



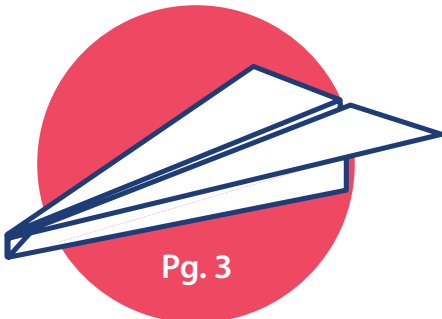
Sam Noble Home



Activities

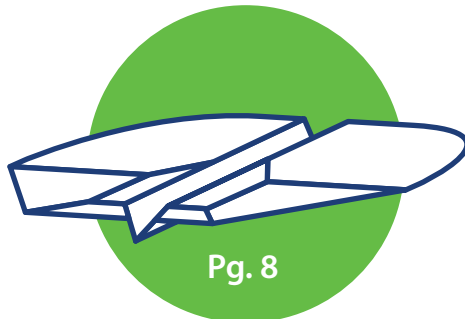


**FLIGHT MANUAL**



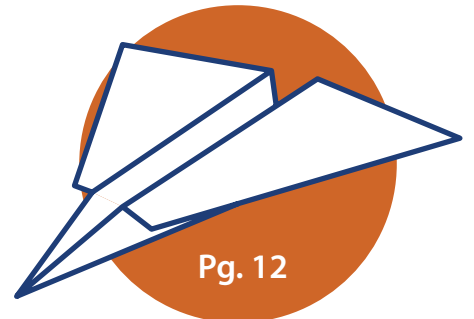
Pg. 3

**THE SPEAR PLANE**



Pg. 8

**THE UFO**



Pg. 12

**BIRD OF PREY**

# WHAT MAKES A PAPER AIRPLANE FLY?



## GRAVITY

is the force that pulls everything toward the center of the earth. It is why when we jump up we fall back to the ground. In order to fly, a paper airplane needs to use some different forces to beat gravity and stay in the air.

## THRUST

is a source of power and motion. When you throw the airplane, your arm is the thrust.

## LIFT

is created when the air below the airplane is pushing up harder than gravity is pulling down. The most lift is created from the wings of the plane.

## DRAG

is the force that pushes against the plane as it moves forward through the air. The shape of the airplane will create less drag if it is a narrow at the front.

## DID YOU KNOW?

A long flight happens when these four forces —gravity, thrust, lift and drag — are balanced.

A plane design that has little lift and drag (small wings and a pointed shape) needs more thrust to fly.

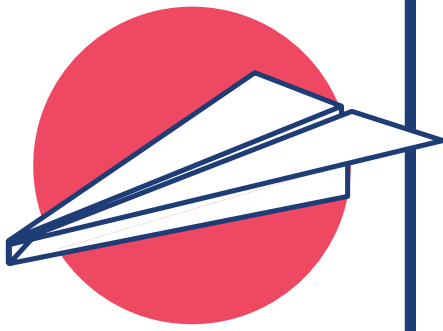
A plane design that has more lift (larger wings and wider shape) needs less thrust.

Try out different shapes and designs to find your favorite balance!

Visit [samnoblemuseum.ou.edu/samnoblehome](http://samnoblemuseum.ou.edu/samnoblehome) for more activities!



Sam Noble Home



## THE SPEAR PLANE PART 1

### 10 STEPS TOTAL

This model eats distance for lunch. The flight path will shoot into the air like a spear.

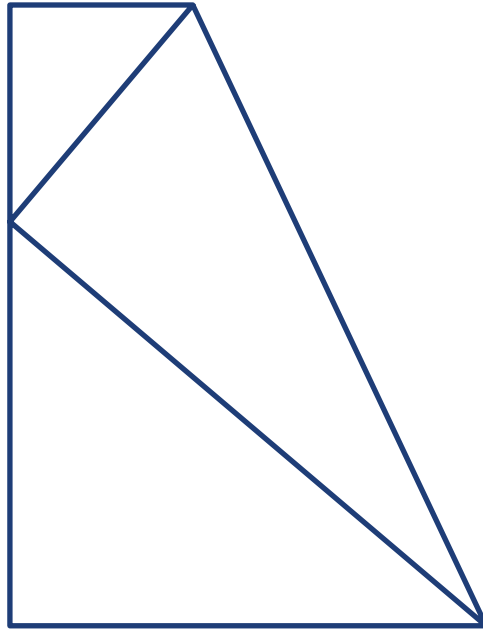
Grey Lines are previously folded sections



Sam Noble Home

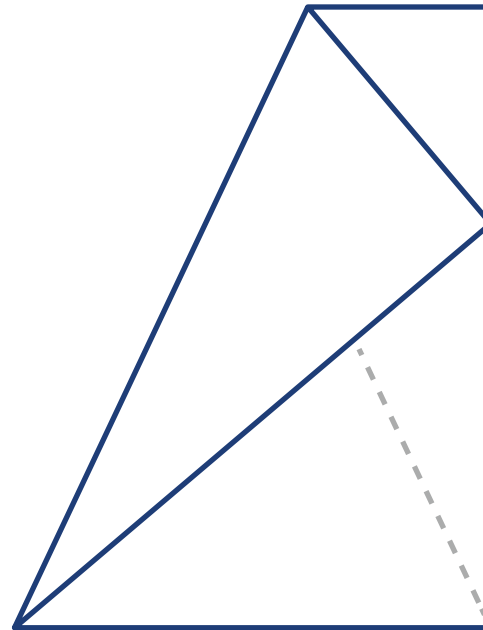


1

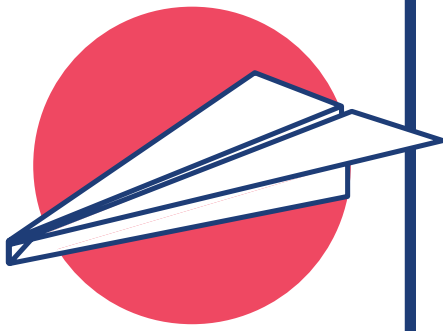


Fold the top right corner to the left side, where the crease begins at the bottom right corner.

