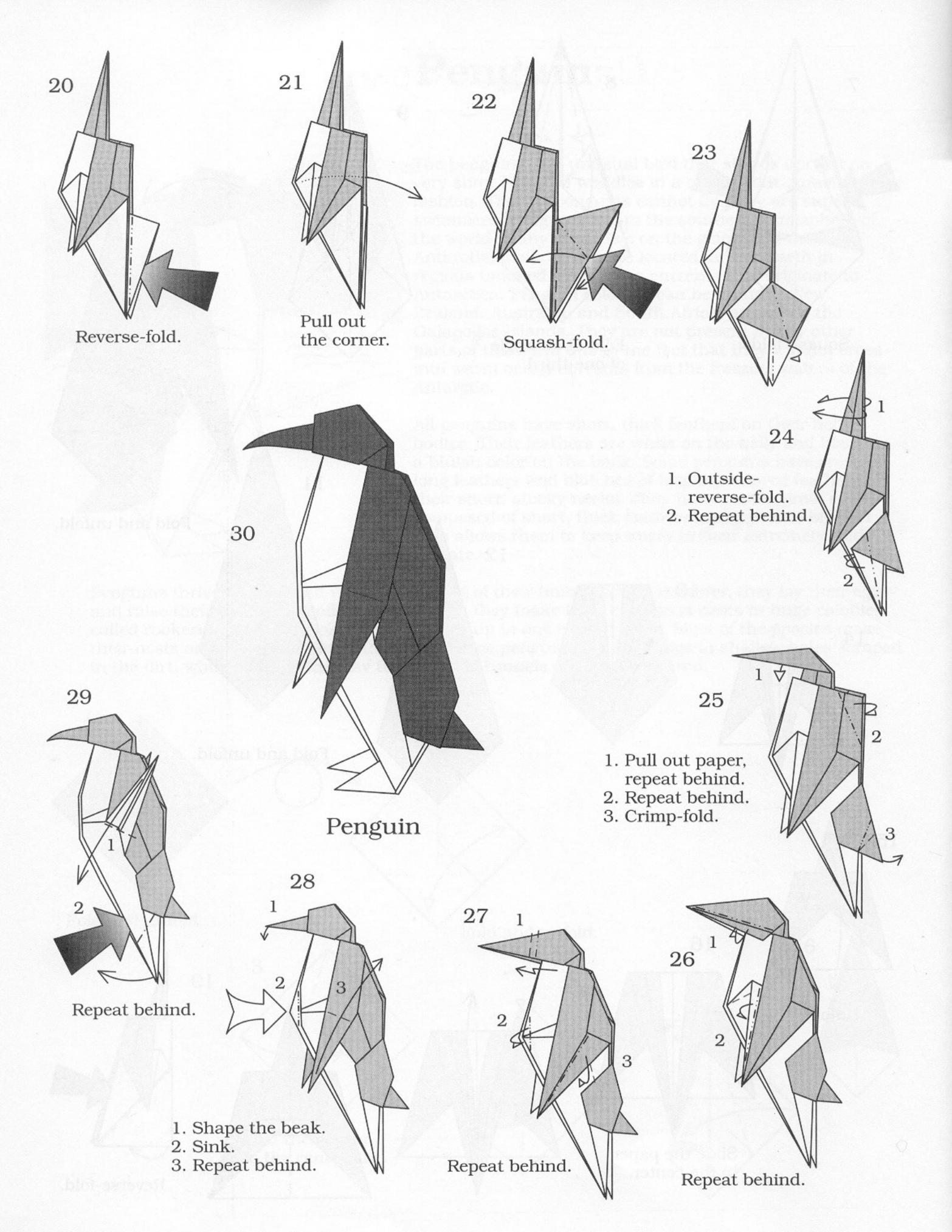
The penguin is an unusual bird that stands upright on very short legs and waddles in a clumsy but amusing fashion. Though penguins cannot fly, they are superb swimmers. Penguins live in the southern hemisphere of the world. Many kinds live on the glaciers of the Antarctic, while others are located farther north in regions touched by cold sea currents that originate in Antarctica. Penguin colonies can be found in New Zealand, Australia, and South Africa, as well as the Galapogos Islands. They are not present in any other parts of the world due to the fact that they will not cross into warm ocean currents from the freezing waters of the Antarctic.

All penguins have short, thick feathers on their hefty bodies. Their feathers are white on the belly and black or a bluish color on the back. Some penguins have crests of long feathers and blotches of brightly colored feathers on their short, stocky necks. They have a waterproof coat composed of short, thick feathers and layers of blubber. This allows them to keep warm in their extremely cold climate.

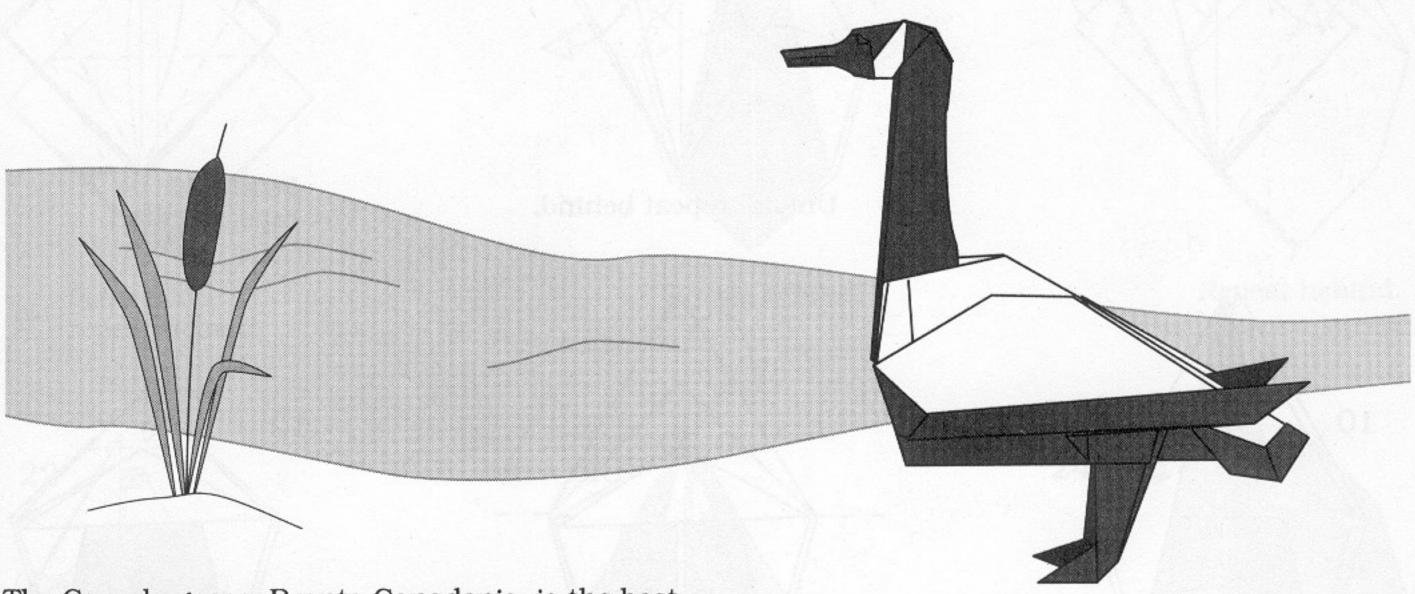
Penguins thrive on fish, and they spend most of their time in water. However, they lay their eggs and raise their young on land. While on land, they make their enormous nests in huge colonies called rookeries. A single rookery can contain up to one million birds. Most of the species make their nests on bare ground or in the grass. Some penguins lay their eggs in shallow holes scraped in the dirt, while a few species lay their eggs in tunnels dug in the ground.



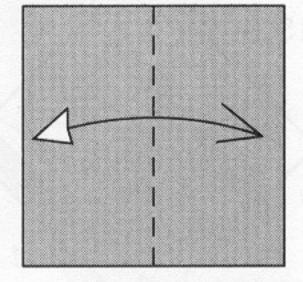




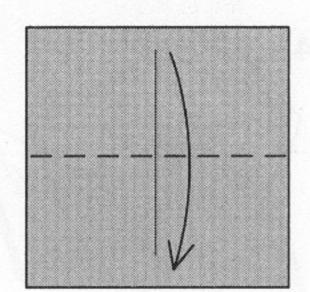
### Canada Goose



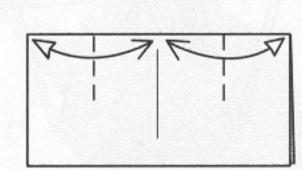
The Canada goose, Branta Canadenis, is the best known goose in North America. It is recognized by the white band across its throat and cheeks. The bird is more often found on land than other waterfowl because of its love for seeds and grains. The long neck is well adapted for grazing. Canada geese migrate in their famous V formations, honking nosily as they fly.



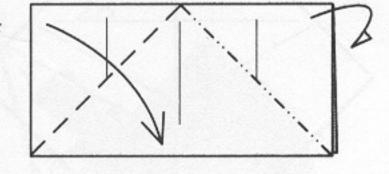
Fold and unfold.



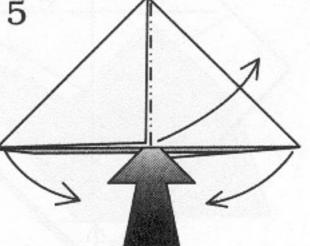
3



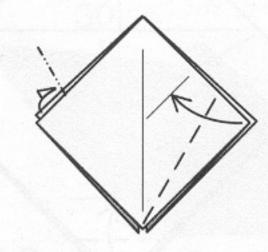
Fold to the center and unfold, creasing only the top half.



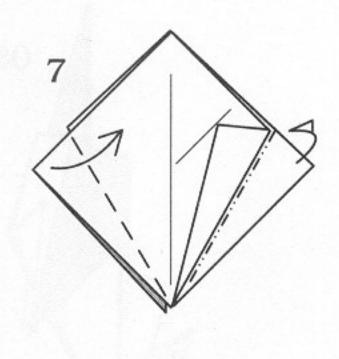
5

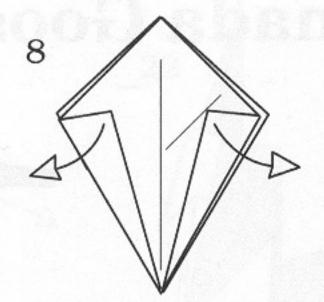


6



Fold to the crease, repeat at the opposite side.

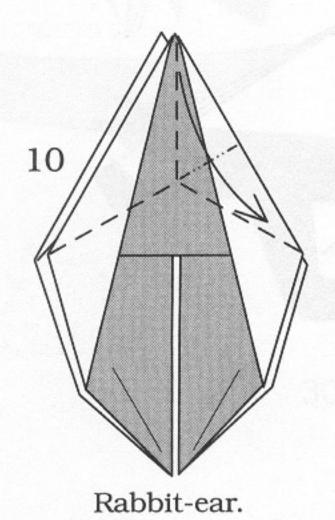


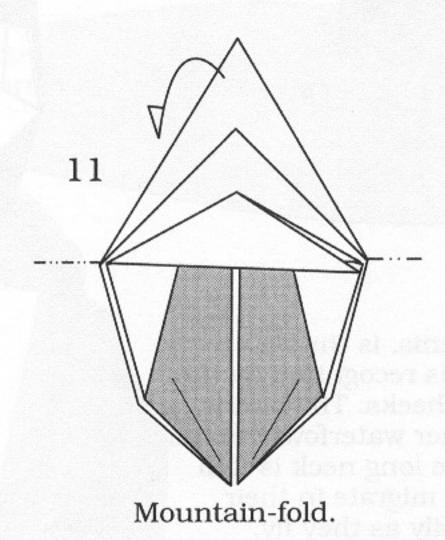


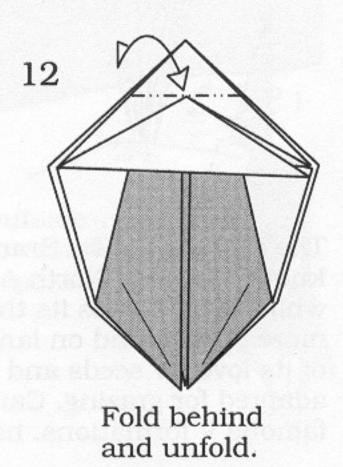
9

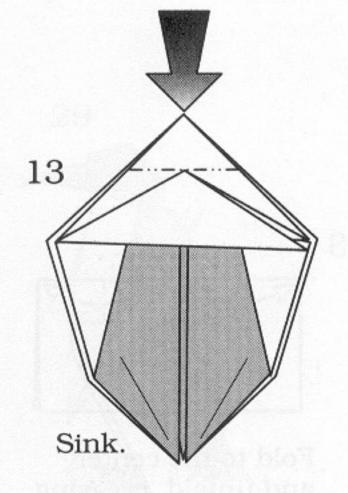
Unfold, repeat behind.

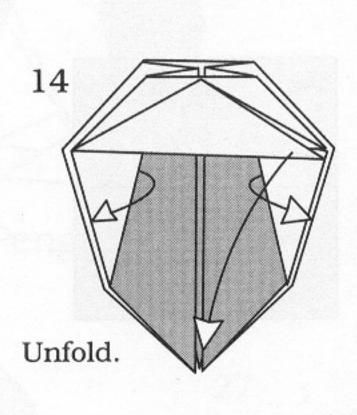
Petal-fold, repeat behind.

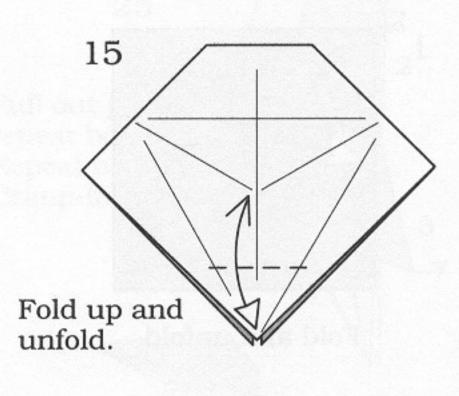


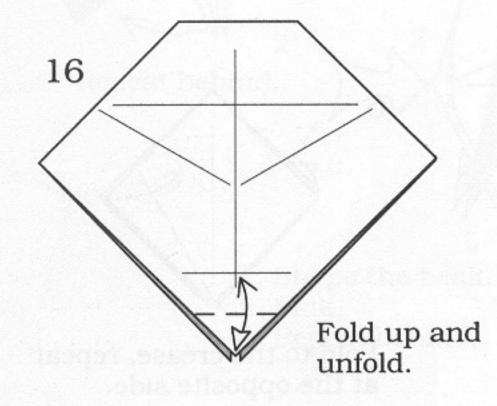


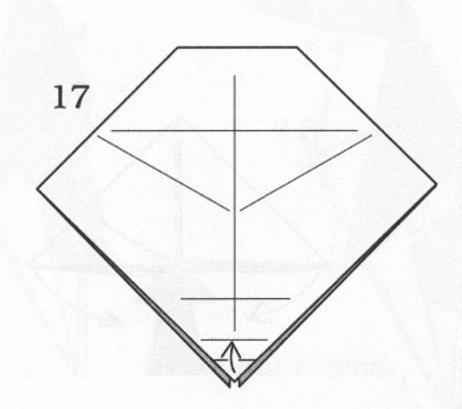


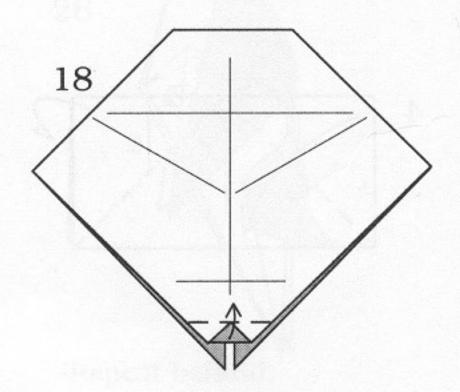


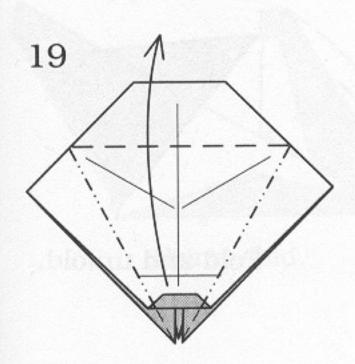




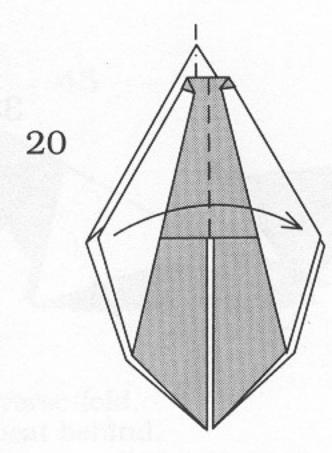




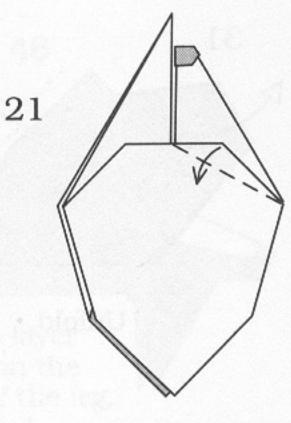




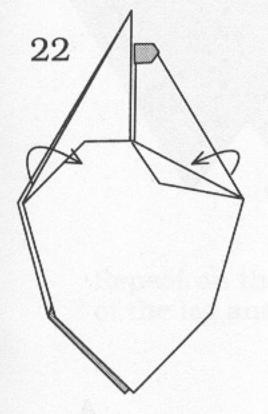
Petal-fold, repeat behind.



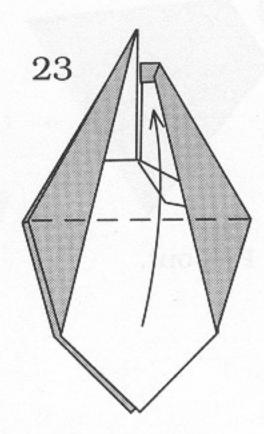
Repeat behind.



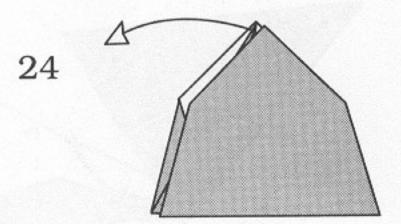
Repeat behind.



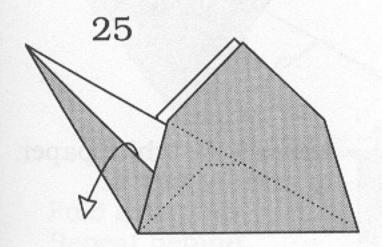
Fold inside-out, repeat behind.



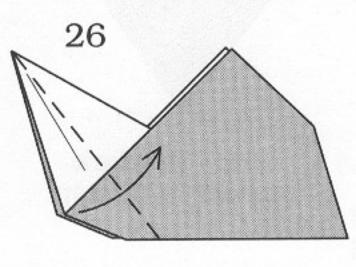
Repeat behind.



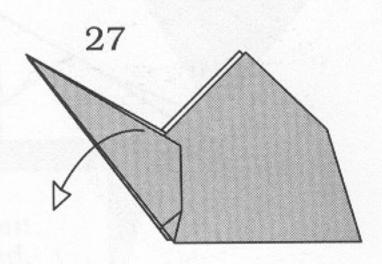
Pull out.



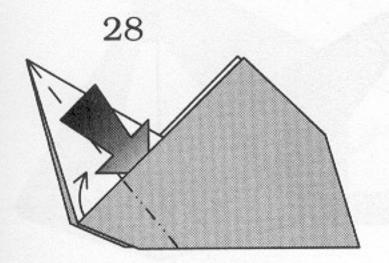
Pull out, repeat behind.



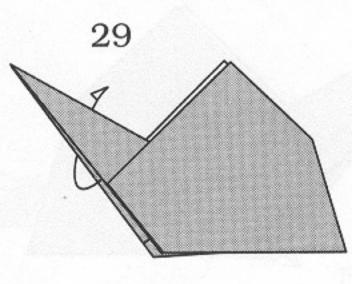
Repeat behind.



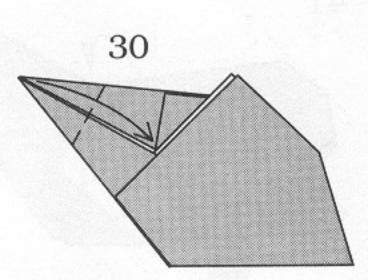
Unfold, repeat behind.



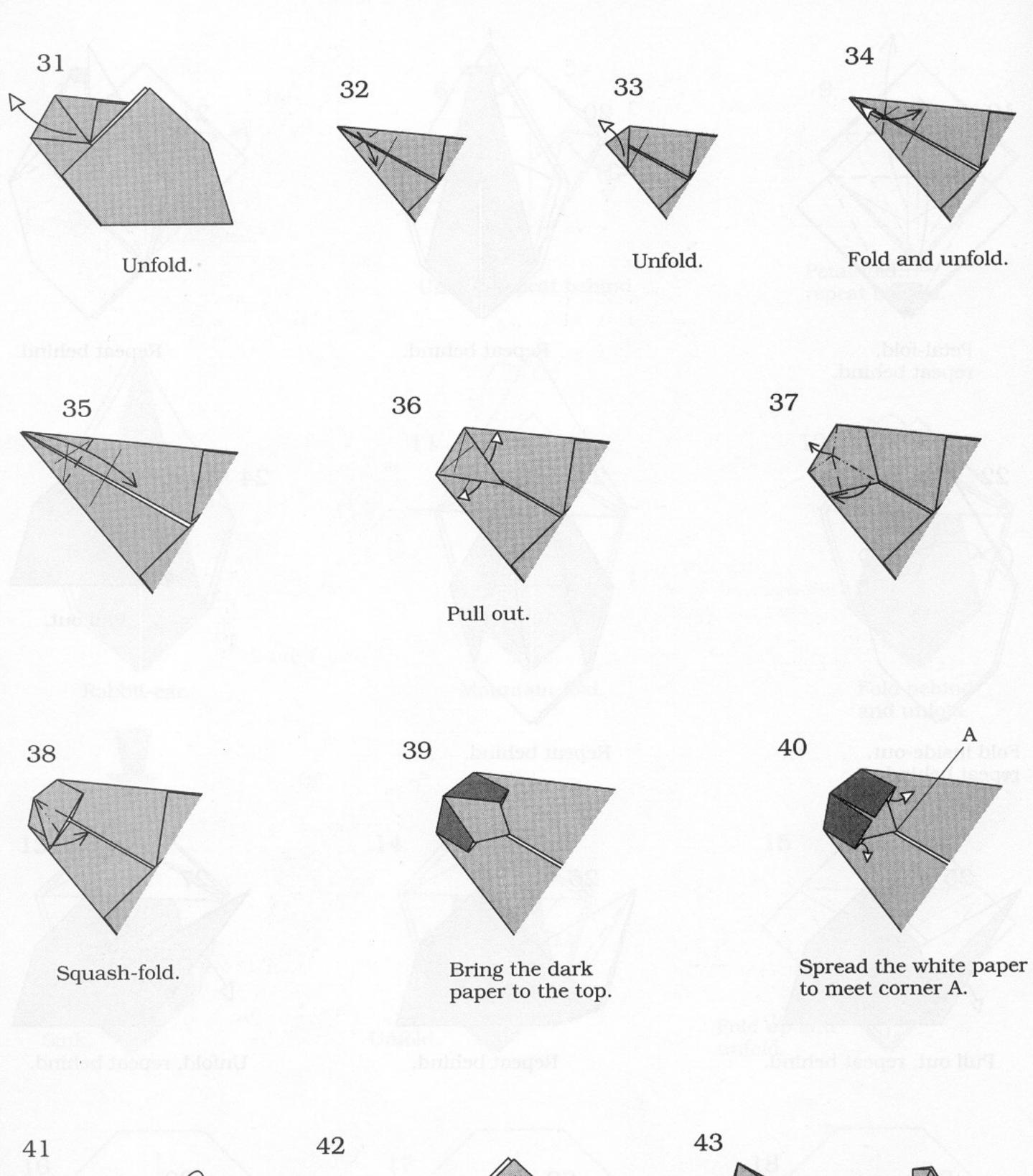
Reverse-fold, repeat behind.

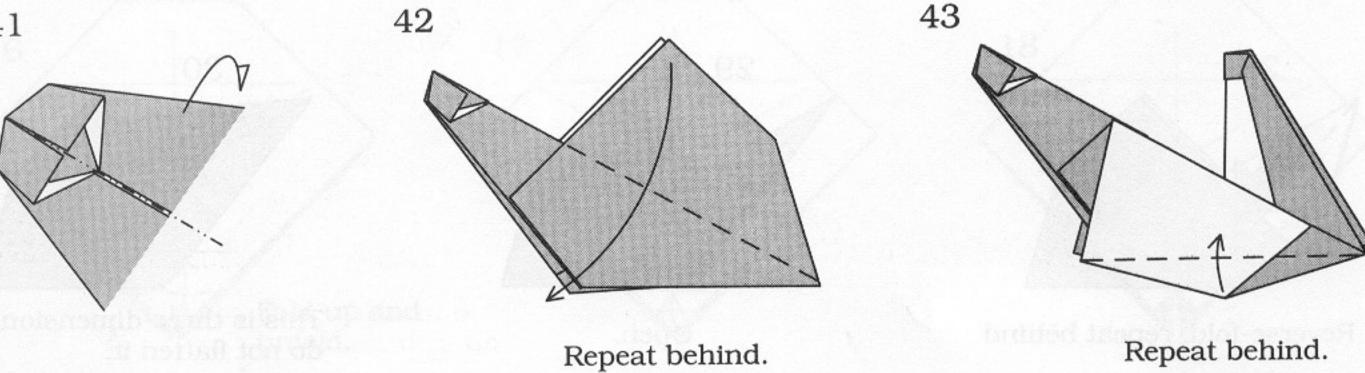


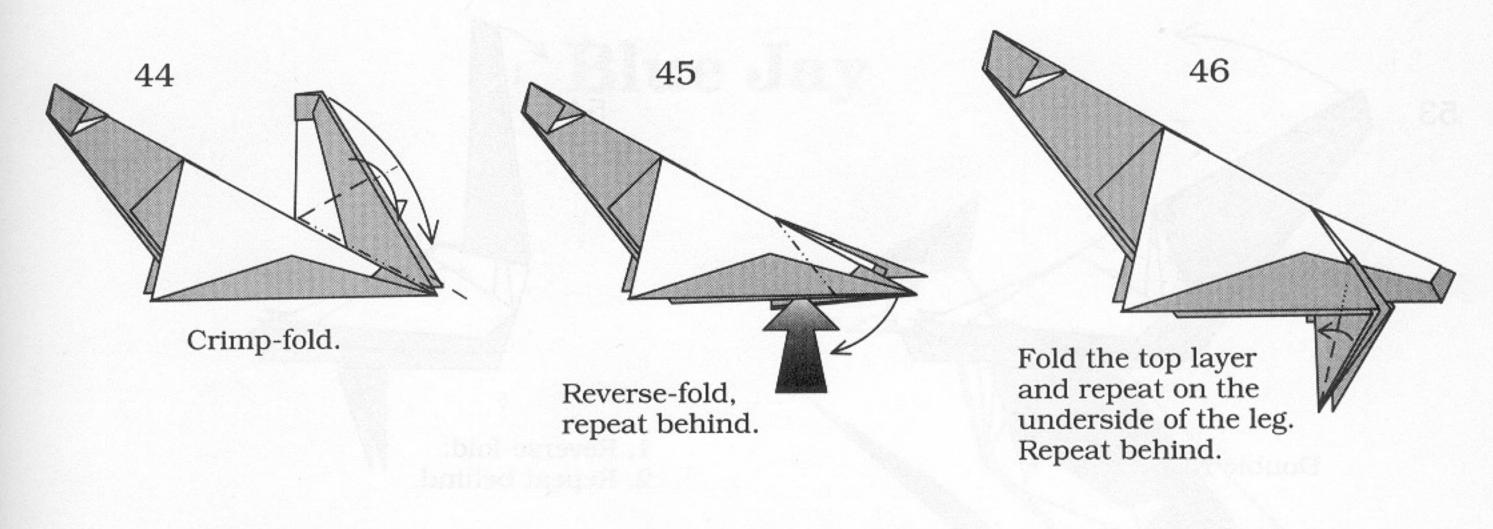
Open.

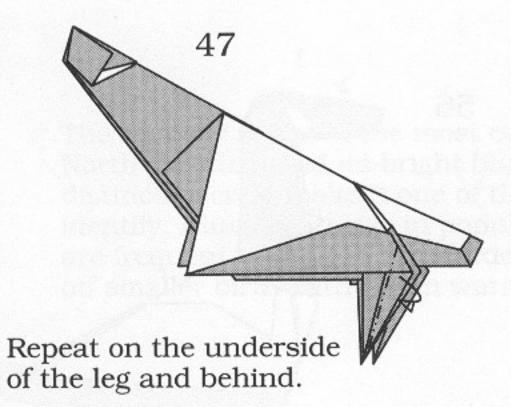


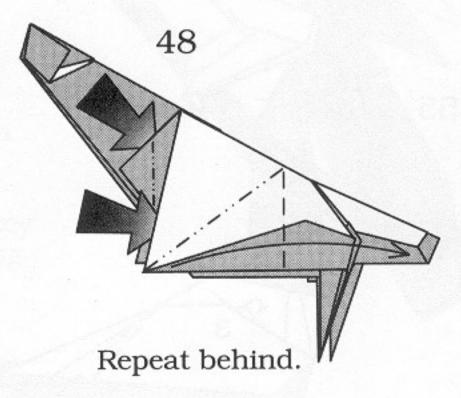
This is three-dimensional, do not flatten it.

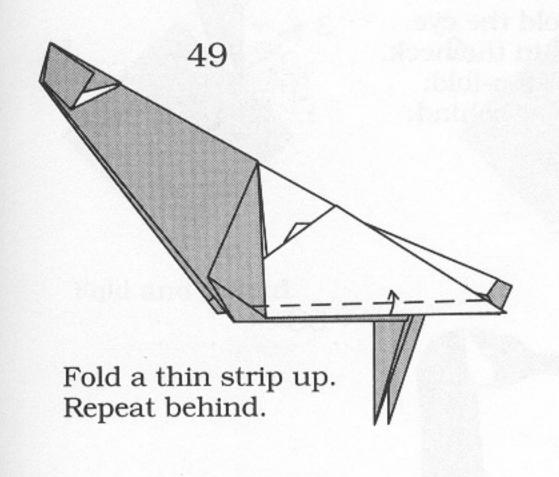


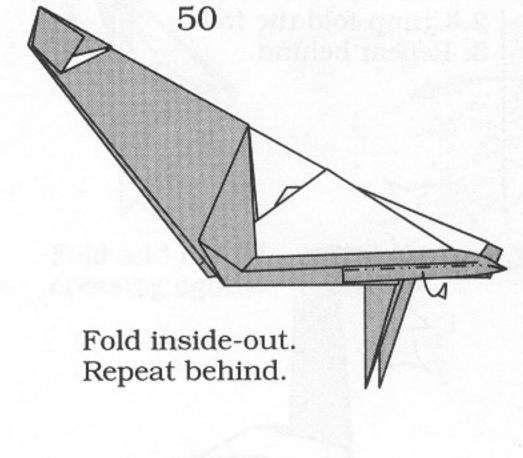


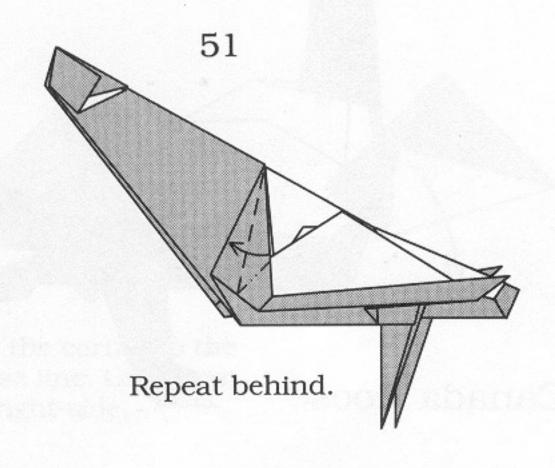


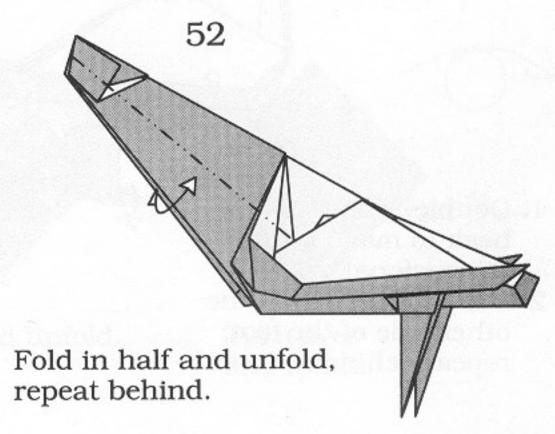


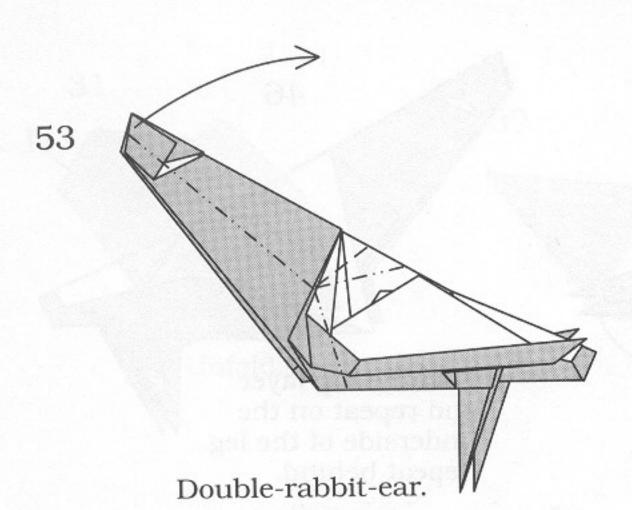


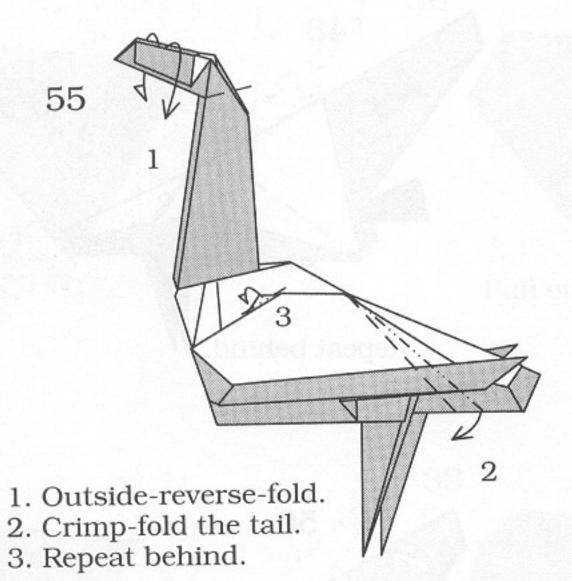


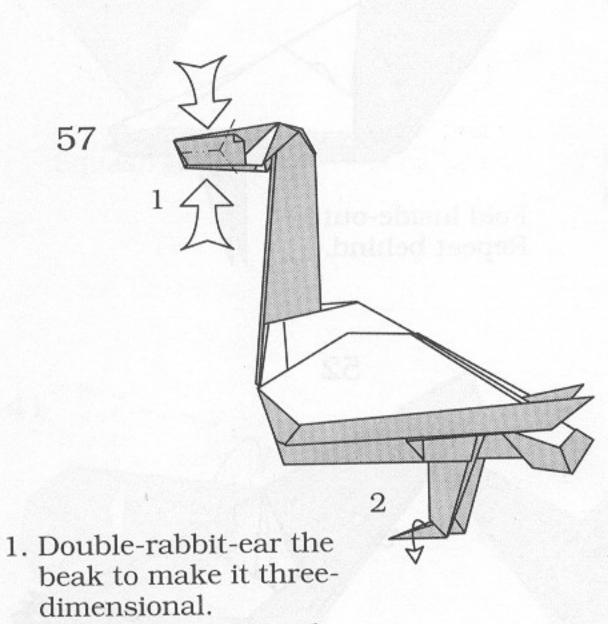




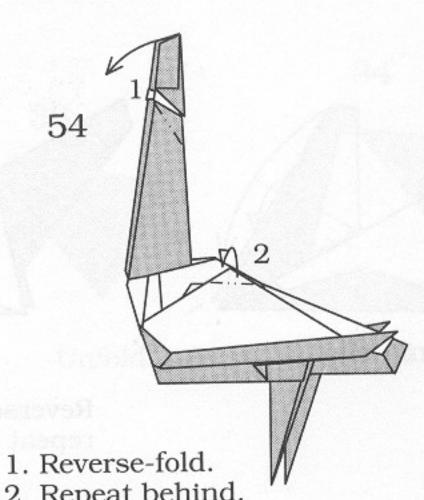




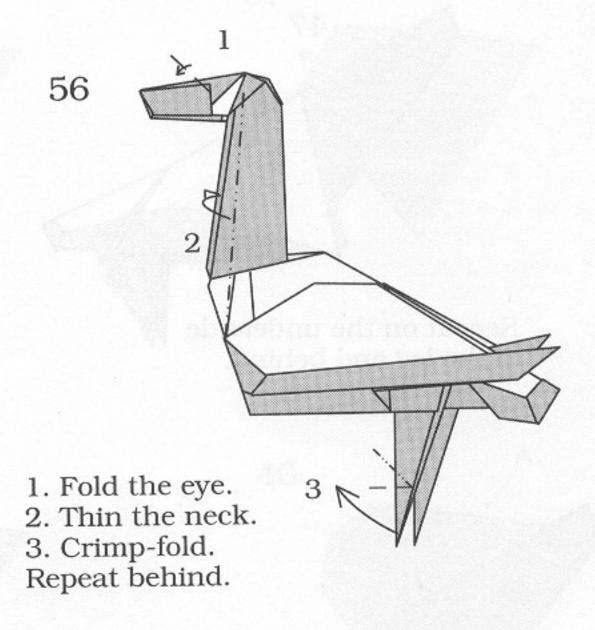


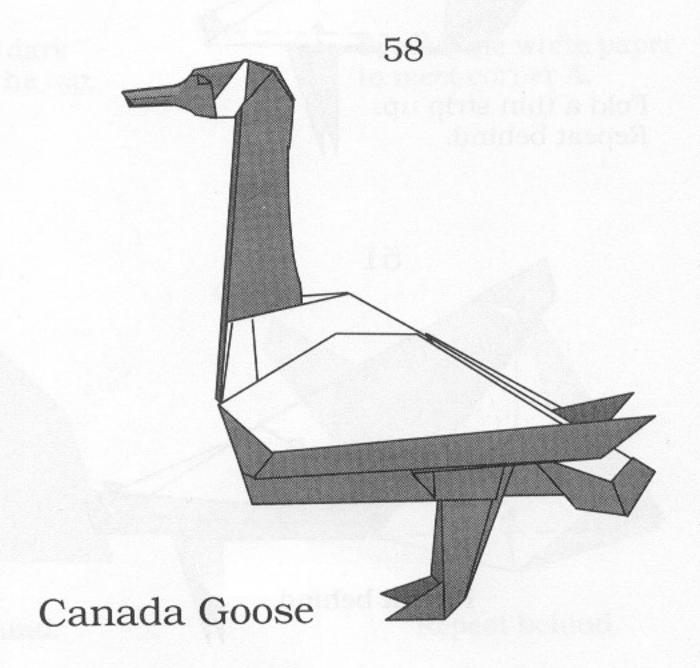


2. Pull out, repeat on the other side of the foot, repeat behind.



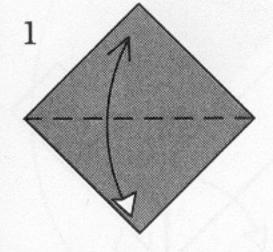
2. Repeat behind.



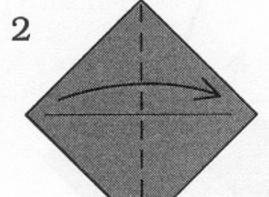


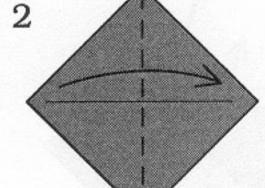
# Blue Jay

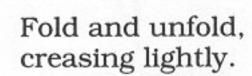
The blue jay is one of the most common birds in North America, and its bright blue color and distinctive crest make it one of the easiest to identify. Blue jays thrive in populated areas. They are frequent visitors to bird feeders, often driving off smaller birds with harsh warning calls.

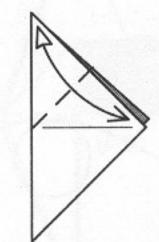


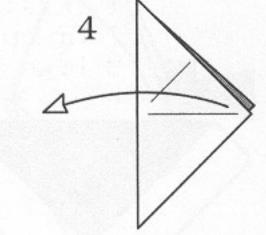
Fold and unfold.

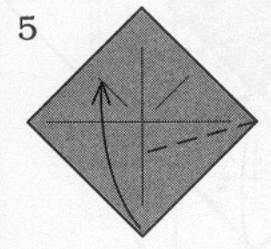




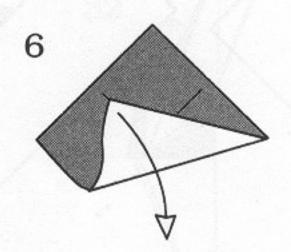




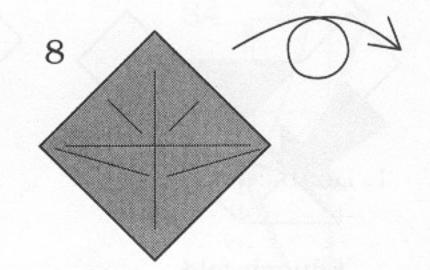




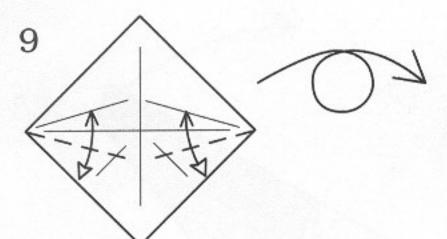
Fold the corner to the crease line. Crease on the right side.



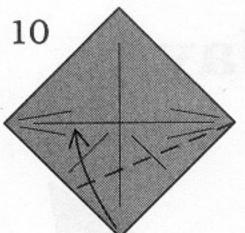
Fold up and unfold.



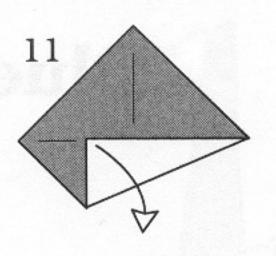
Turn over and rotate.



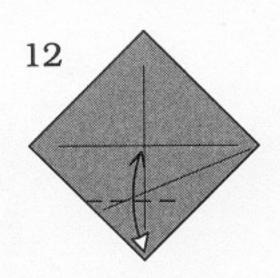
Fold up to the crease line and unfold.



Crease lightly.

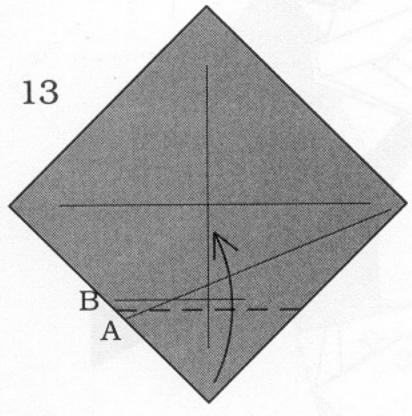


Unfold.

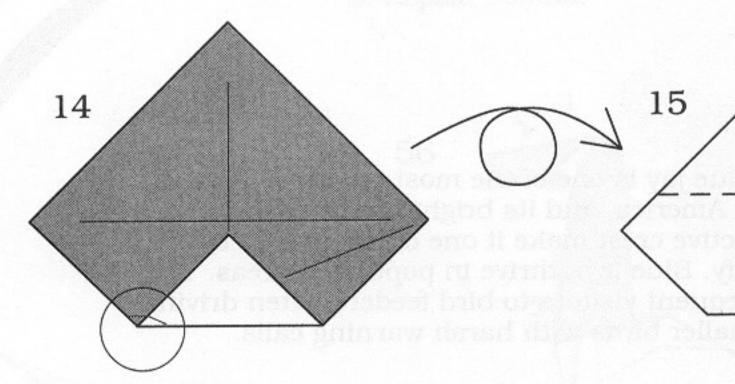


Fold up to the center and unfold. Crease lightly and only on the left side.

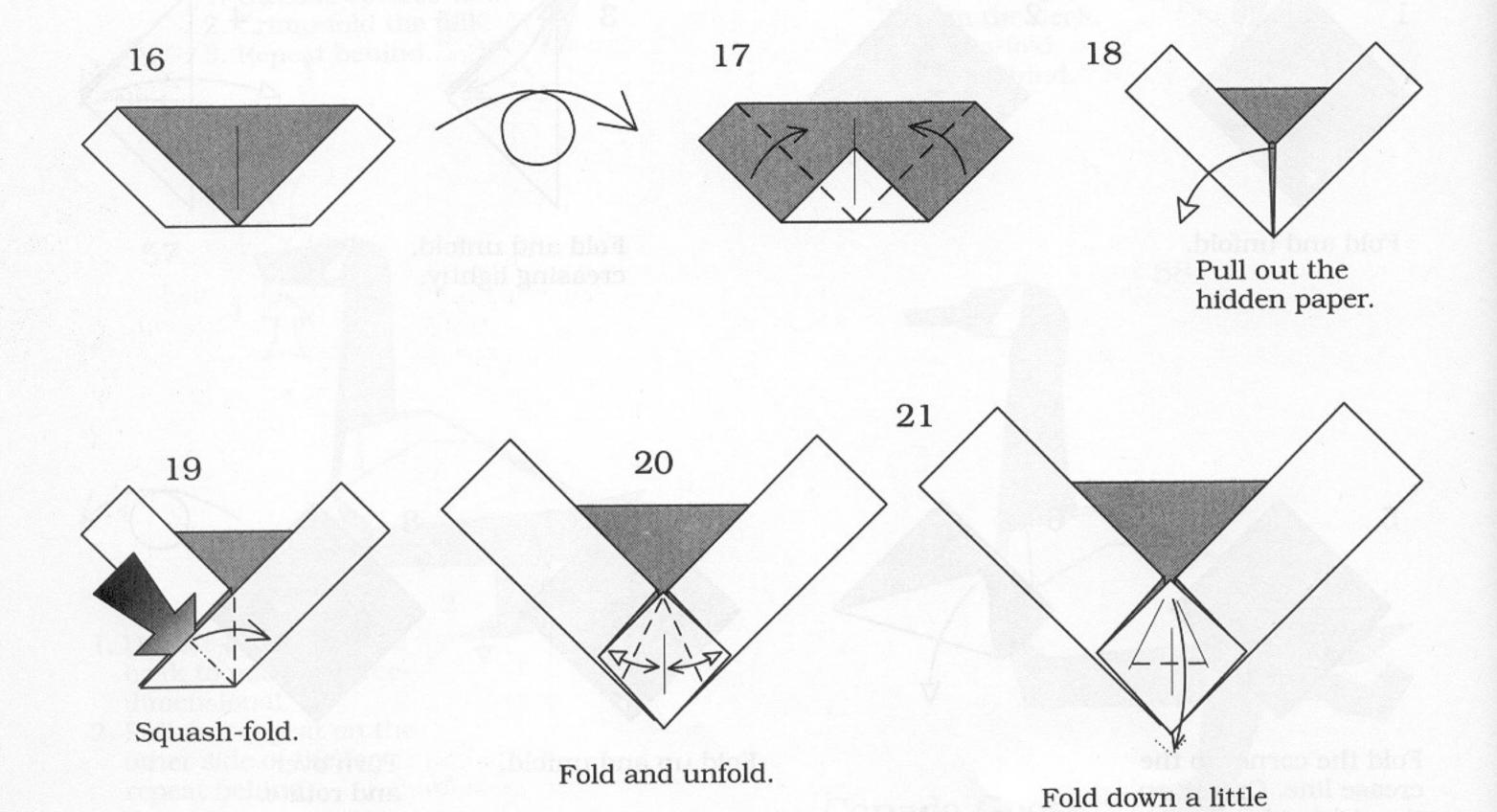
below the bottom.

