



ULTIMATE ULTRALIGHTS!

BACKGROUND:

Ultralight flight is a great way to capture the imagination and attention of young people. Flying through the sky like a bird is how many children picture flight. Using miniature ultralight gliders, *Ultimate Ultralights!* participants will learn about the four forces of flight and various parts of ultralights.

OBJECTIVE/GOAL:

Ultimate Ultralights! participants will construct card stock gliders modeled after ultralights. As they fly the gliders, the participants will learn how to manipulate control surfaces and balance to achieve better flight.

REQUIREMENTS:

Each *Ultimate Ultralights!* participant will need a place to work. Set up tables or workbenches so that each person will be able to hear and see you as you lead the group through the ultralight-building process.

TIME:

10 minutes to 20 minutes (instructor's discretion)

AGE:

8 years to 13 years

Each Participant Will Need:

- *Ultimate Ultralights!* card stock pattern
- Pair of scissors
- Cellophane tape
- Markers or crayons to decorate the ultralights (optional)
- Paper clips (optional)

As a Leader You Will Need:

- Your own set of supplies (it is recommended that you build your *Ultimate Ultralights!* glider in advance).
- This instruction sheet is for you to read; you do not need to make copies for each person.

DO THIS:

SAY THIS:

1. Stand in front of the group and speak in a relaxed, conversational tone . . . like you are telling a good story. Let the group discuss a few reasons why the Chinese would tie a person to a kite.

Did you know that the first person to fly was probably a Chinese soldier who was tied to a huge kite? This happened more than 3,000 years ago. Why do you think they tied a guy to a kite?

They called the big kite a Manlifter, and it was designed to carry a person (a very brave person), high into the air so he could see where the enemy was. So, the Manlifter was really the first spy plane! Later, the Chinese used big kites to carry soldiers over the walls of their enemies.

Almost 600 years ago, an artist named Leonardo da Vinci (no, not the actor in *Titanic*) spent a lot of time drawing amazing flying machines. While Leonardo never built any of his flying contraptions, he did inspire quite a few people who did build gliders later.

One of the people who saw Leonardo's drawings was a German farmer named Otto Lilienthal (Lil-en-thal). Otto dreamed of flying like a bird, and when he saw the drawings, he decided to build a glider that was shaped like a big bird.

Otto had a challenge. His farm was on very flat land, so he didn't have any way to get up high and glide down. He made his own mountain! Otto piled dirt very high and built a small shed at the top of his hill to hold his glider. Otto flew his glider many times, and people came for miles to see him fly.

2. The kids will say various names of airplanes. You shouldn't have to wait long before someone says *Wright Flyer*.

One of the people who came to watch Lilienthal was Octave Chanute. Octave built his own gliders and moved to America where he met two brothers from Dayton, Ohio. The two brothers, that's right – the Wright Brothers – also built a glider and flew it rather well.

After the Wright Brothers flew their glider, they built a bigger glider and put an engine on it. Does anyone know the name of that famous plane?

DO THIS:

SAY THIS:

3. Let the group express reasons hang gliding would be fun. It's interesting to hear children's ideas on flight, and it helps them to communicate their ideas.

That's right, the *Wright Flyer* was the first airplane to take off from flat ground with a pilot! That was in 1903, and after that people spent a lot of time making bigger and faster airplanes. The nice thing about airplanes is you don't need a big hill like Otto Lilienthal's to go flying.

About 30 years ago near Lake Michigan, a man named John Moody made a glider a lot like the Wright Brothers' glider. He flew it around, and people began to build their own gliders. A new sport was born. Hang gliding became a very popular sport.

Can you think of why a hang glider would be fun?

One of the nice things about hang gliders is that they are inexpensive, but they require a big hill and perfect weather to fly.

Introducing the ultralight!

It's like a hang glider, only it has a small engine so it can take off from level ground. The ultralight is popular because it is inexpensive like the hang glider and is a lot of fun, too!

In an ultralight, you can fly really high, stop the motor, and glide home just like in a hang glider. Does that sound like fun?

Let's build our very own ultralights!

4. Hold up the *Ultimate Ultralights!* pattern.

Take the *Ultimate Ultralights!* pattern and carefully cut out the three pieces of your ultralight. The three parts are the wing, the nose reinforcement, and the body, or fuselage.

5. Assist the group as needed. Suggest to those who finish quickly that they help the ones who are still working.

Try not to rush. If some children have difficulty cutting and taping, ask the older kids to provide assistance.

After you have your three parts cut out, lay them flat on the table so I know you are ready to continue.

Take the nose reinforcement part, (it's the one shaped like a fish), and fold it up so it looks like a triangle.

Tape the triangle together so it is flat.

DO THIS:

SAY THIS:

6. The nose reinforcement piece should form the airfoil when taped to the wing. Apply tape to the leading edge to create a smooth airfoil shape.