2



Open the sheet back up and repeat the same step with the left corner.



## THE SPEAR PLANE PART 2

### 10 STEPS TOTAL

This model eats distance for lunch. The flight path will shoot into the air like a spear.

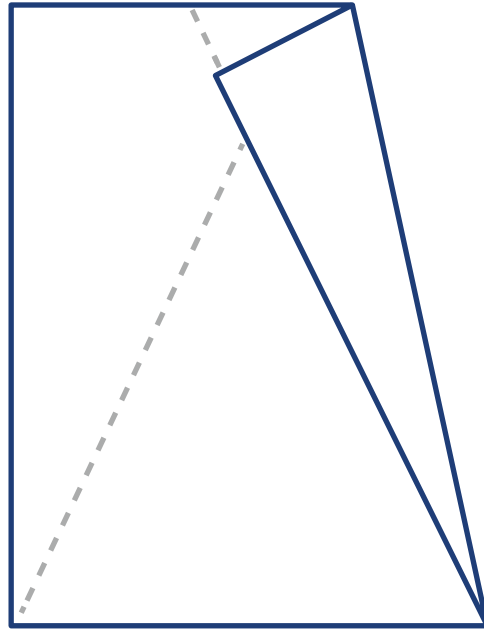
Grey Lines are previously folded sections



Sam Noble Home

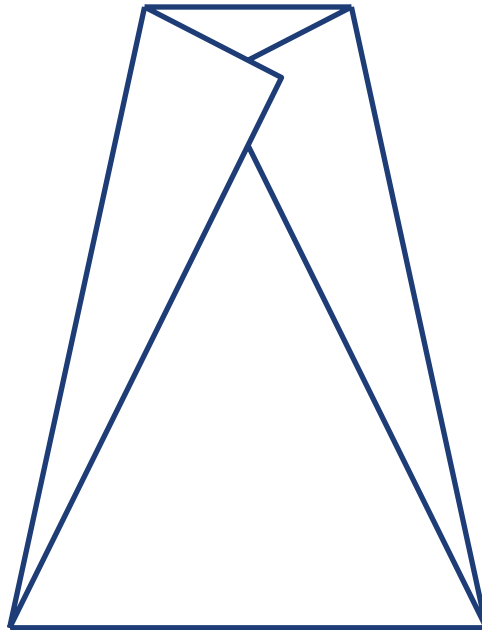


3

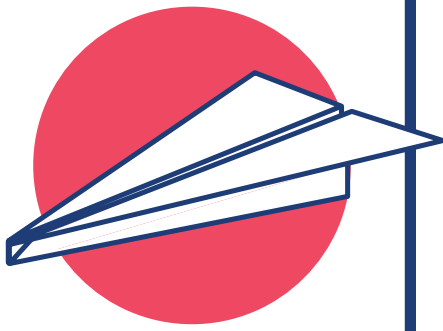


Open back up and fold the right corner along the crease of the previous fold.

4



Repeat with the left side.



### THE SPEAR PLANE PART 3

#### 10 STEPS TOTAL

This model eats distance for lunch. The flight path will shoot into the air like a spear.

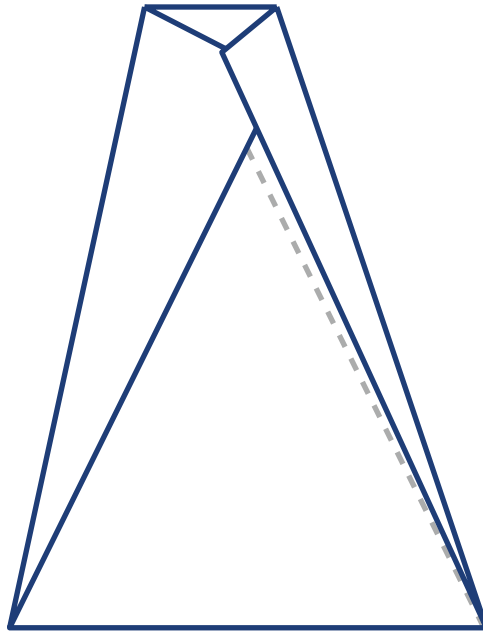
Grey Lines are previously folded sections



Sam Noble Home

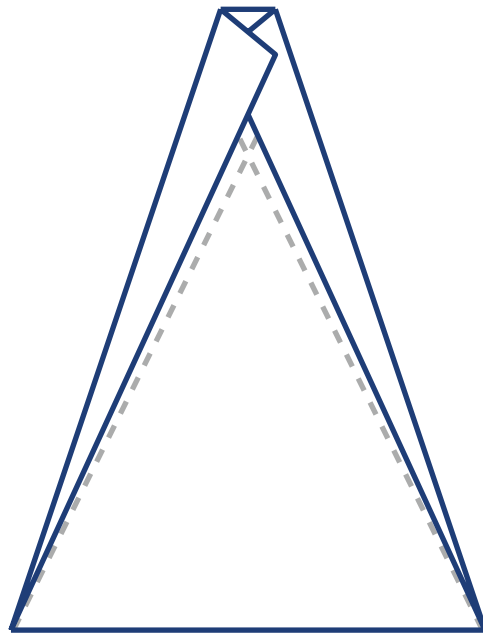


5

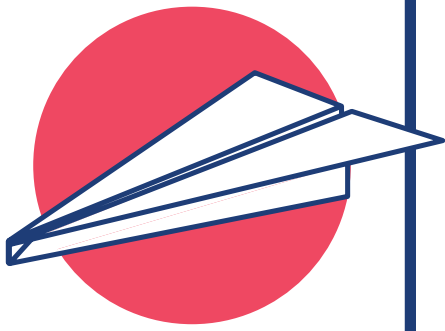


Fold the top right edge again, where the outer edge meets the raw edge in the center.