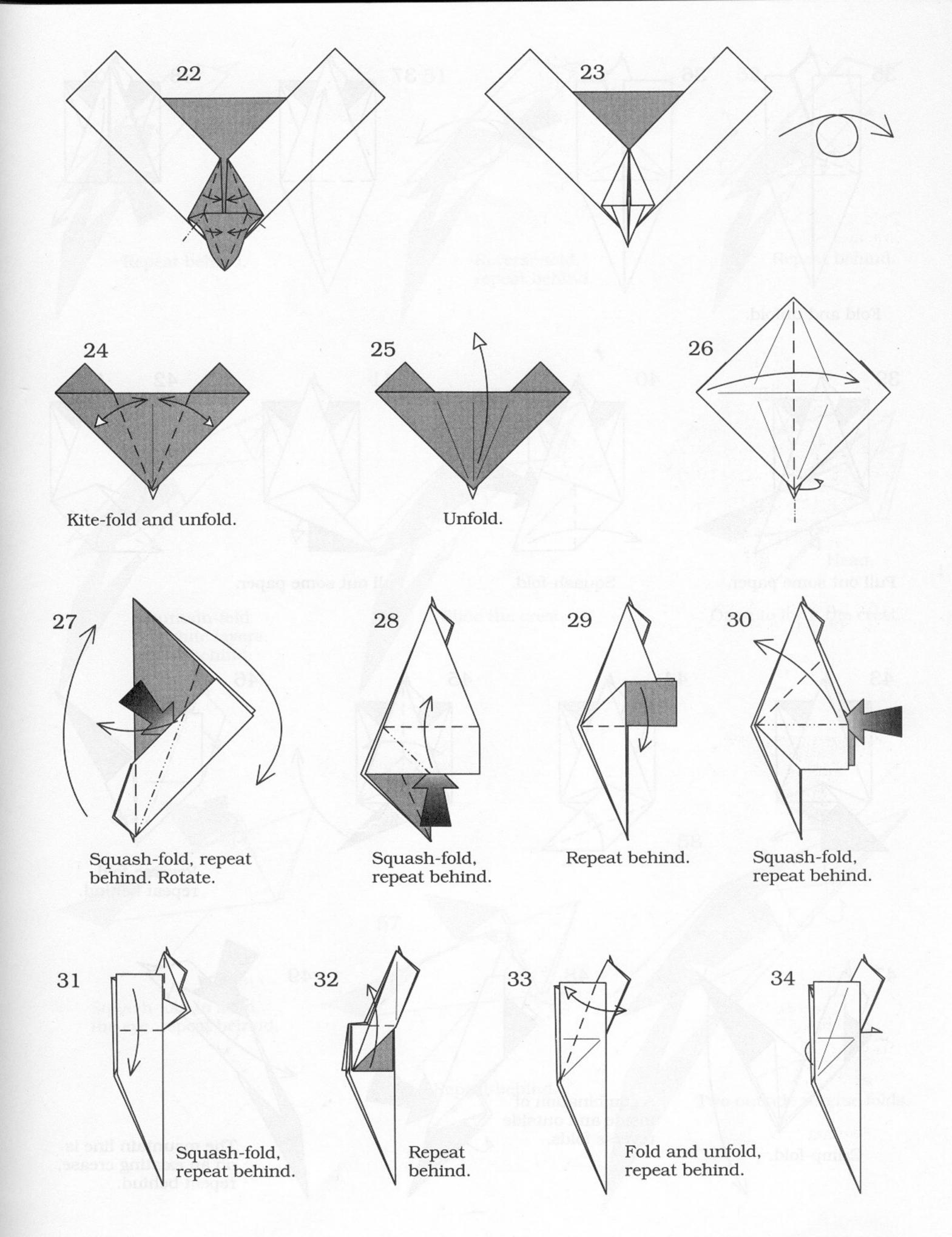


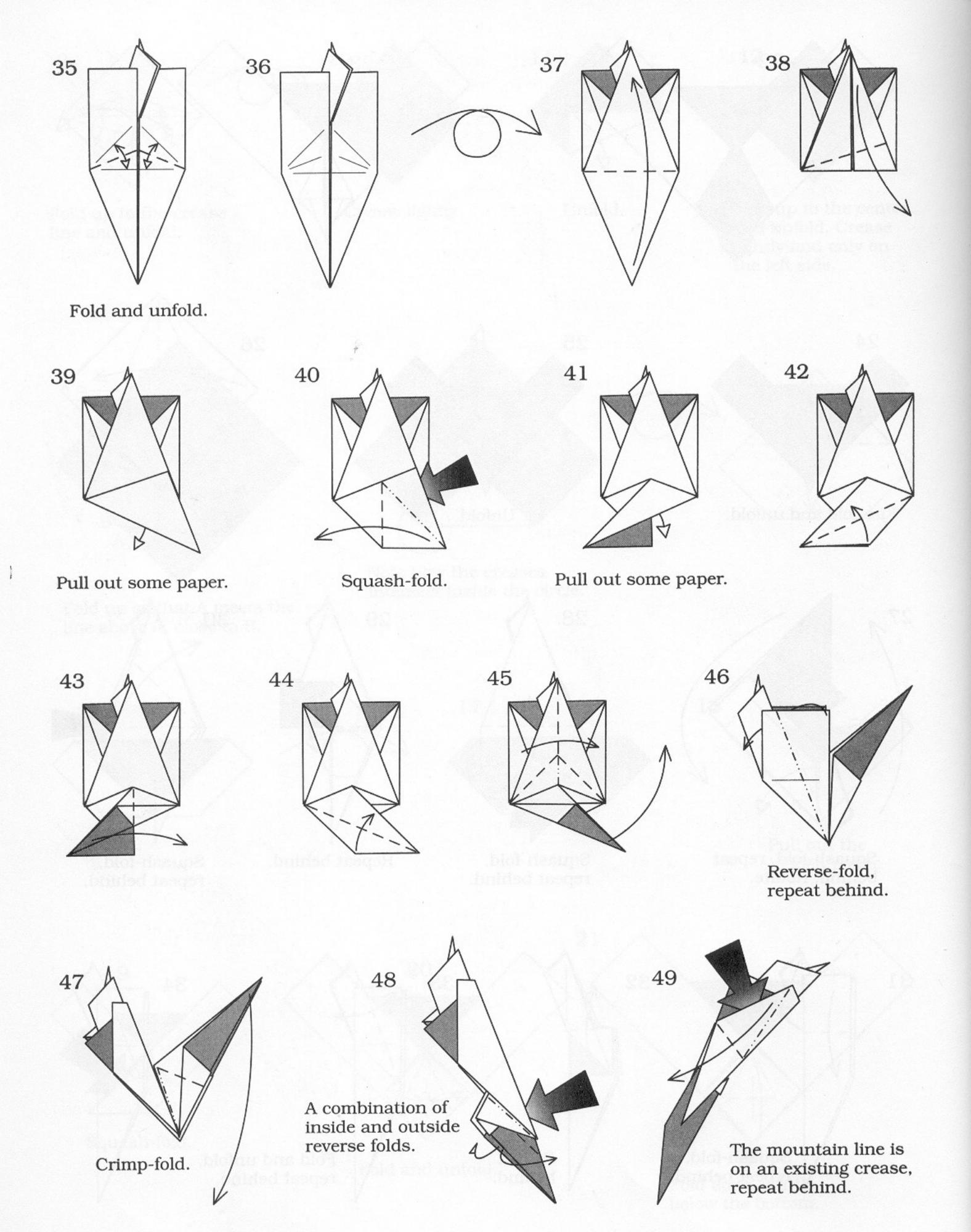
Fold up so that A meets the line above it, close to B.

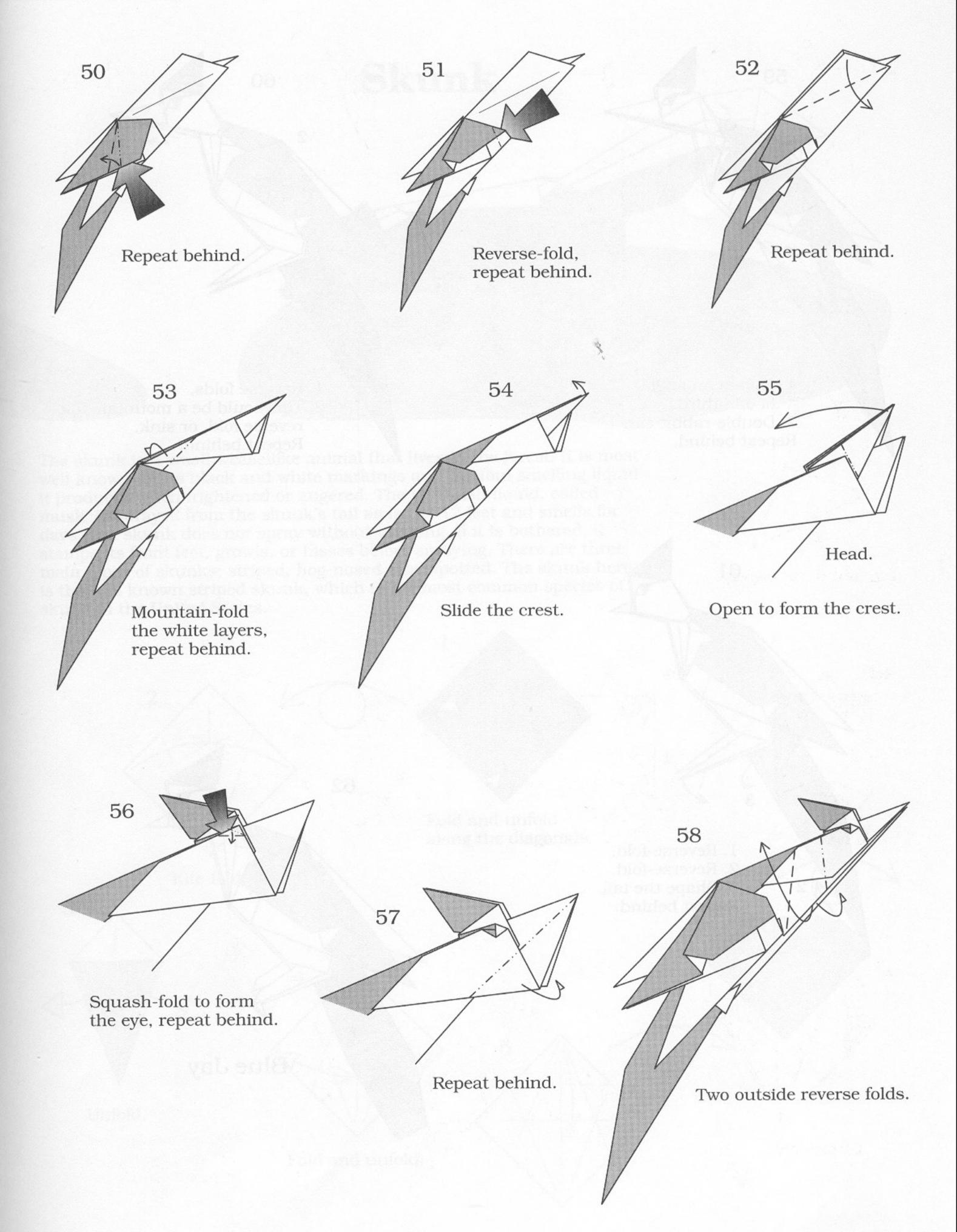


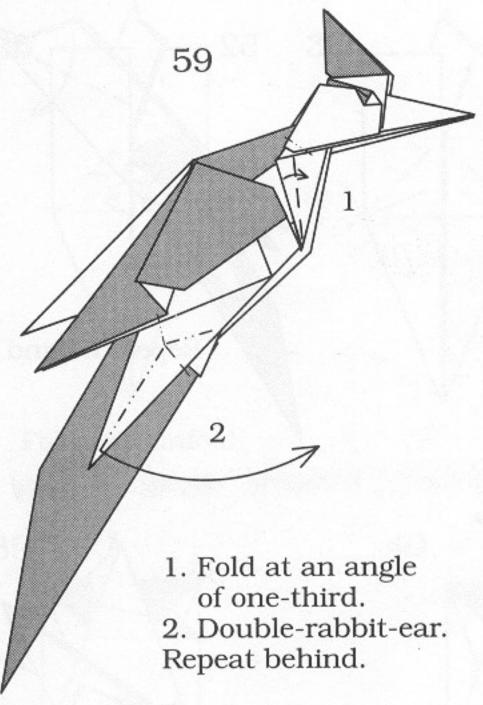
Note how the creases intersect inside the circle.

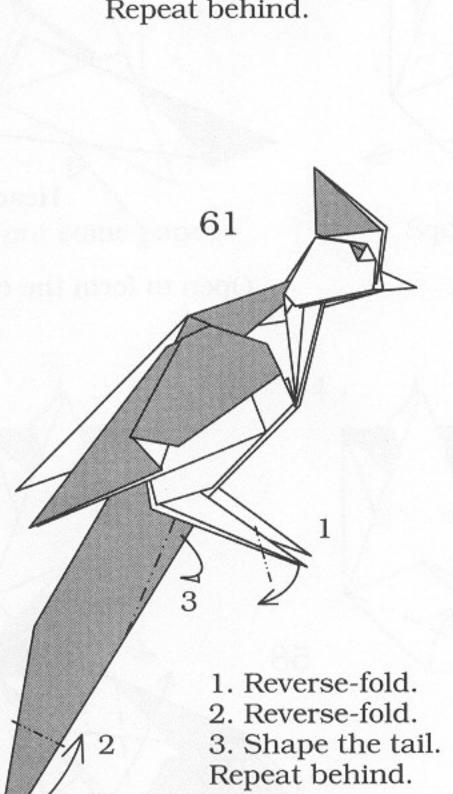


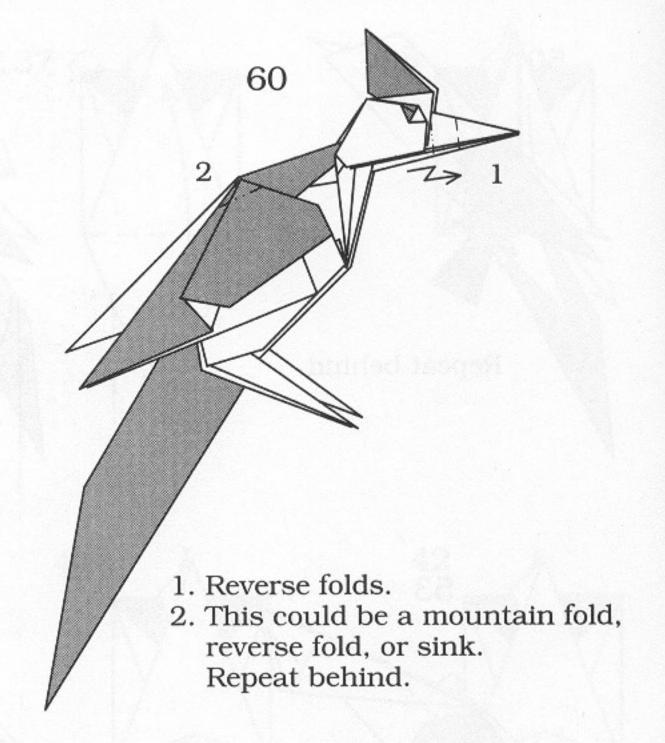


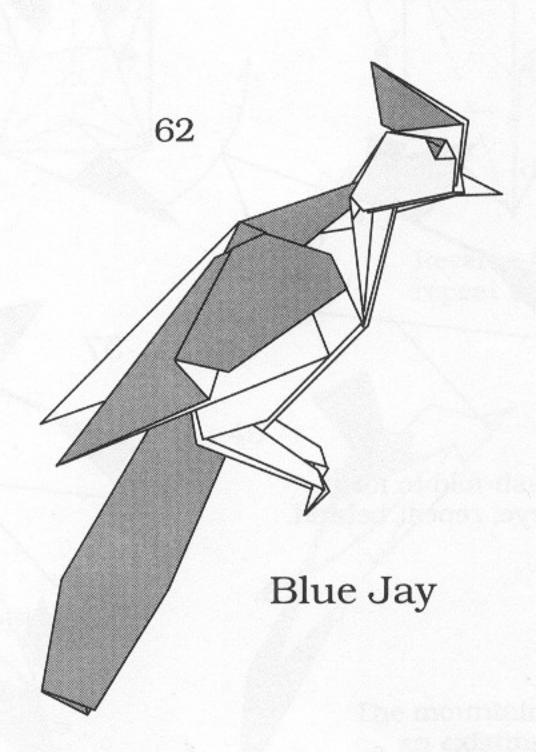


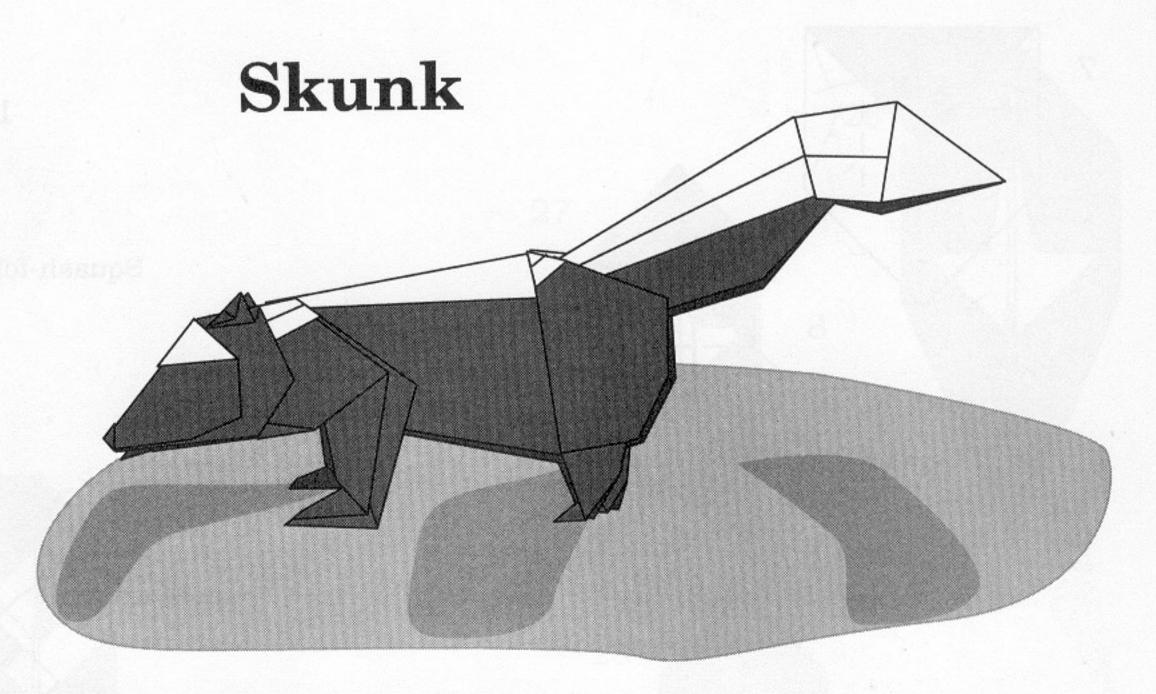




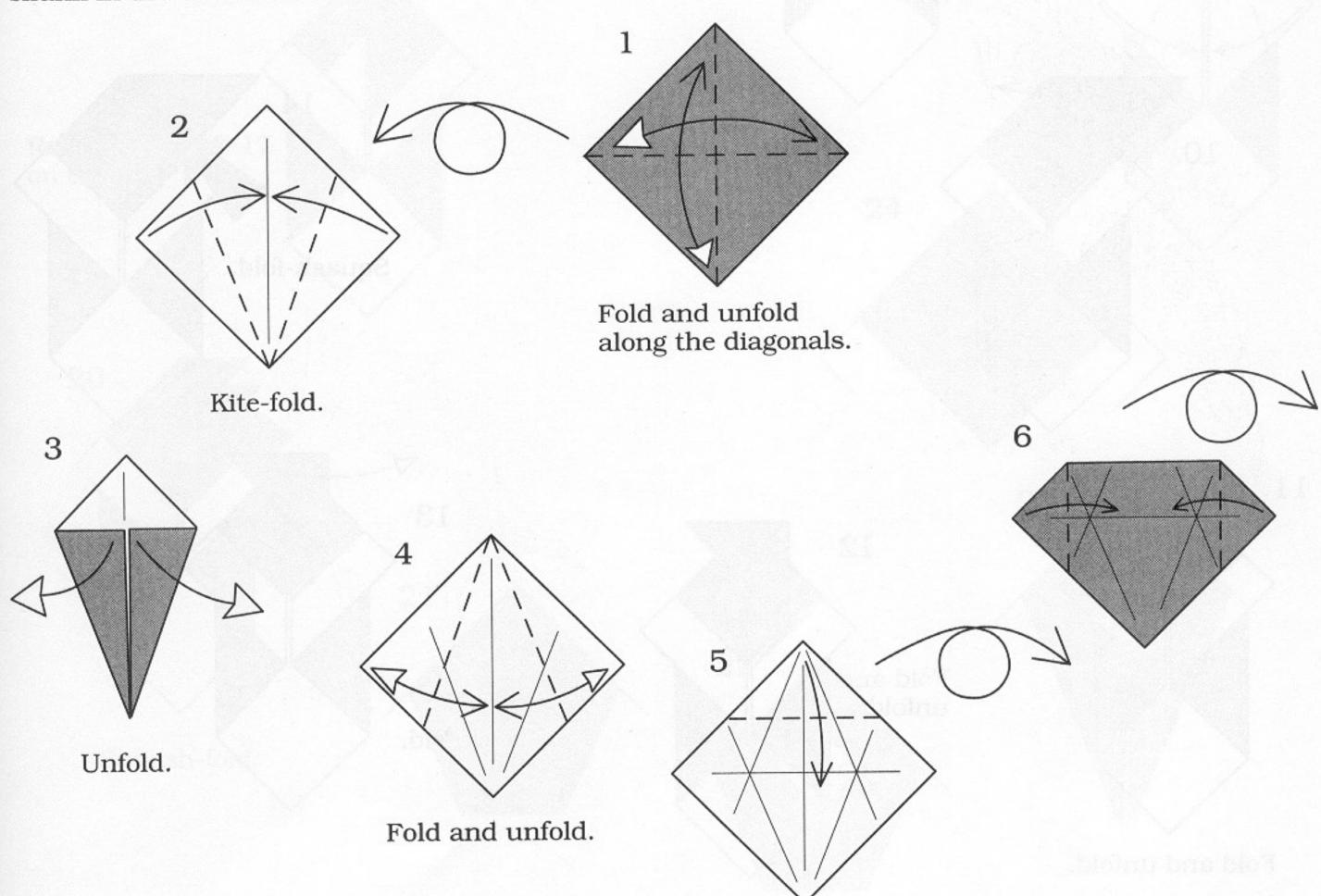


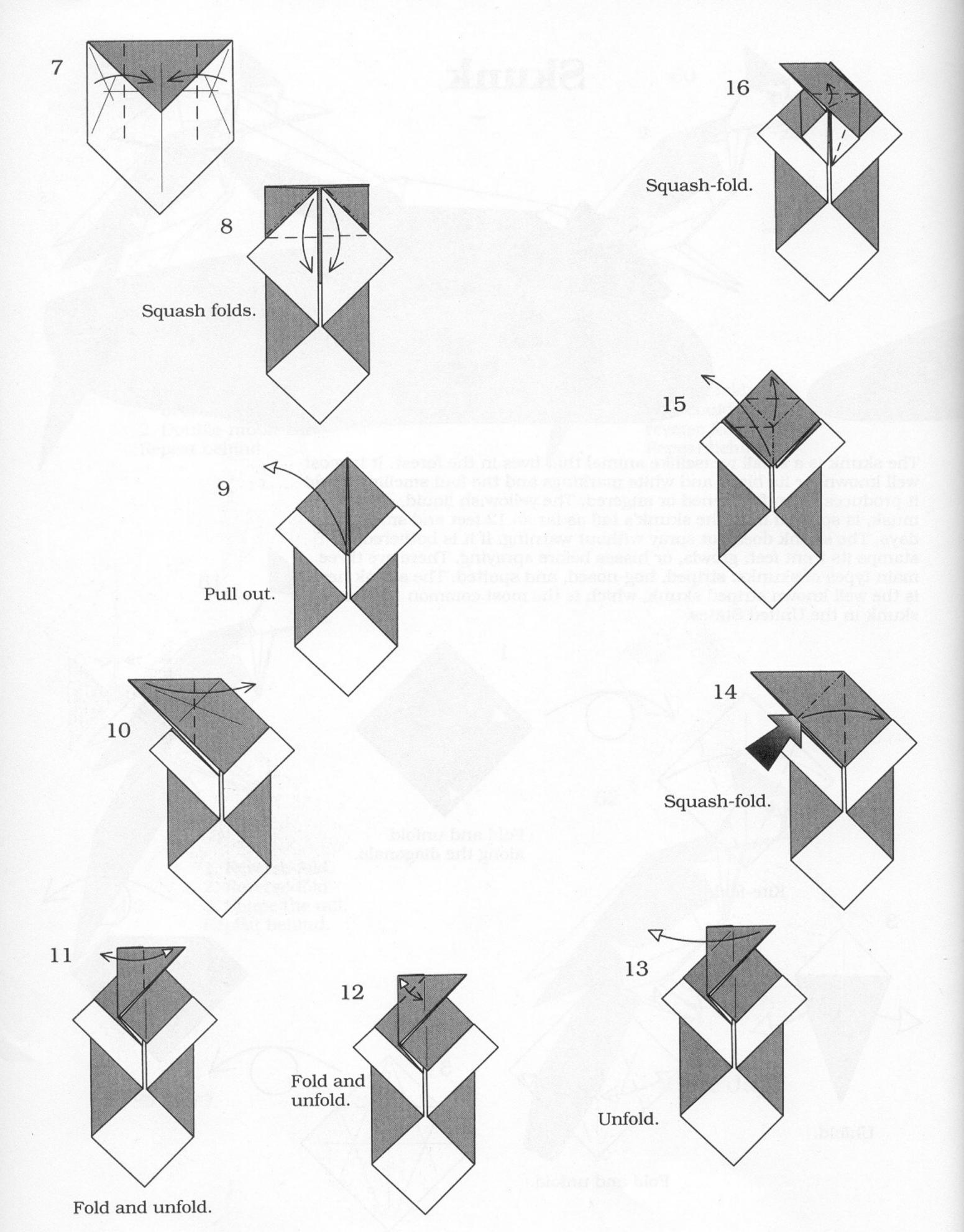




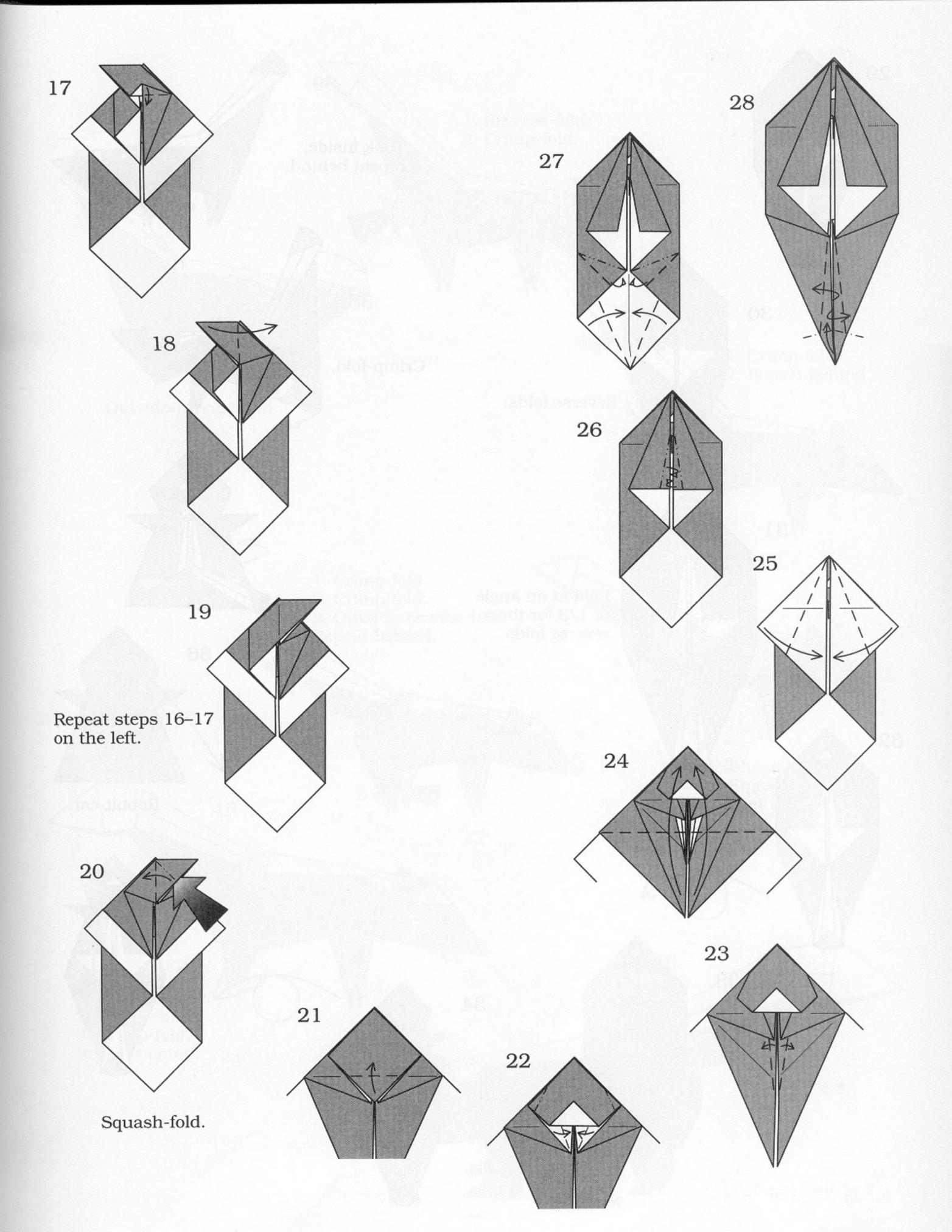


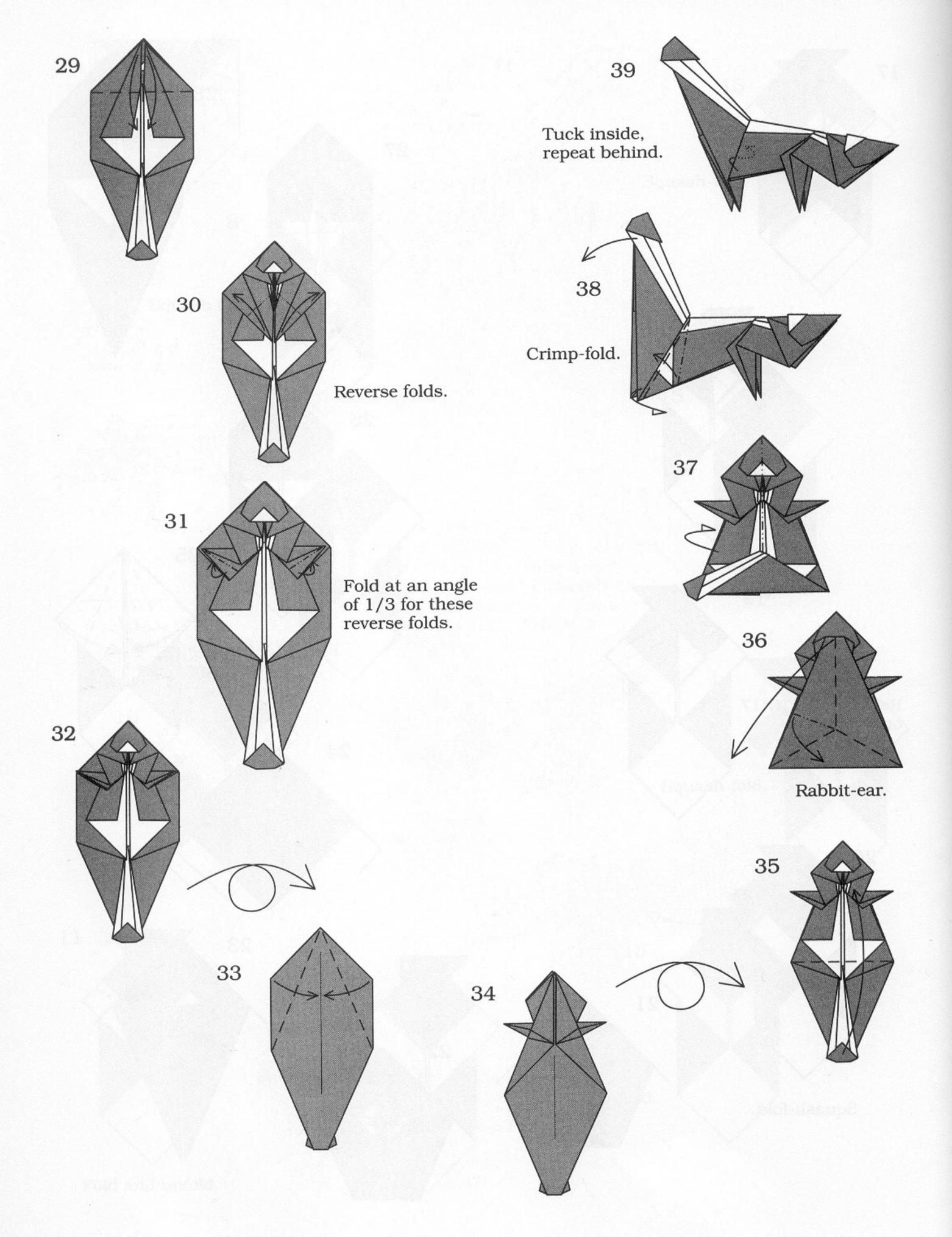
The skunk is a small weasellike animal that lives in the forest. It is most well known for its black and white markings and the foul smelling liquid it produces when frightened or angered. The yellowish liquid, called musk, is sprayed from the skunk's tail as far as 12 feet and smells for days. The skunk does not spray without warning. If it is bothered, it stamps its front feet, growls, or hisses before spraying. There are three main types of skunks: striped, hog-nosed, and spotted. The skunk here is the well known striped skunk, which is the most common species of skunk in the United States.

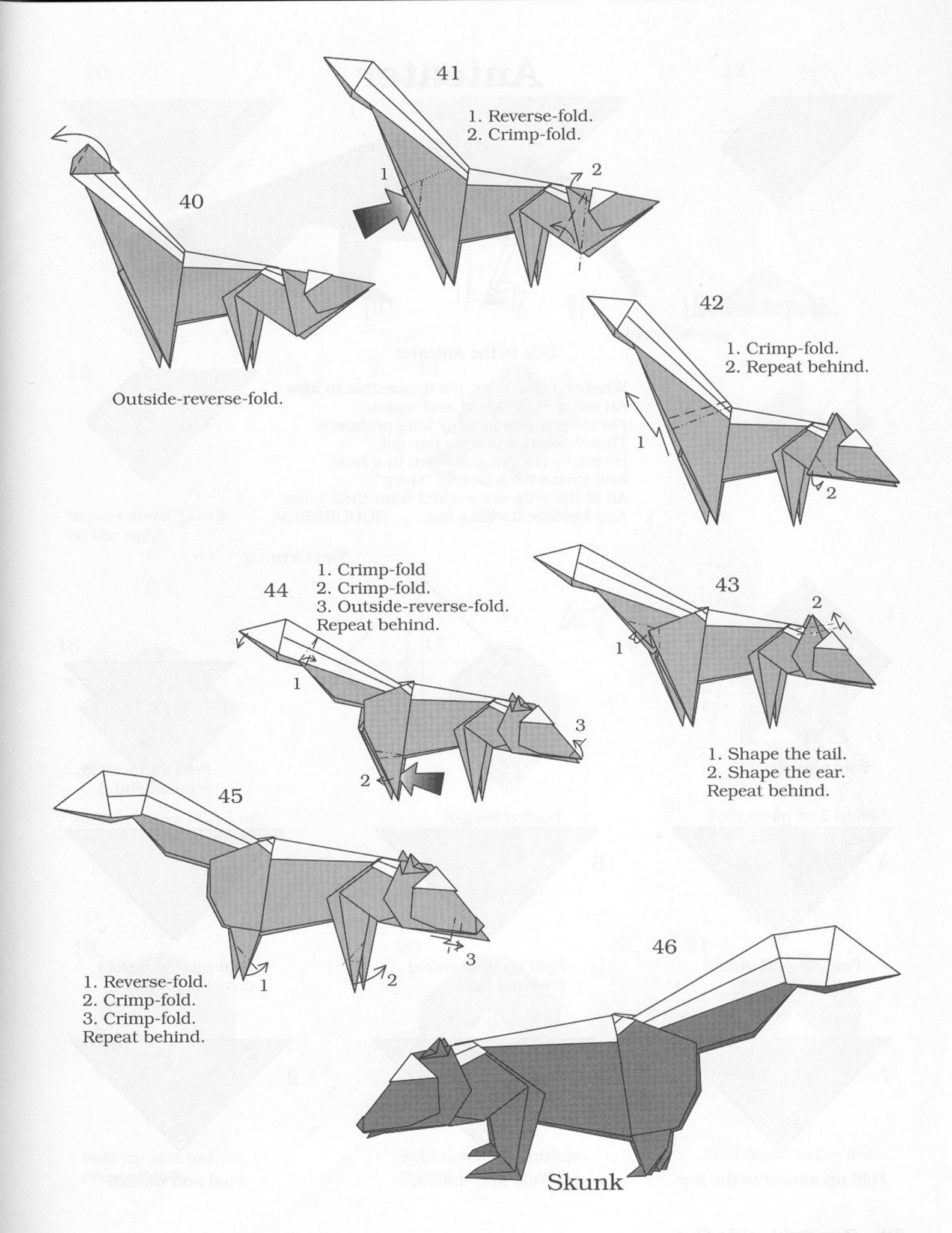




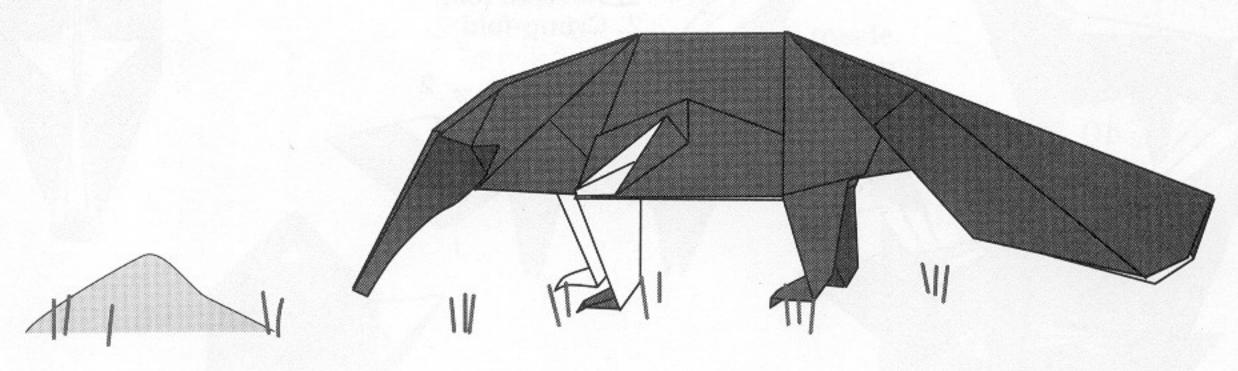
54 Origami Inside-Out







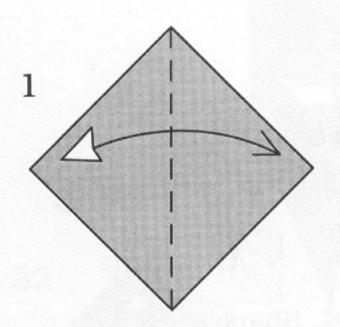
## Anteater



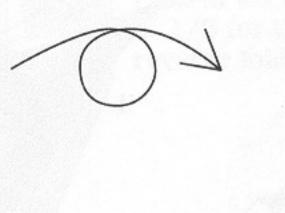
Ode to the Anteater

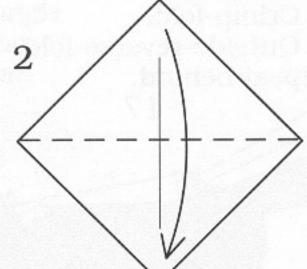
Whatever one says, it's impossible to kiss An anteater so short and squat; For there's this terribly long proboscis That this eater of ants has got. He sticks his honker down in a hole, And then with a deadly "slurp", All of the ants are sucked from their home And become nothing but . . . BUUURRRRP!

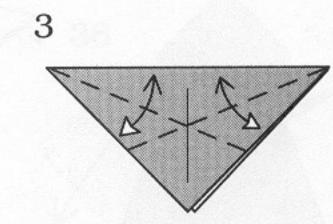
#### Tim Getman



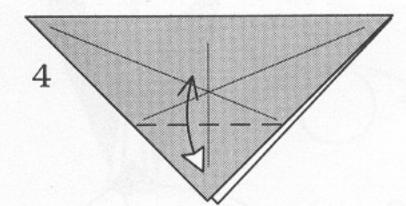
Fold and unfold.



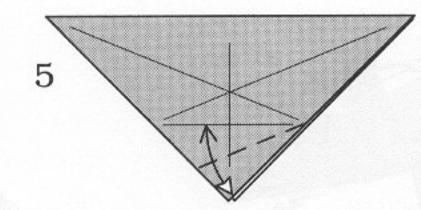




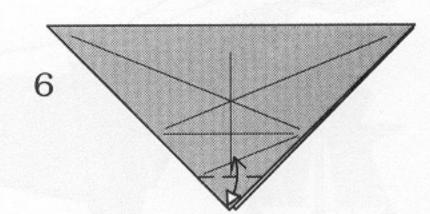
Fold and unfold, repeat behind.



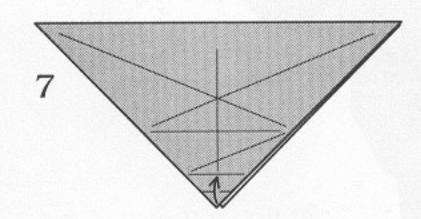
Fold up and unfold creasing lightly.



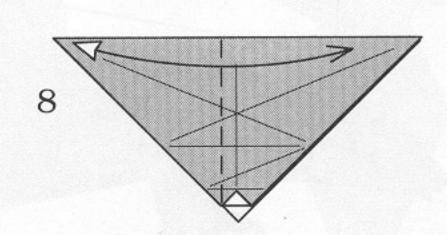
Fold up and unfold creasing lightly.



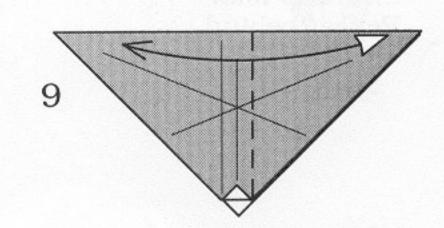
Fold up and unfold creasing lightly.



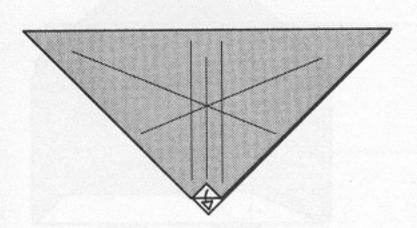
Fold up almost to the line.



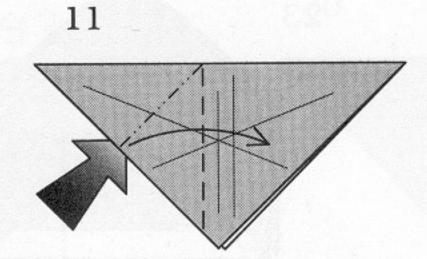
Fold and unfold.



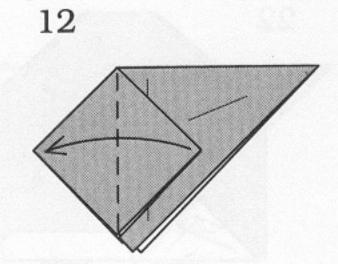
Fold and unfold.



Unfold.

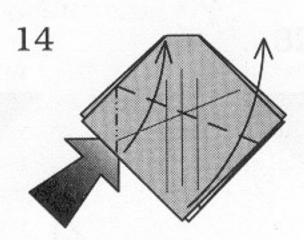


Squash-fold.

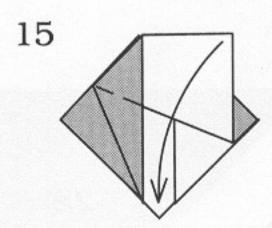


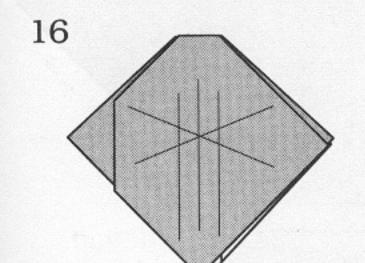
13

Repeat steps 11–12 on the right.

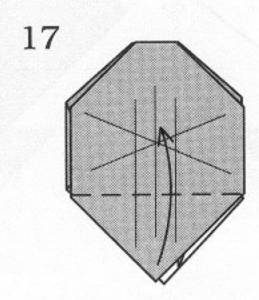


Squash-fold.