Tape the triangle piece onto the nose of the wing part. The front edge should be very smooth so the air will flow around it easily.

Go ahead and put the wing part down and locate the body part. It's the part with the little pilot on it.

7. The fuselage should hang at a right angle from the wing.

Fold over the tab that is labeled A. Pick up the wing and tape the body to the wing so the two stars line up with the two stars on the wing. Let's call the body the fuselage.

The pilot should be facing the pointed end of the wing.

8. Children love the name elevator. It is easy for them to make the connection between a people-moving elevator and the control surfaces.

Do you see the little elevators on the wing?

Can anyone tell me what an elevator does?

In a building, the elevator takes you up or down, right? On an airplane or an ultralight, the elevators make the aircraft go up or down.

9. Let the children guess what happens if they bend the elevators down.

Show them how to bend the elevators up.

If you bend the elevators upon the dotted line, the air flowing over the top of the wing will hit the elevators and make the back of the wing go down. If the back of the wing moves down, then the nose will move up!

What happens if you bend the elevators down?

That's right. The air moving under the wing will hit the elevators and cause the back of the wing to go up. What will happen to the nose? That's right! The nose will go down.

I suggest bending the elevators up just a little bit. This will help make your ultralight go up.

DO THIS:

SAY THIS:

10.

If you stop to administer the oath, the children will be forced to slow down and think about their gliders. When you place an emphasis on “a professional manner,” children usually respond very well.

When administering the “Ultimate Ultralight Pilot Oath,” pause frequently to give the kids time to repeat the oath.

Before you fly your ultralight, you must take the “Ultimate Ultralight Pilot Oath.”

Raise your right hand and repeat after me.

“I promise to fly my Ultimate Ultralight in a safe and professional manner. (pause) I will treat my ultralight with care (pause) and abide by all Federal Aviation Administration regulations.”

Now, you are officially Ultimate Ultralight pilots!

11.

Encourage the group to experiment with the elevators. The wing can be shaped to enhance flight as well. If time permits, hold a distance or sustained flight competition. Have fun!

Hold your ultralight by the fuselage with two fingers. Gently toss the ultralight to launch it.

Be careful not to toss too hard. Ultralights are designed to fly slowly. If you toss too hard you may damage your aircraft and break the pilot oath.

Happy flying!

12.

These cardstock ultralights fly exactly like a real ultralight. A light touch at the controls and no or very little wind is necessary for a good flight. You may need to remind the newly-made ultralight pilots to toss gently.

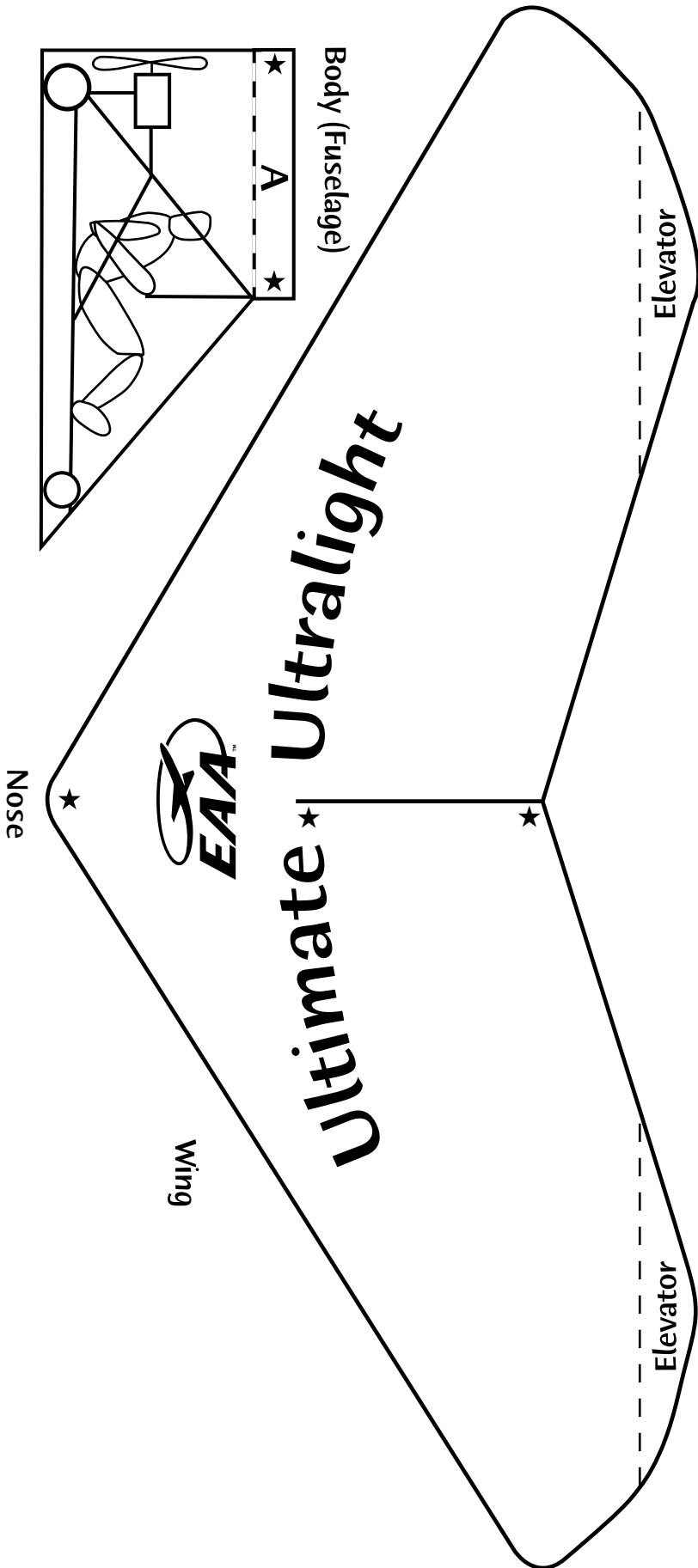
Have fun!