6



Repeat with the left side.



## THE SPEAR PLANE PART 4

### 10 STEPS TOTAL

This model eats distance for lunch. The flight path will shoot into the air like a spear.

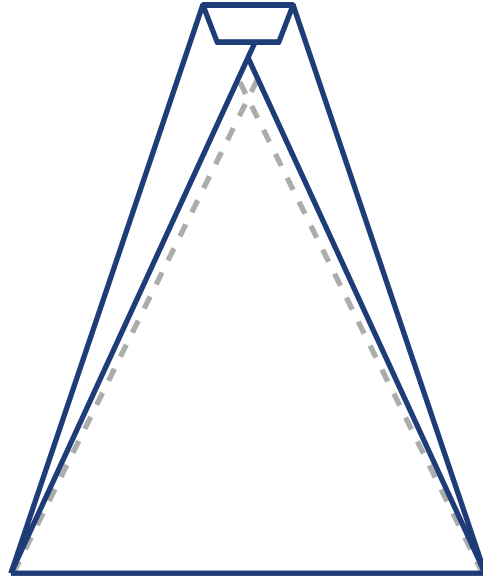
Grey Lines are previously folded sections



Sam Noble Home

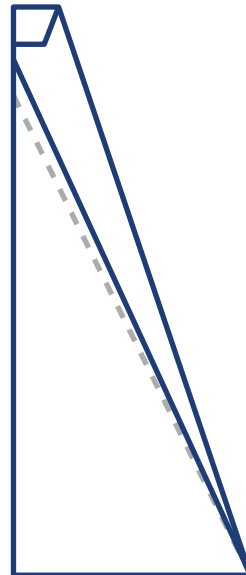


7

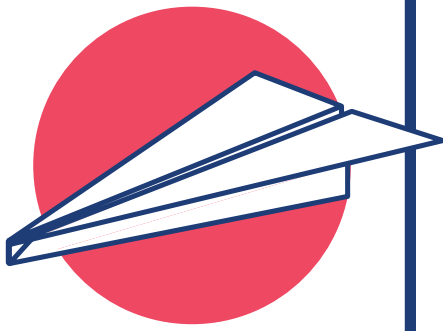


Fold the top edge down to meet the point where the layers cross.

8



Fold the plane in half, with the folded tip on the outside.



## THE SPEAR PLANE PART 5

### 10 STEPS TOTAL

This model eats distance for lunch. The flight path will shoot into the air like a spear.

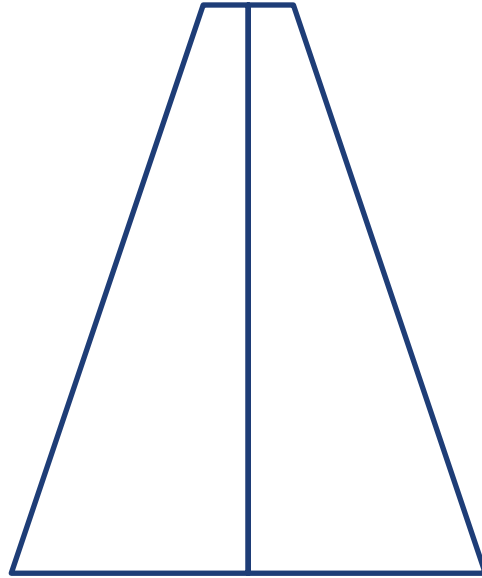
Grey Lines are previously folded sections



Sam Noble Home

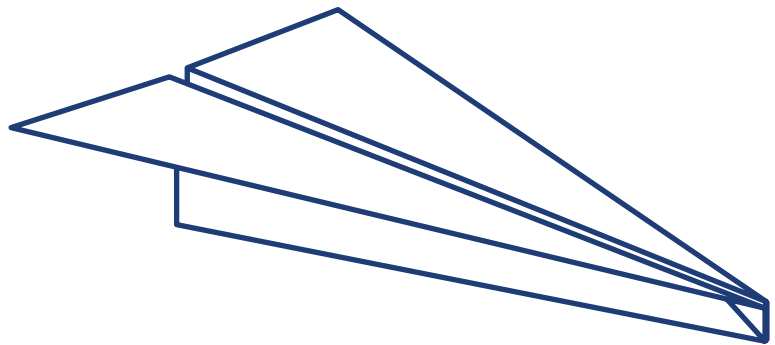


9



Fold down one wing at a slight angle. Repeat with the second wing. There should be no folds showing from the top.

10



Congratulations, You are ready to soar through the skies!



**THE UFO  
PART 1**

**8 STEPS TOTAL**

This model is from a different galaxy. Its shape allows it hover through the air just like a UFO.