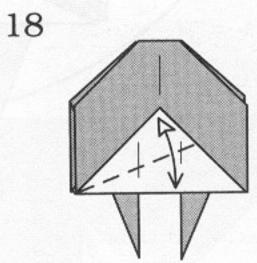




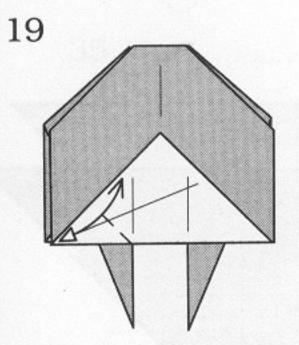
Repeat steps 14–15 on the right and behind.



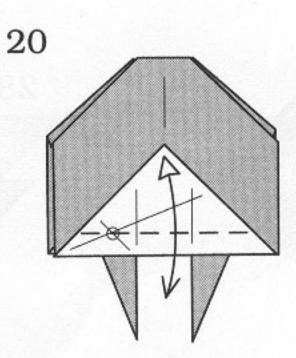
Repeat behind.



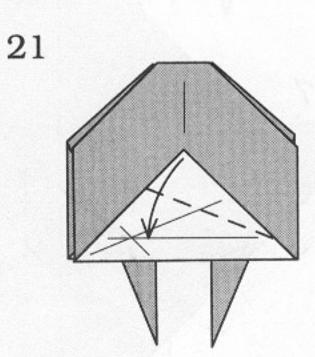
Fold down and unfold, crease lightly.



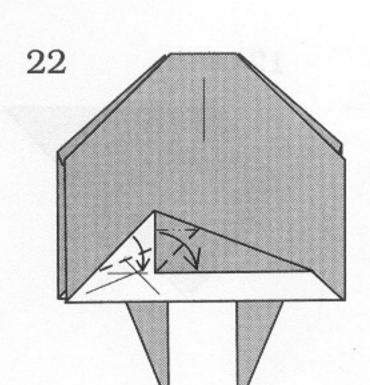
Fold up and unfold, crease lightly.



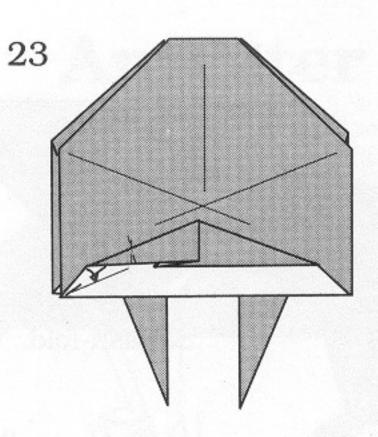
Fold down and unfold, crease lightly.



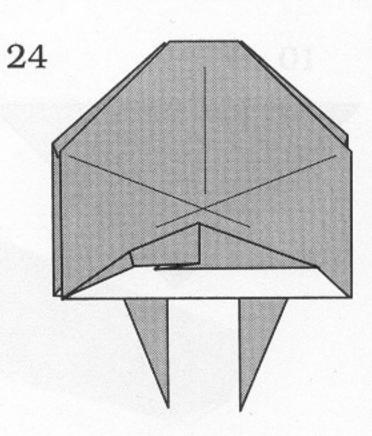
Fold down to the line.



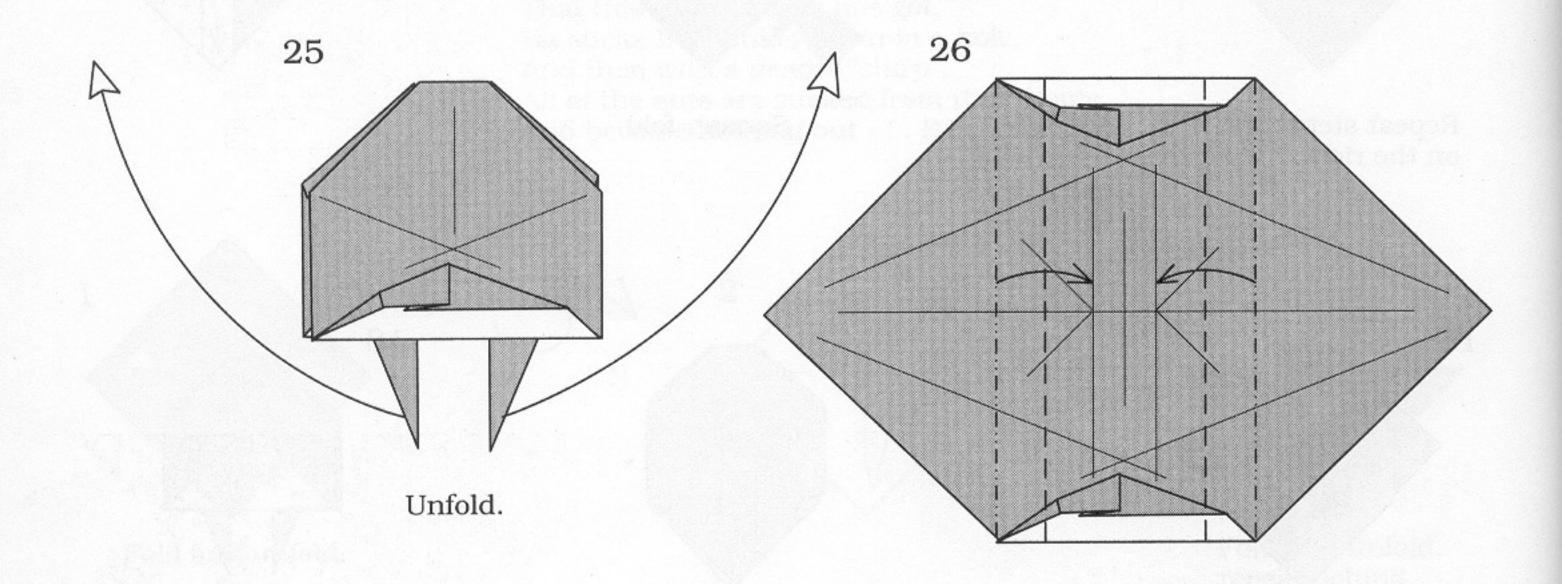
Squash-fold.

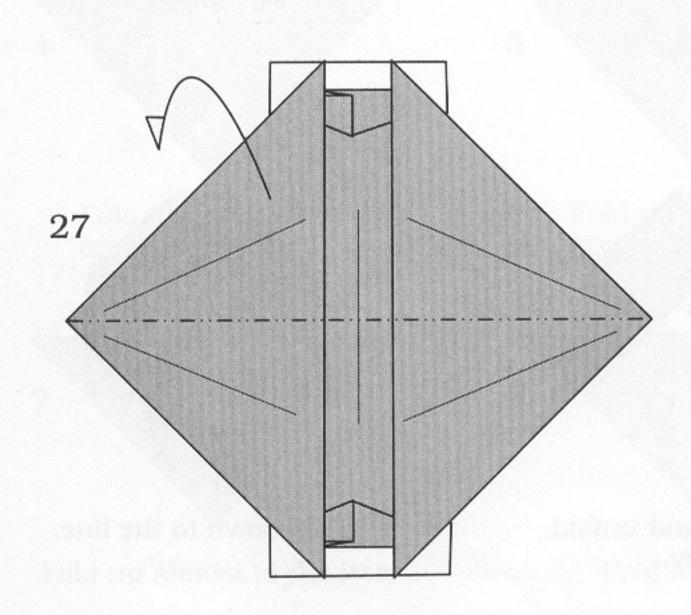


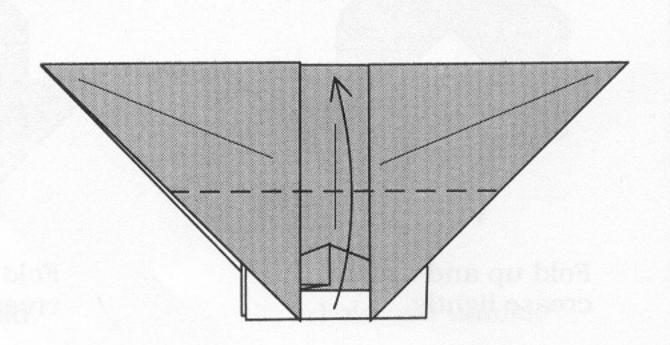
Fold to the crease line.



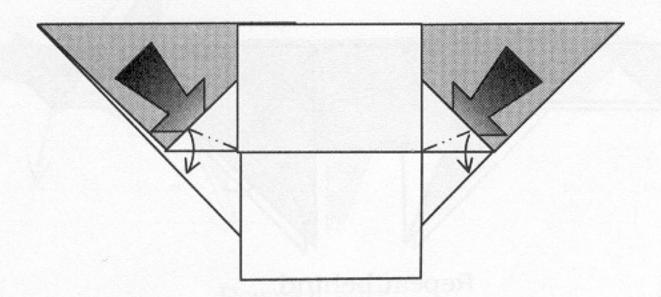
Repeat steps 18–23 behind in its mirror image.

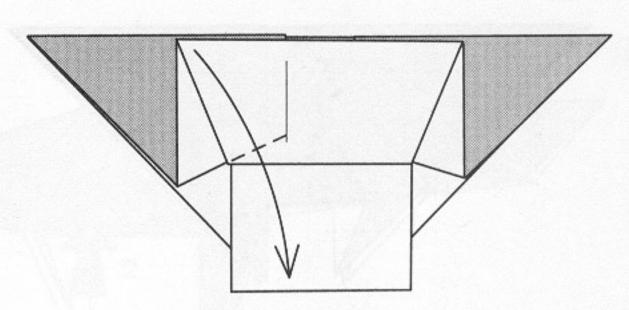




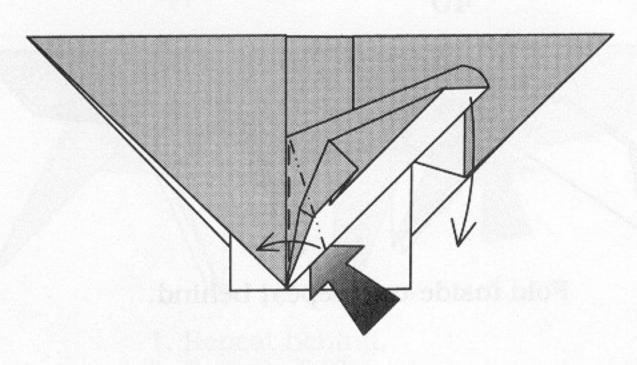




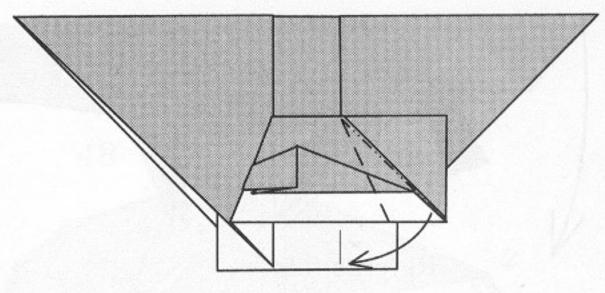




Only crease on the left side.

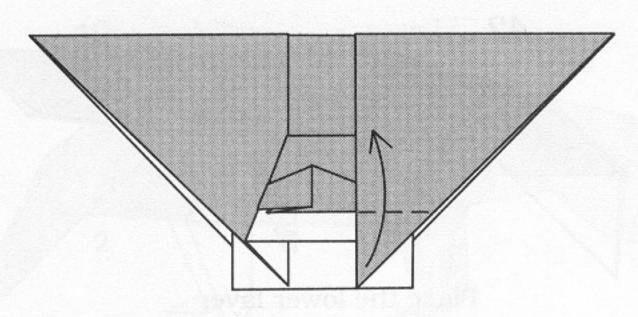




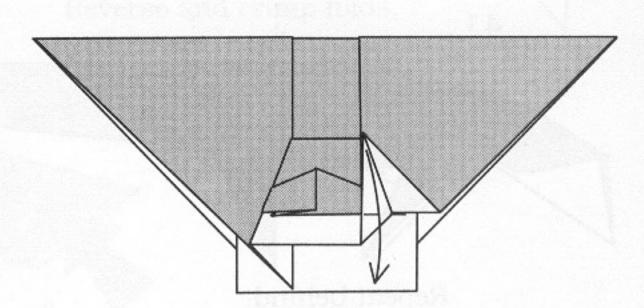


Squash-fold.

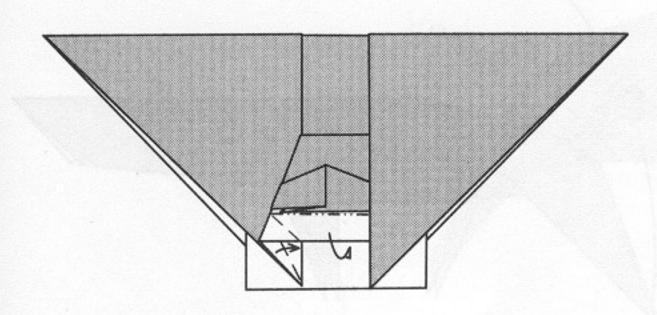
33



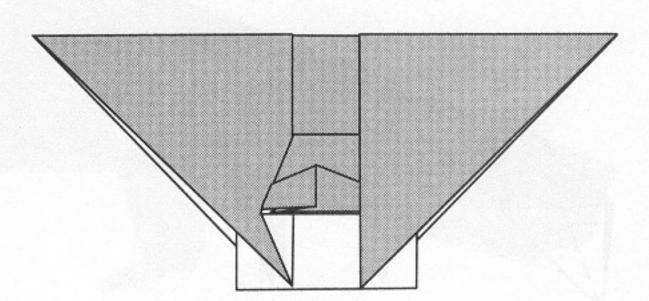
34



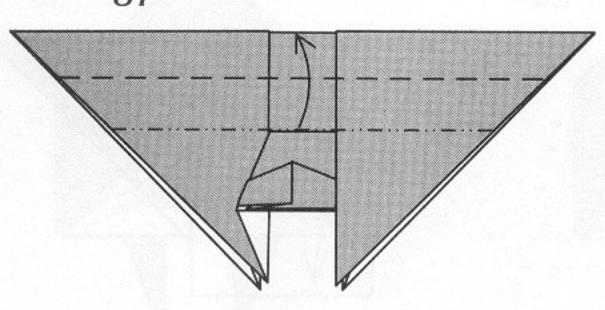
Crease lightly.



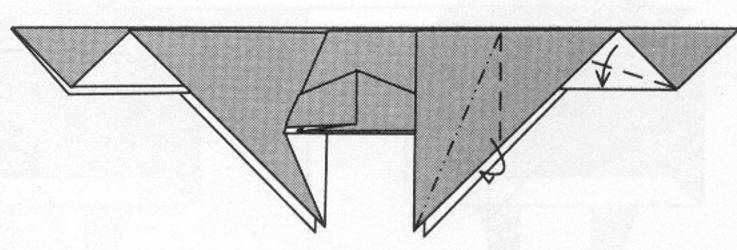
36



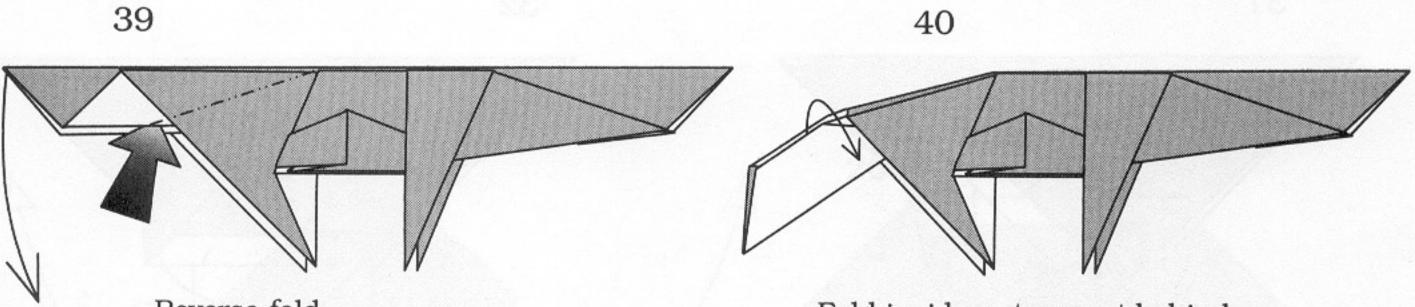
Repeat steps 28–35 behind.



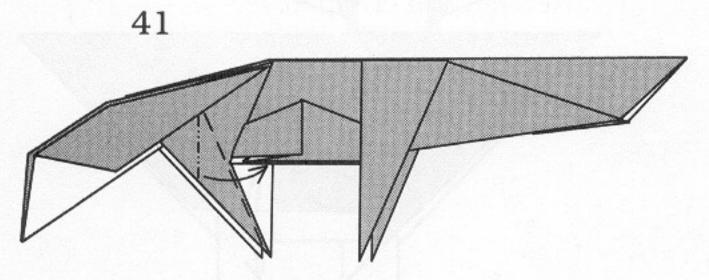
Repeat behind.



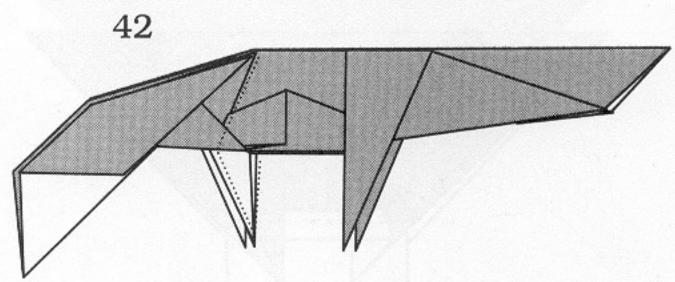
Repeat behind.



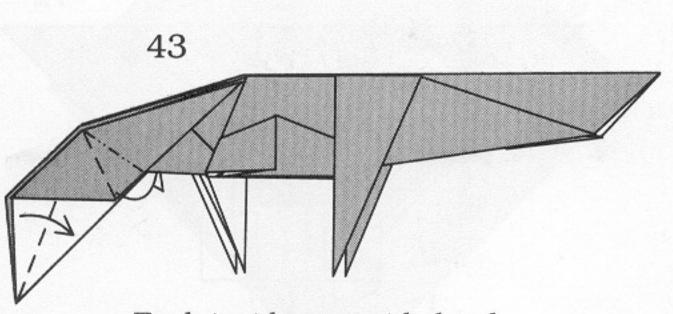
Reverse-fold. Fold inside-out, repeat behind.



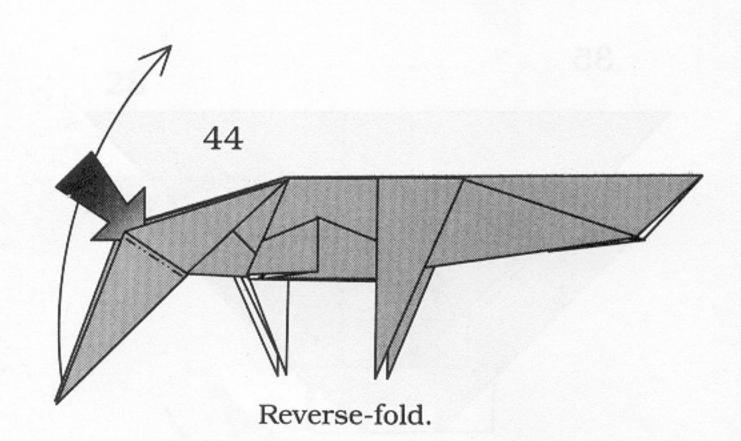
Repeat behind.



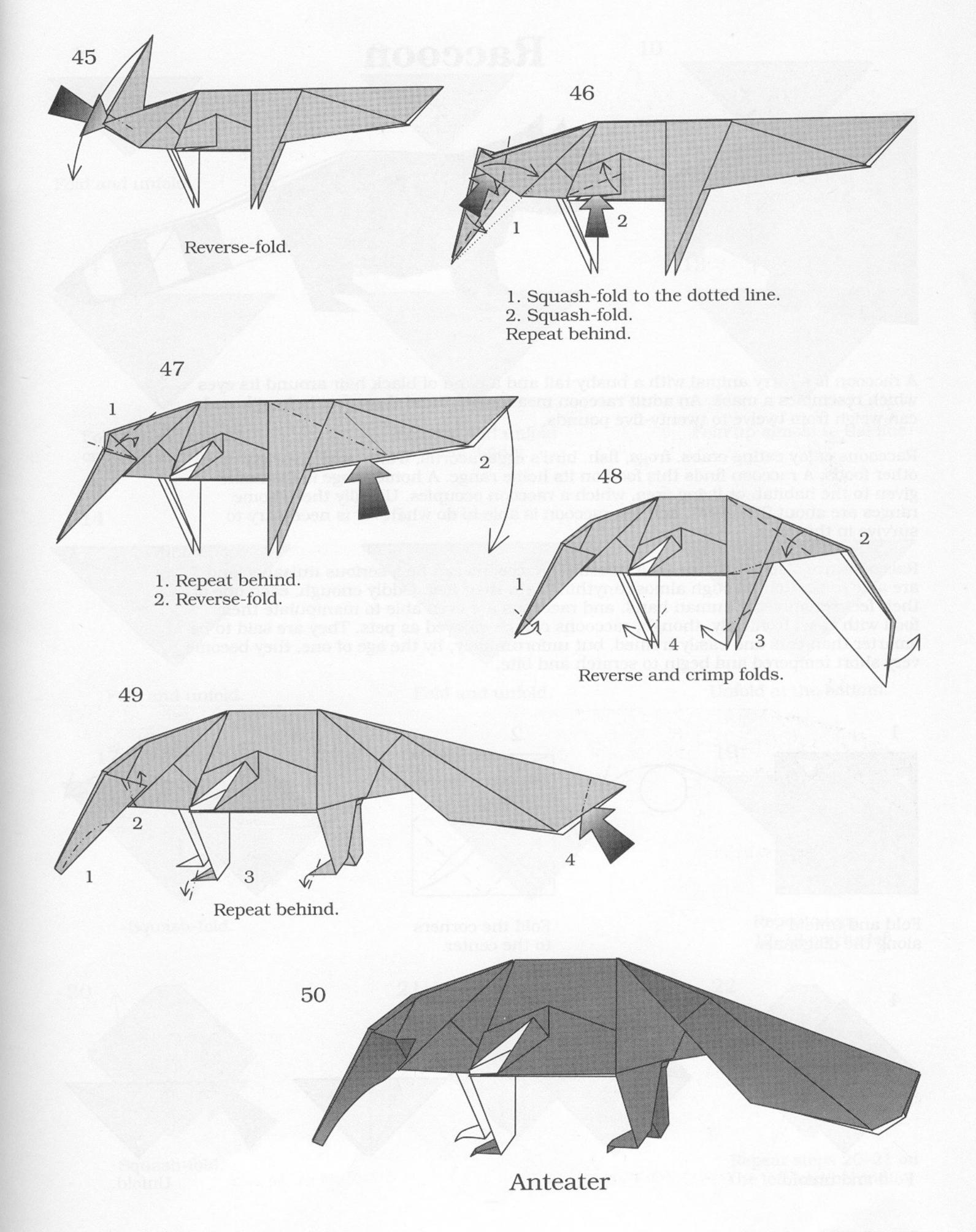
Place the lower layer on top. Repeat behind.



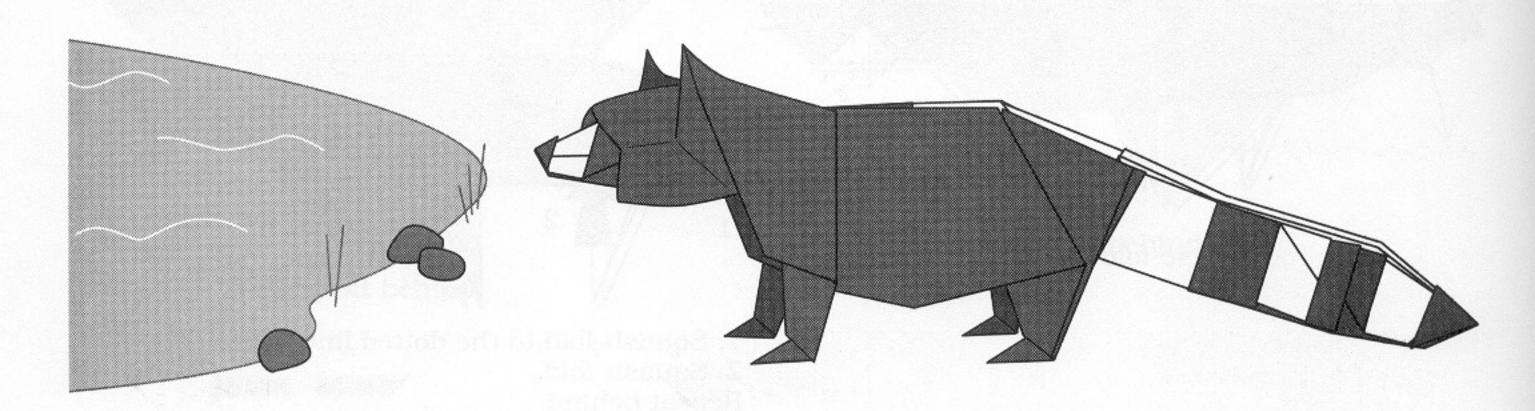
Tuck inside, repeat behind.



Origami Inside-Out



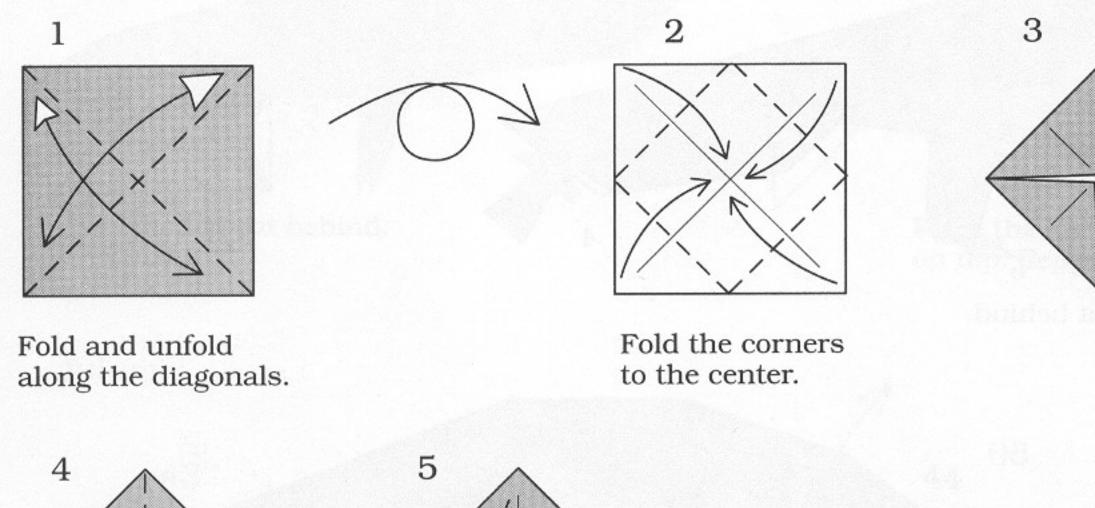
#### Raccoon

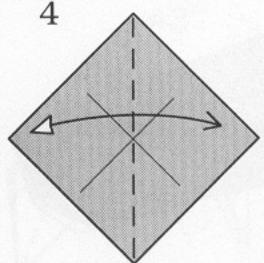


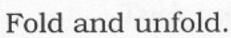
A raccoon is a furry animal with a bushy tail and a band of black hair around its eyes which resembles a mask. An adult raccoon measures around three feet in length and can weigh from twelve to twenty-five pounds.

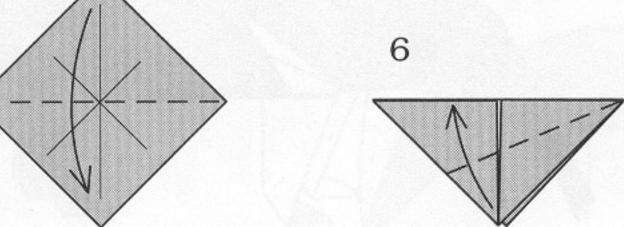
Raccoons enjoy eating crabs, frogs, fish, bird's eggs, acorns, fruits, and a variety of other foods. A raccoon finds this food on its home range. A home range is the name given to the habitat, or living area, which a raccoon occupies. Usually these home ranges are about 200 acres, and the raccoon is able to do whatever is necessary to survive in this area.

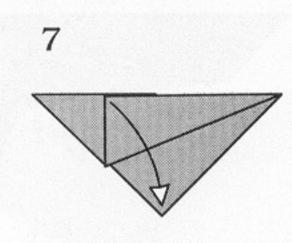
Raccoons are also known for their mischief. Raccoons can be a serious nuisance and are able to scratch through almost anything with their feet. Oddly enough, each one of their feet resembles a human hand, and raccoons are even able to manipulate their food with ease. Ironically, though, raccoons can be enjoyed as pets. They are said to be smarter than cats and easily trained, but unfortunately, by the age of one, they become very short tempered and begin to scratch and bite.



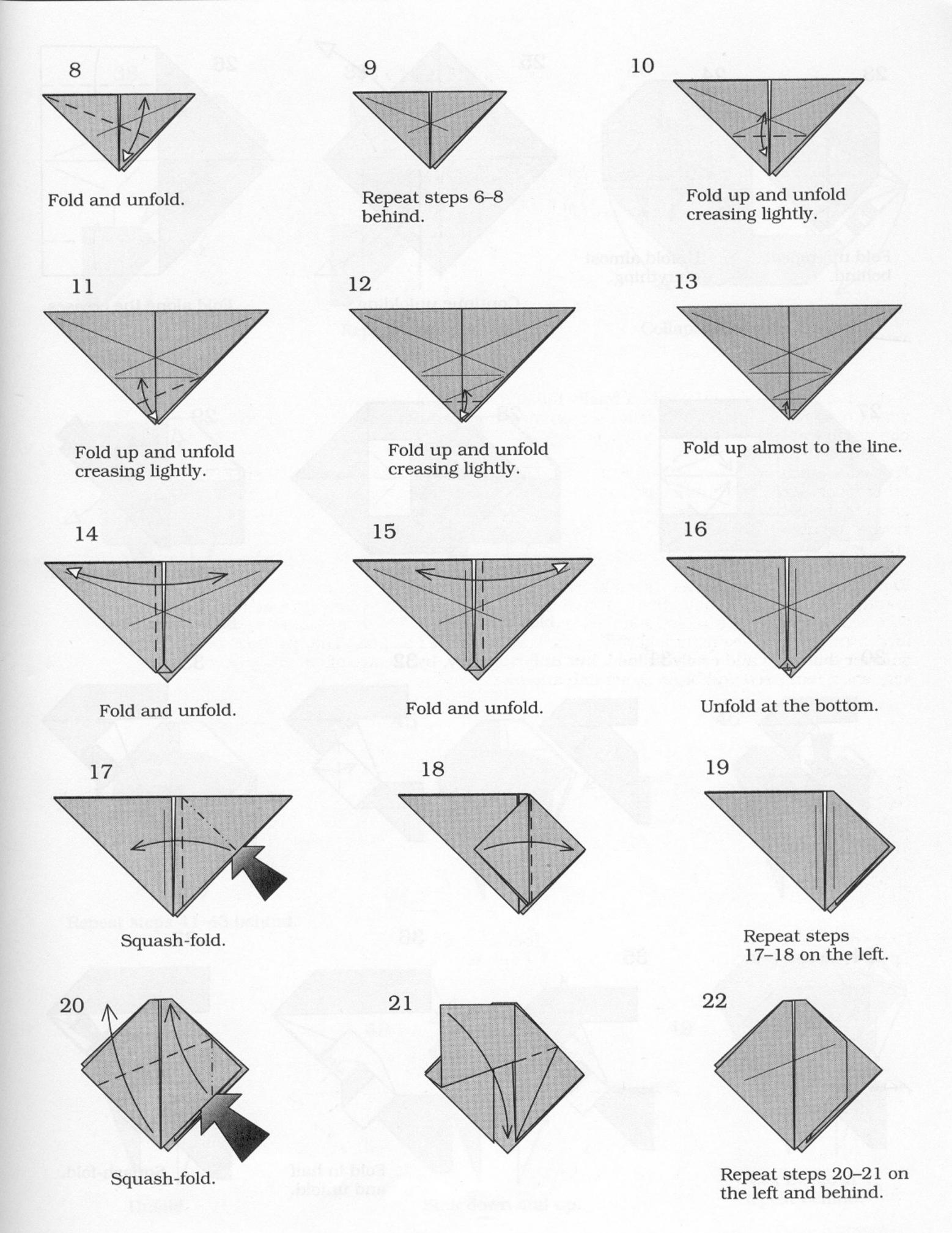


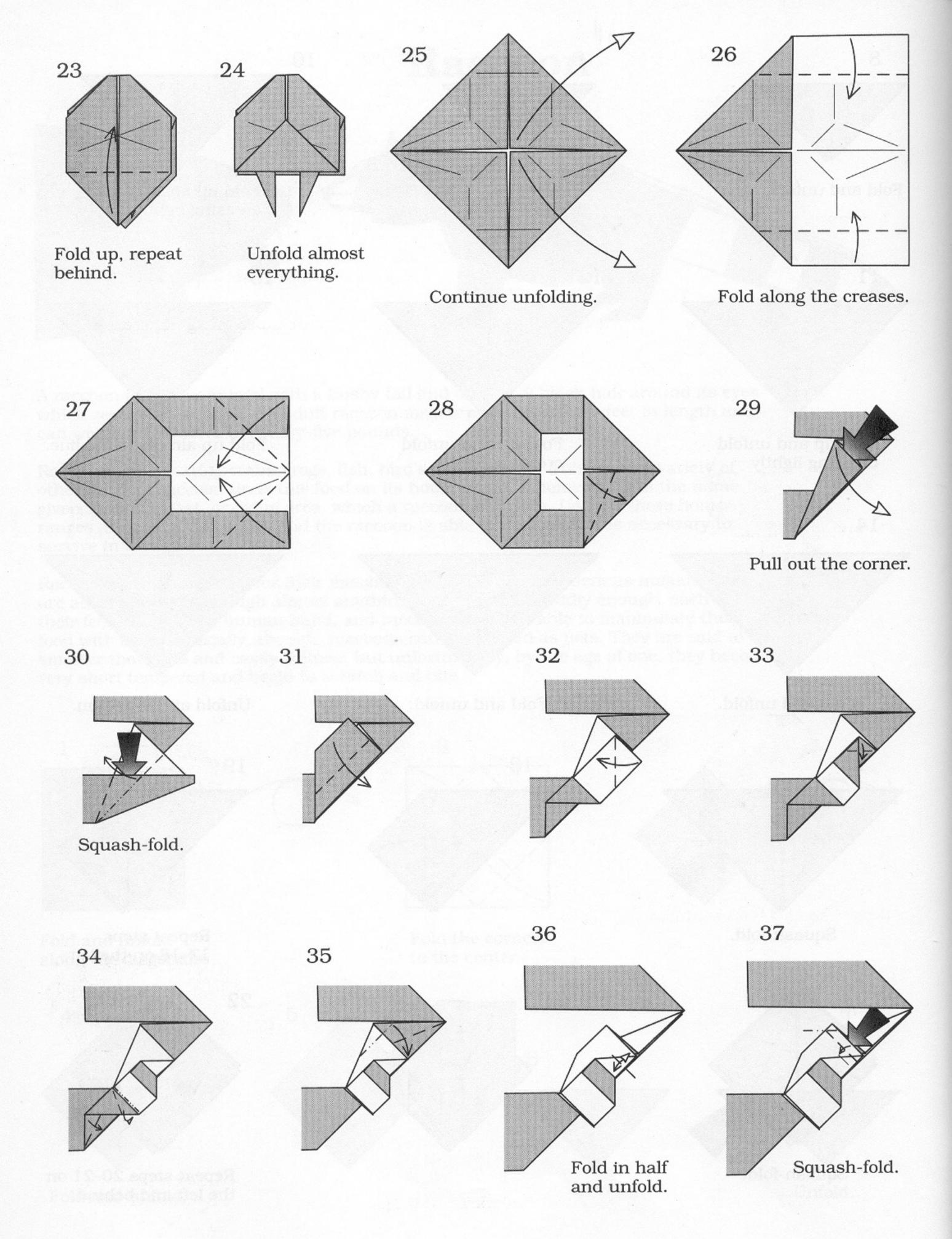


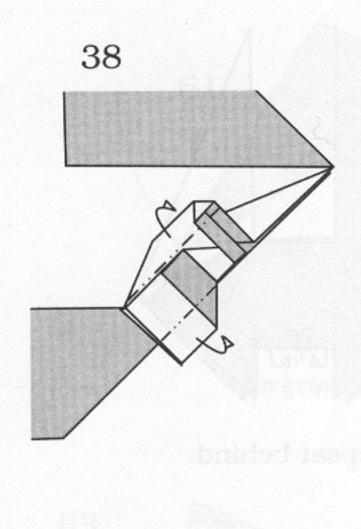


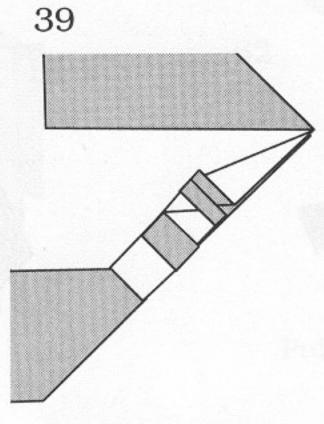


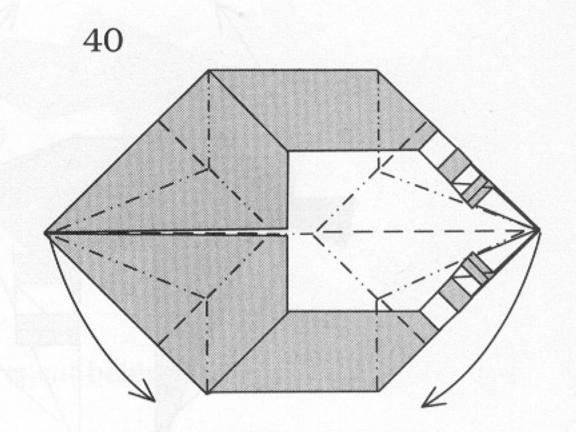
Unfold.





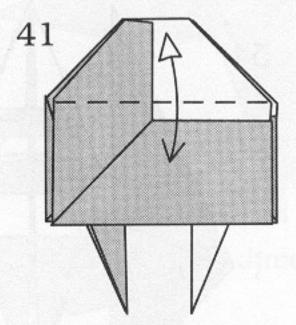


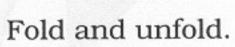


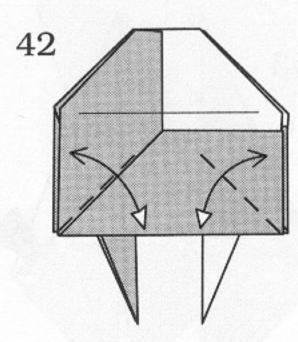


Repeat steps 28–38.

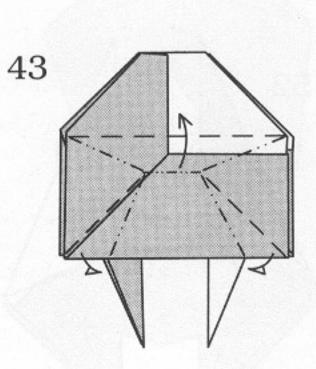
Collapse along the creases.



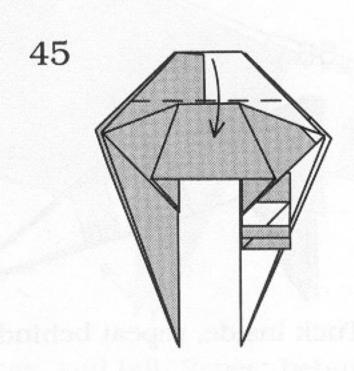


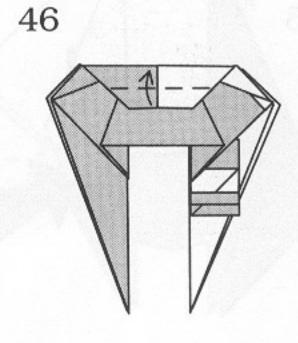


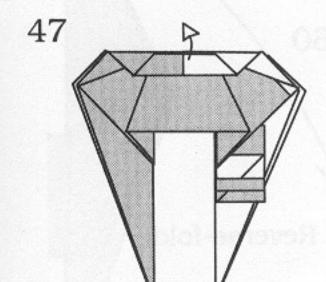
Fold and unfold.



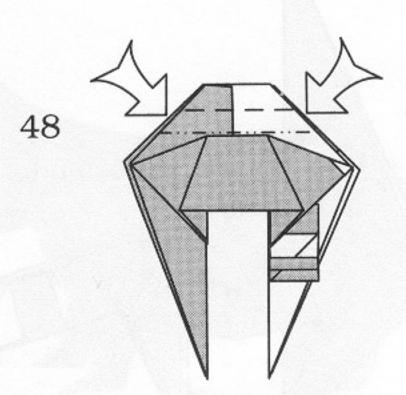
Repeat steps 41-43 behind.



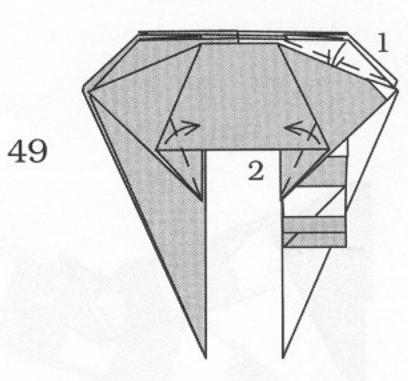




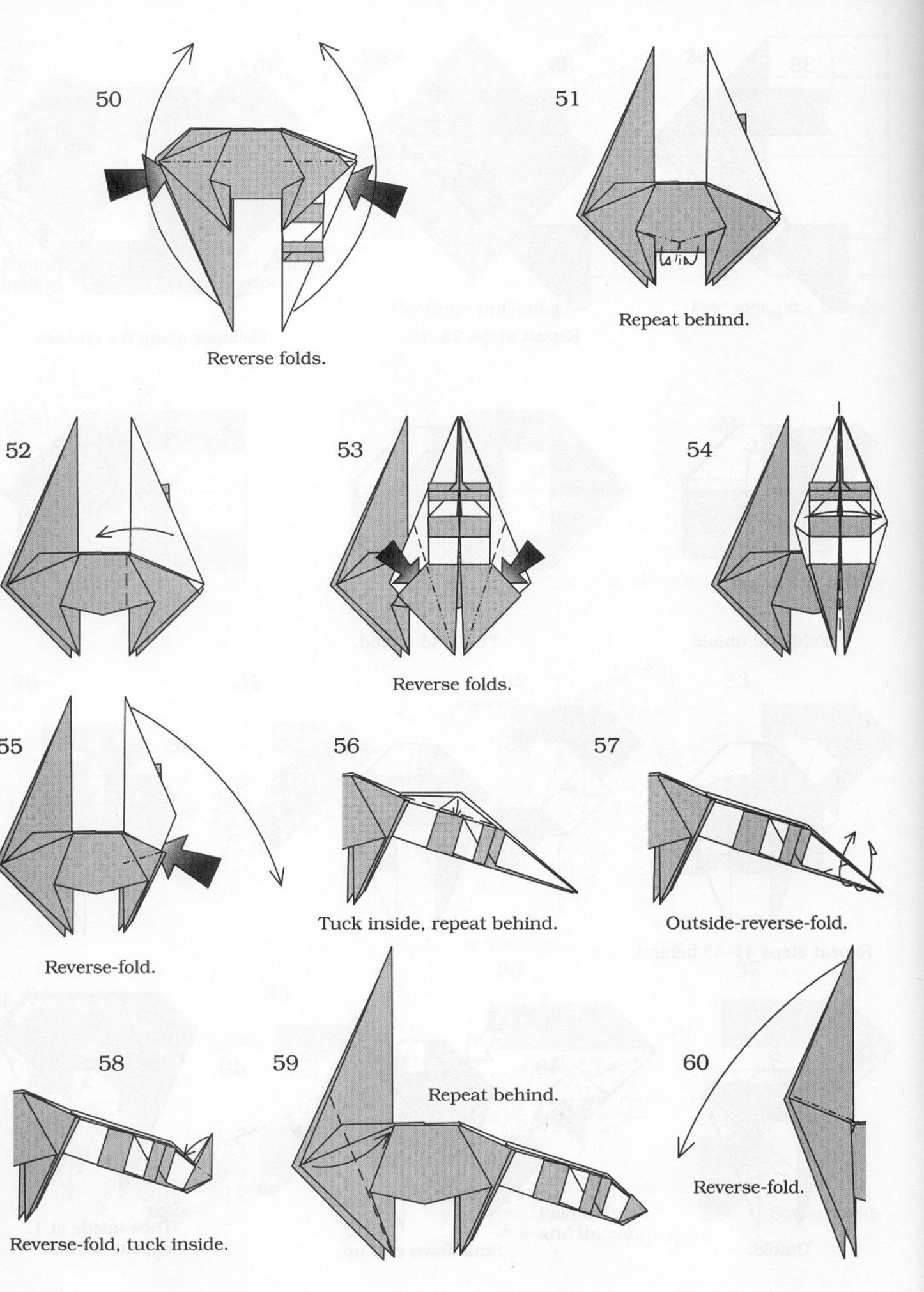
Unfold.

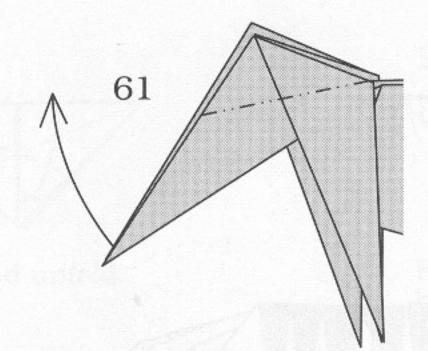


Sink down and up.

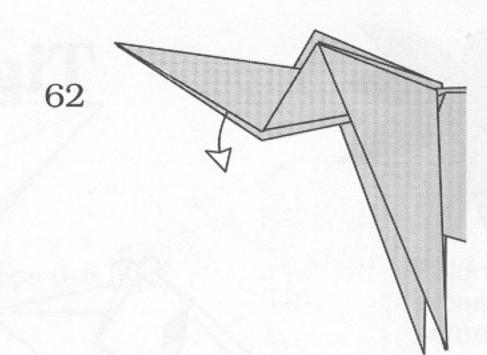


Tuck inside at 1. Repeat behind.

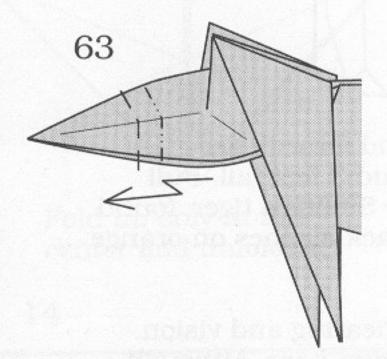




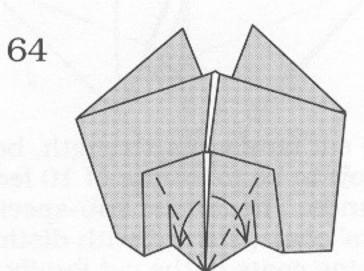
Reverse-fold.