Add a paper clip to the nose of the ultralight if windy conditions or a heavy-handed ultralight pilot is at the controls.

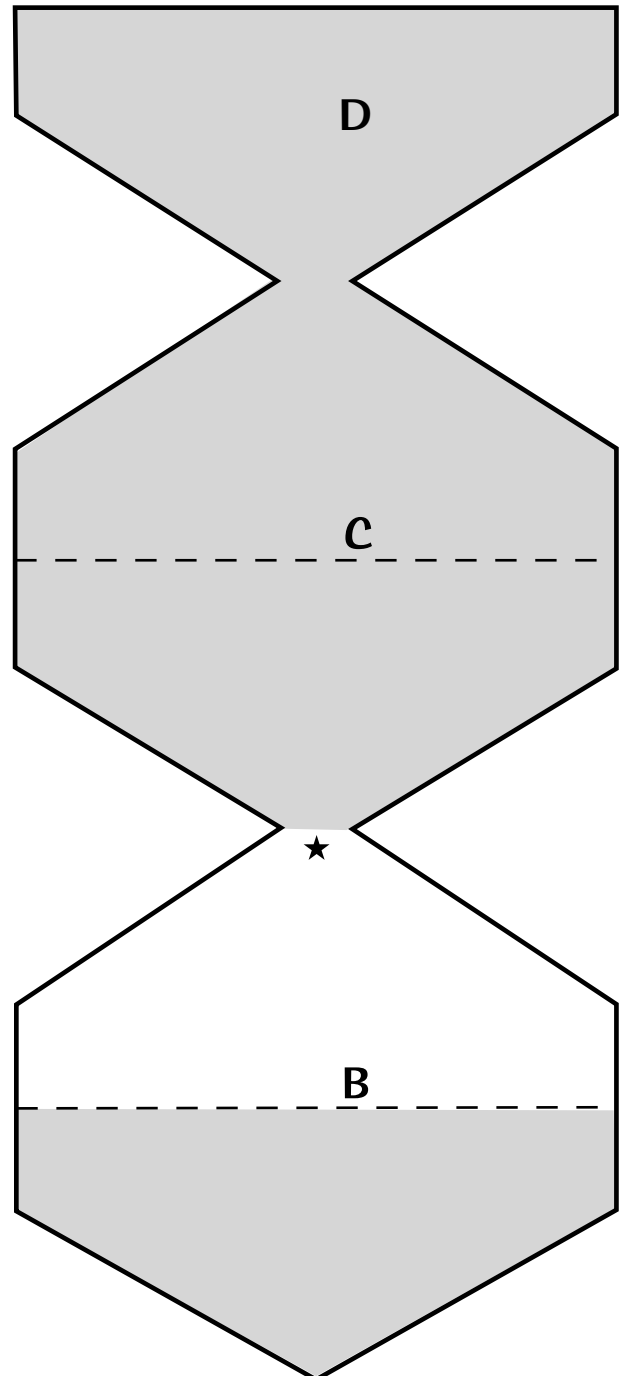
Happy flying!

EAA's Ultimate Ultralight

1. Cut out pieces.
2. Fold Part A at a 90° angle.
3. Fold Pieces B and C on the dashed line.
4. Tape tab on the trike (also called the body or fuselage) to the wing. Match the two stars beside the line on the wing to the two stars on the trike.
5. Stack nose reinforcements on the nose and tape the edges.
6. Bend the elevators on the dashed lines.



Nose Reinforcement



Acknowledgment: Ken Blackburn