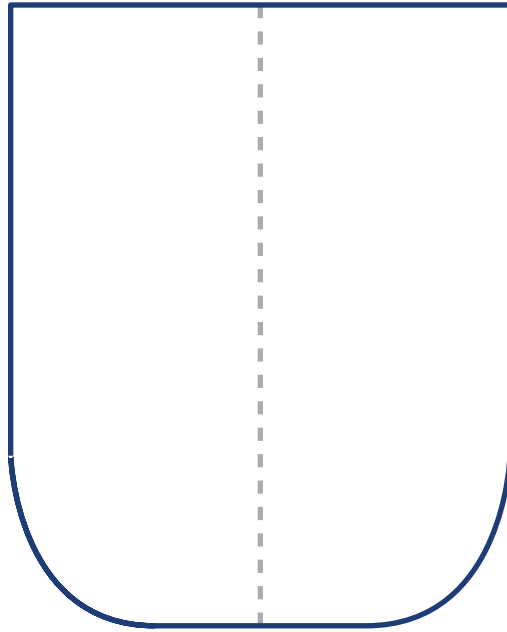
Grey Lines are previously folded sections



Sam Noble Home

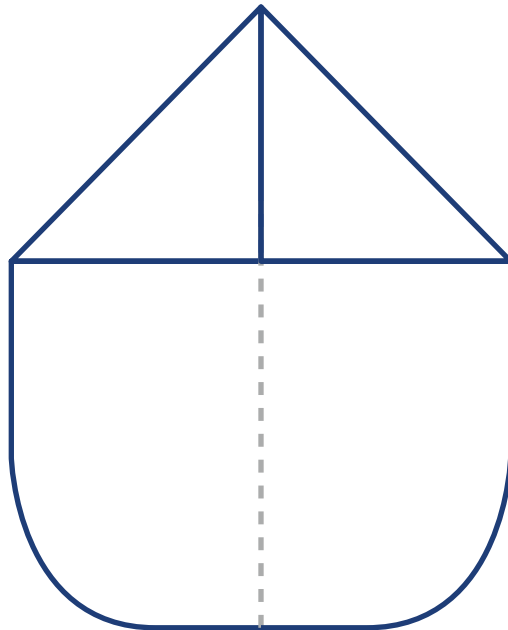


**1**



Cut out the bottom corner to round it off as shown.

**2**



Fold the top corners to the center line.



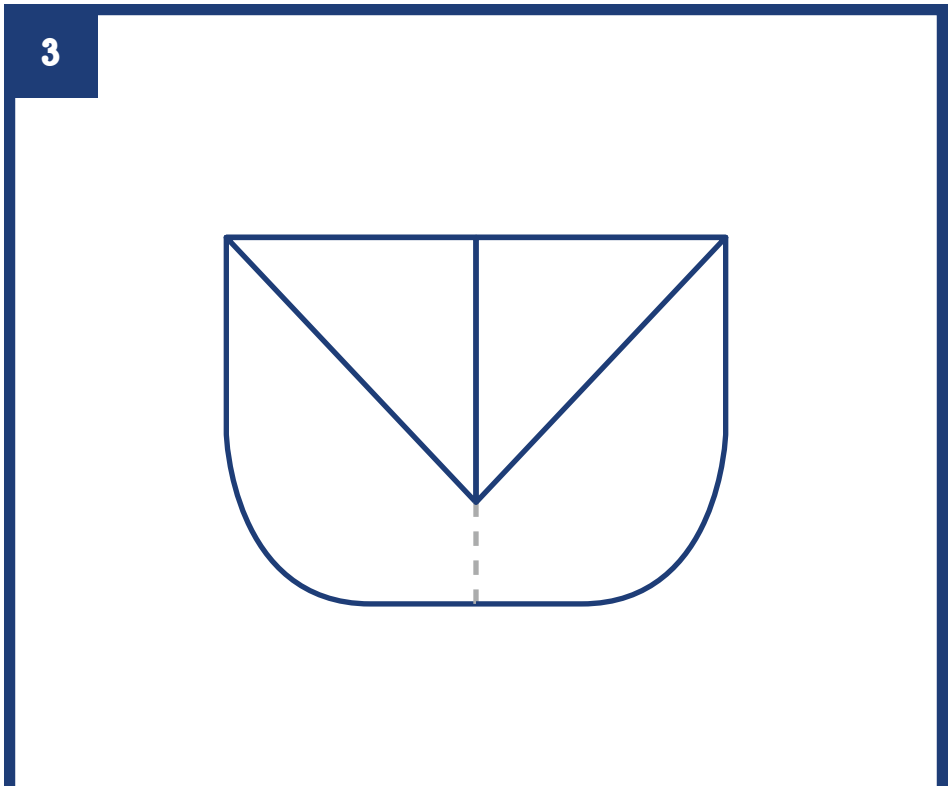


**THE UFO  
PART 2**

**8 STEPS TOTAL**

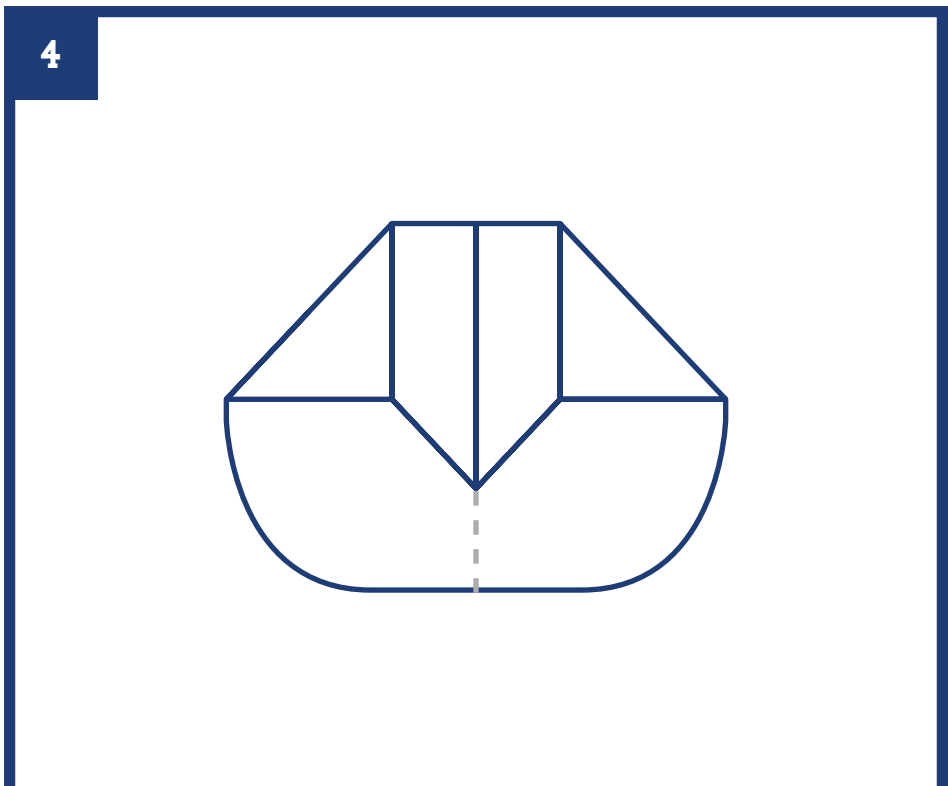
This model is from a different galaxy. Its shape allows it hover through the air just like a UFO.