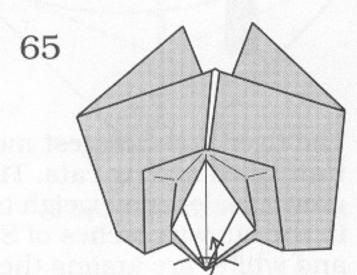
Pull out, repeat behind.



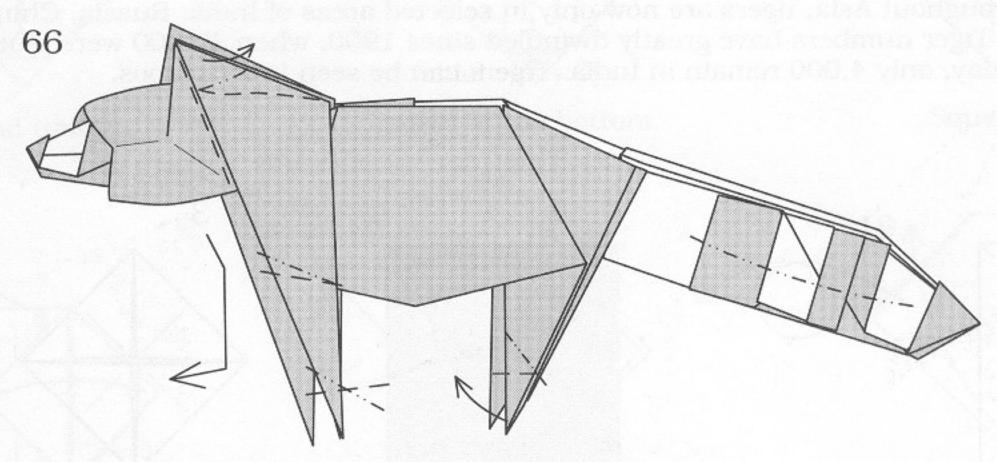
The head is three-dimensional.



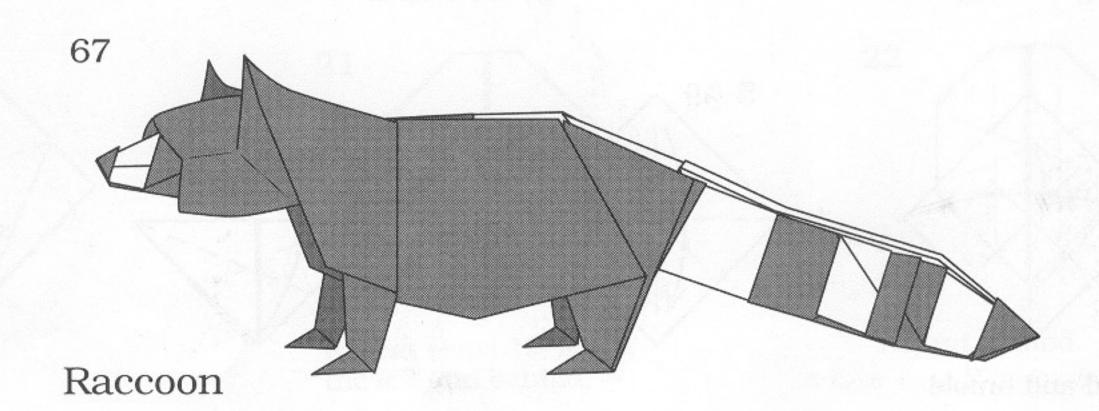
Front view.

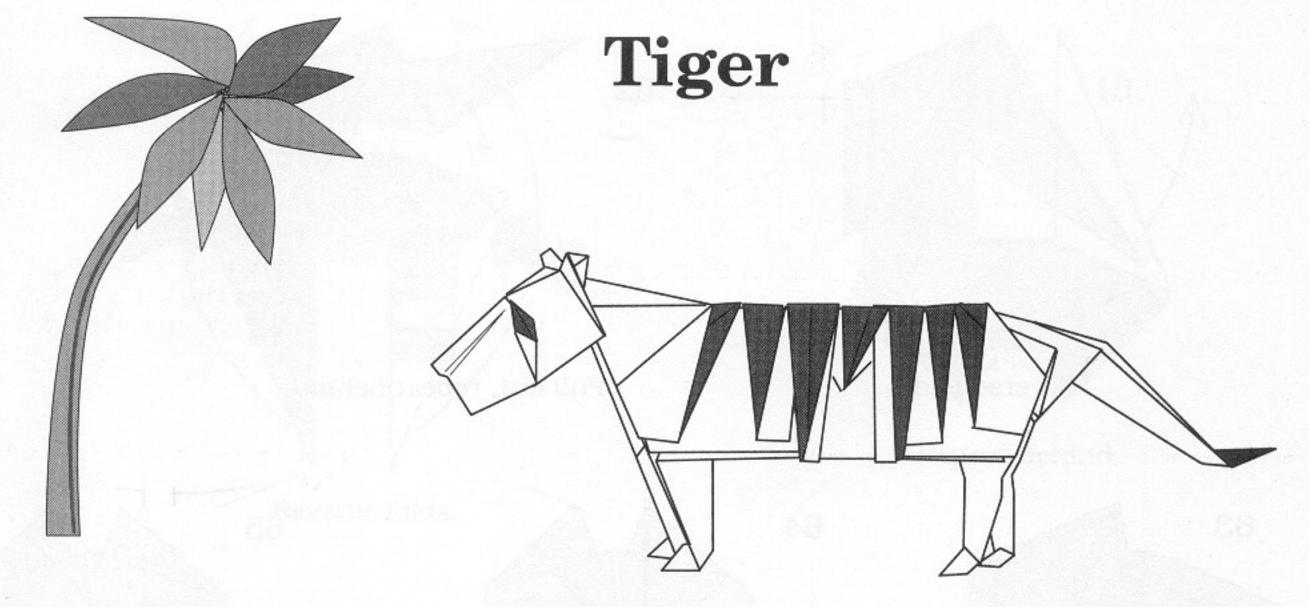


Reverse folds.



Shape the ears, legs, and tail. Repeat behind.

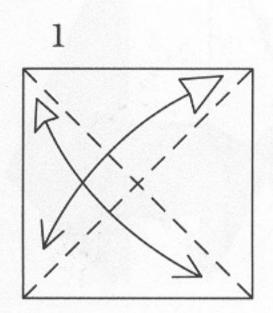




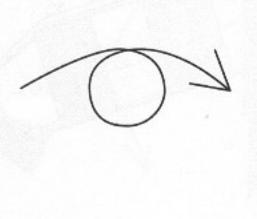
The tiger is the largest member of the cat family. Its strength, beauty, and ferocity are unrivalled among cats. Tigers may grow to be in excess of 10 feet long and 3 feet tall. Full grown males may weigh over 600 pounds. The largest sub-species is the Siberian tiger, found in the snowy reaches of Siberia. Tigers' coats, striped with distinctive black slashes on orange and white, are among the most stunning coats of the cat family.

Tigers are solitary hunters. They usually hunt at night, using excellent hearing and vision. Their prey consists mainly of larger animals—deer, antelope, wild oxen, and boar. Although most cats dislike water, tigers often take to water on hot days. Tigers have ranges extending over 250 square miles.

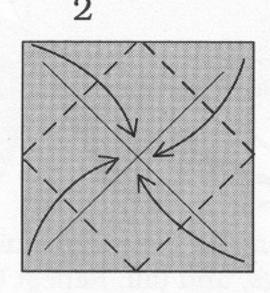
Once found throughout Asia, tigers are now only in selected areas of India, Russia, China, and Indonesia. Tiger numbers have greatly dwindled since 1900, when 40,000 were found in India alone. Today, only 4,000 remain in India. Tigers can be seen in most zoos.



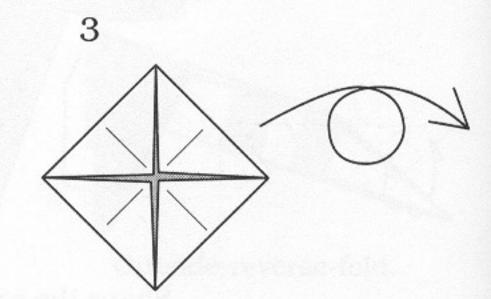
Fold and unfold

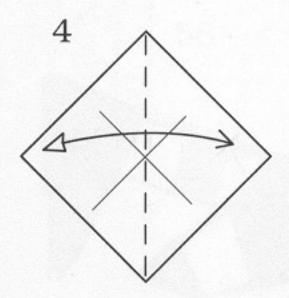


along the diagonals.

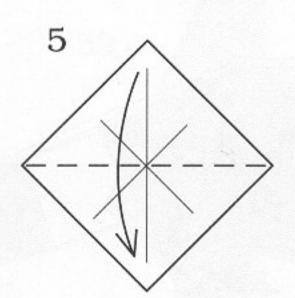


Fold the corners to the center.

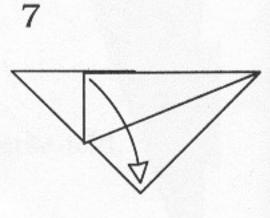




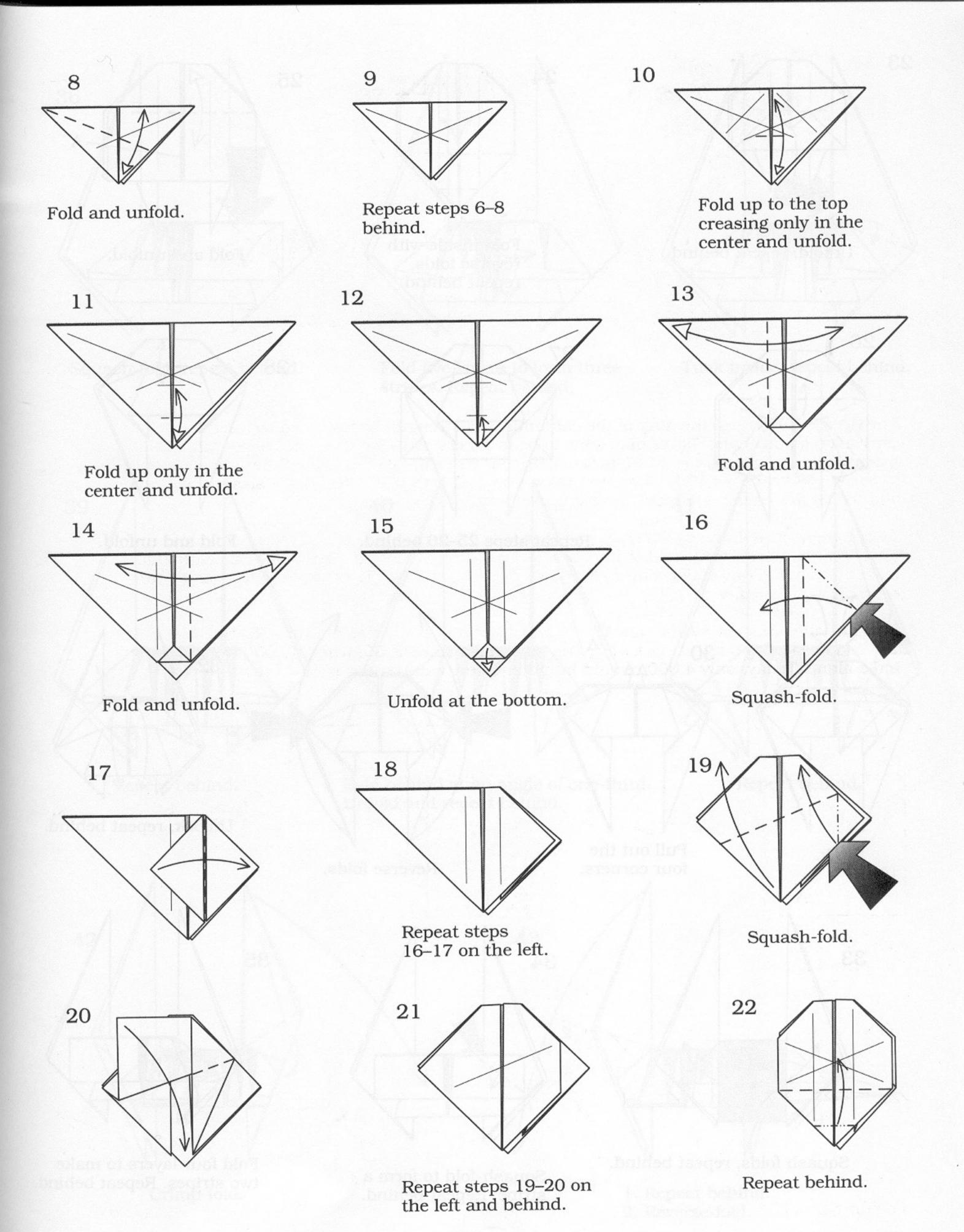
Fold and unfold.

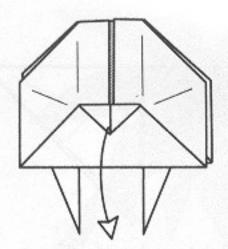


6

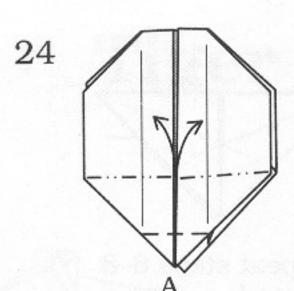


Unfold.

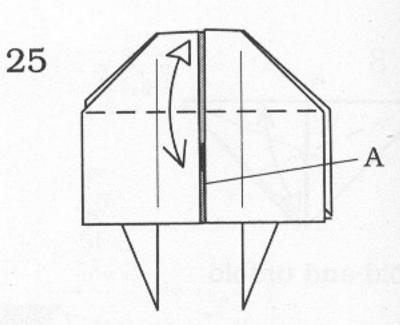




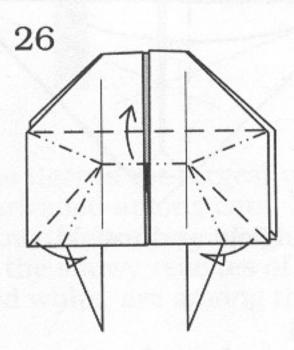
Unfold, repeat behind.



Fold inside with reverse folds, repeat behind.

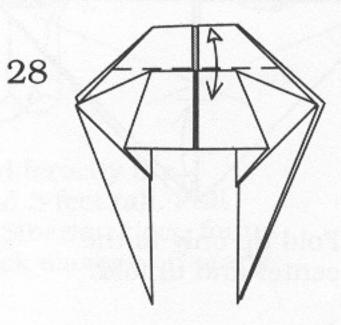


Fold and unfold.

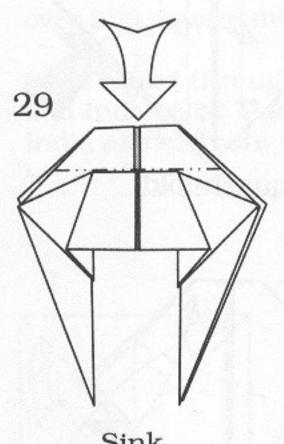


27

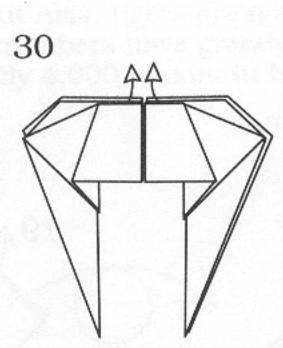
Repeat steps 25-26 behind.



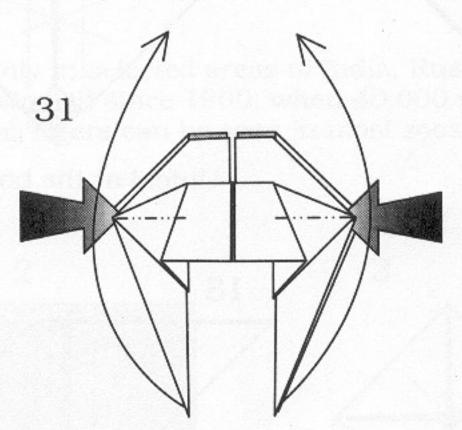
Fold and unfold.



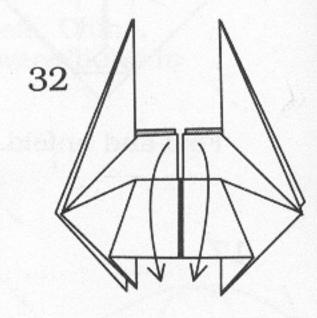




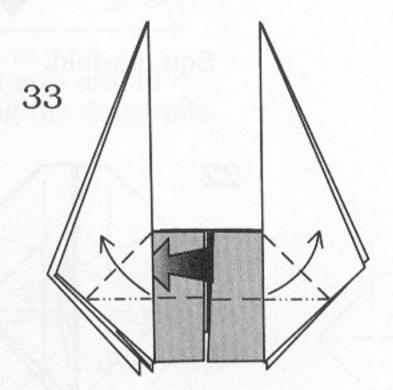
Pull out the four corners.



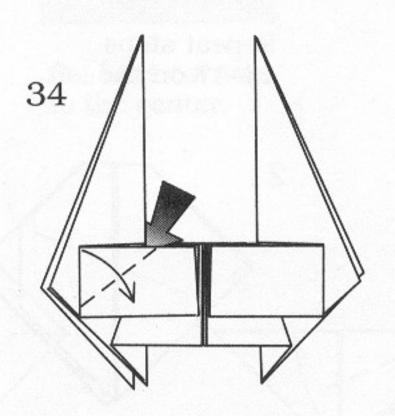
Reverse folds.



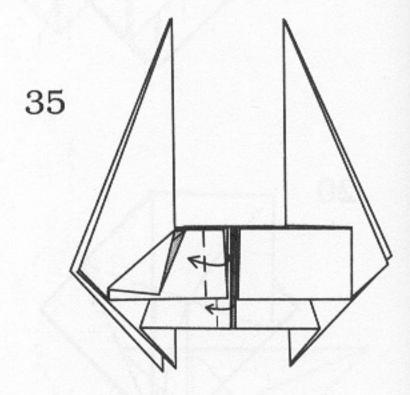
Unlock, repeat behind.



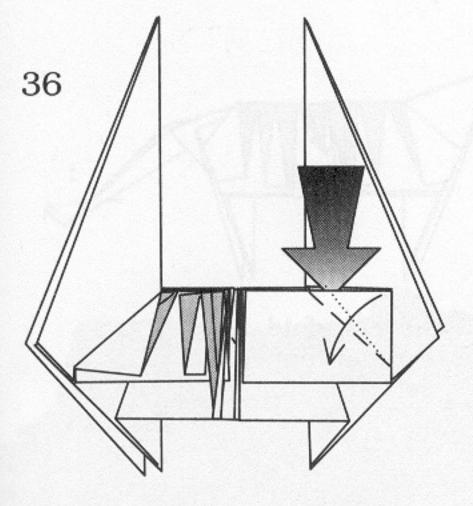
Squash folds, repeat behind.



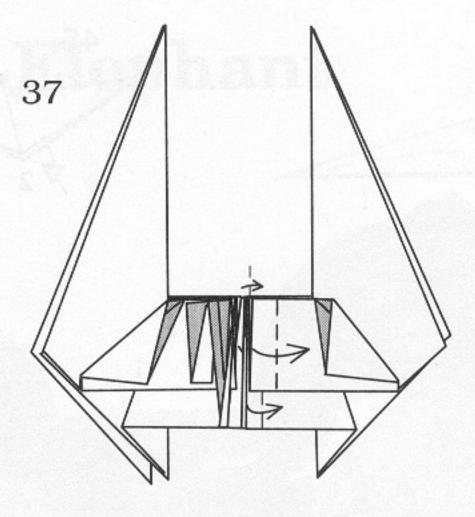
Squash-fold to form a stripe. Repeat behind.



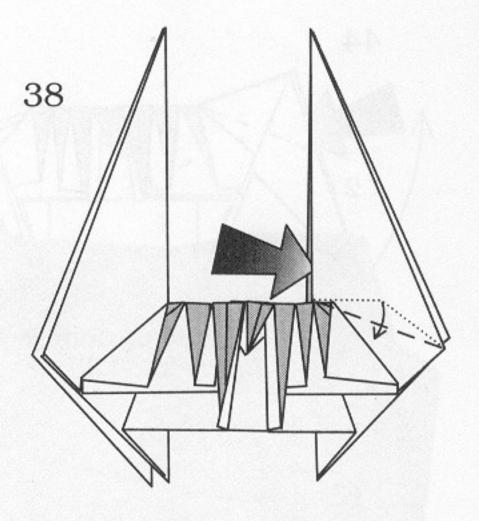
Fold four layers to make two stripes. Repeat behind.



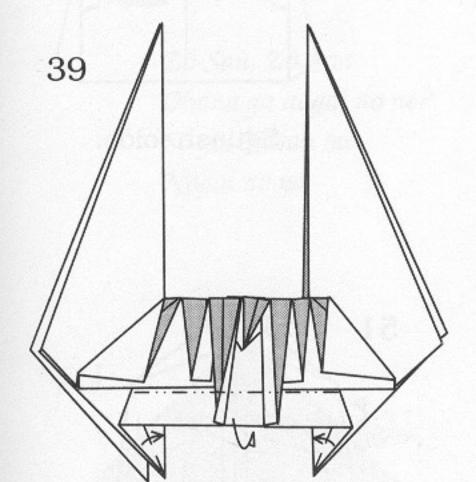
Squash-fold, repeat behind.



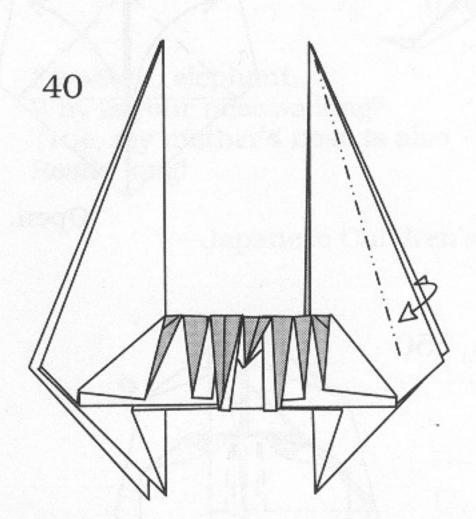
Fold five layers to form three stripes. Repeat behind.



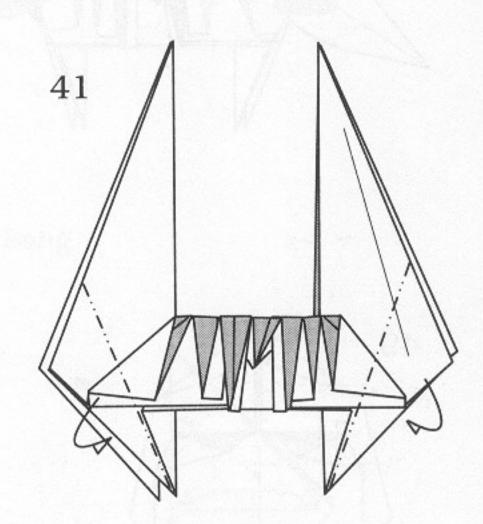
Tuck inside, repeat behind.



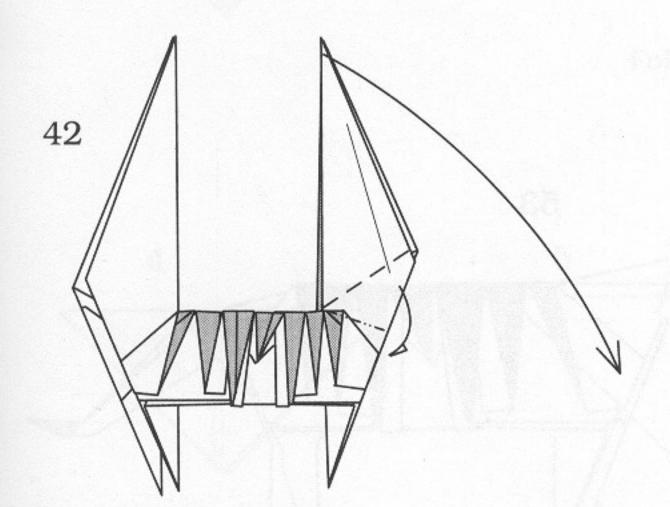
Repeat behind.



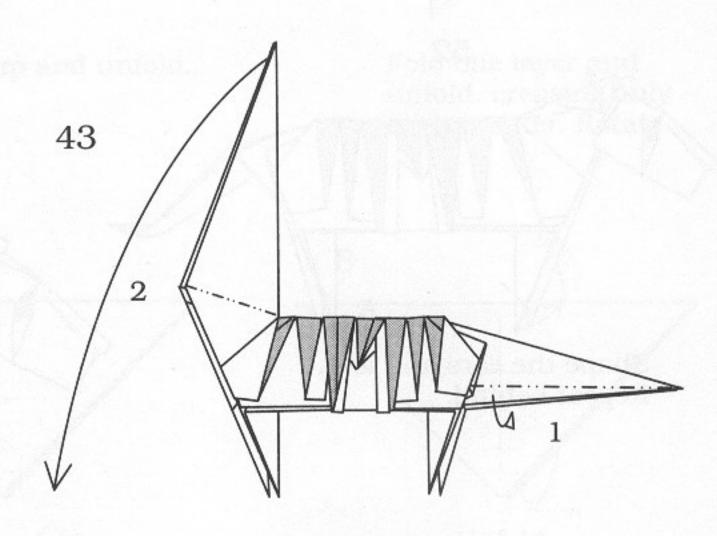
Fold behind at an angle of one-third. Unfold and repeat behind.



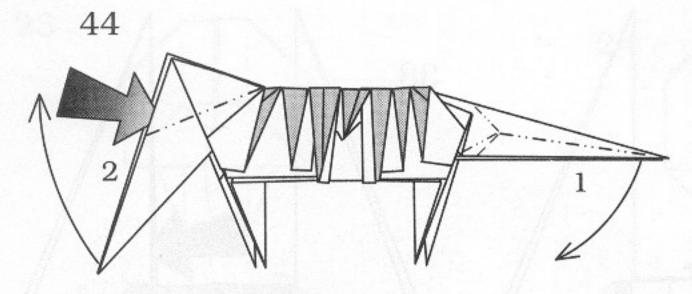
Repeat behind.



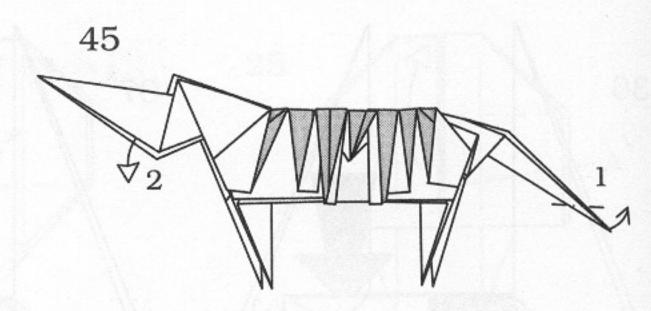
Crimp-fold.



Repeat behind.
 Reverse-fold.

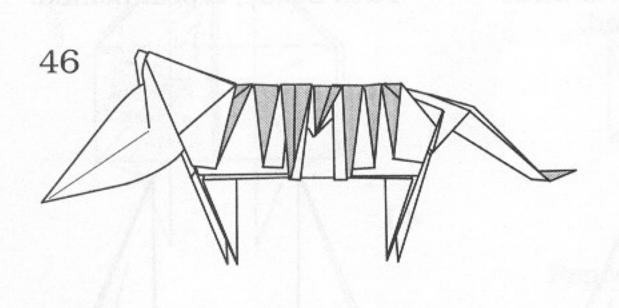


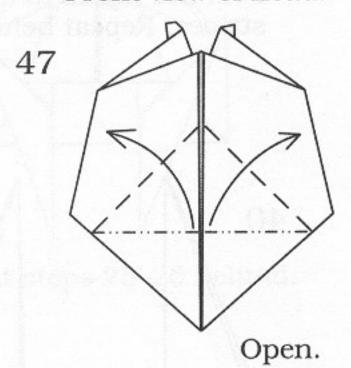
- 1. Double-rabbit-ear.
- 2. Reverse-fold.

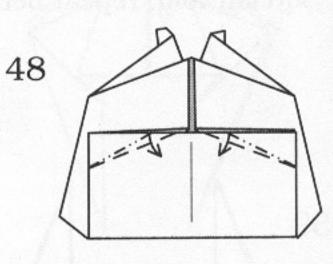


- 1. Reverse-fold.
- 2. Pull out paper, repeat behind.

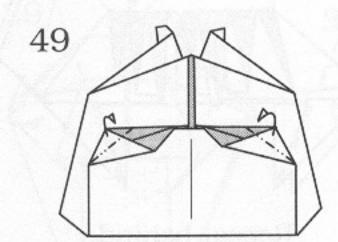


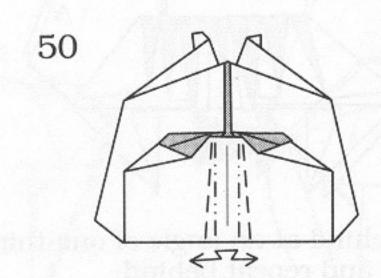


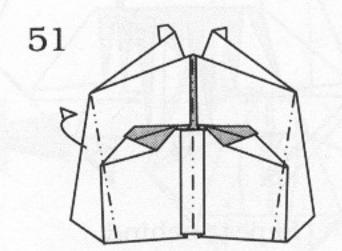




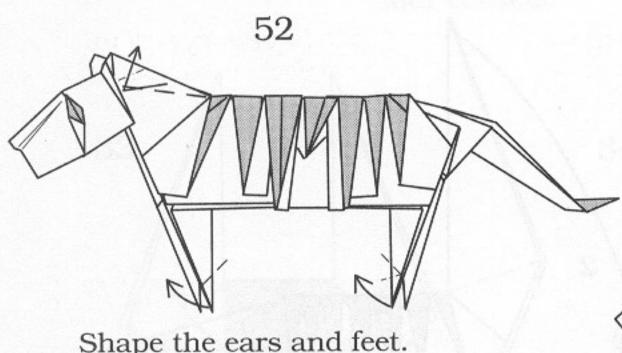
Squash folds.

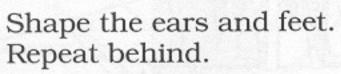


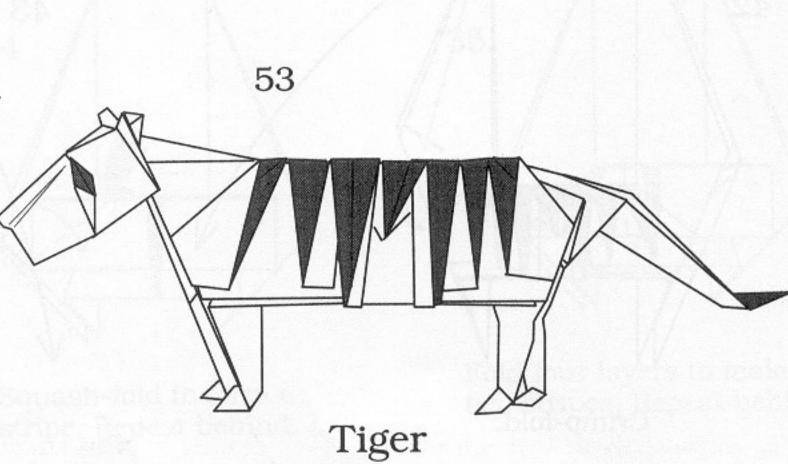




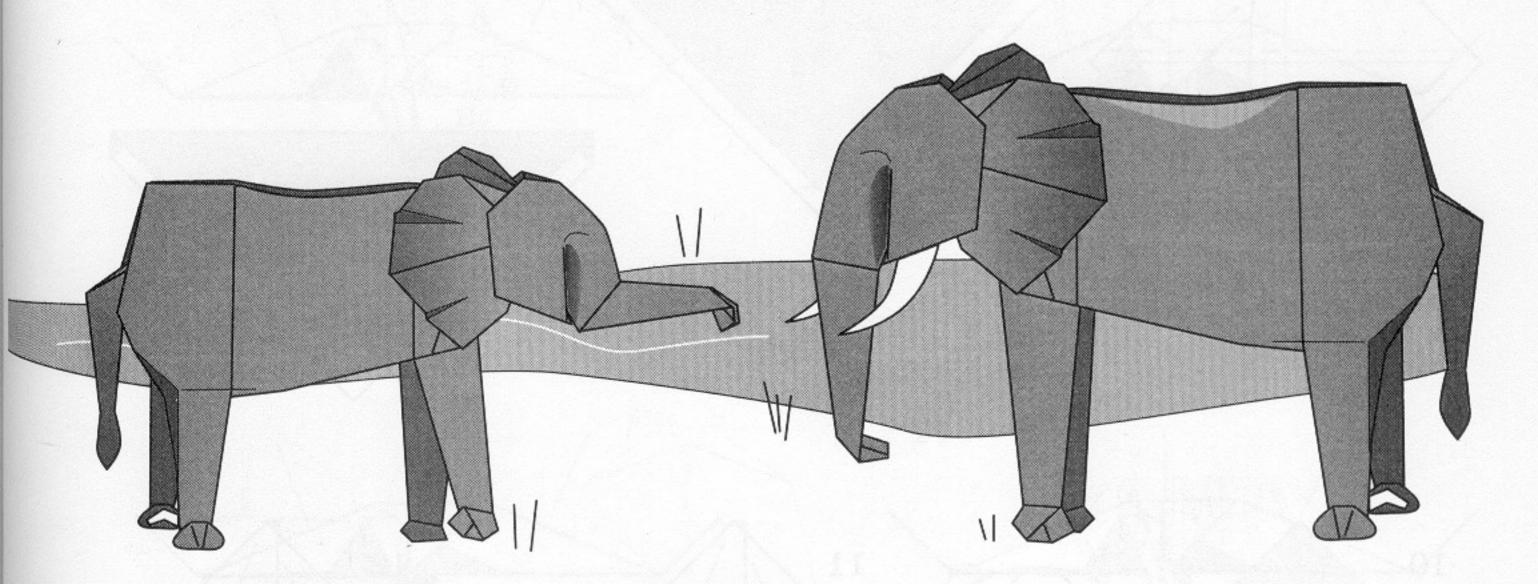
Fold the head in half. It will be three-dimensional.







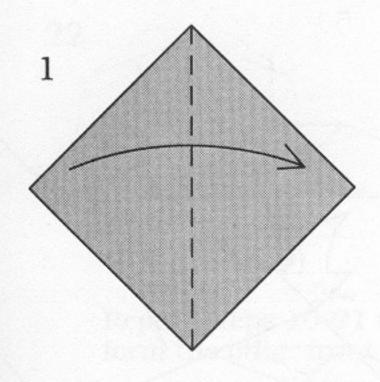
## Elephant

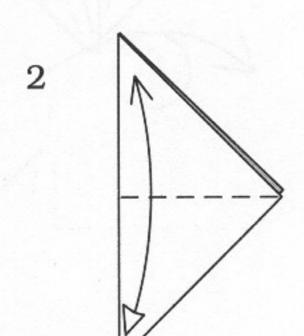


Zō-San, Zō-San Ohana ga nagai no ne? Sō yo, Kāsan mo Nagai no yo.

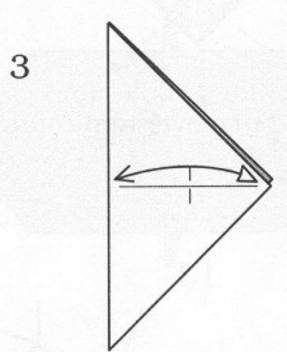
Elephant, elephant, Why is your nose so long? True, my mother's nose is also Really long!

-Japanese Children's Song

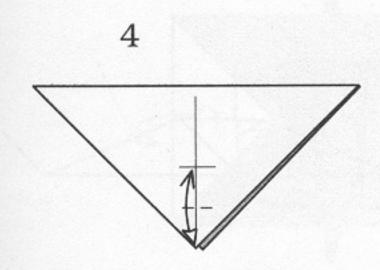




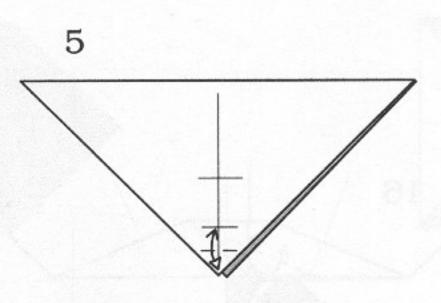
Fold up and unfold.



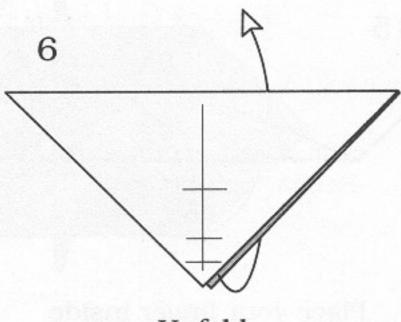
Fold one layer and unfold, creasing only at the center. Rotate.



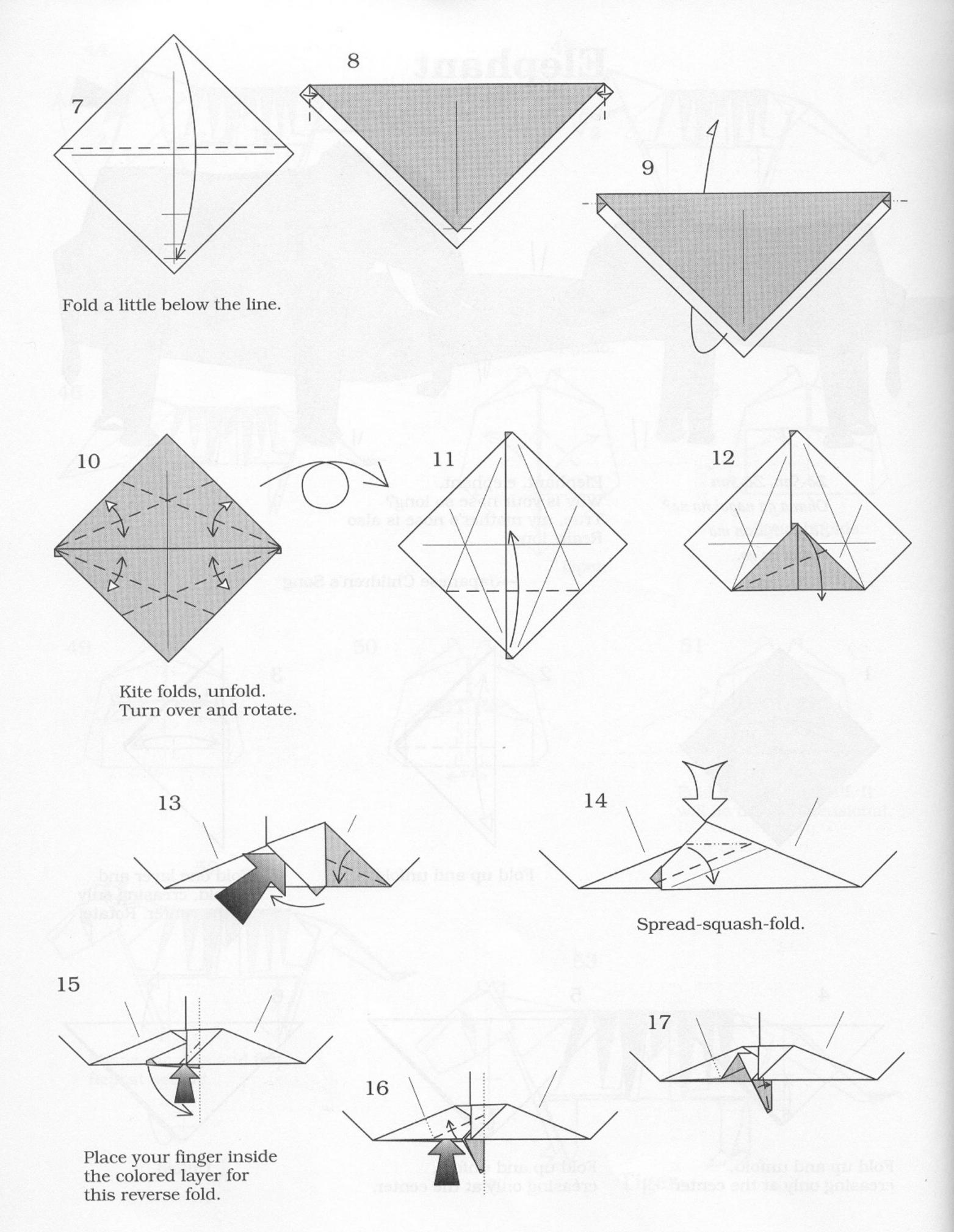
Fold up and unfold, creasing only at the center.

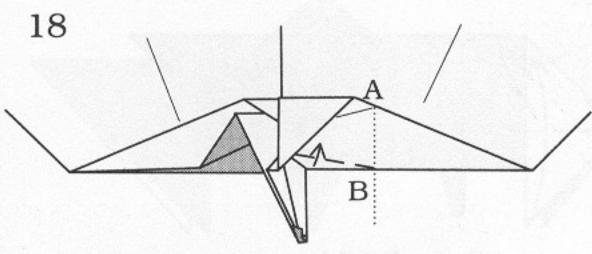


Fold up and unfold, creasing only at the center.

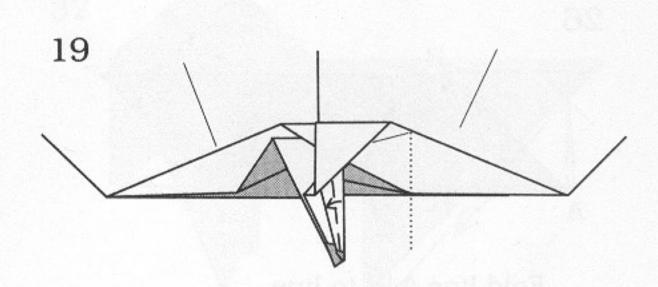


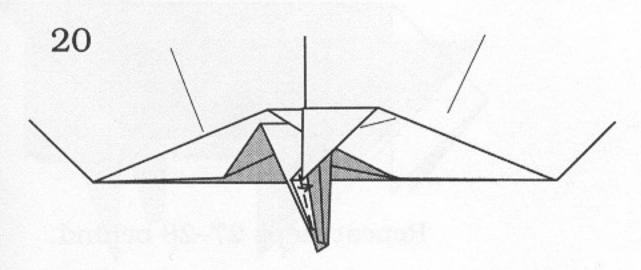
Unfold.





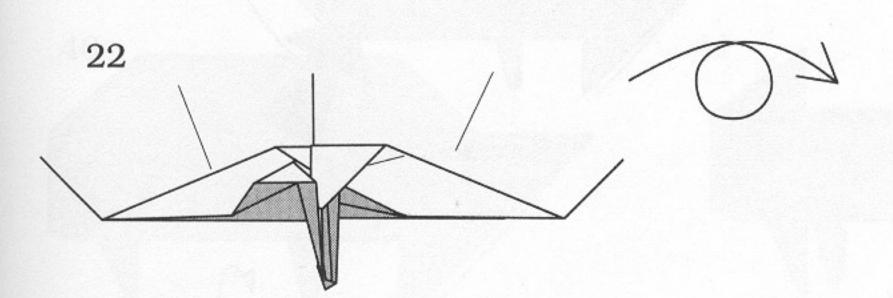
Use A as a guide for B.



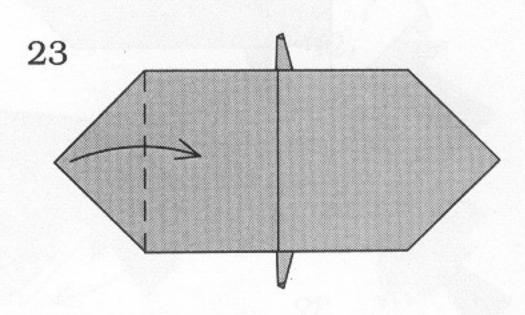


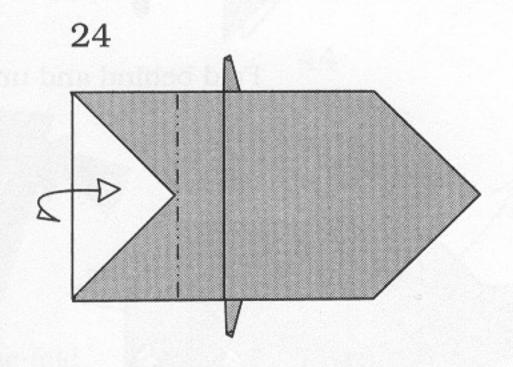
21

Squash-fold.

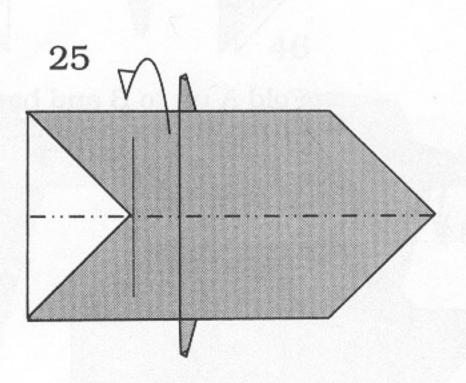


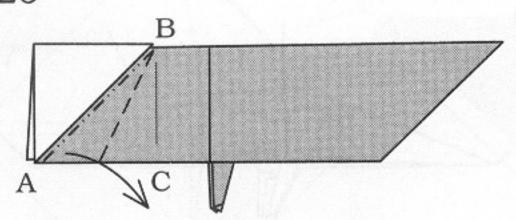
Repeat steps 10–21 to form the other front leg.



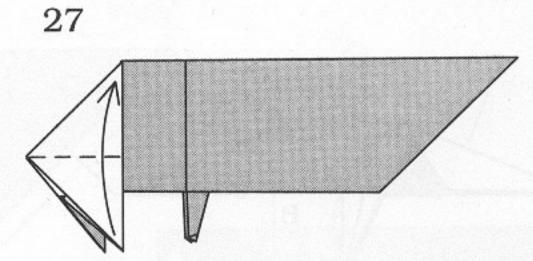


Fold behind and unfold, crease lightly.

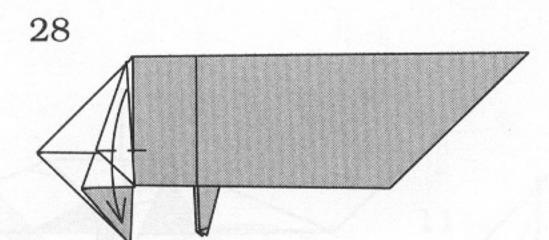


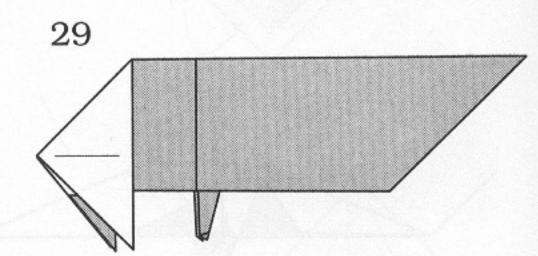


Fold line A–B to line B–C, repeat behind.