Grey Lines are previously folded sections



**3**

Fold the peak down 2 inches before the bottom edge.



**4**

Fold down the top two corners about half way down each diagonal line.



**THE UFO  
PART 3**

**8 STEPS TOTAL**

This model is from a different galaxy. Its shape allows it hover through the air just like a UFO.

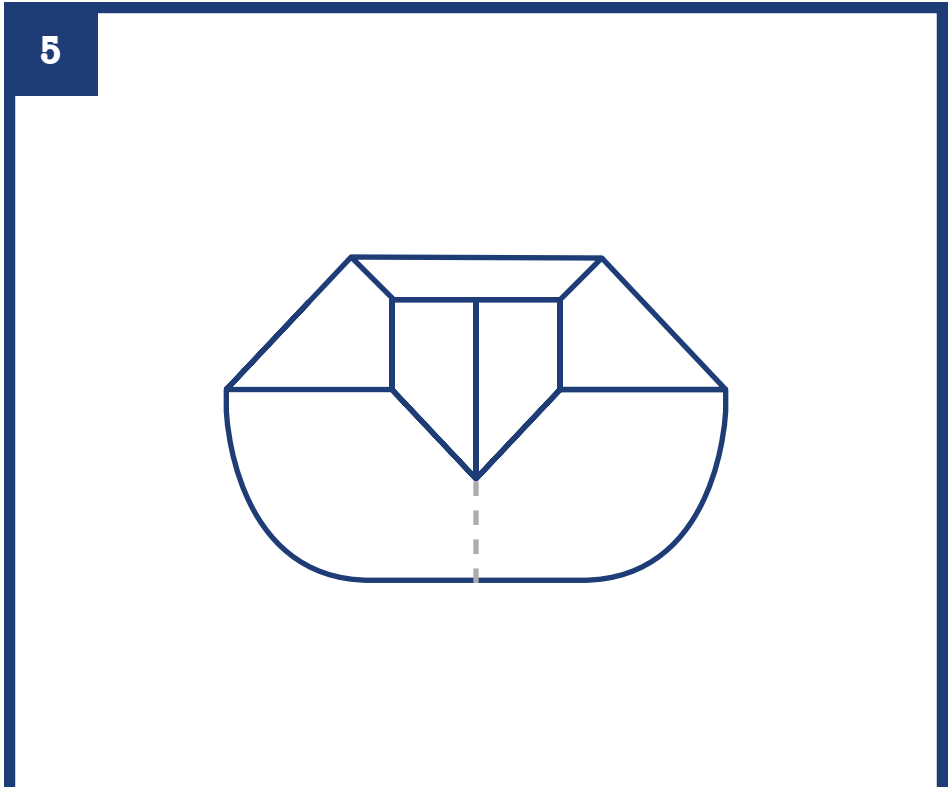
Grey Lines are previously folded sections



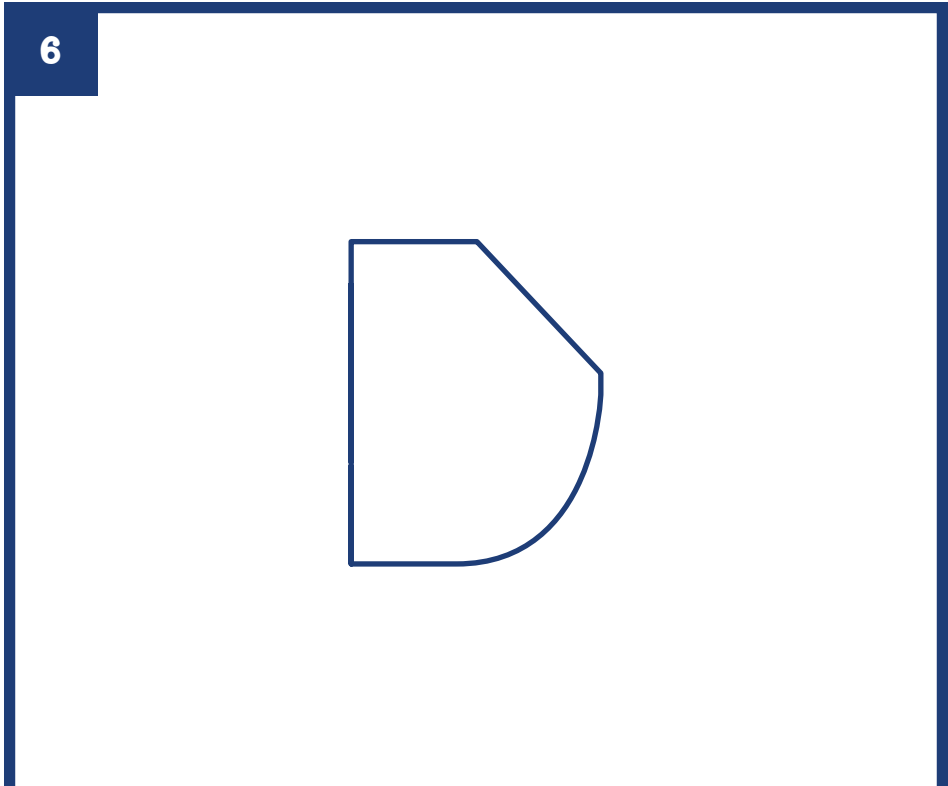
Sam Noble Home

---

**STEM**  
Activities



Fold the top edge down about one inch.