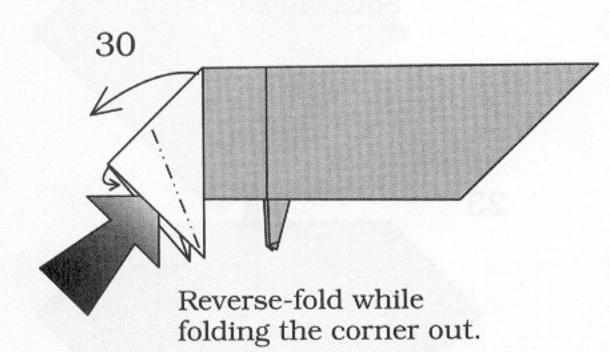


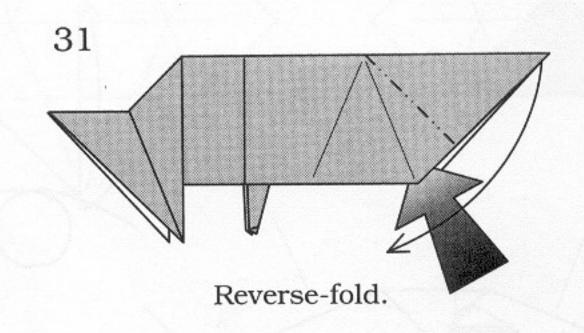
Squash-fold.

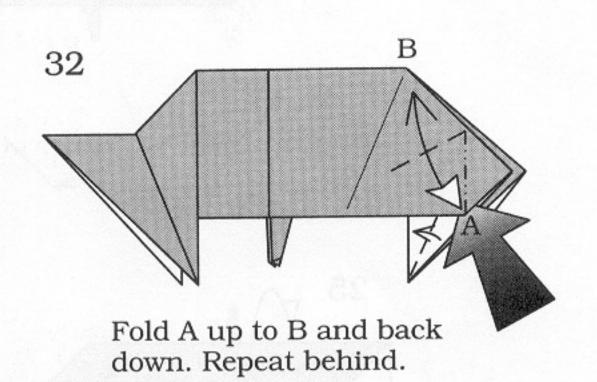


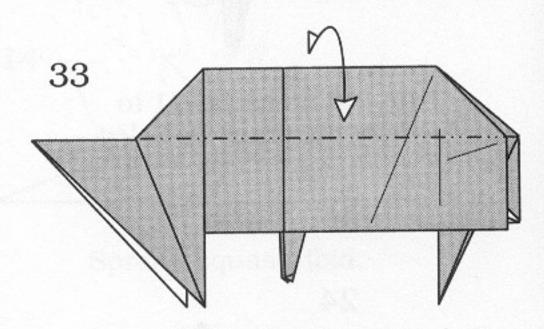


Repeat steps 27–28 behind.

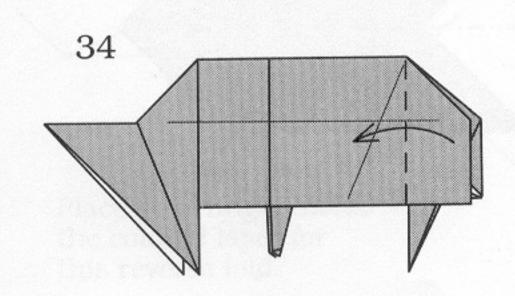


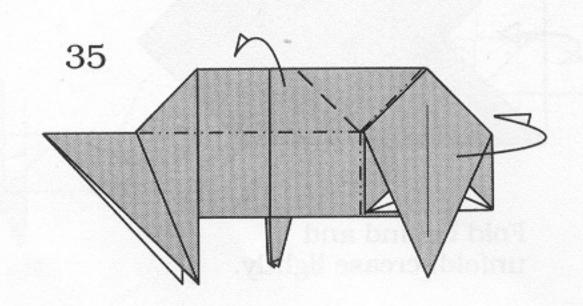


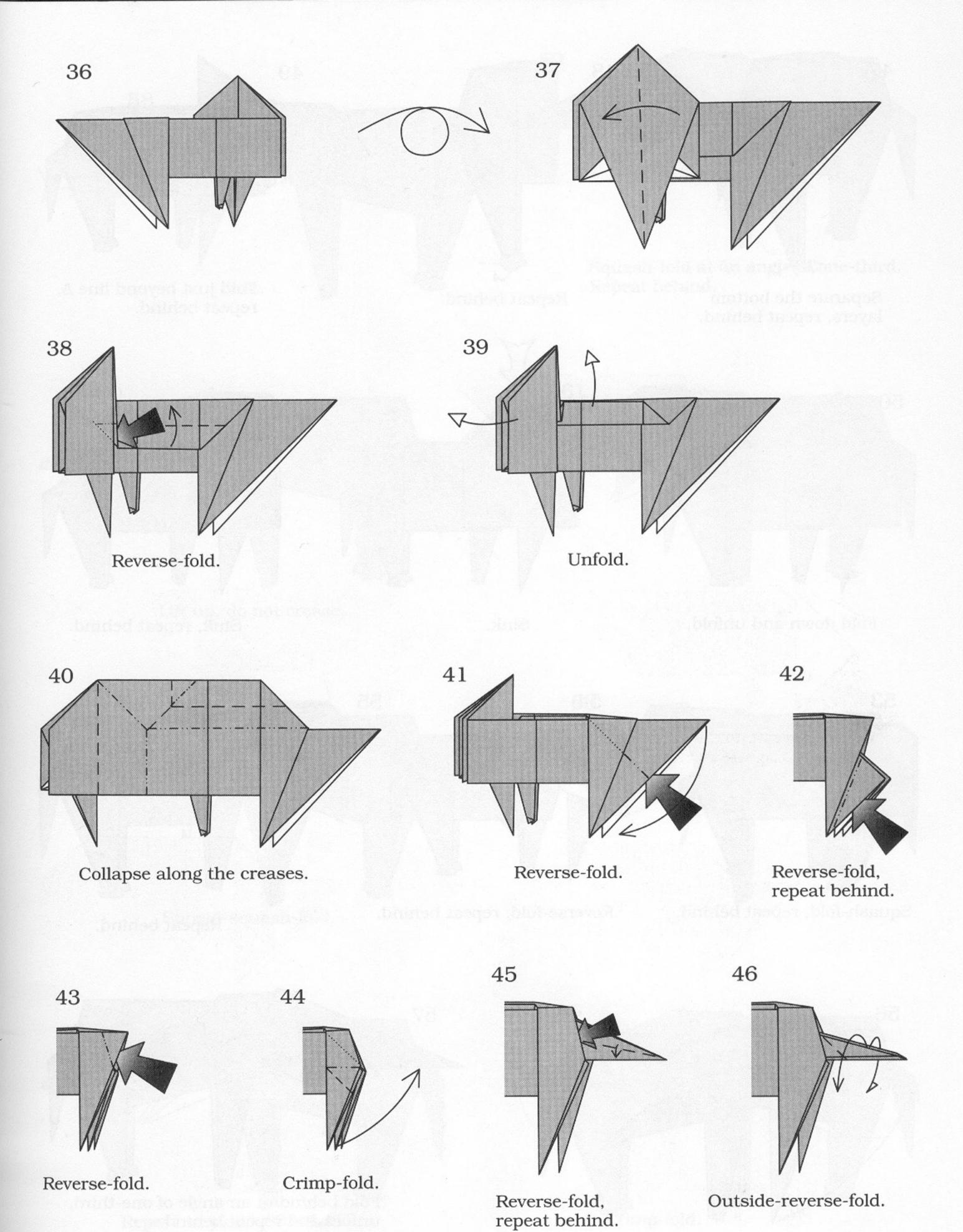


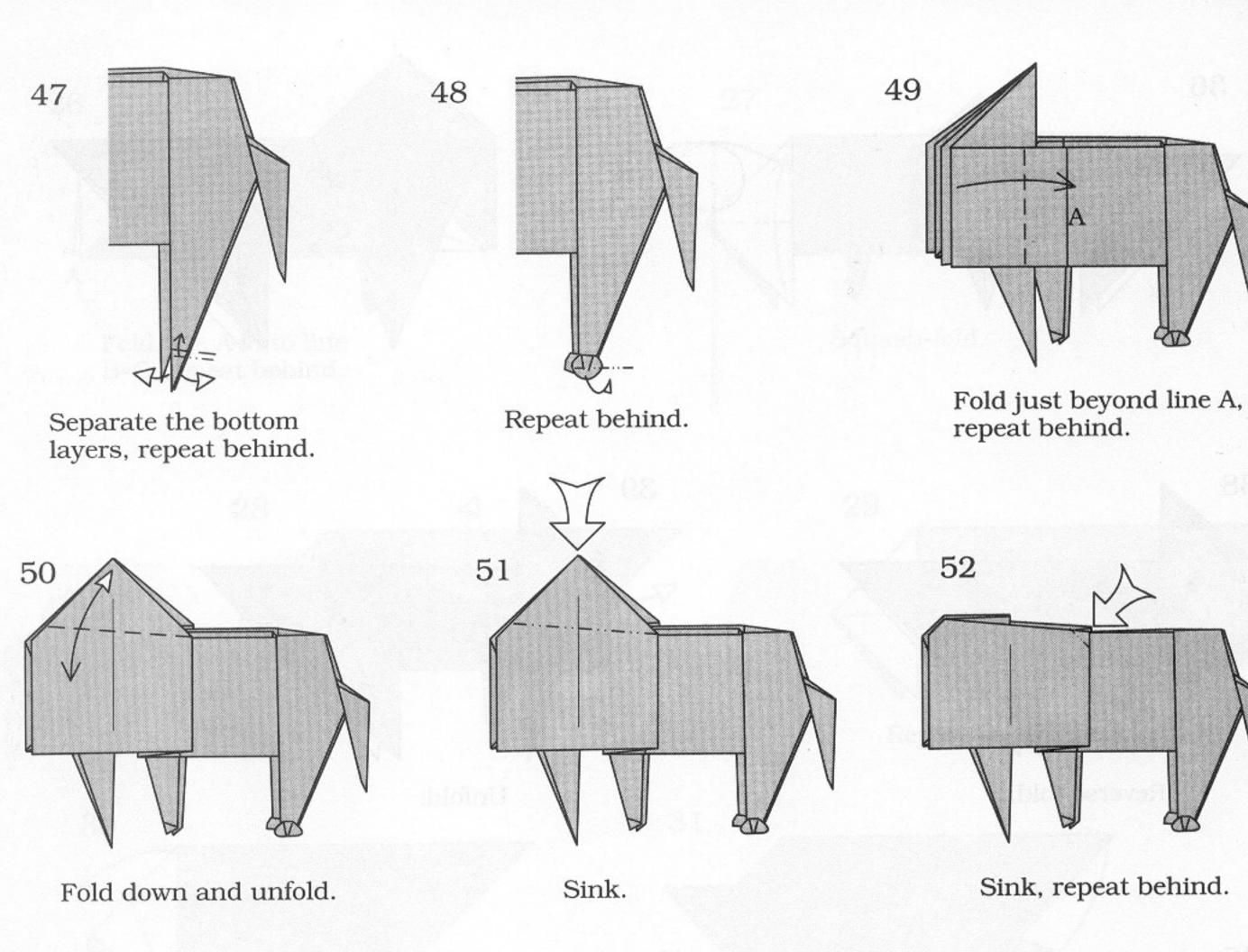


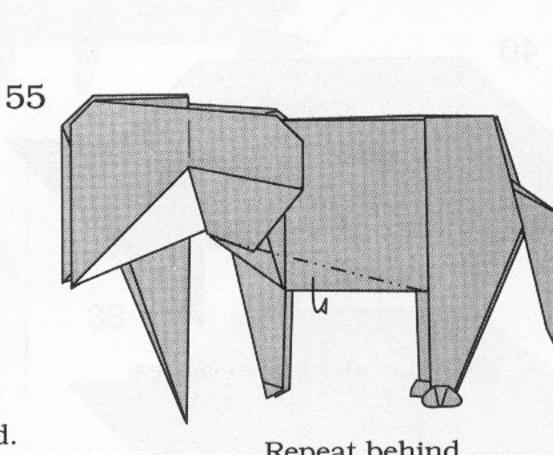
Fold behind and unfold.

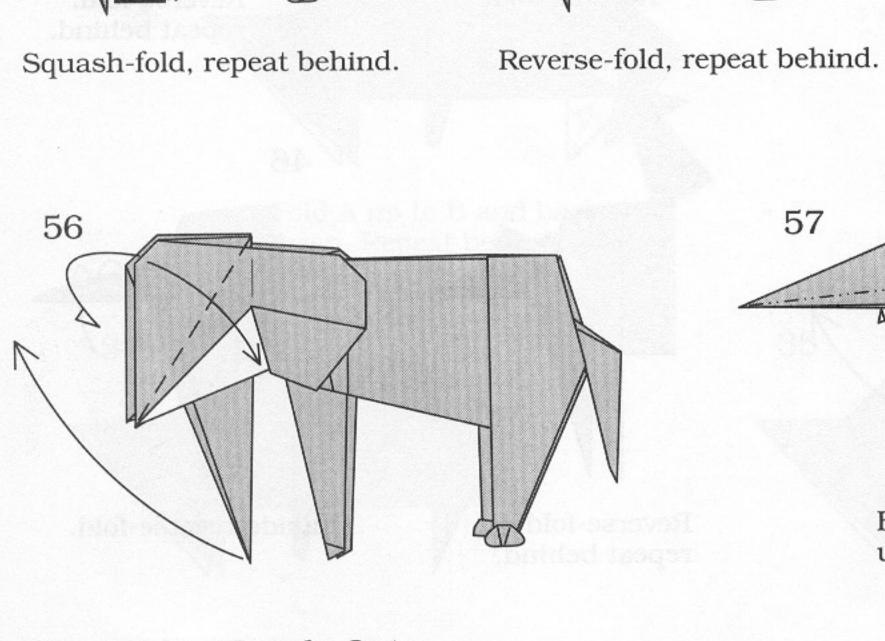


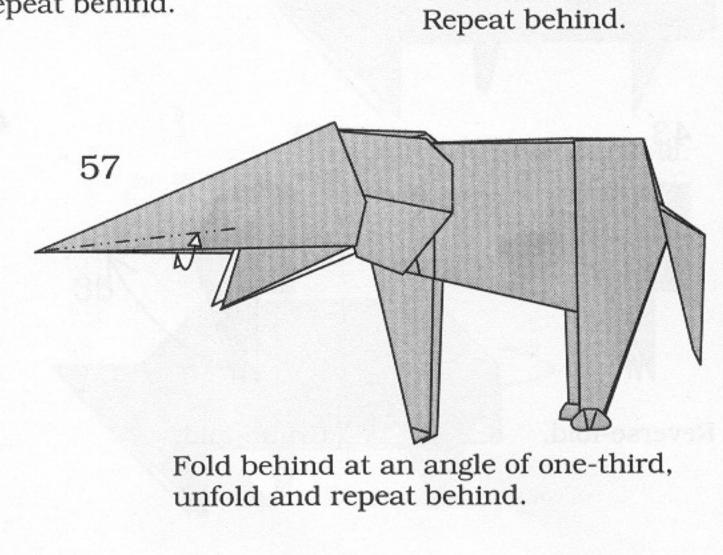


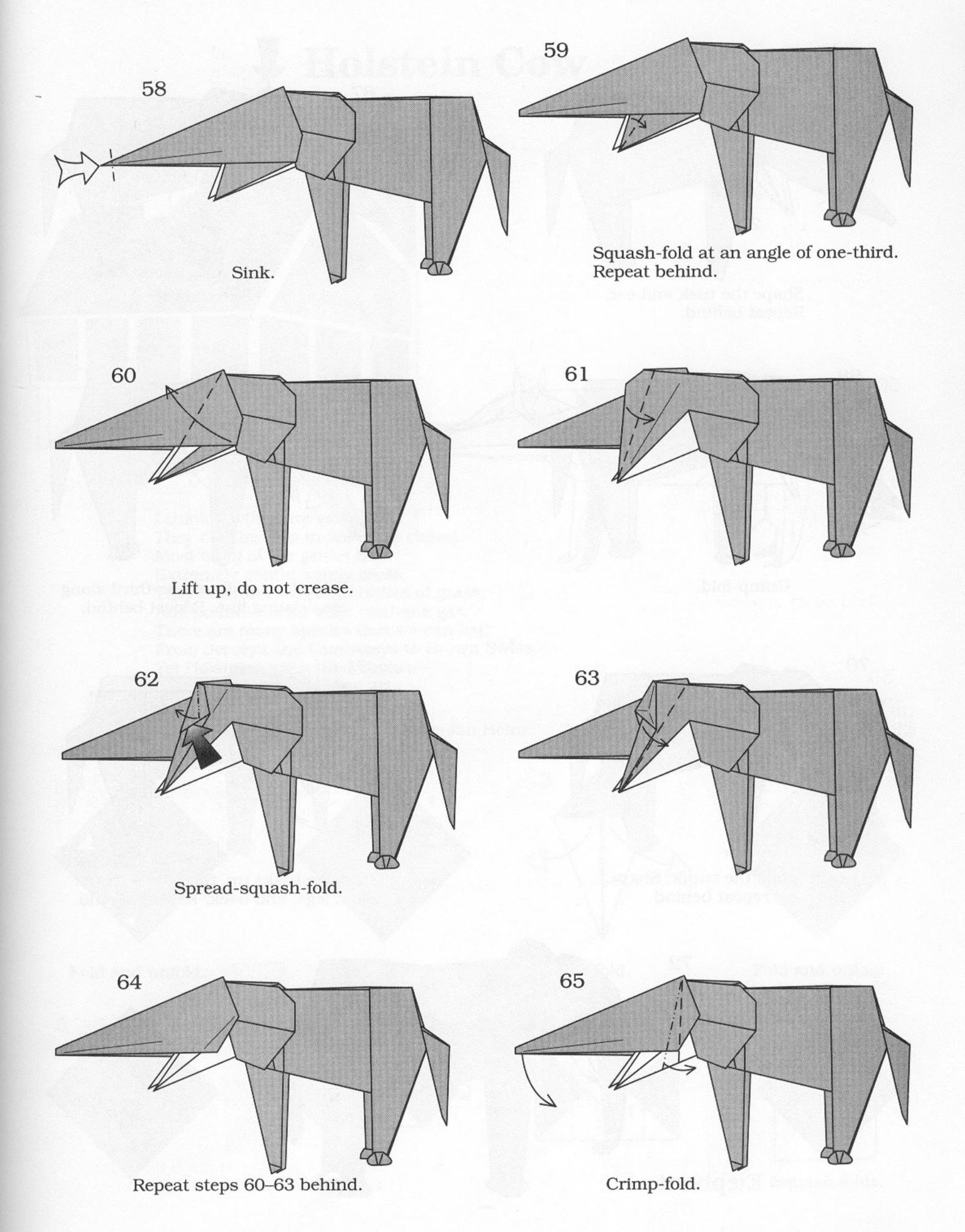


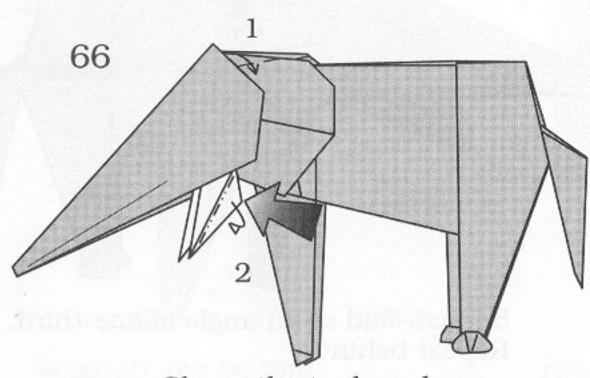




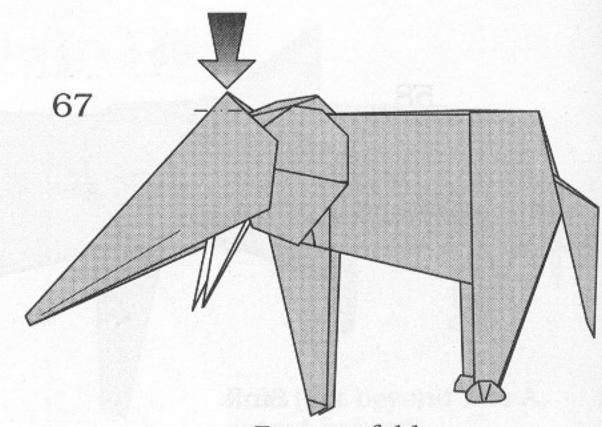




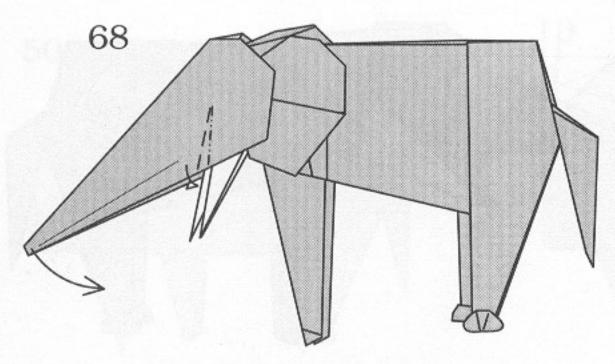




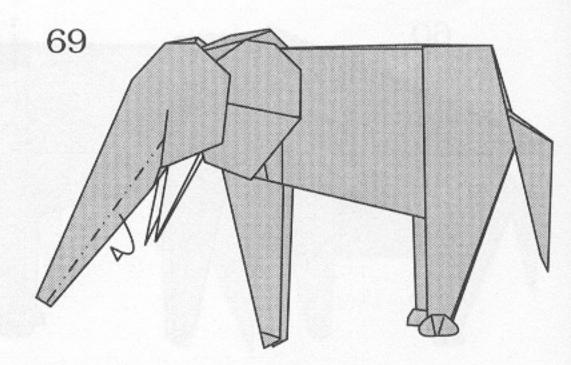
Shape the tusk and ear. Repeat behind.



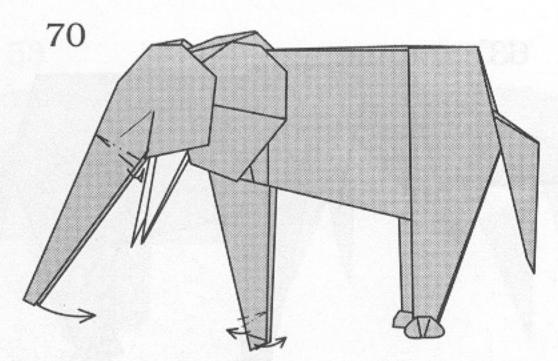
Reverse-fold.



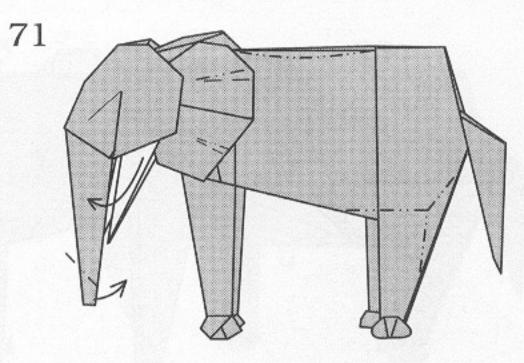
Crimp-fold.



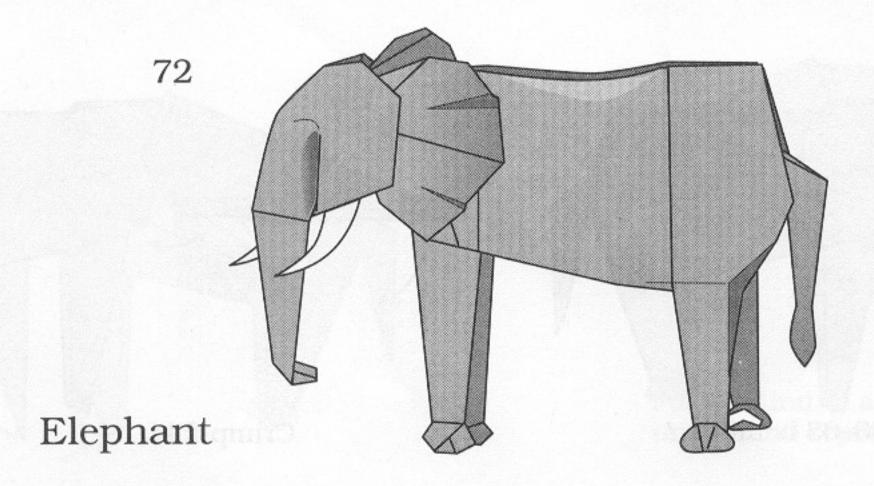
Fold at an angle of one-third along the existing line. Repeat behind.



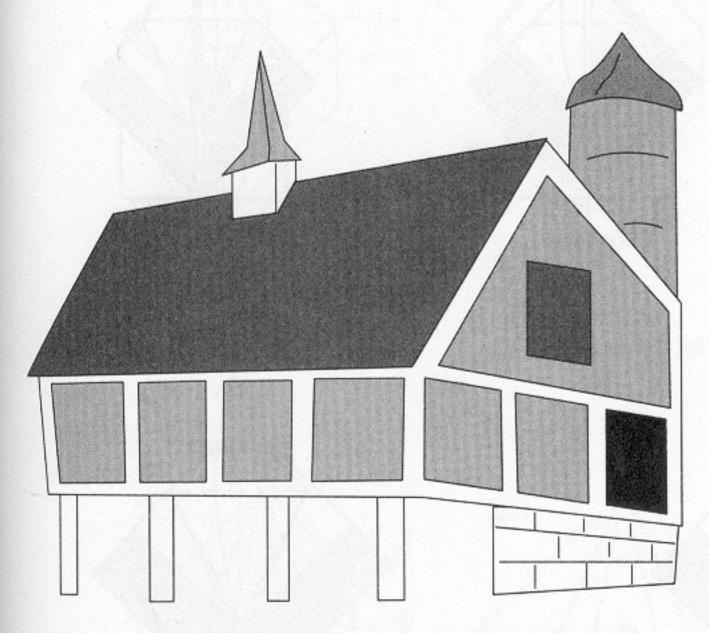
Crimp-fold the trunk. Shape the toes, repeat behind.



Curl the tusks up. Shape the trunk. ears, legs, and back. Repeat behind.



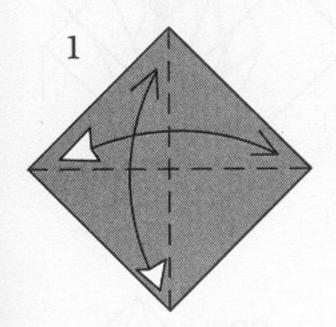
#### **Holstein Cow**



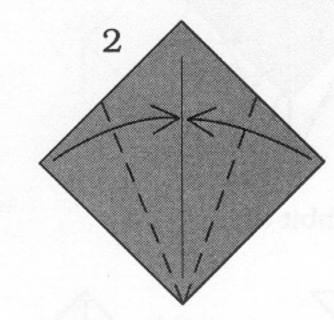
Ode to a Holstein Cow

I think bovines are very fine:
They dot the hills in northern climes.
Most often of the genus Bos,
Extremely gentle, rarely cross,
They consume large quantities of grass,
And pollute the air with methane gas. There are many species that we can list: From Jerseys and Guernseys to Brown Swiss. Yet Holsteins are a breed apart— Black and white, origami art.

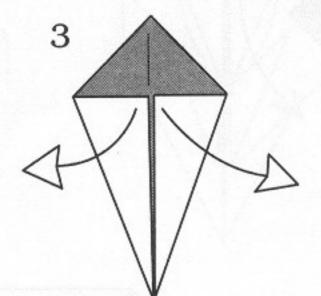
#### Jeremiah Helm



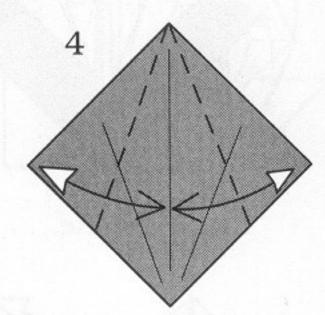
Fold and unfold.



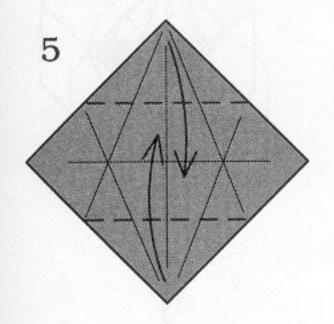
Kite-fold.

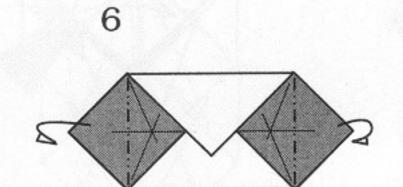


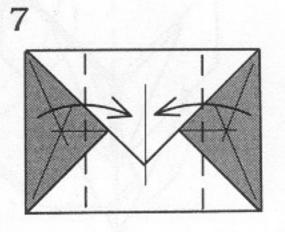
Unfold.

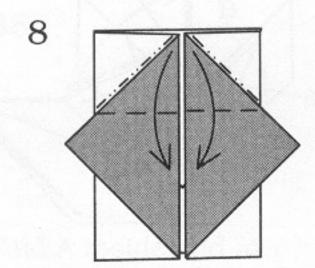


Fold and unfold.

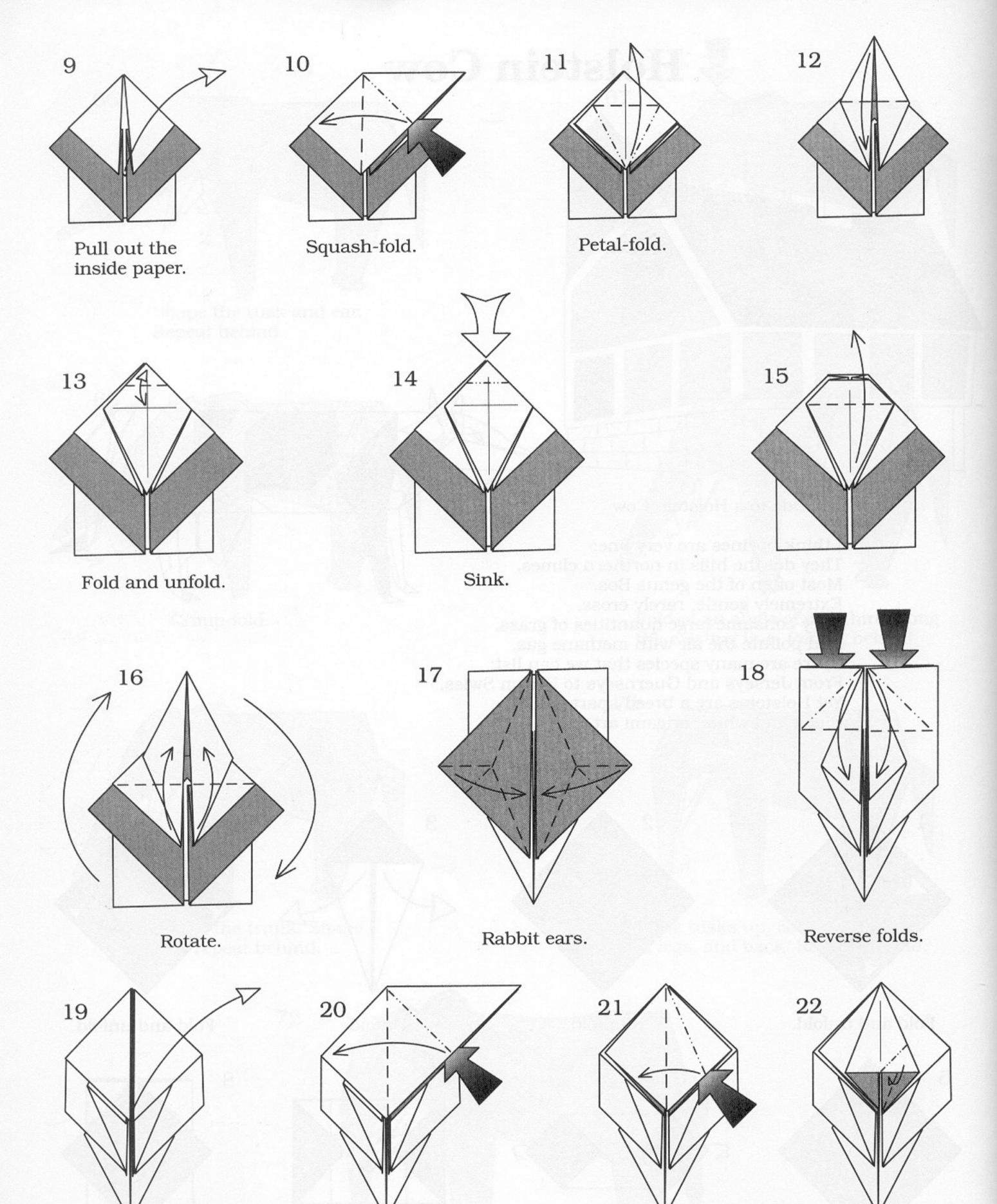








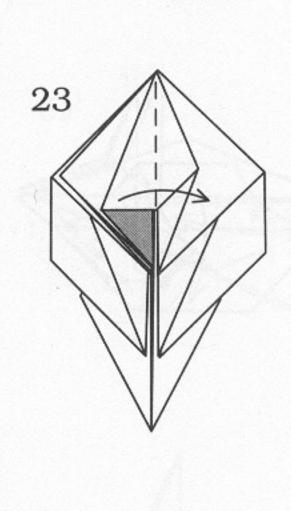
Squash folds.

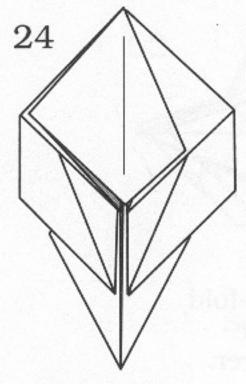


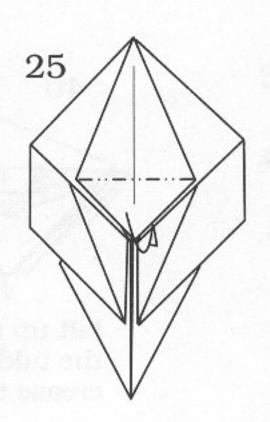
Squash-fold.

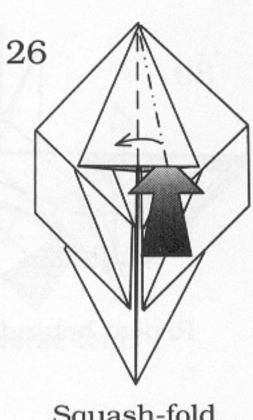
Squash-fold.

Pull out the inside paper.



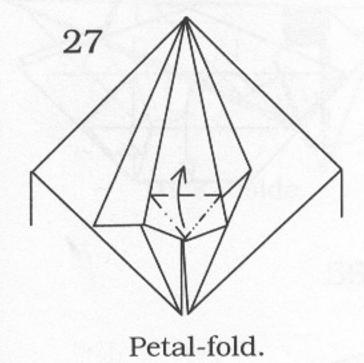


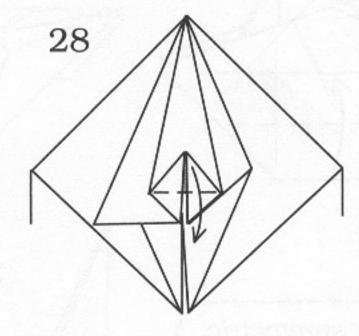


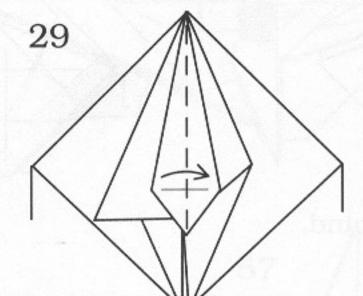


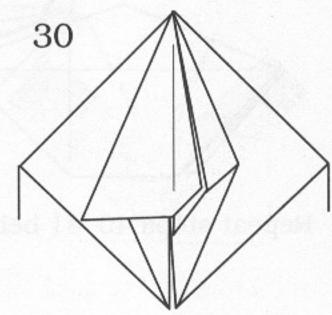
Repeat steps 21–23 on the left.

Squash-fold.

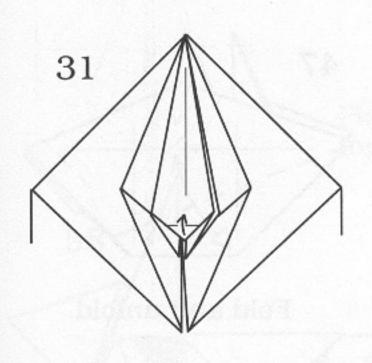


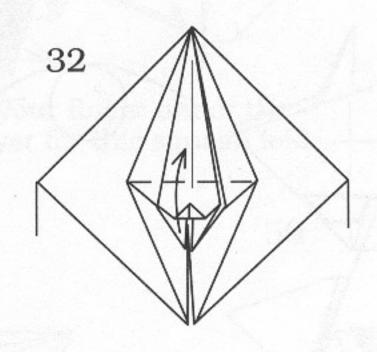


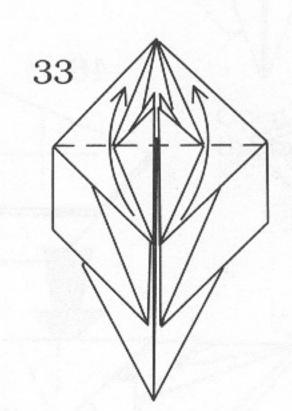


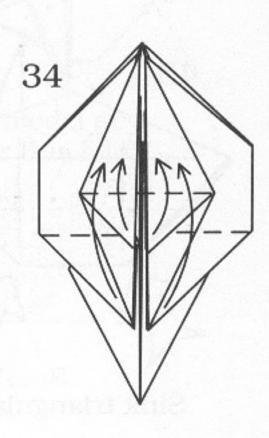


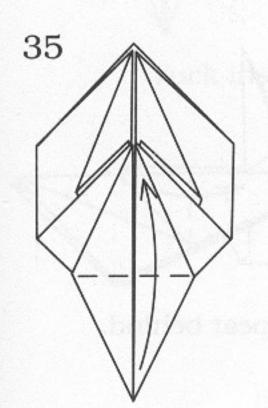
Repeat steps 26–29 on the left.

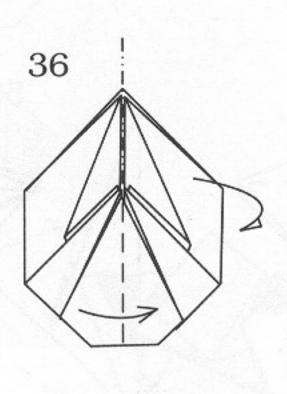


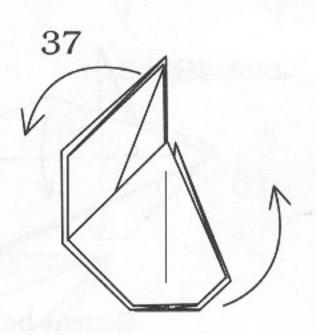




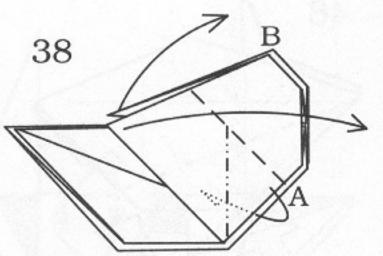




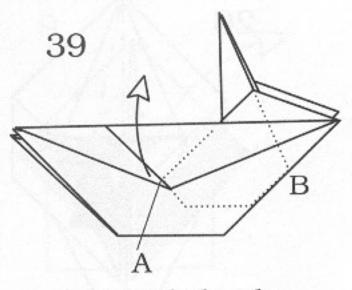




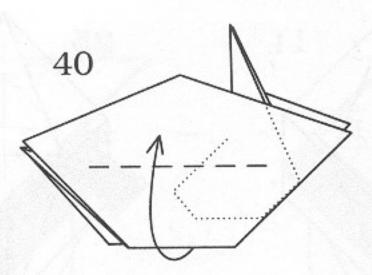
Rotate.



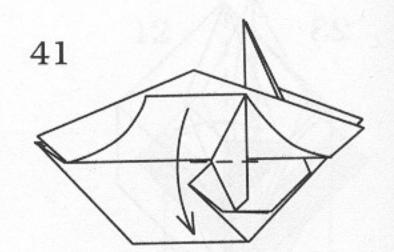
Fold A inside and to the left, repeat behind at the same time.



Repeat behind.

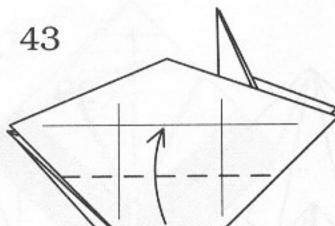


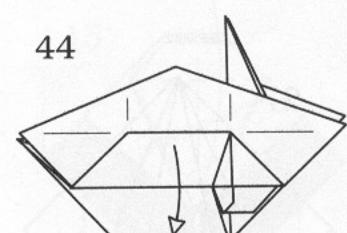
Lift up to squash-fold the udder. Do not crease the top layer.



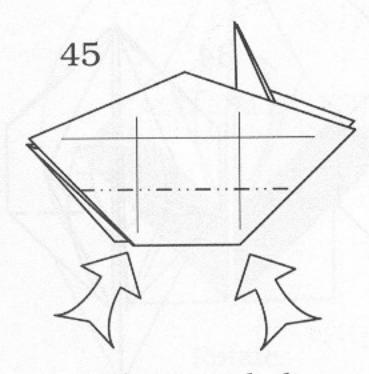
42

Repeat steps 40-41 behind.

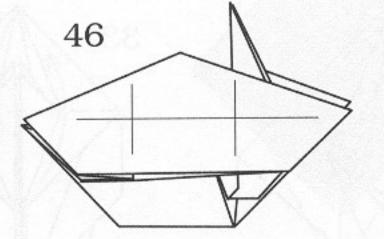


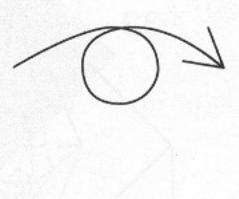


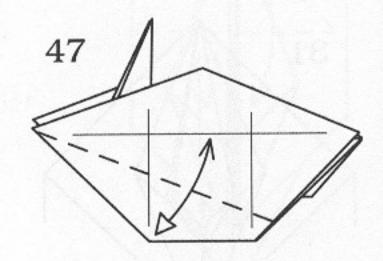
The folding is no longer symmetric. Be sure to orient your model along with the diagrams.



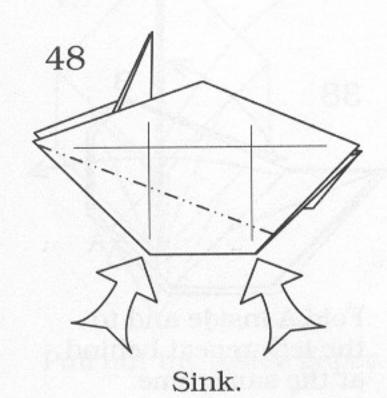
Sink triangularly.





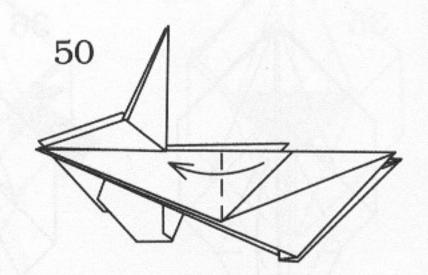


Fold and unfold.

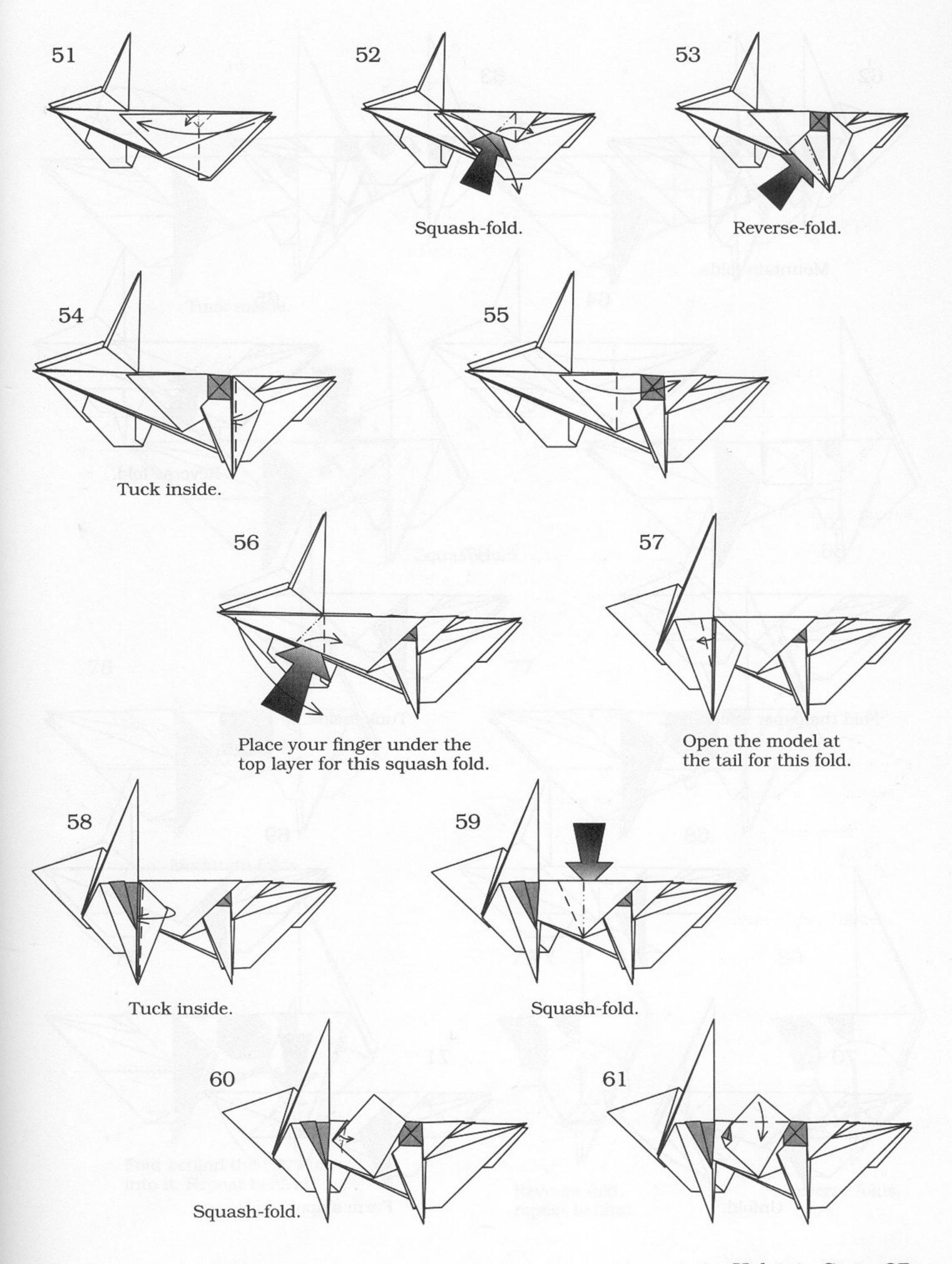


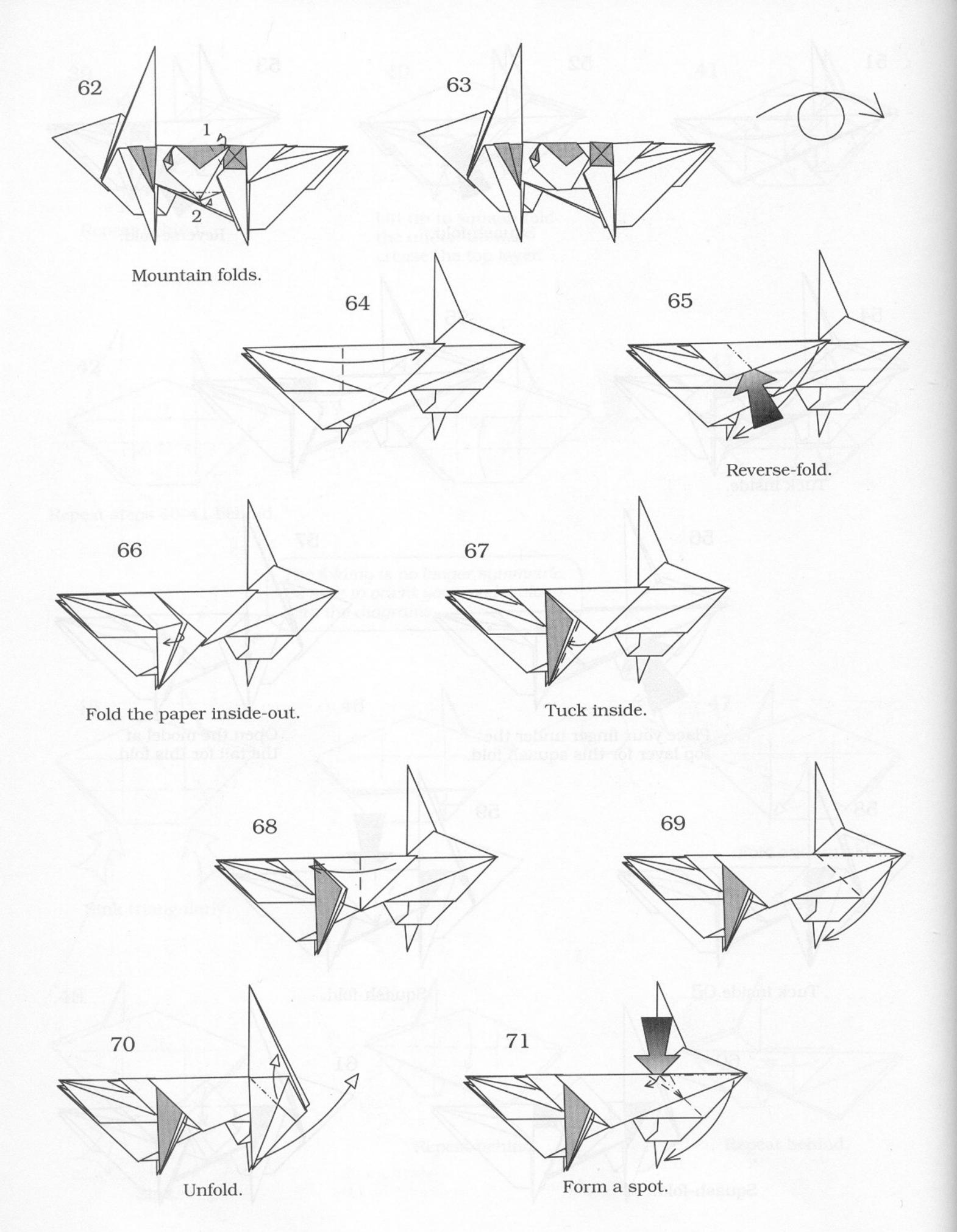
49

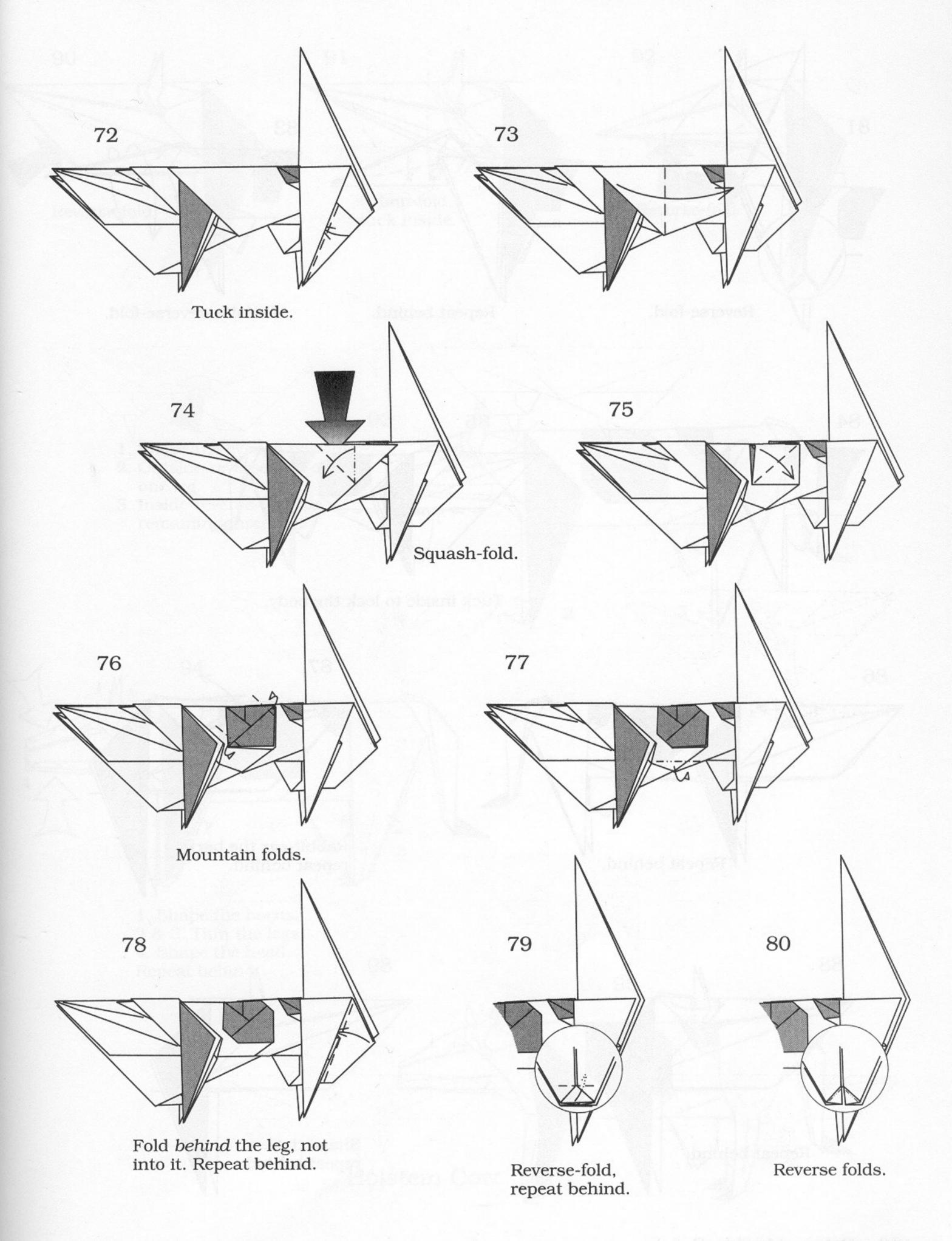
Repeat behind.

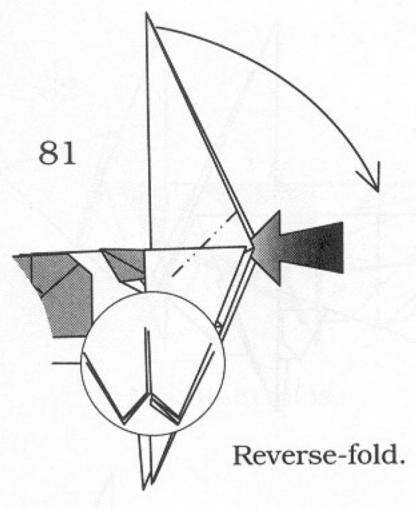


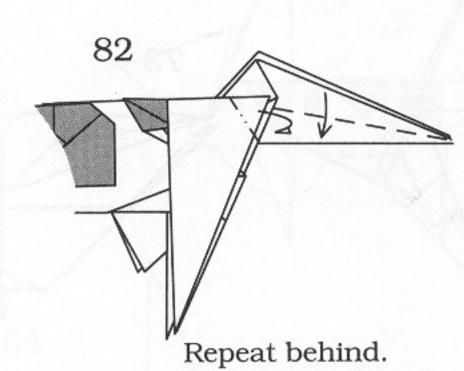
Repeat behind.

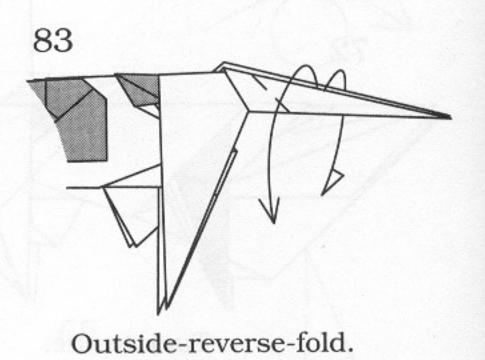




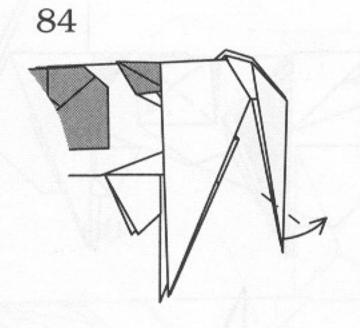


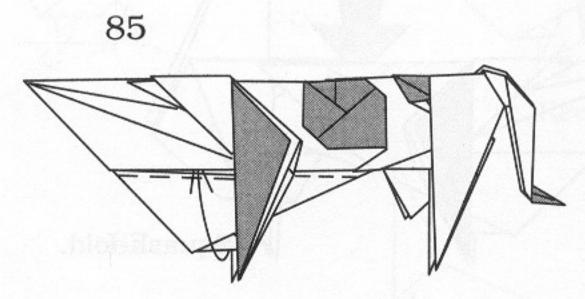




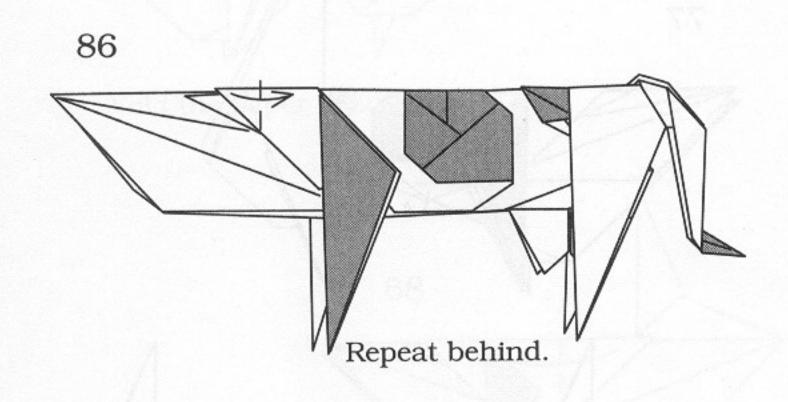


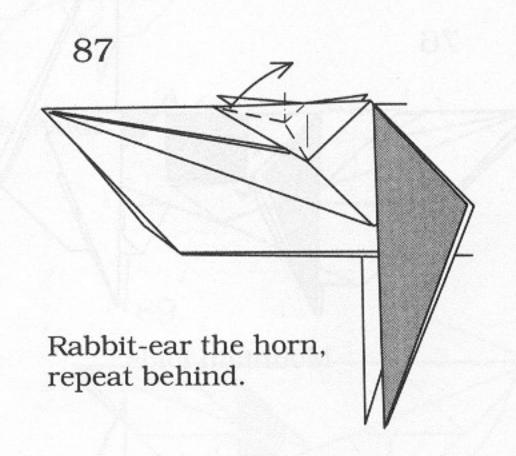


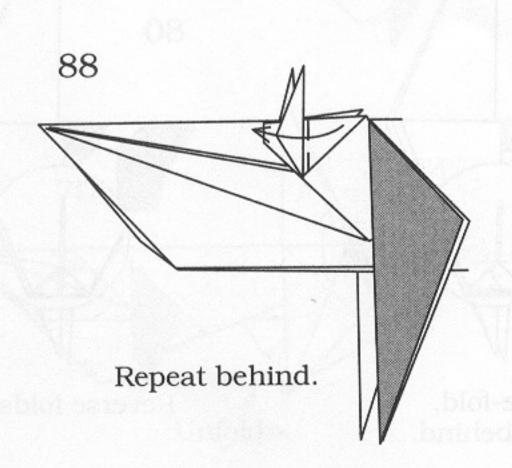


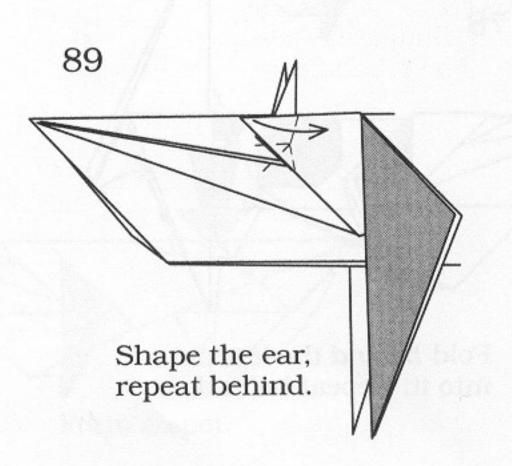


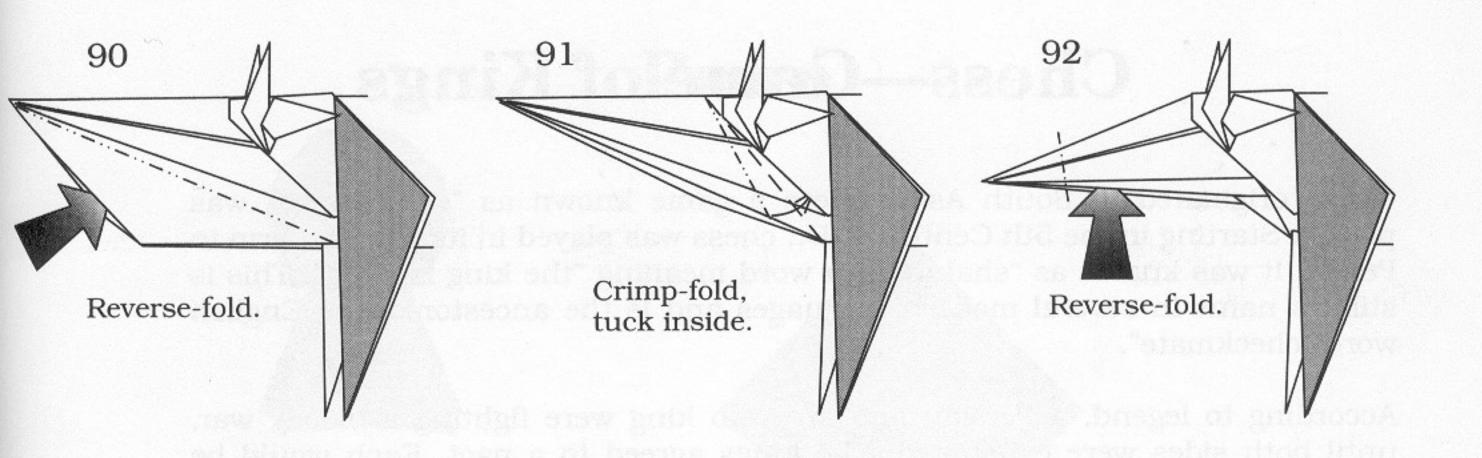
Tuck inside to lock the body.



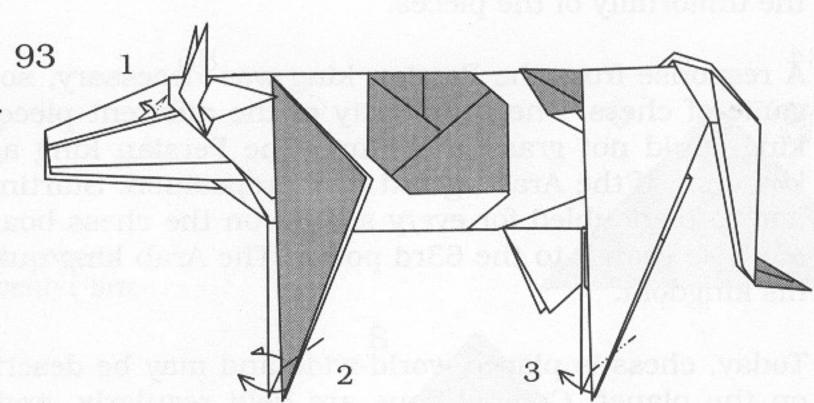


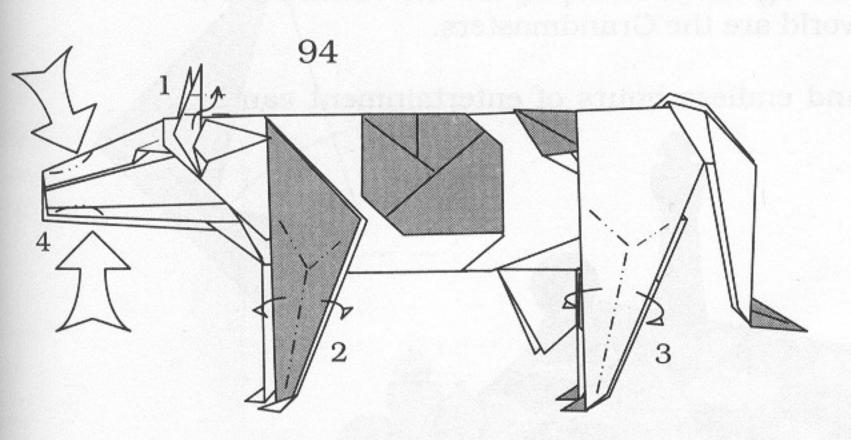




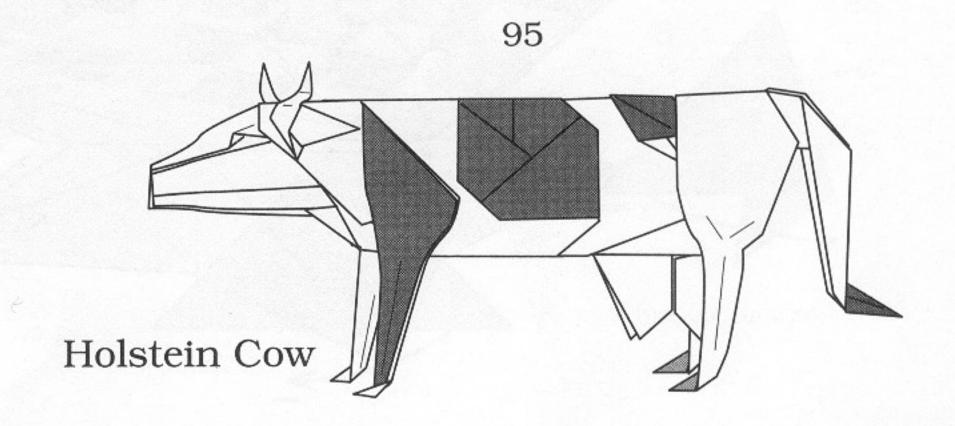


- Shape the eyes, if possible.
   Outside-reverse-fold only
- one leg. 3. Inside-reverse-fold the remaining three legs.





- 1. Shape the horns.
- 2 & 3. Thin the legs.
- 4. Shape the head. Repeat behind.



### Chess—Game of Kings

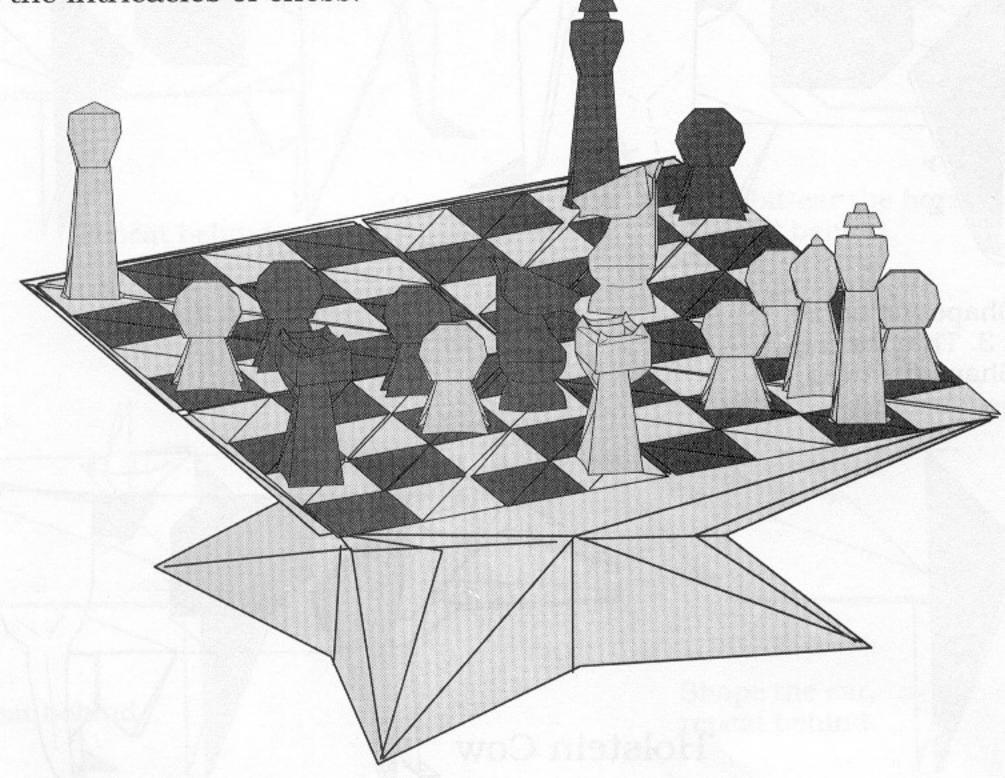
Chess originated in South Asia, where a game known as "chaturanga" was played. Starting in the 5th Century A.D., chess was played in its present form in Persia. It was known as "shahmat," a word meaning "the king is dead". This is still its name in several modern languages and is the ancestor of the English word "checkmate".

According to legend, a Persian and an Arab king were fighting a bloody war, until both sides were exhausted. The kings agreed to a pact. Each would be required to invent a game, and if the other could not learn how to play, he would be required to forfeit half his kingdom. The Arabian king sent the ancient equivalent of checkers, which was easily understood by the Persian king, due to the uniformity of the pieces.

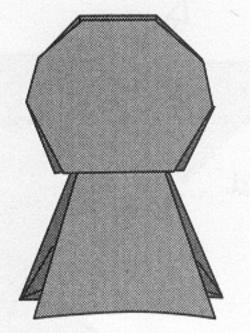
A response from the Persian king was necessary, so he invented and sent the game of chess. The complexity of the different pieces was such that the Arab king could not grasp the game. The Persian king agreed not to take half his kingdom, if the Arab agreed to a proposition. Starting with one grain of rice, it had to be doubled for every square on the chess board. Mathematically, this is one less than 2 to the 63rd power. The Arab king quickly agreed to give up half his kingdom.

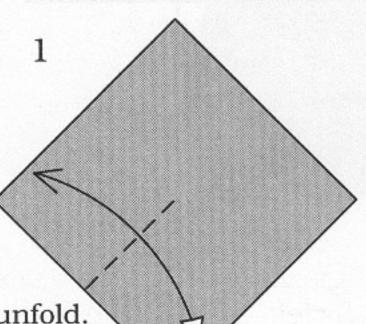
Today, chess is played world-wide and may be described as the foremost game on the planet. Competitions are held regularly, and players are ranked on a point system. The elite of the chess world are the Grandmasters.

Anyone can quickly learn to play, and endless hours of entertainment can be found in the intricacies of chess.

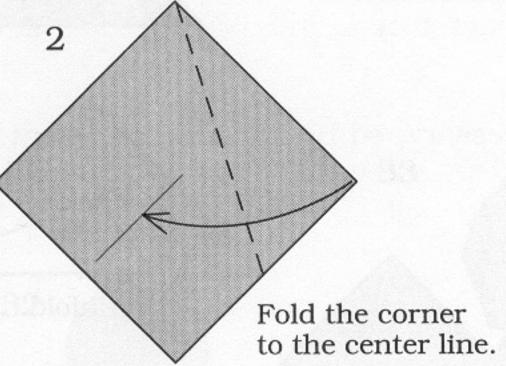


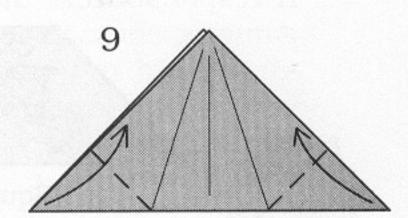
## Pawn

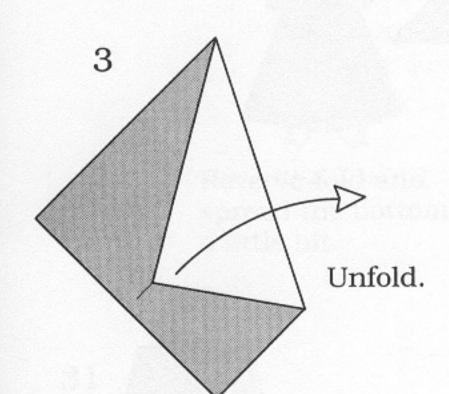


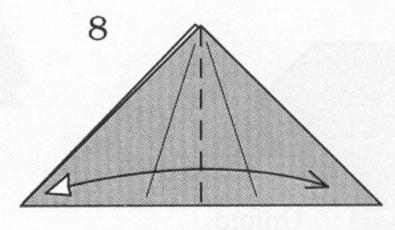


Fold and unfold.

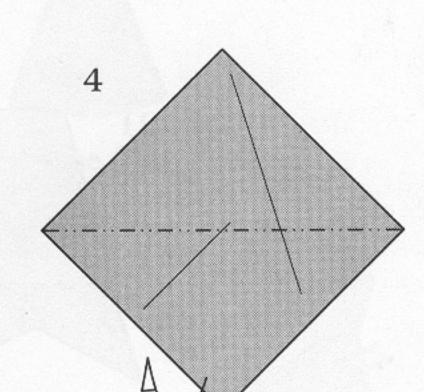


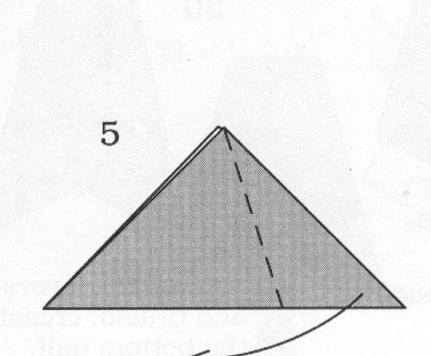


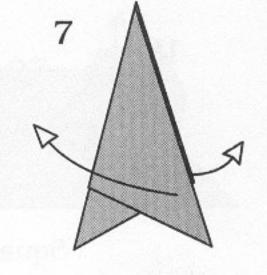




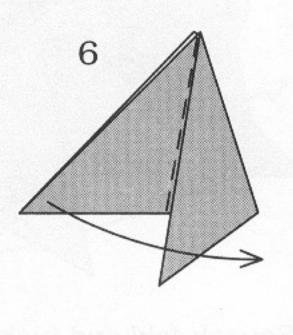
Fold in half and unfold.

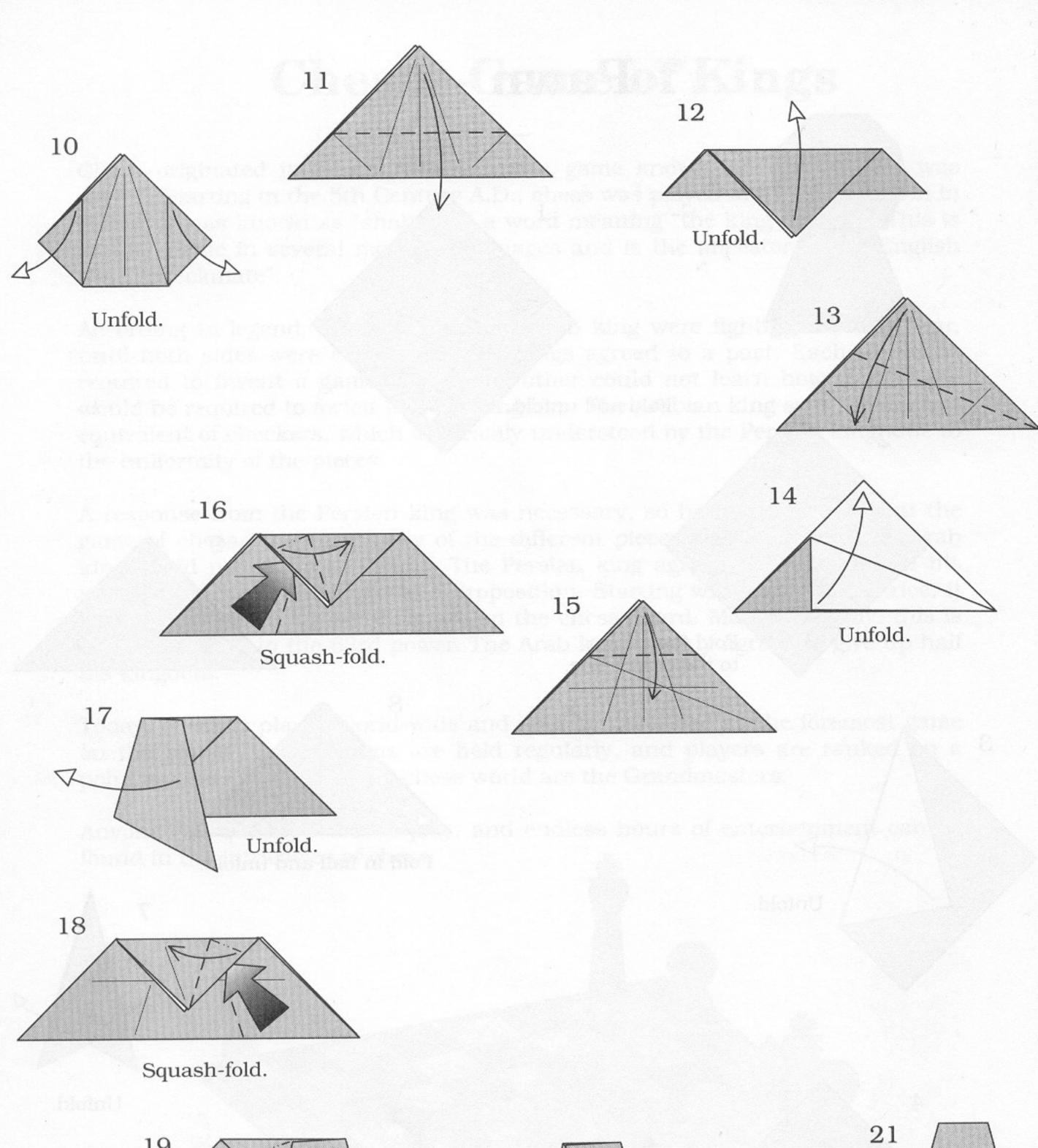


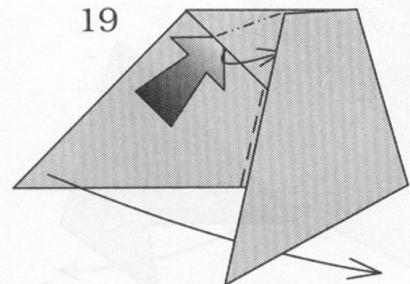




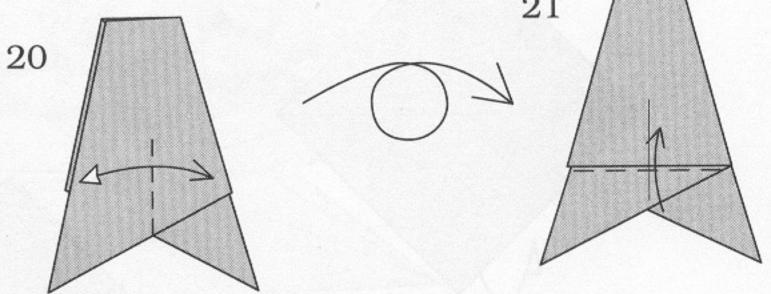
Unfold.



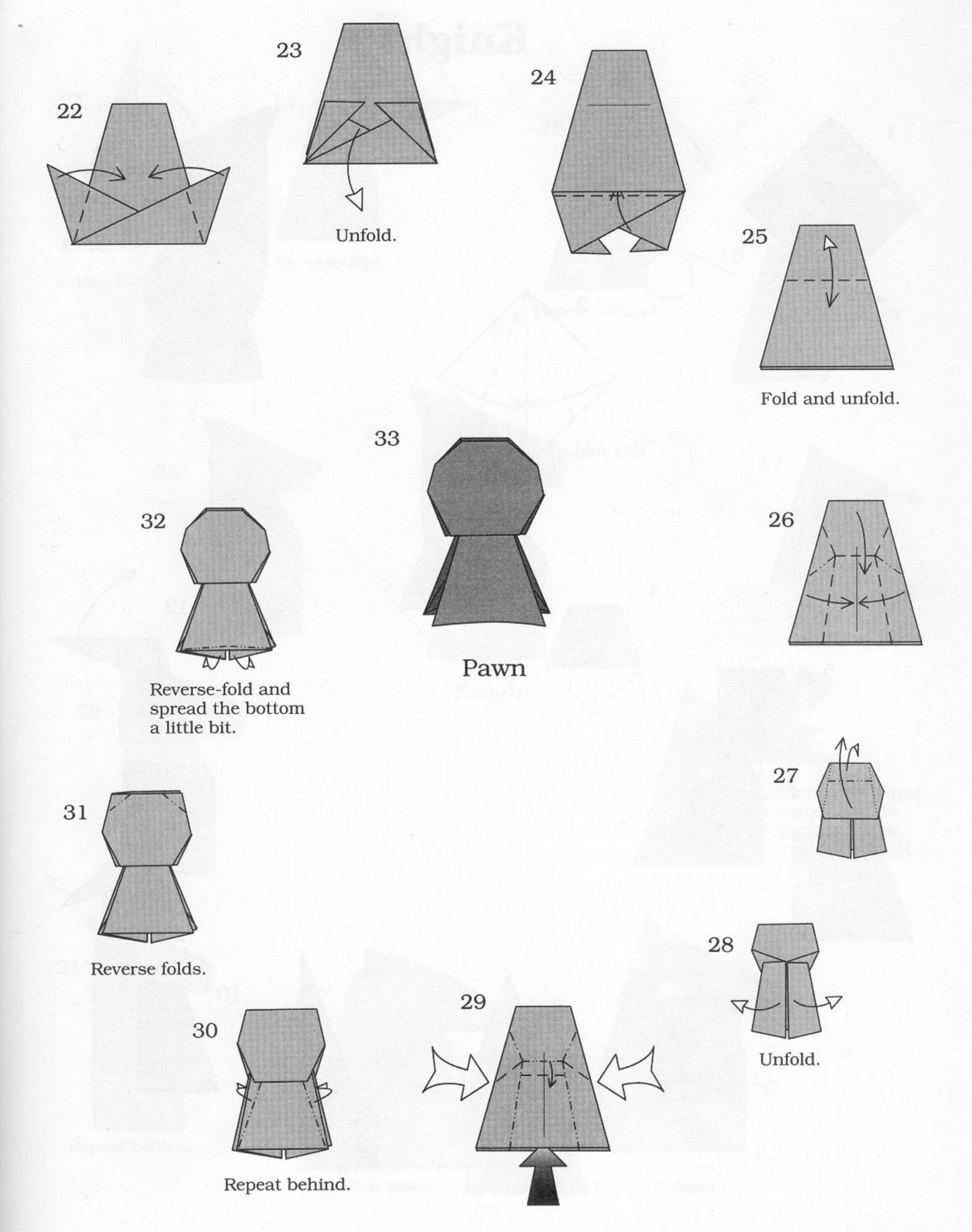




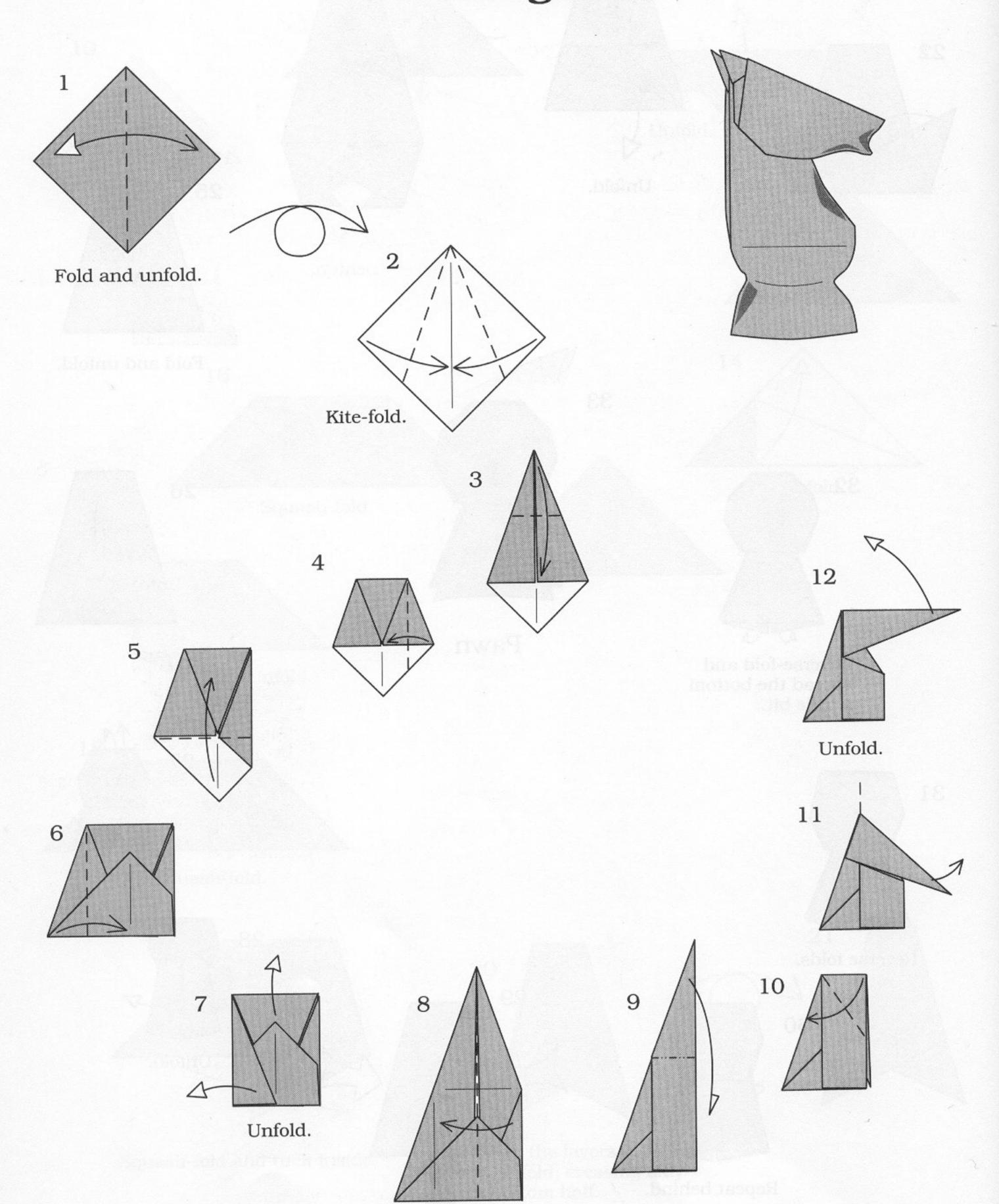
Squash-fold and tuck inside.

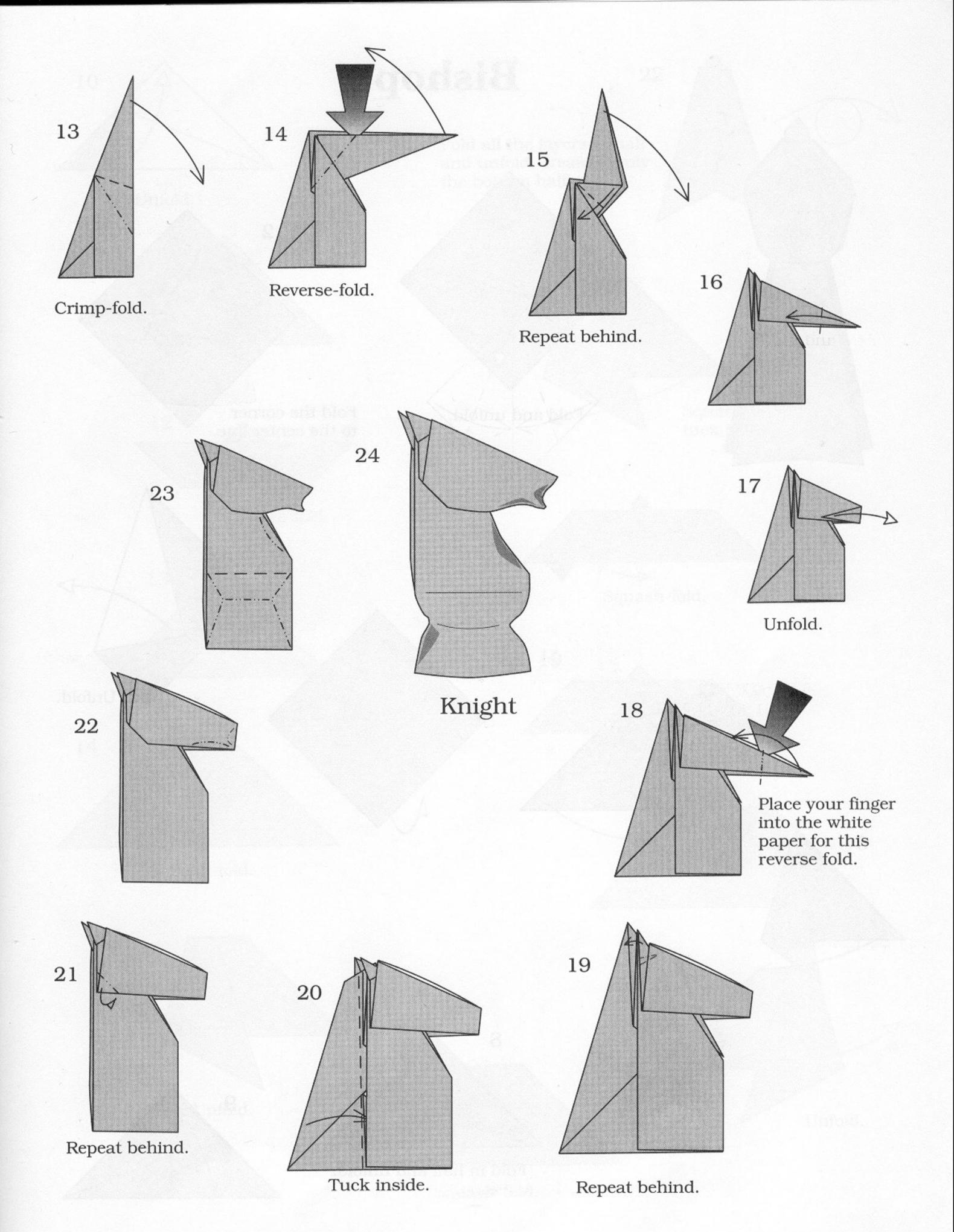


Fold all the layers in half and unfold, creasing only the bottom half.