Fold the plane in half.



**THE UFO  
PART 4**

**8 STEPS TOTAL**

This model is from a different galaxy. Its shape allows it hover through the air just like a UFO.

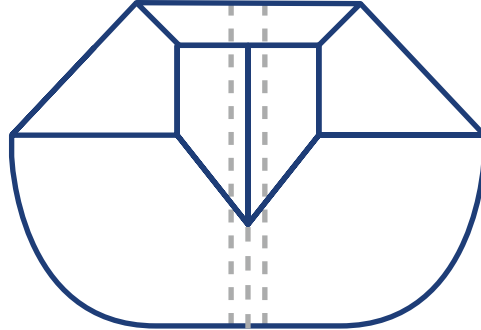
Grey Lines are previously folded sections



Sam Noble Home

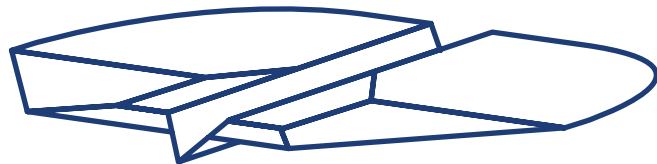


**7**



Finally, fold the sides out to create the long round wings. The body should be a 1/2 an inch.

**8**



Congratulations, You are ready to explore the galaxy!



**BIRD OF PREY  
PART 1**

**8 STEPS TOTAL**

This model is quick to attack. It flies gracefully and has a precision strike.

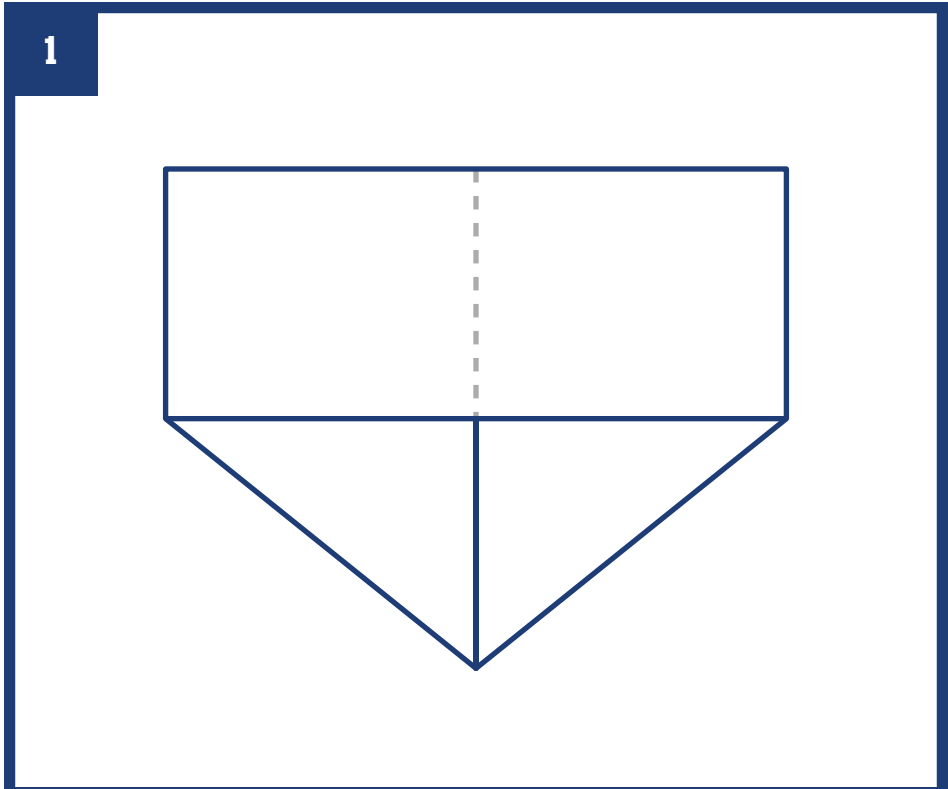
Grey Lines are previously folded sections