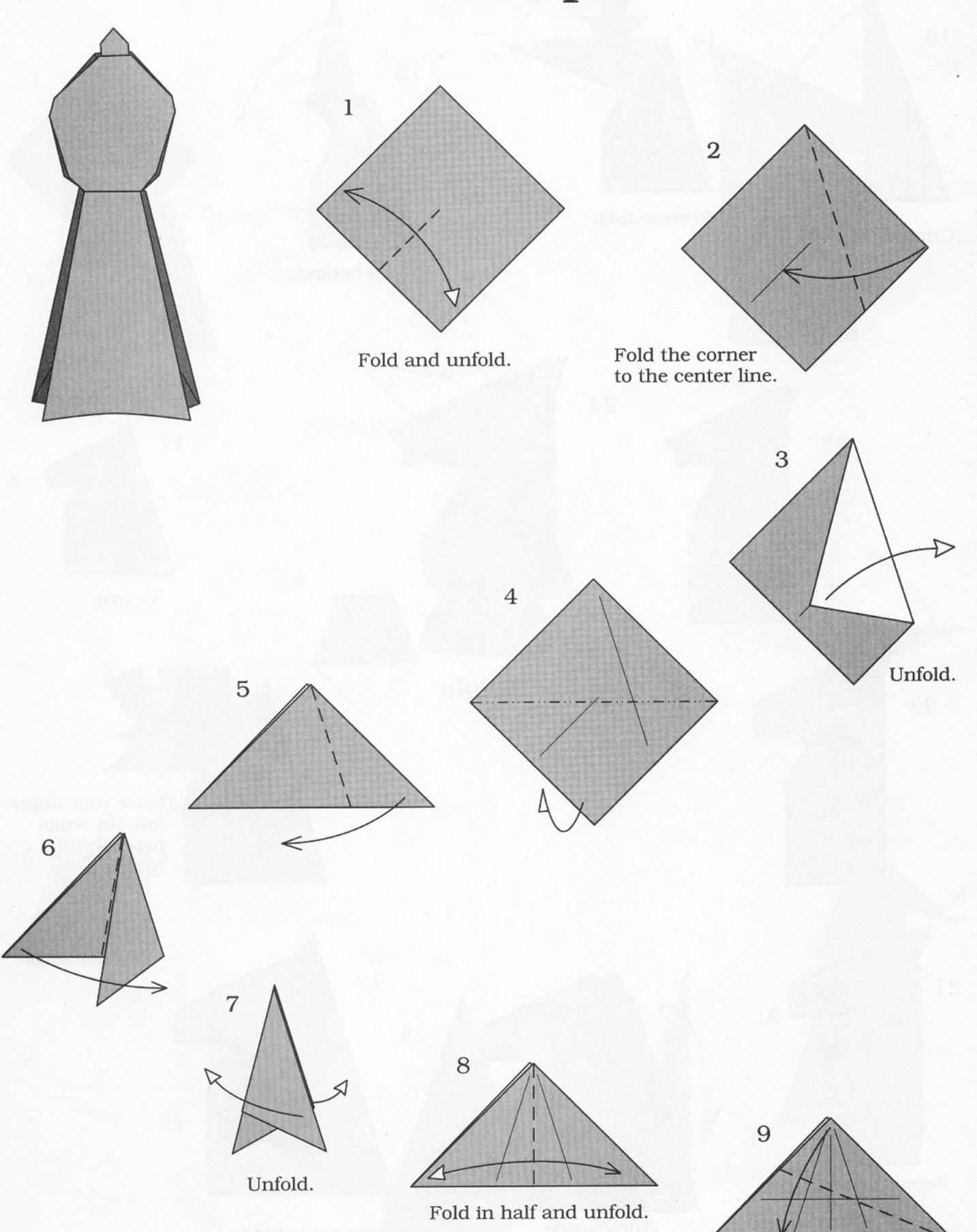


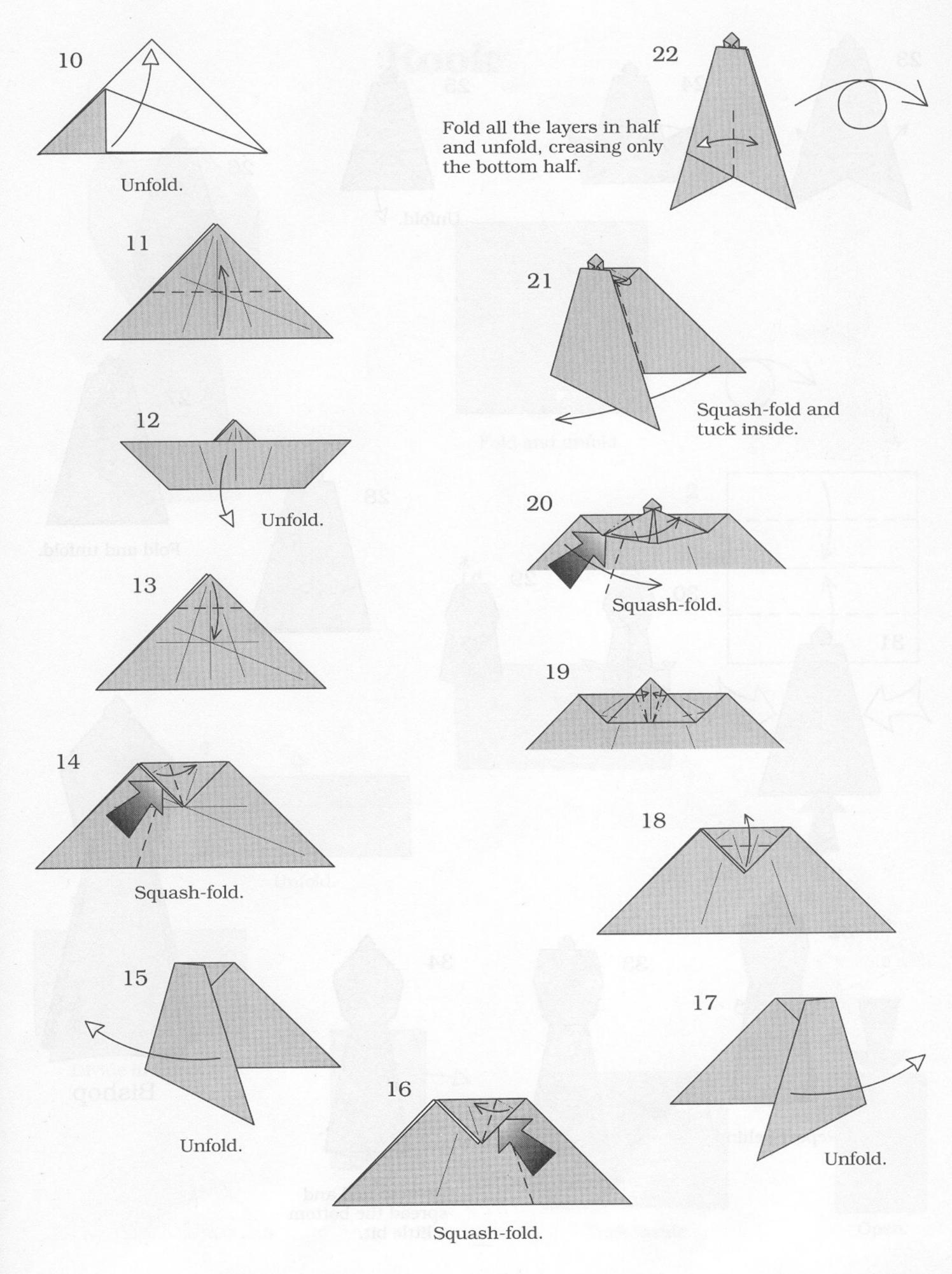
# Knight

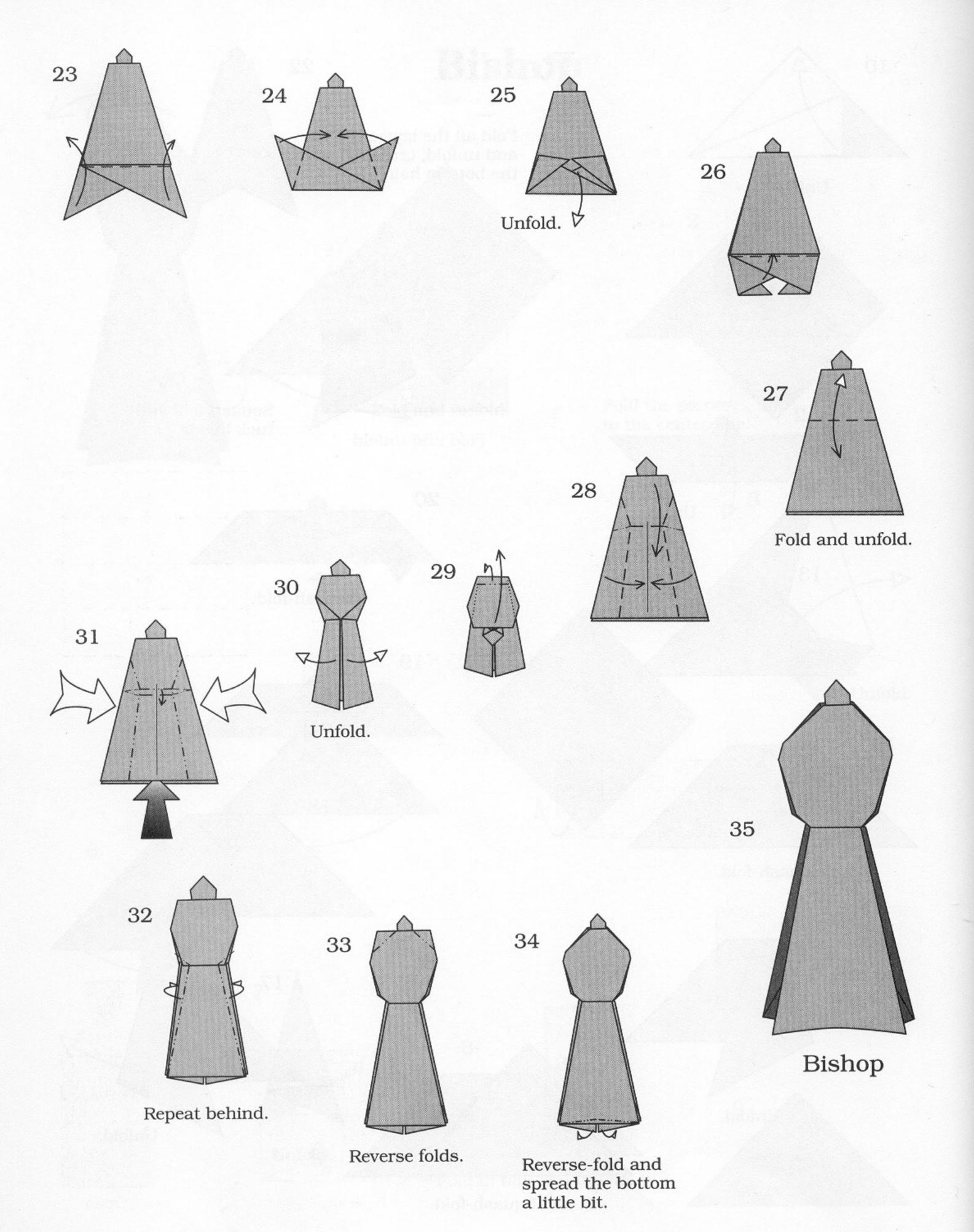




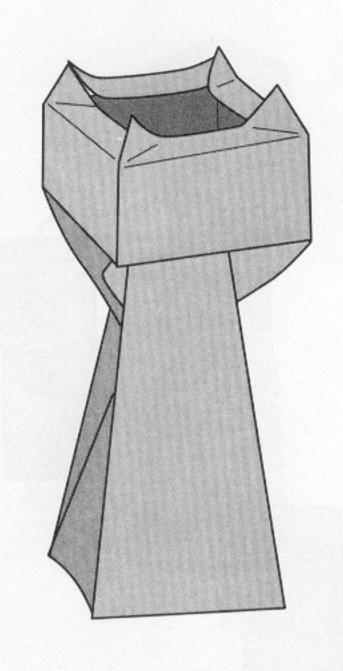
## **Bishop**

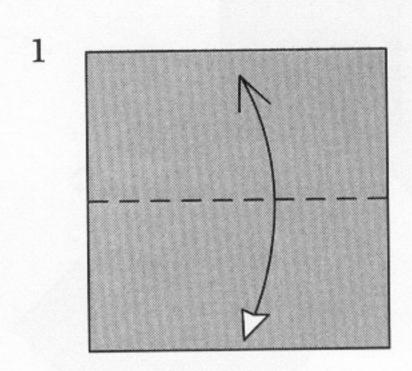


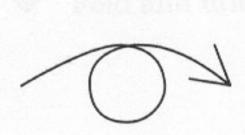




### Rook

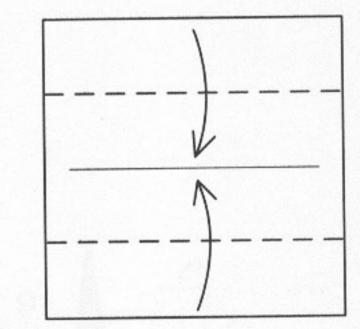




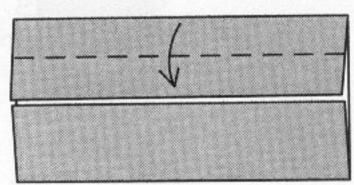


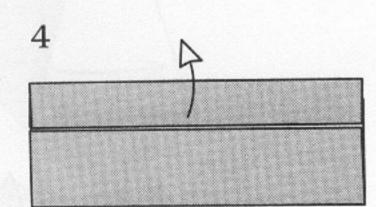
Fold and unfold.

2



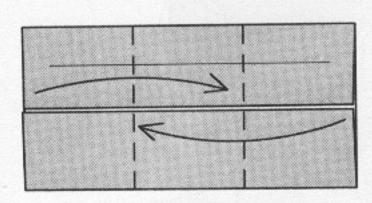
3



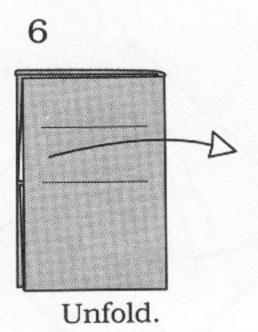


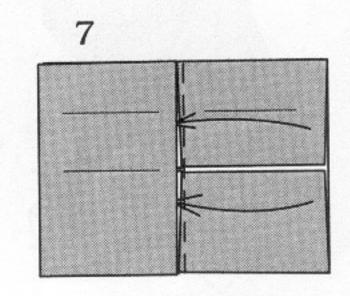
Unfold.

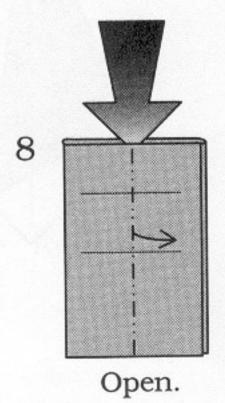
5



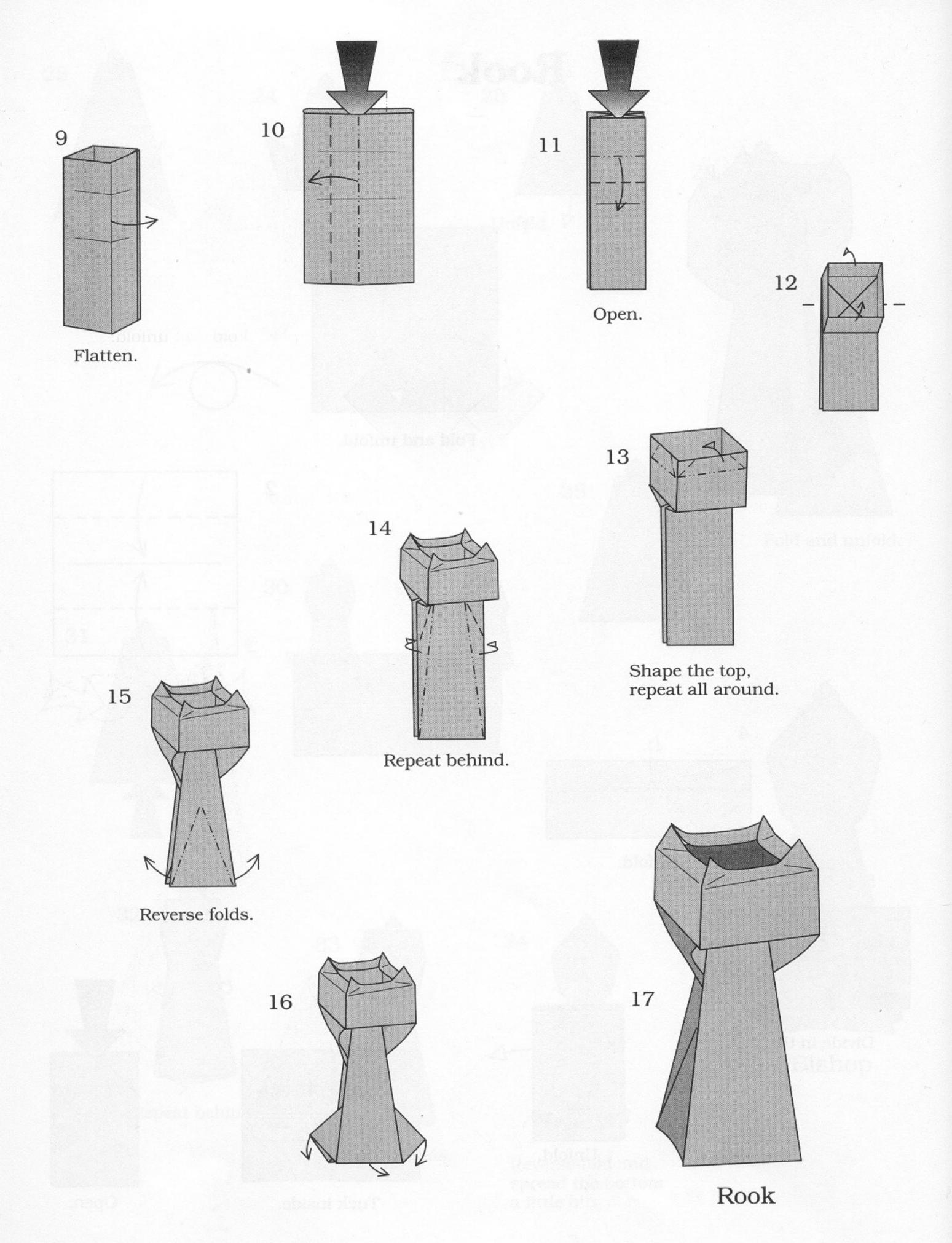
Divide in thirds.



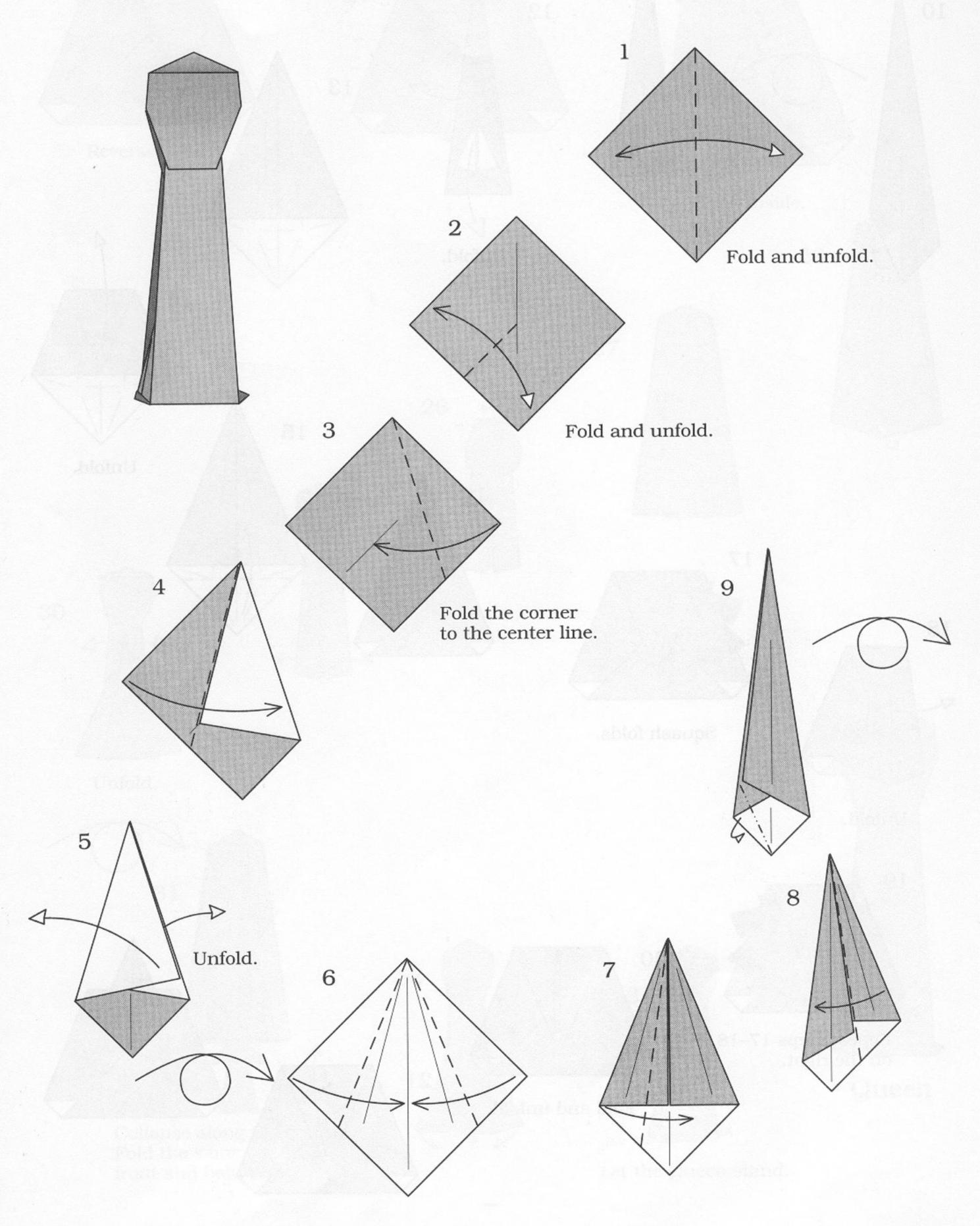


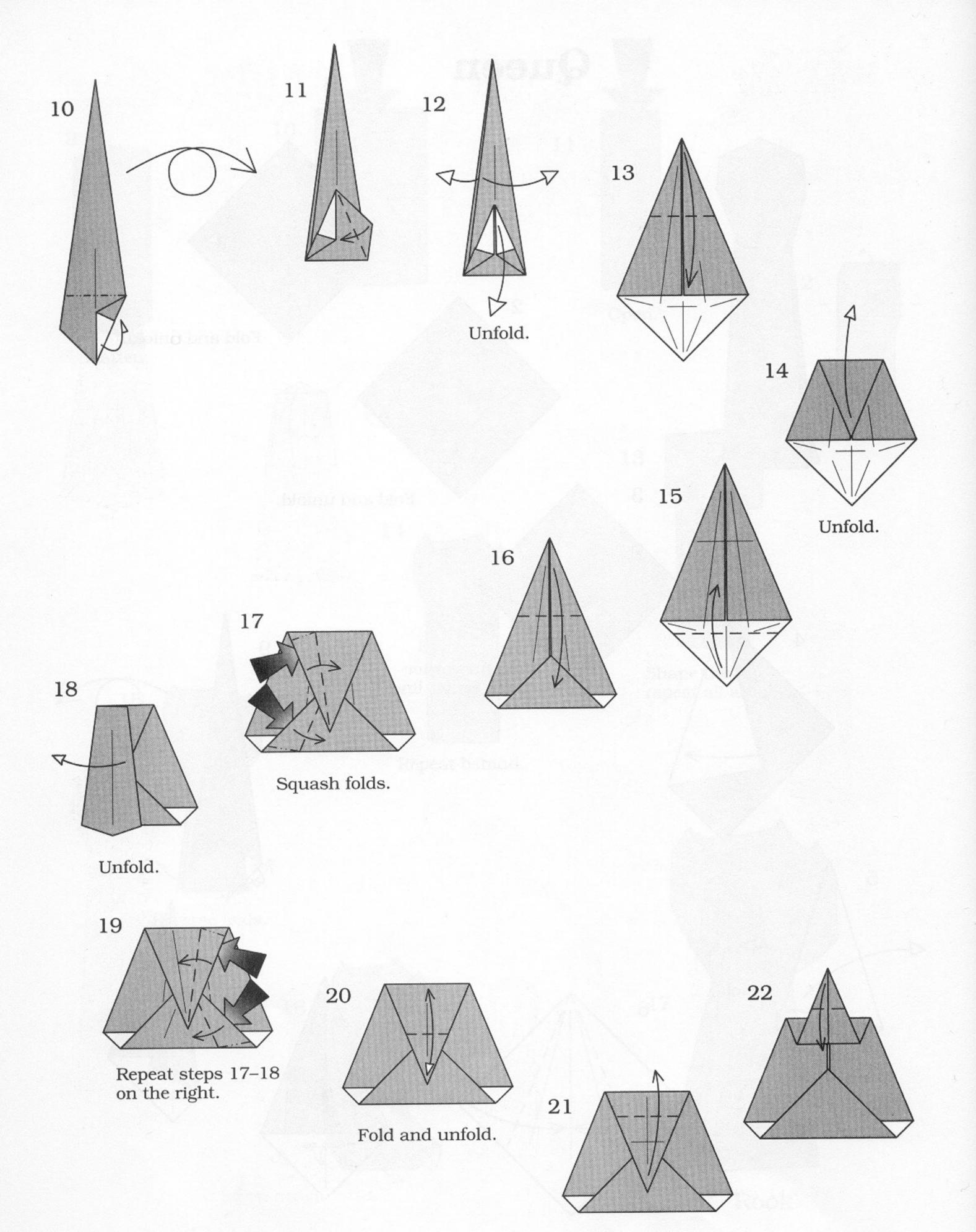


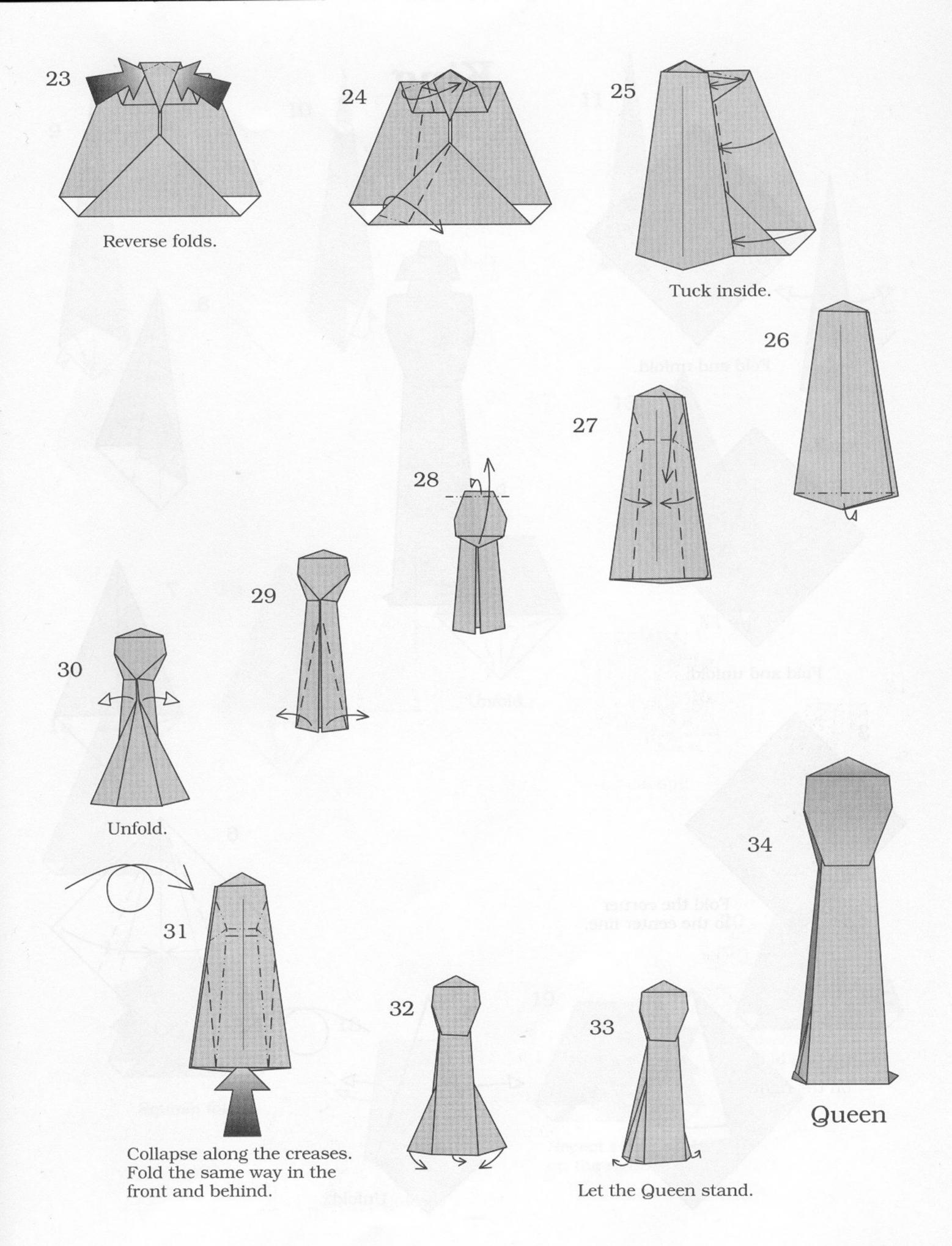
Tuck inside.



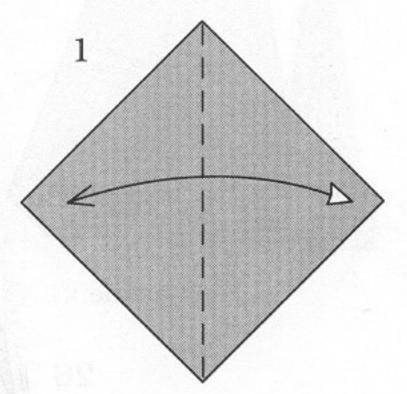
## Queen



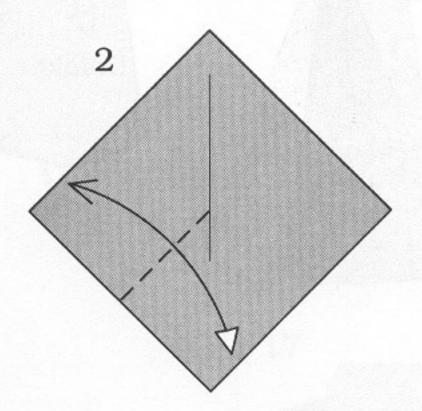




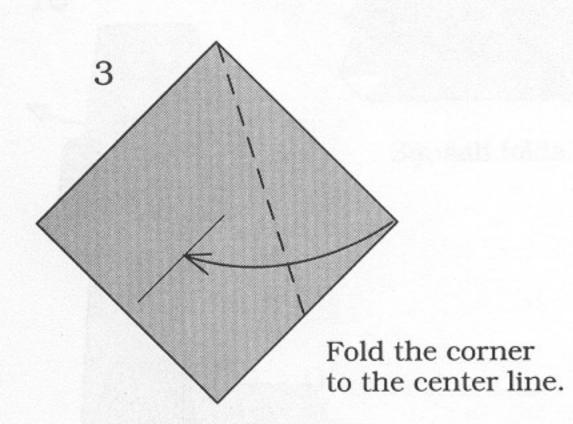
## King

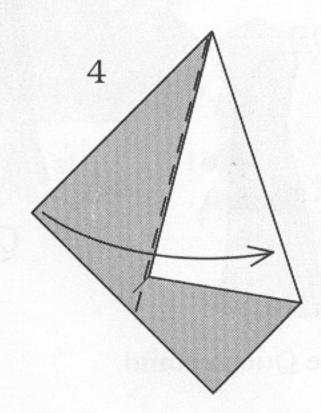


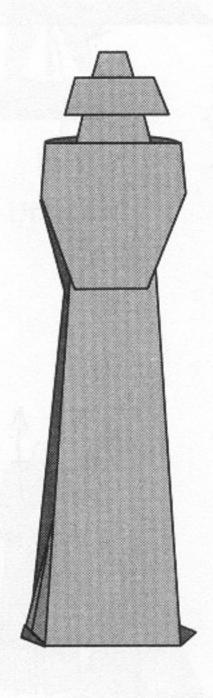
Fold and unfold.

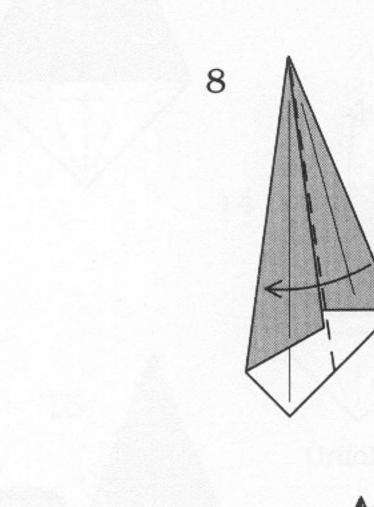


Fold and unfold.

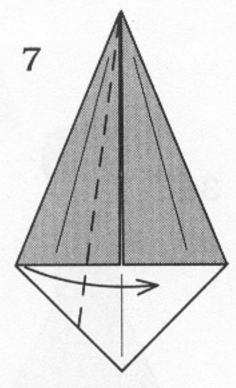


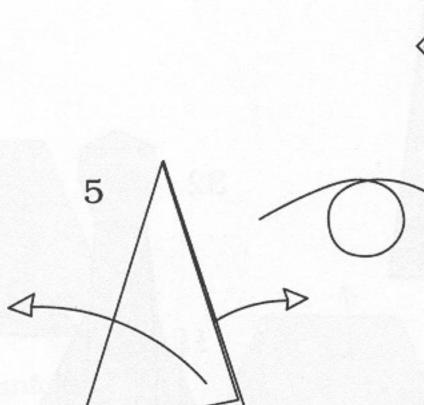


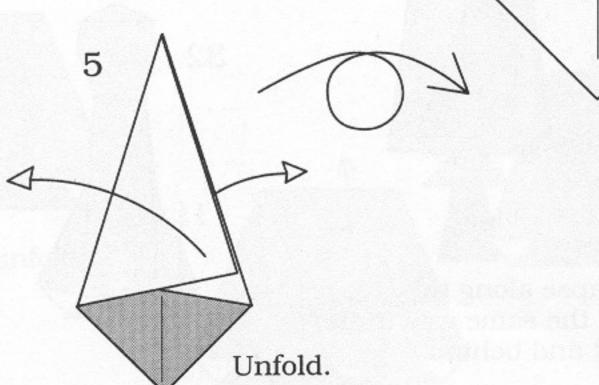


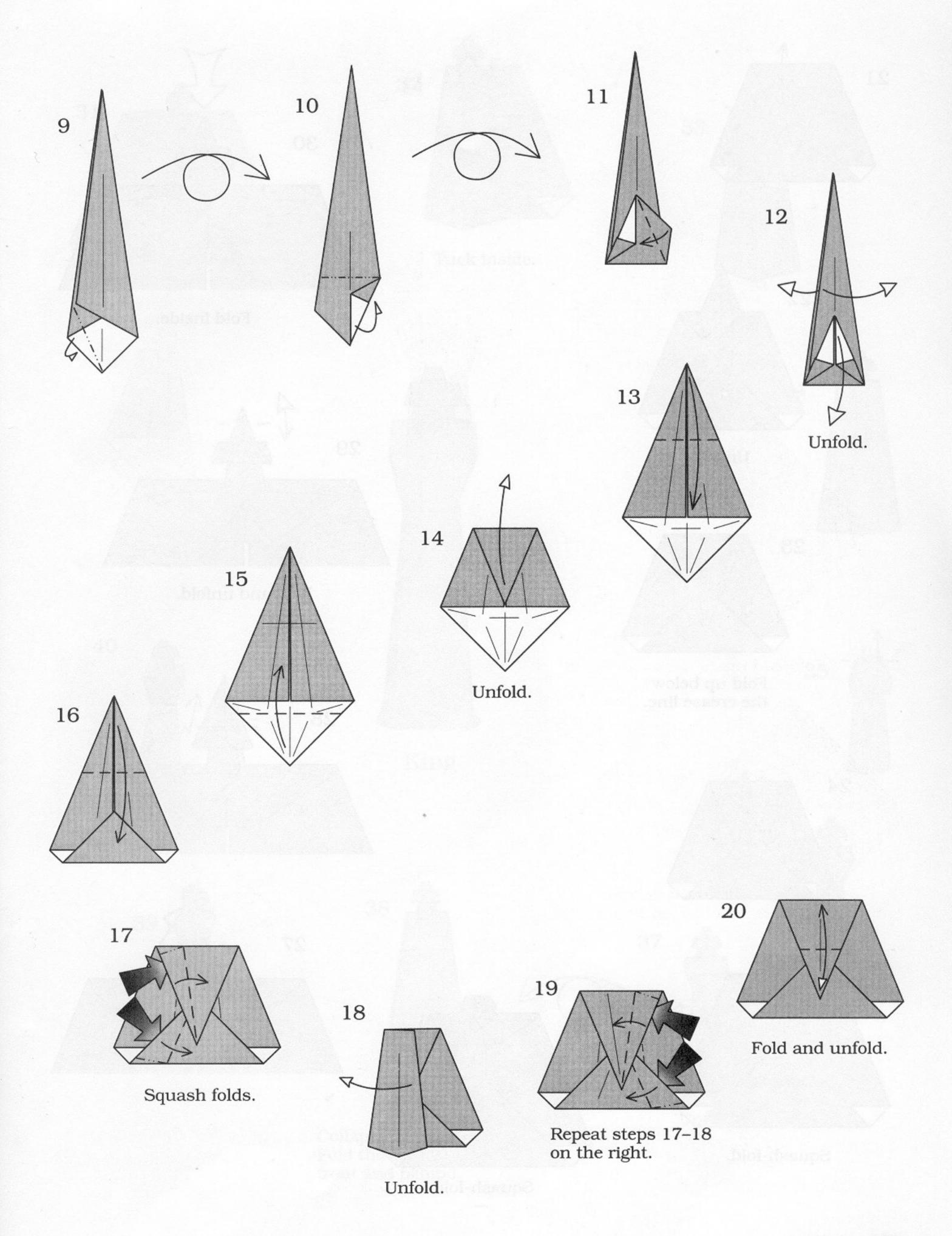


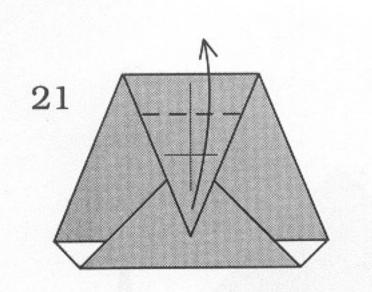
6

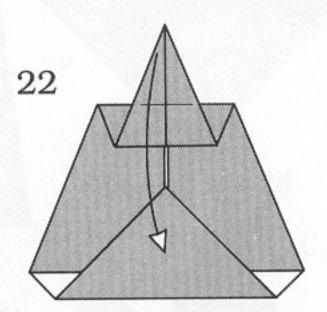


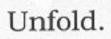


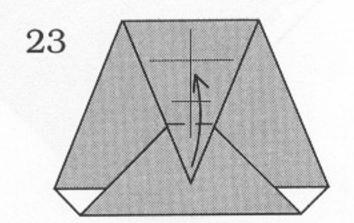




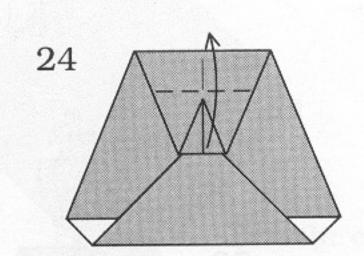


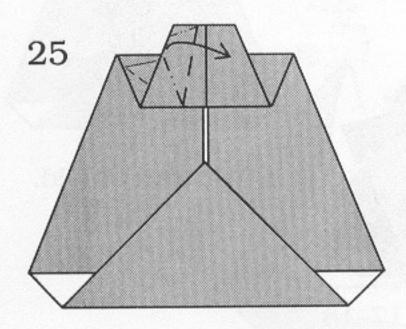




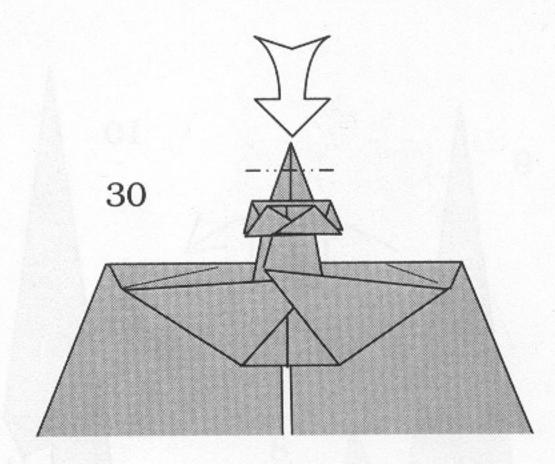


Fold up below the crease line.

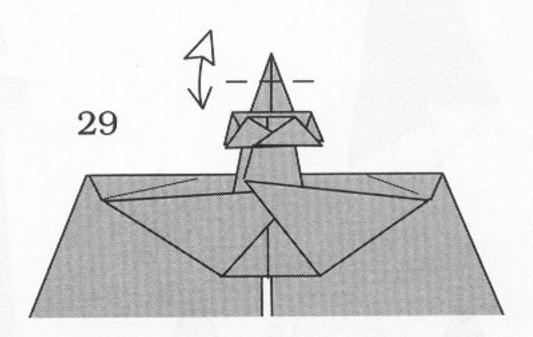




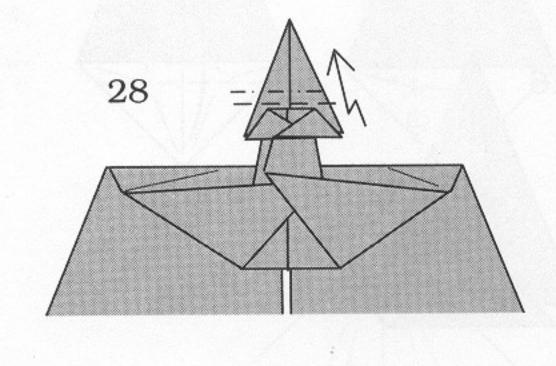
Squash-fold.

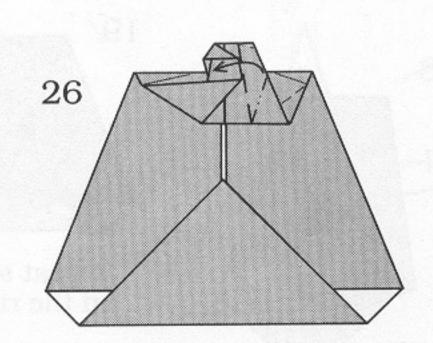


Fold inside.

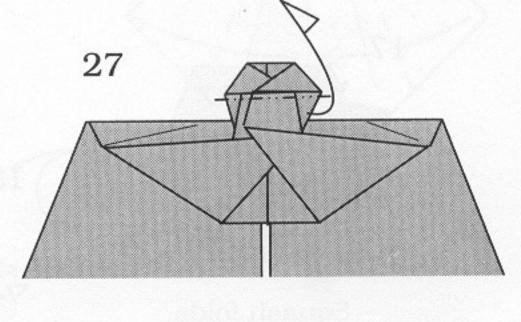


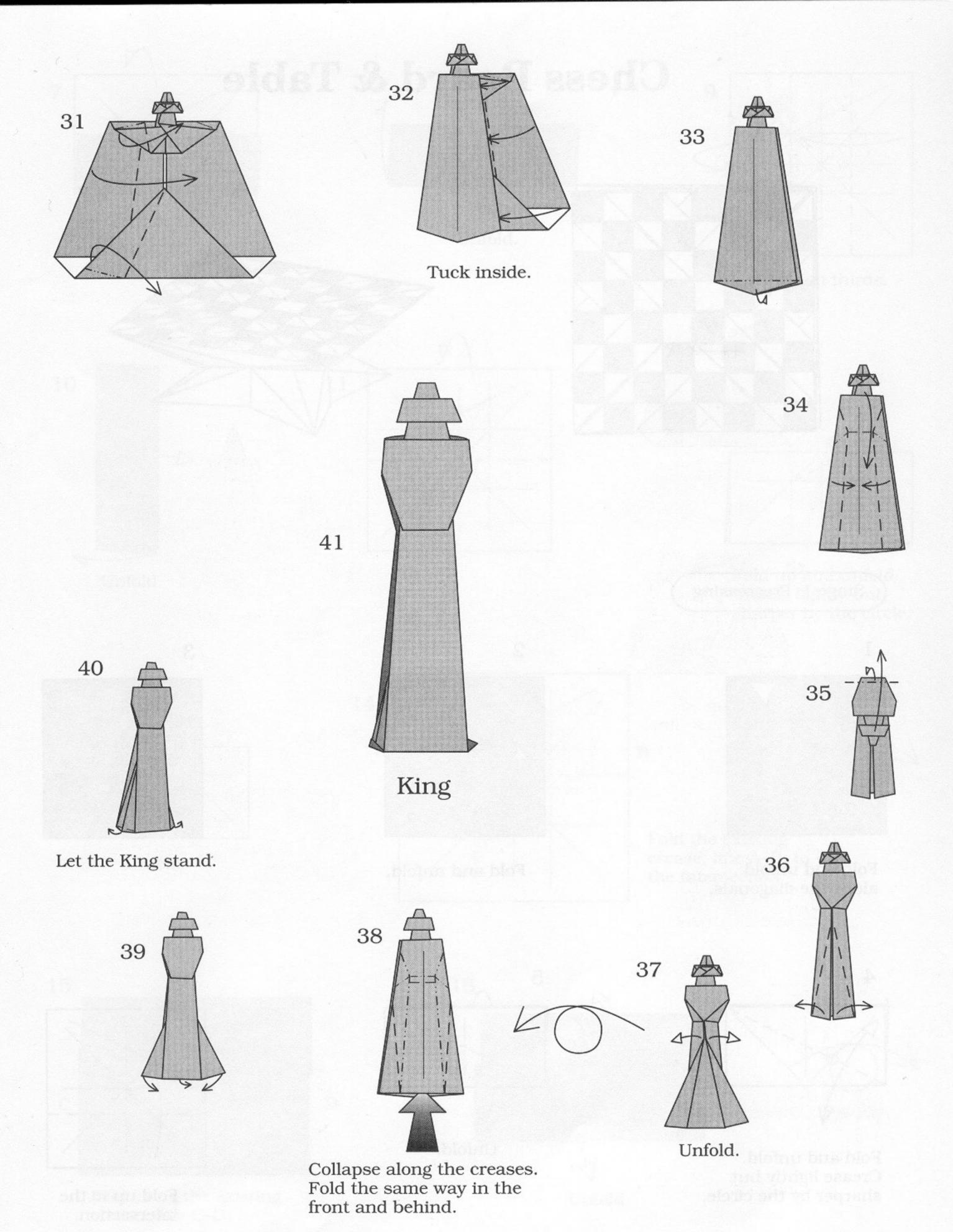
Fold and unfold.



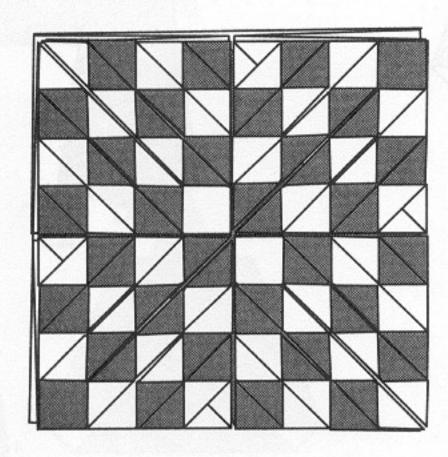


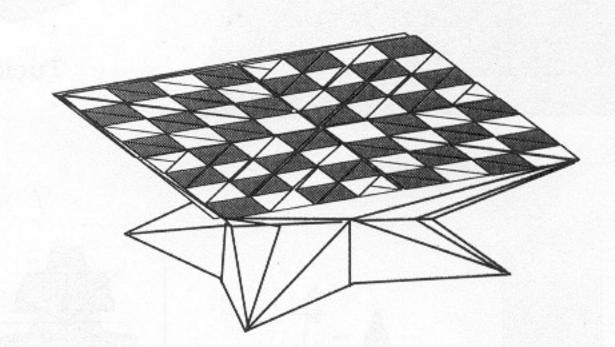
Squash-fold.





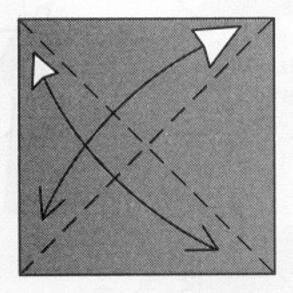
# Chess Board & Table





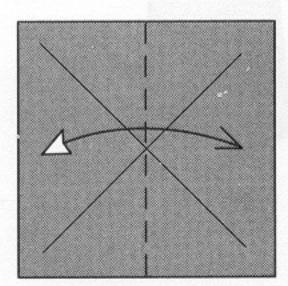
Stage 1: Precreasing

1



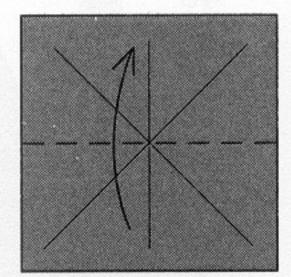
Fold and unfold along the diagonals.