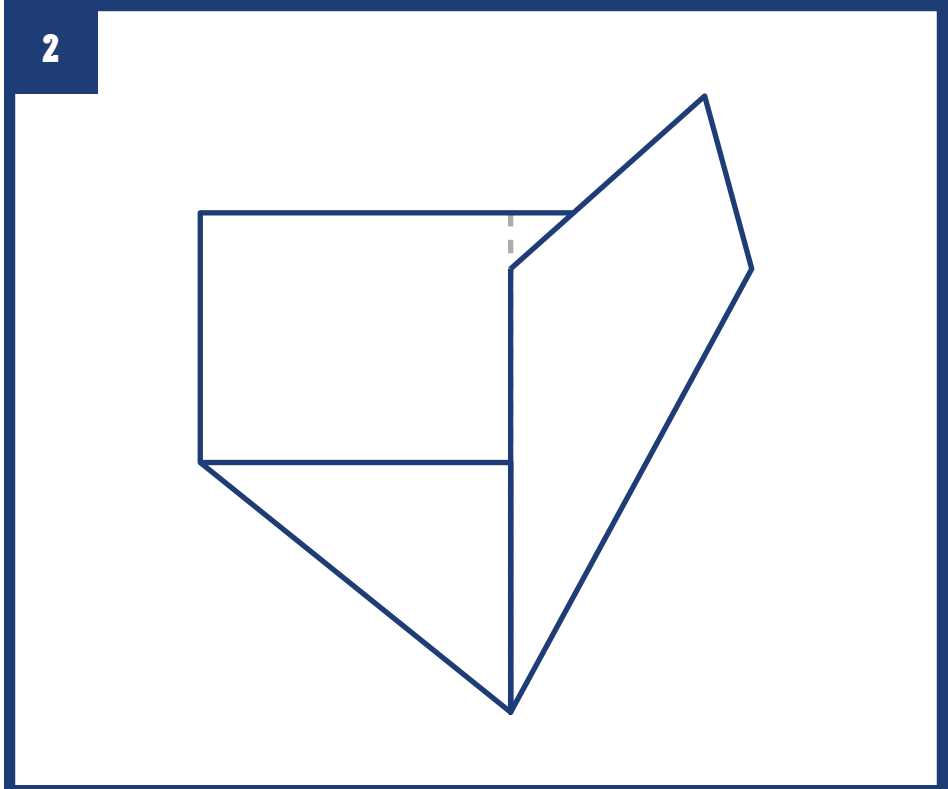
Sam Noble Home

---

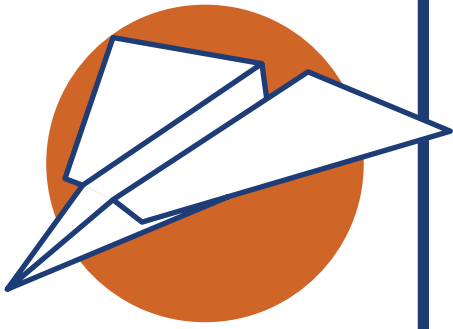
**STEM**  
Activities



Hold paper long way, crease down the middle and fold corners in.



Fold corners into the crease again



## BIRD OF PREY PART 2

### 8 STEPS TOTAL

This model is quick to attack. It flies gracefully and has a precision strike.

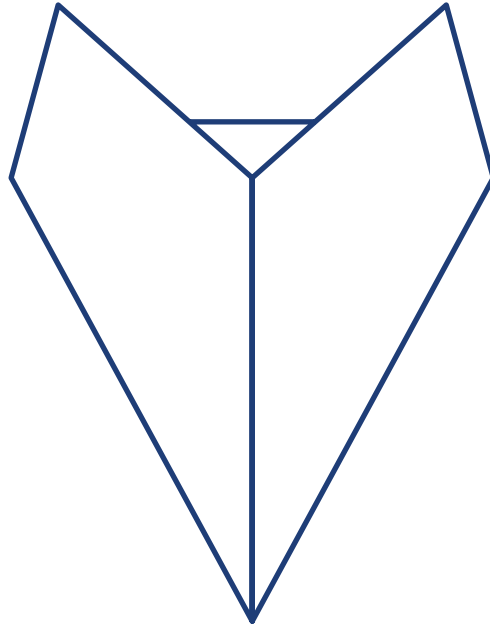
Grey Lines are previously folded sections



Sam Noble Home

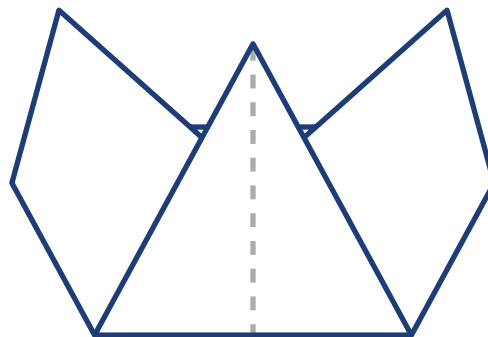


3

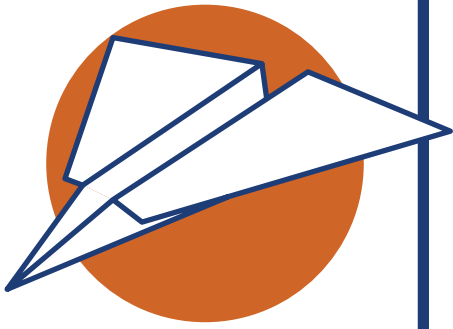


Fold the other side.

4



Fold the point up between the wings.



### BIRD OF PREY PART 3

#### 8 STEPS TOTAL

This model is quick to attack. It flies gracefully and has a precision strike.

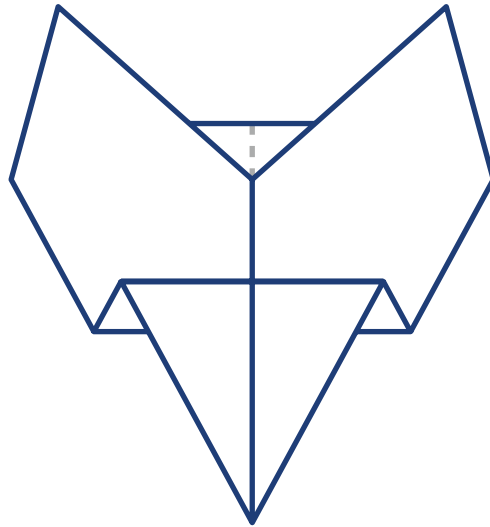
Grey Lines are previously folded sections



Sam Noble Home

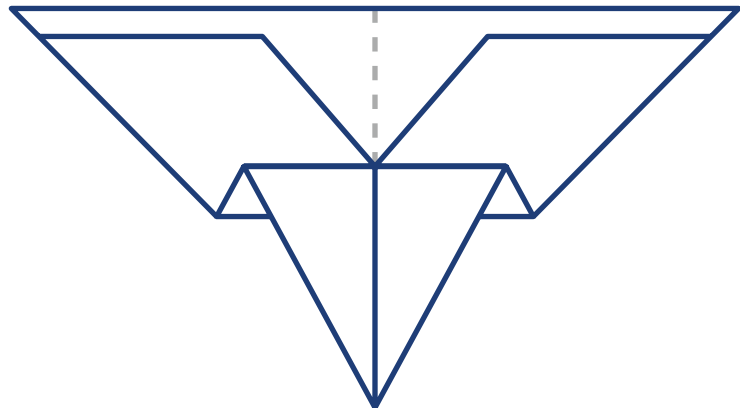


5



Fold the pointy end back down, creasing it one inch above the bottom

6



Grab the ends of the wings and pull them out to the side, pressing them flat.