2

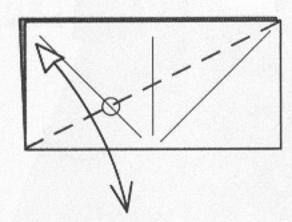


Fold and unfold.

3

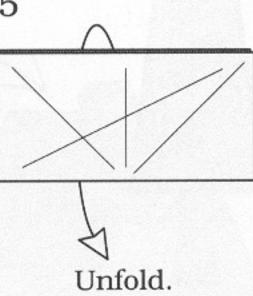


4

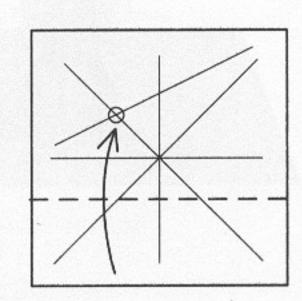


Fold and unfold. Crease lightly but sharper by the circle.

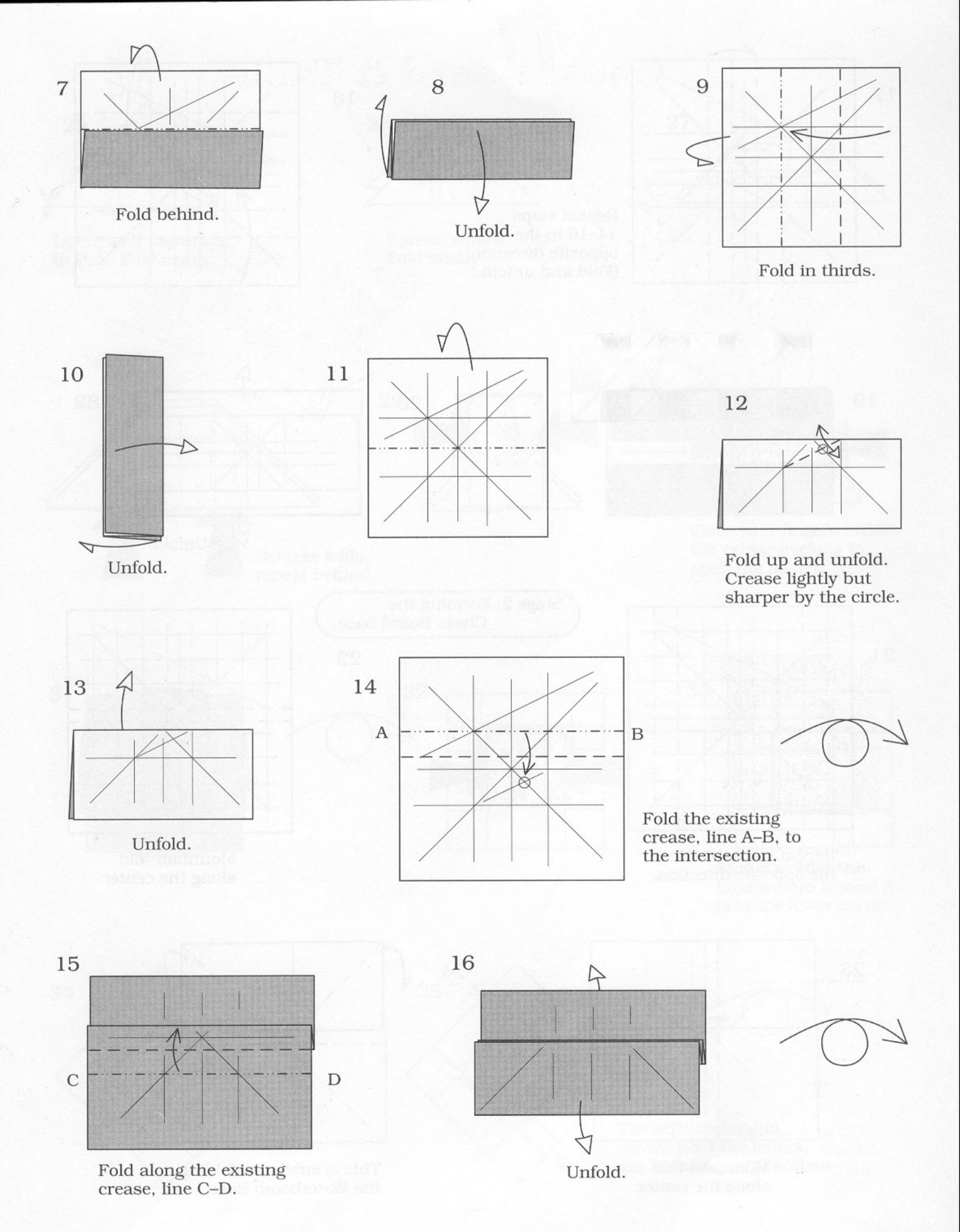
5

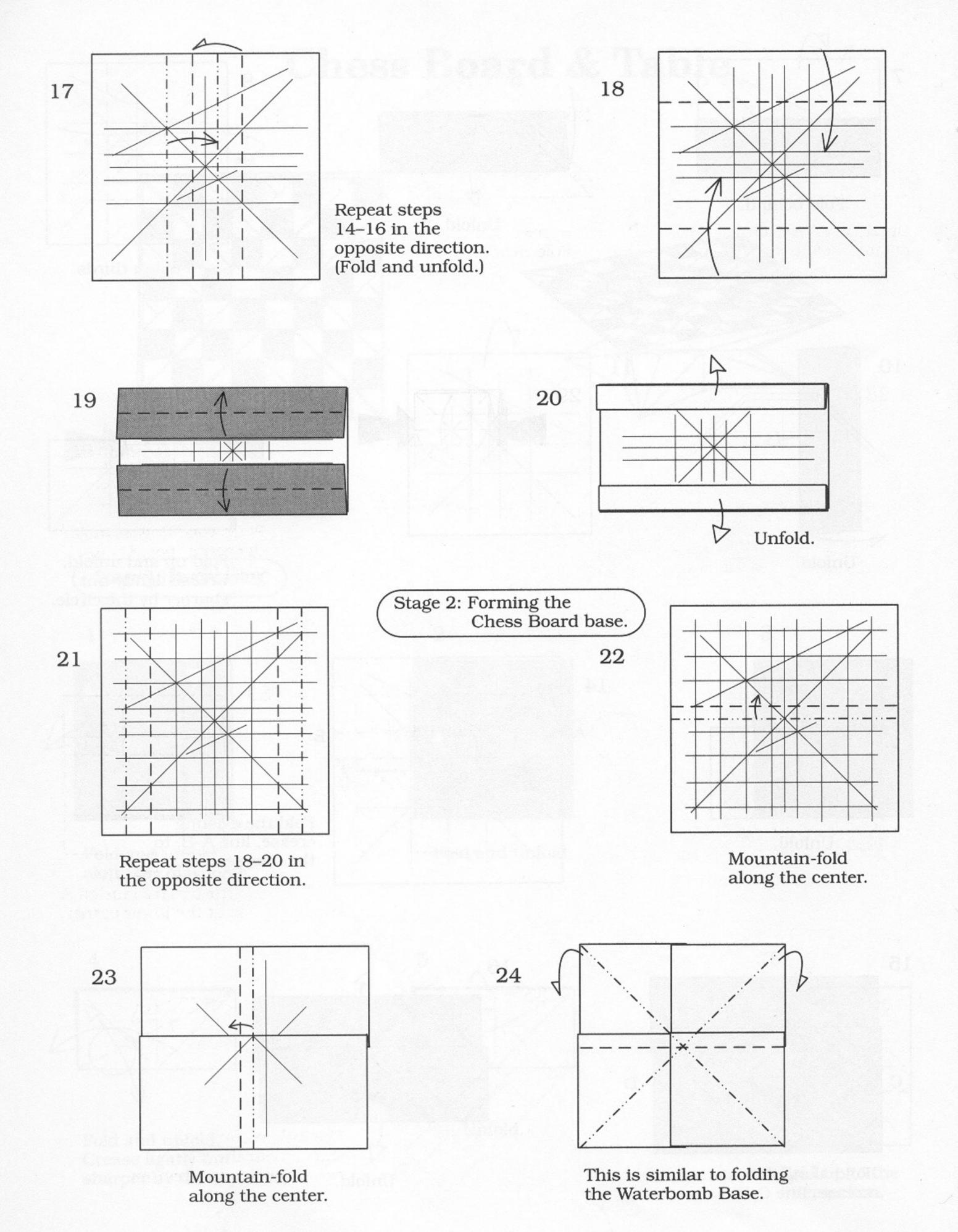


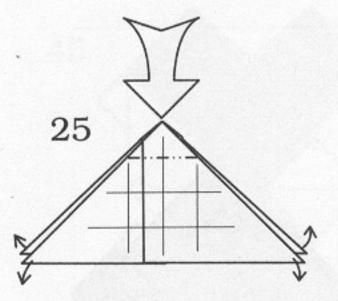
6



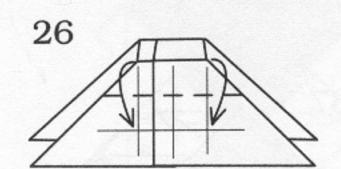
Fold up to the intersection.



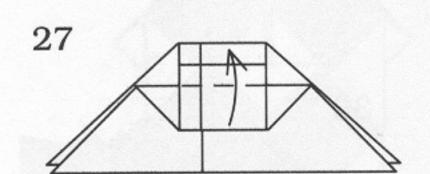


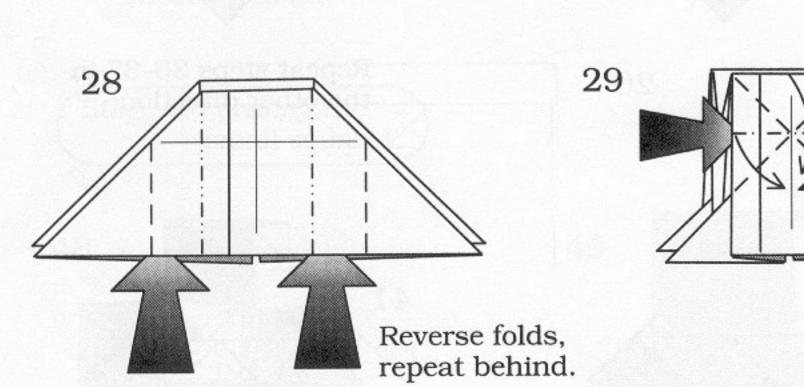


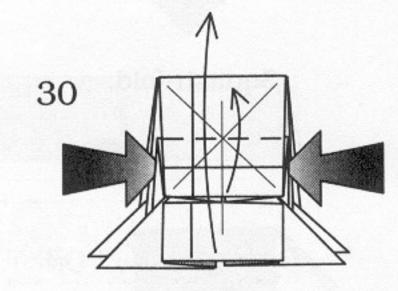
Open, as if beginning to sink. Fold neatly.



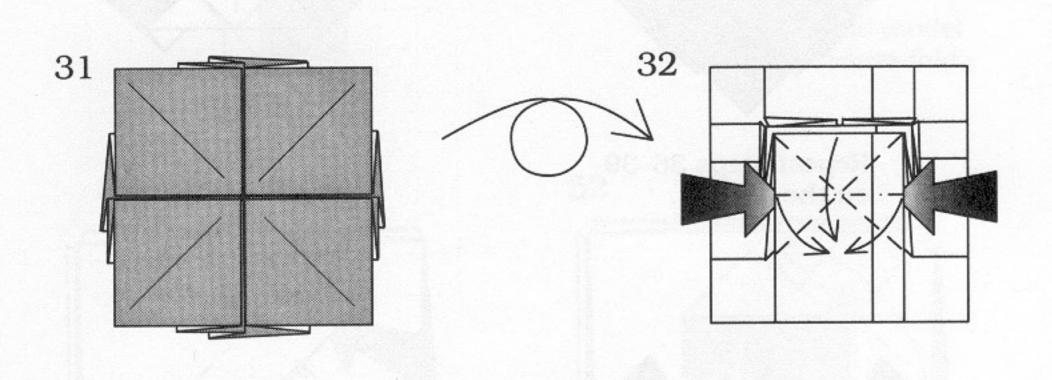
Spread-squash-fold. Fold neatly.

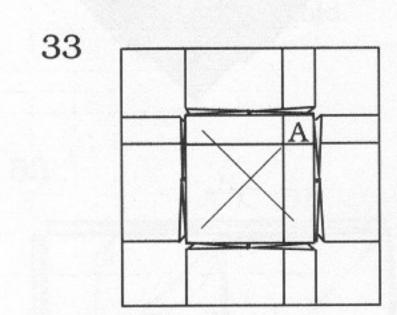




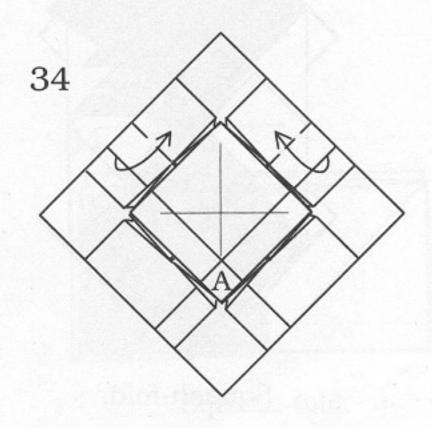


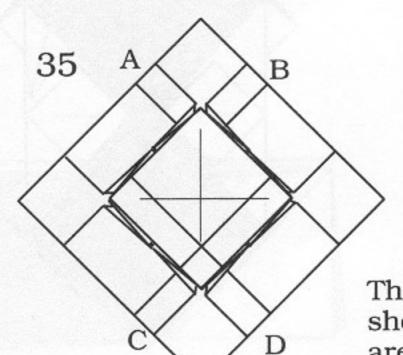
Place your fingers inside the center pockets to open the model.

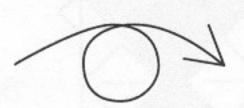




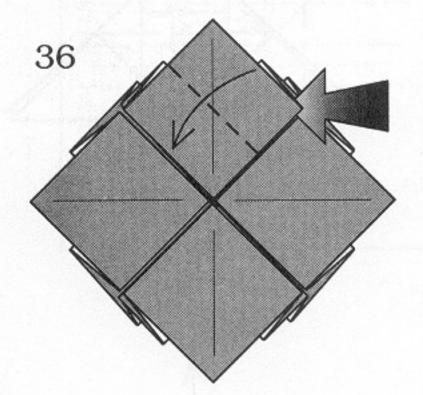
Rotate so that the little square labeled A is at the lower corner.



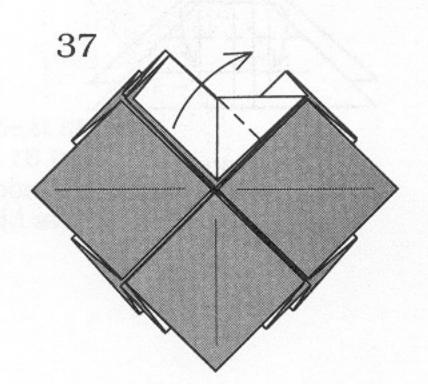




The little rectangles, shown near the letters, are at the top and bottom.

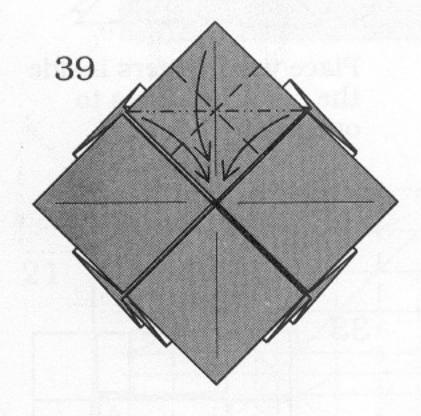


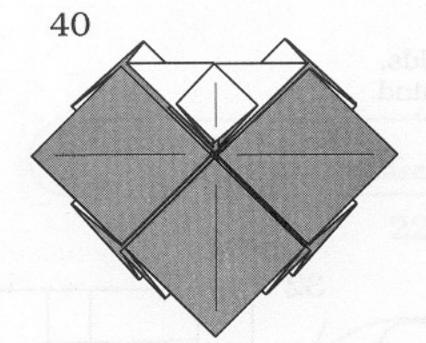
Squash-fold.



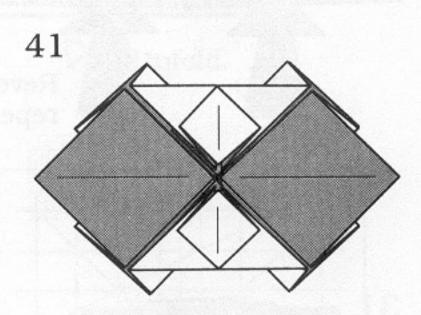
Repeat steps 36–37 in the other direction.

38

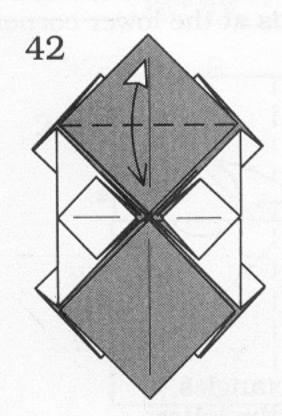




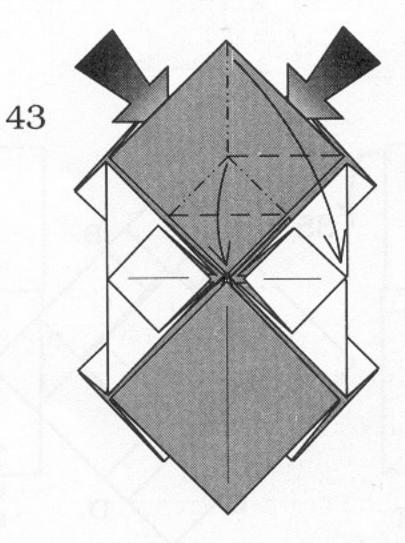
Repeat steps 36–39 on the bottom.

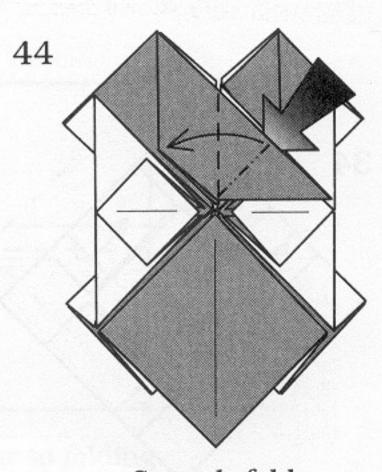


Rotate.

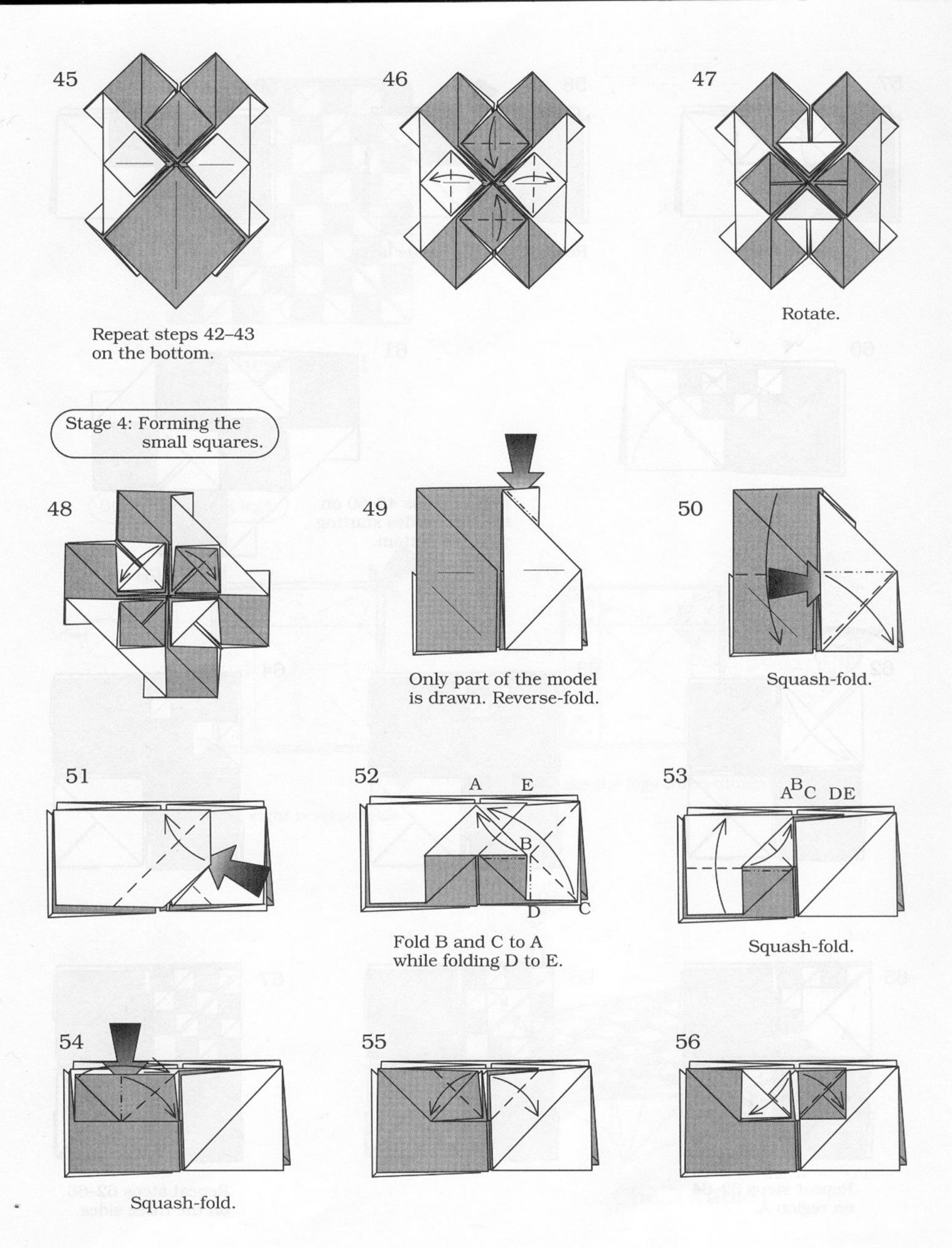


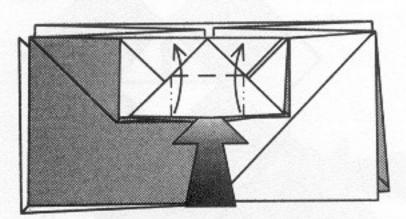
Fold and unfold.



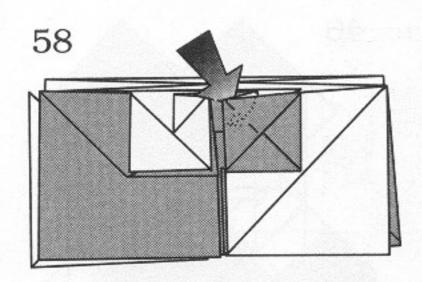


Squash-fold.

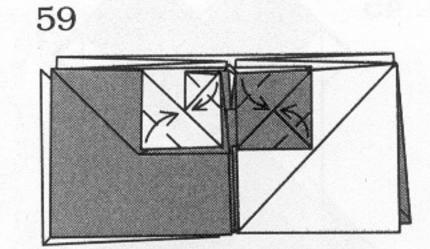


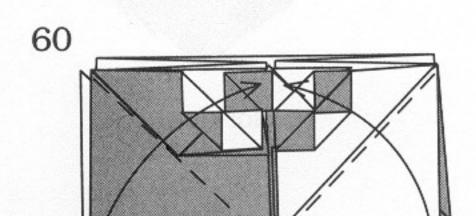


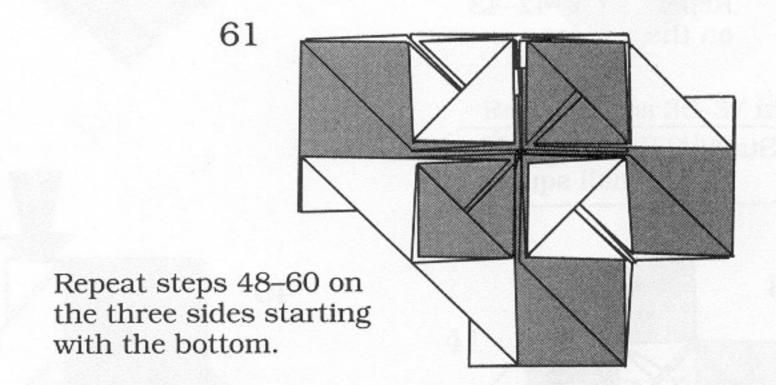
Petal-fold.

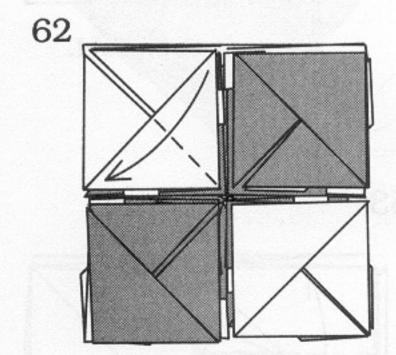


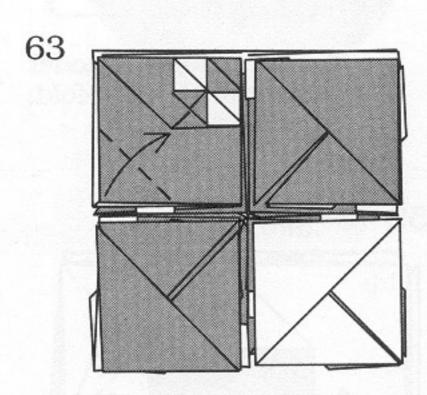
Reverse-fold the inside layer.

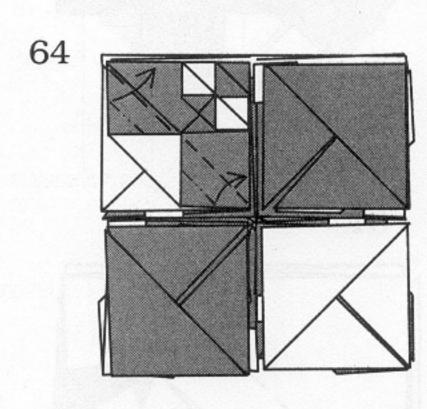




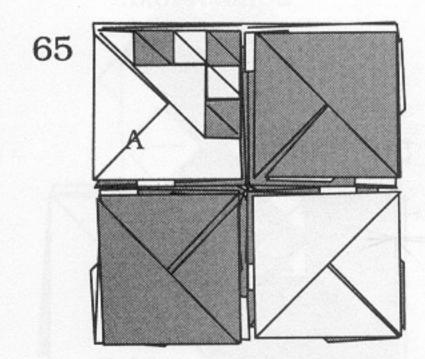




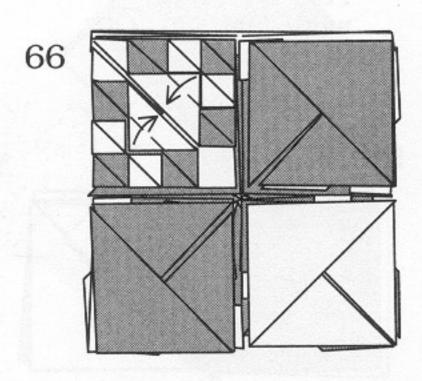




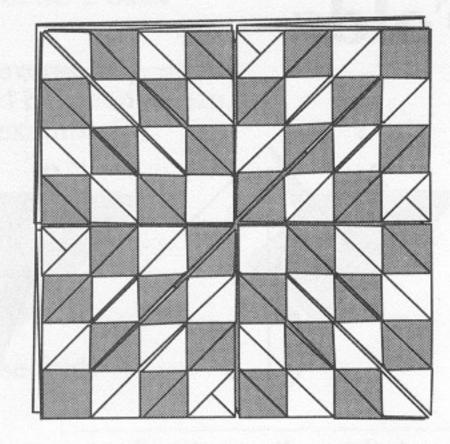
67



Repeat steps 62–64 on region A.

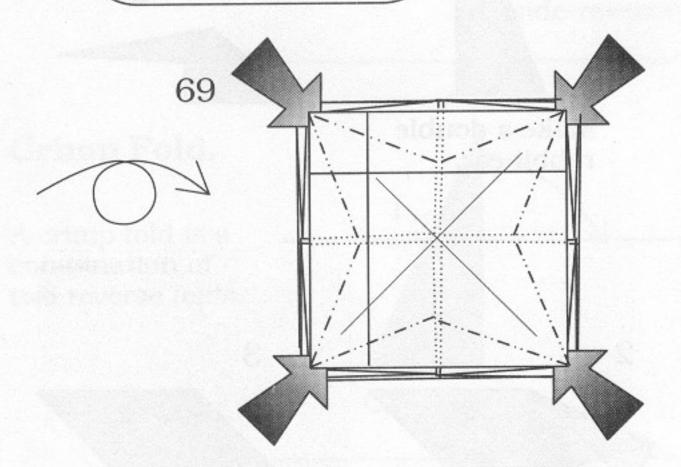


Repeat steps 62–66 on the three sides.

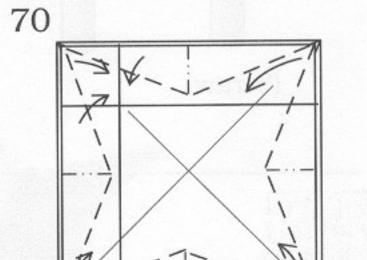


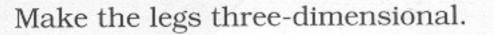
Chess Board

## Stage 5: Making legs.

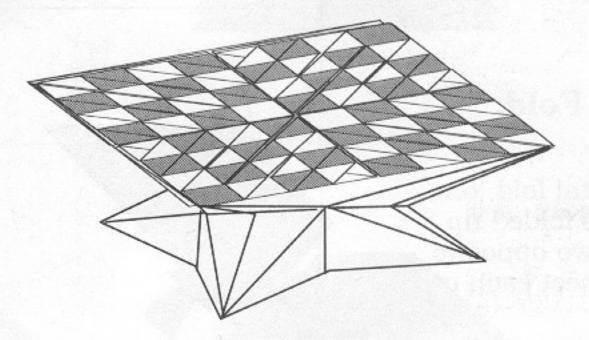


Make eight reverse folds.







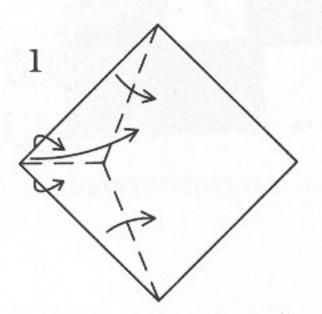


Chess Table

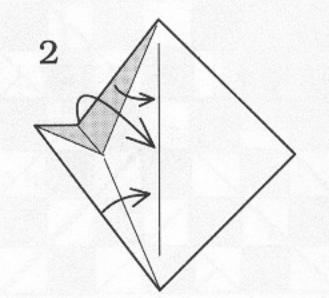
# **Basic Folds**

#### Rabbit Ear.

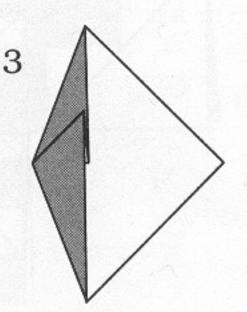
To fold a rabbit ear, one corner is folded in half and laid down to a side.



Fold a rabbit ear.

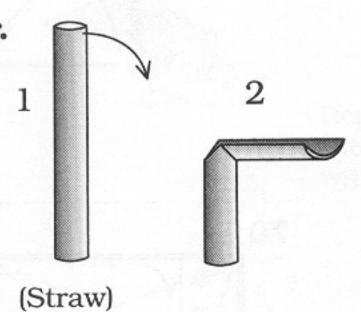


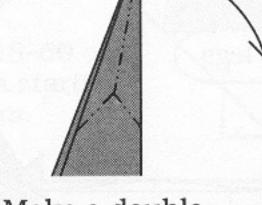
A three-dimensional intermediate step.



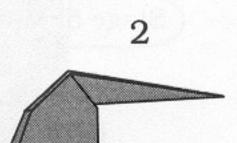
Double Rabbit Ear.

If you were to bend a straw you would be folding the double rabbit ear.



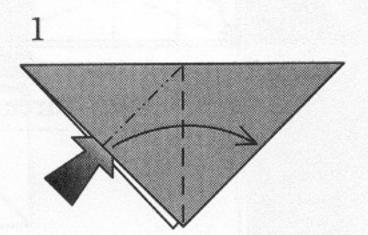


Make a double rabbit ear.

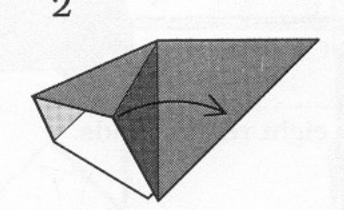


#### Squash Fold.

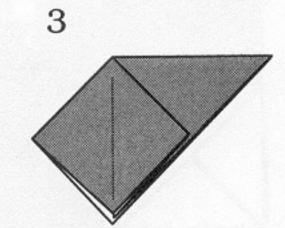
In a squash fold, some paper is opened and then made flat. The shaded arrow shows where to place your finger.



Squash-fold.

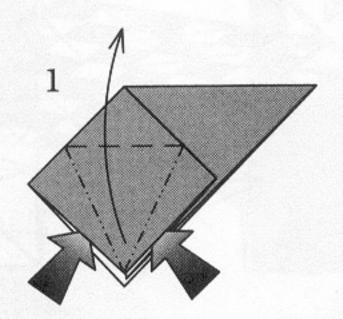


A three-dimensional intermediate step.

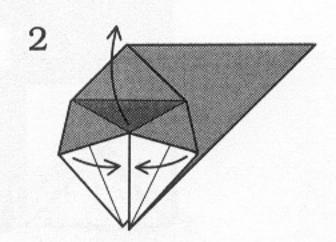


#### Petal Fold.

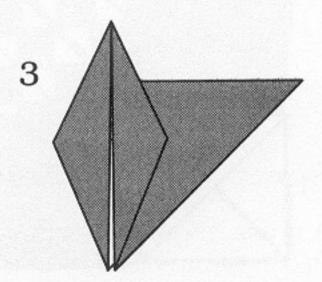
In a petal fold, one point is folded up while two opposite sides meet each other.



Petal-fold.

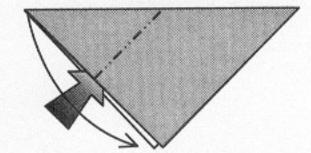


A three-dimensional intermediate step.

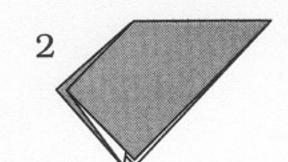


#### Inside Reverse Fold.

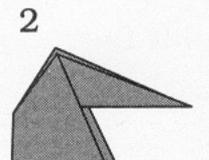
In an inside reverse fold, some paper is folded between layers. Here are two examples.



Reverse-fold.

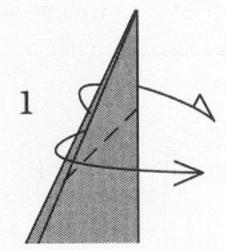


Reverse-fold.

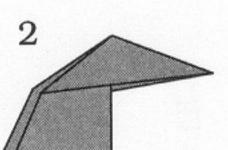


#### Outside Reverse Fold.

Much of the paper must be unfolded to make an outside reverse fold.

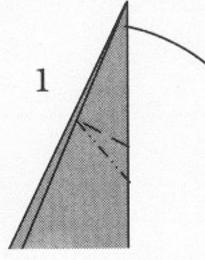


Outside-reverse-fold.

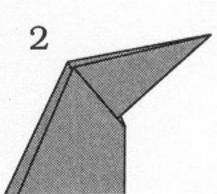


## Crimp Fold.

A crimp fold is a combination of two reverse folds.

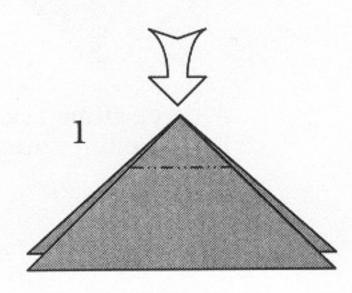


Crimp-fold.

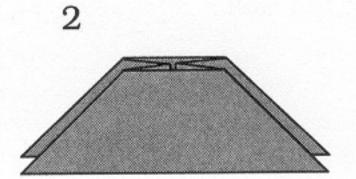


#### Sink Fold.

In a sink fold, some of the paper without edges is folded inside. To do this fold, much of the model must be unfolded.

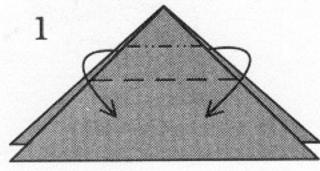


Sink.

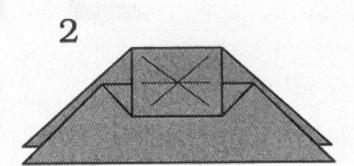


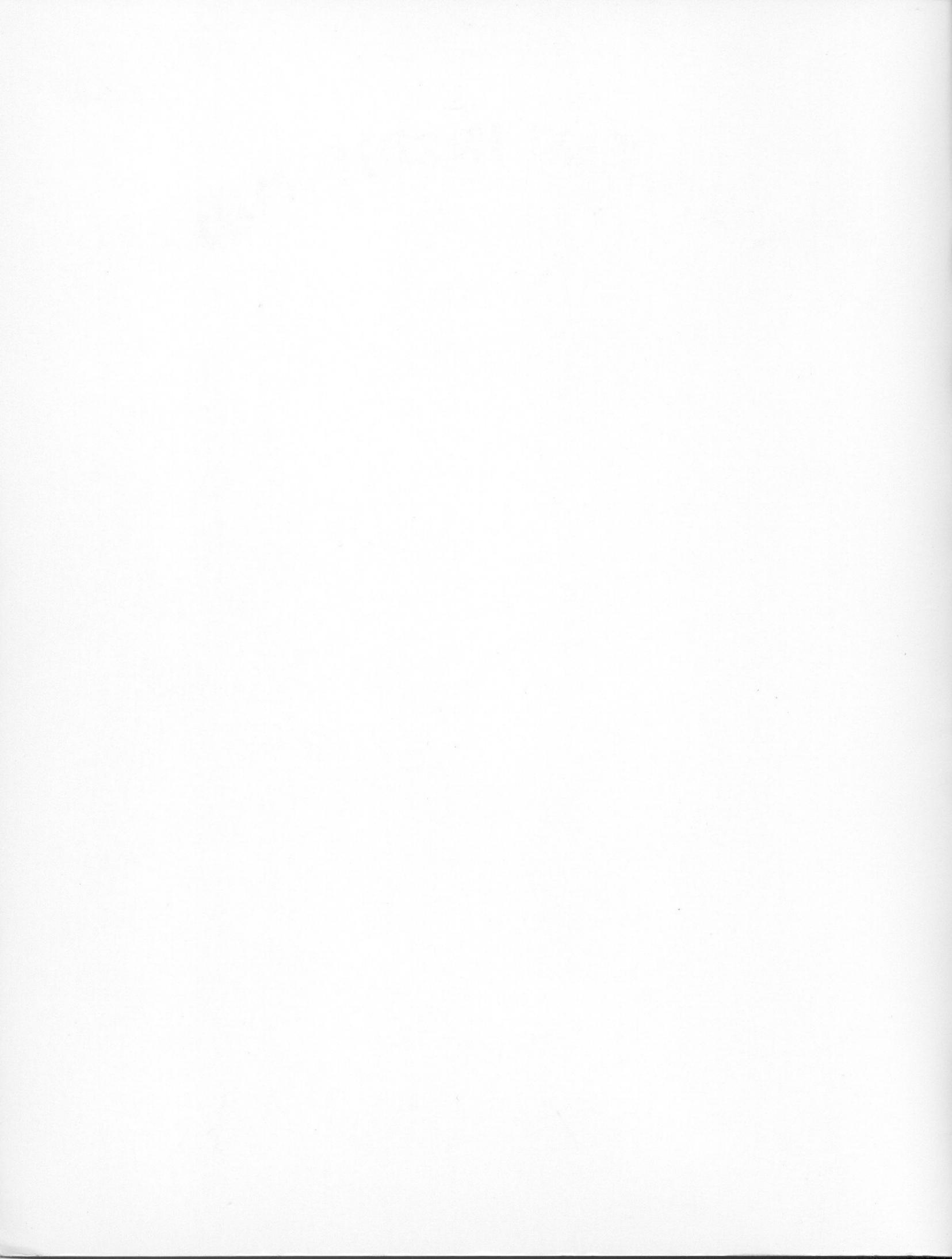
# Spread Squash Fold.

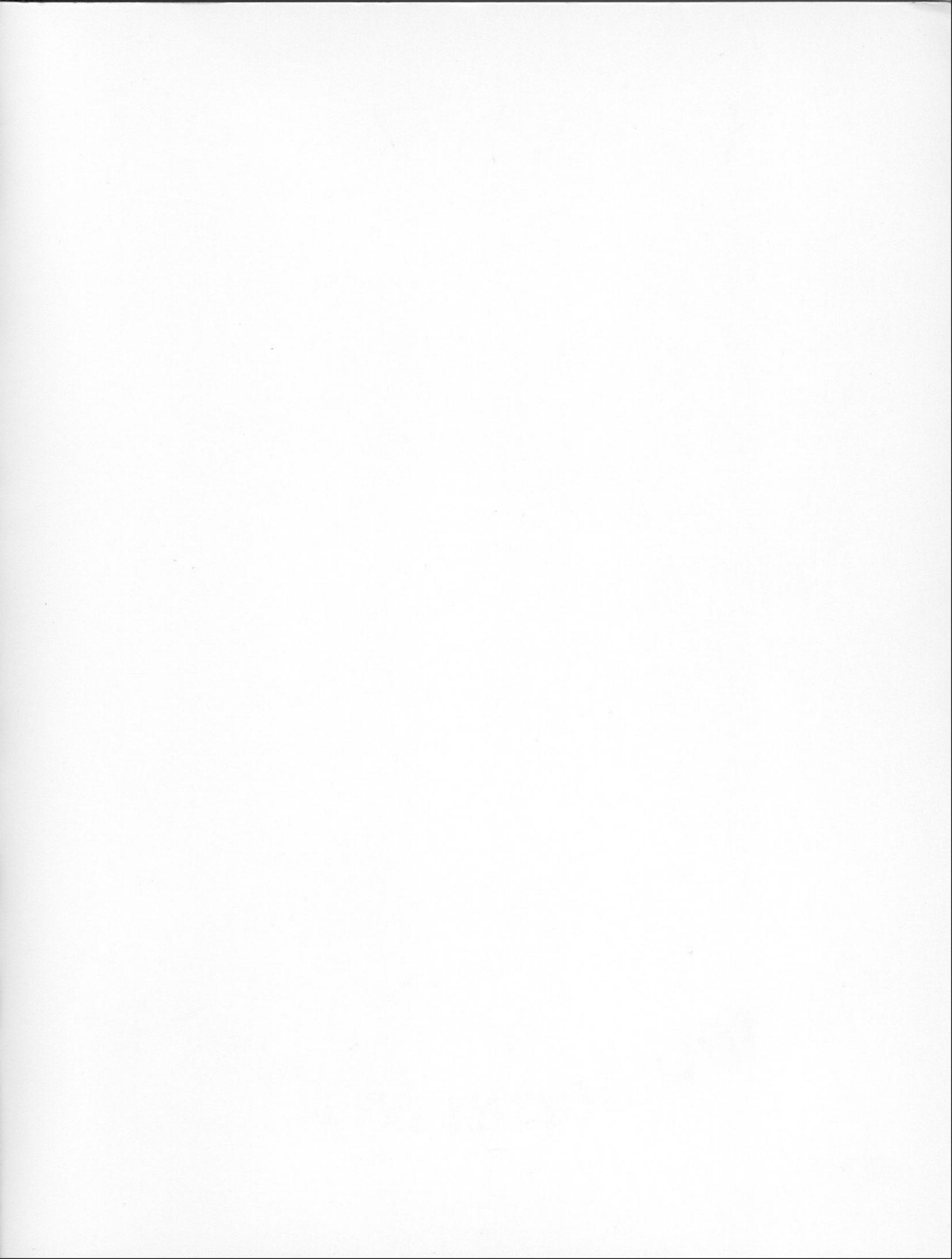
A cross between a squash fold and sink fold, some paper in the center is spread apart and then made flat.

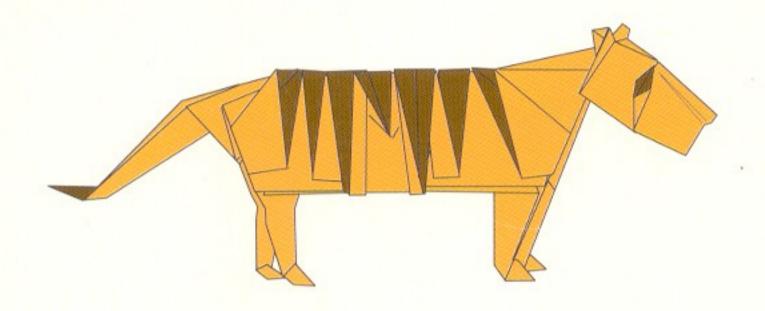


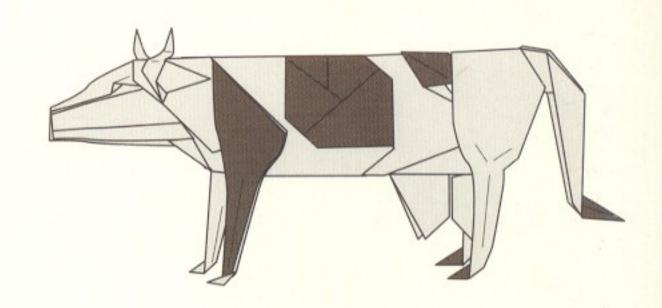
Spread-squash-fold.











# Origami Inside-Out

## John Montroll

Most traditional origami concentrates only on form. Now John Montroll, a world renowned master of origami, has added new realism to his folding by integrating color patterns into this exciting collection of 25 new projects.

Each creation in this book is crafted from a single sheet of standard origami paper, white on one side and colored on the other. The papers are twisted, folded, bent almost magically to make animals and objects accurate not only in shape but also in pattern. Mr. Montroll's raccoon wears a handsome mask, the ferocious tiger has a full set of stripes, and the technicolor Martians would grace a science-fiction movie. Besides animal projects, there are directions for elegant, multicolored geometric shapes and for a full-sized chess board, accompanied, of course, by a complete set of pieces.

The instructions for each project include dozens of step-by-step, computer generated illustrations. With this book and a few packets of paper, everyone from beginner to expert can create beautiful works of origami art.

Unabridged Dover (1993) replication of the edition published by Antroll Publishing Company, Maryland, 1993. 1112 illustrations. 120pp. 8 1/2 x 11. Paperbound.

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