**BIRD OF PREY  
PART 4**

**8 STEPS TOTAL**

This model is quick to attack. It flies gracefully and has a precision strike.

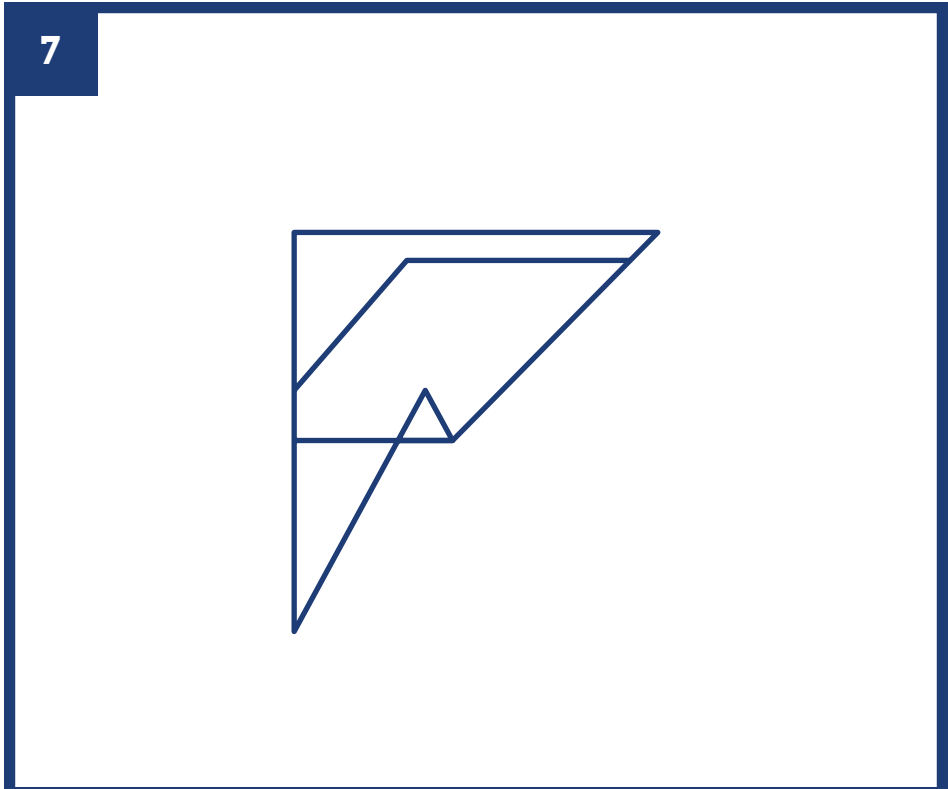
Grey Lines are previously folded sections



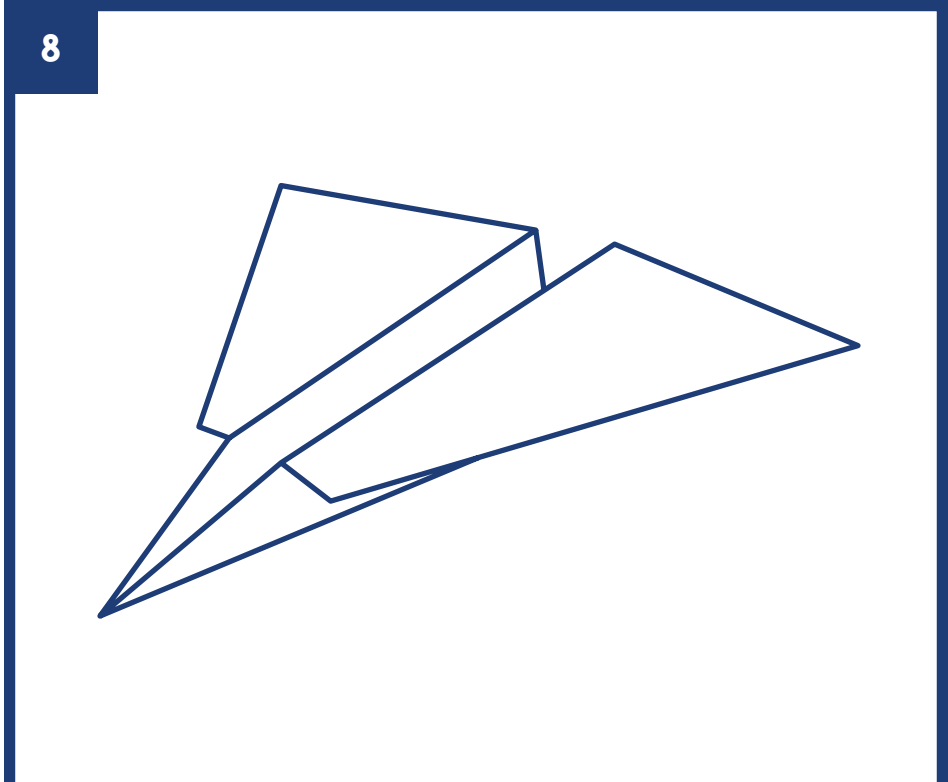
Sam Noble Home

---

**STEM  
Activities**



Fold down the middle so that the previous folds are on the outside.



Fold both wings down and your ready to go on the prowl!