

TOOLKIT 2

BIRDS, FISH & AIRPLANES



OKLAHOMA
Aeronautics



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CareerTech

Overview: Students are introduced to the parts of an airplane. They identify the parts of a bird and a fish and relate those parts to similar parts of an airplane. They recognize the main parts of an airplane and develop a basic understanding of what the main parts do.

Source: *The Aerospace Curriculum Guide: Grades K-3*, Oklahoma Department of Career and Technology Education

Grade Levels: K-3

Location: All resources are provided in this toolkit.

1 Student Activity	2 Lesson Plan or Procedure	3 Activity Evaluation or Rubric	4 Suggested Activities	5 Glossary	6 Teacher Background or Concepts	7 Student Background or Concepts	8 Standards Alignment
x	x	x	x	x			
Notes:							

KEY:

1. Student Activity: This is the focus of the toolkit. It is at least one complete activity or lab for students to complete that relates to a topic relevant to aviation/aerospace. It may include related worksheets.
2. Lesson Plan or Procedure: These are the steps or instructions for the teacher to use to deliver the activity.
3. Activity Evaluation or Rubric: These are the answers to the activity or a rubric or other tool for evaluating students' results.
4. Suggested Activities: These are additional or extension strategies for the teacher that relate to the topic/activity.
5. Glossary: This is a list of the vocabulary terms and their definitions that relate to the activity and/or associated concepts.
6. Teacher Background or Concepts: This is any background information for the teacher that explains key concepts relating to the topic/activity, provides the aerospace context for the activity or otherwise helps prepare the teacher for the topic/activity.
7. Student Background or Concepts: This is any background information for the student about theory and concepts related to the topic/activity. It may be separate handout files or a text section within the larger topic/activity.
8. Standards Alignment: These are education or industry standards that align with the topic/activity.

SUPPLEMENTAL RESOURCES

General Resources

- *Pilot's Handbook of Aeronautical Knowledge*, Federal Aviation Administration, 2016. Free to download at https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/.
- Airport Acronyms and Abbreviations, Federal Aviation Administration, <https://www.faa.gov/airports/resources/acronyms/>
- Find an Airport, Oklahoma Aeronautics Commission, <https://oac.ok.gov/airports>
- K-12 Student/Teacher Resources, NASA, <https://www.nasa.gov/aeroresearch/resources/k-12-resources>
- "Science Takes Flight With Paper Airplanes," Edutopia, <https://www.edutopia.org/article/science-takes-flight-paper-airplanes>

Instructional Practice Resources

- *60 Formative Assessment Strategies*, Natalie Regier, 2012. Free to download at <https://www.okcareertech.org/educators/resource-center/teacher-trainer-tools>.
- *Student Learning That Works: How brain science informs a student learning model*, McREL International, 2018. Free to download at <https://www.mcrel.org/student-learning-that-works-wp/>.

Career Planning Resources

- OK Career Guide. Free to Oklahoma educators. For more information, see <https://www.okcareertech.org/educators/career-and-academic-connections/ok-career-guide>.
- Aviation Organizations, Oklahoma Aeronautics Commission, <https://oac.ok.gov/media-outreach/aviation-organizations>
- *Careers in Aerospace*, American Institute of Aeronautics and Astronautics. Free to download at <https://www.aiaa.org/get-involved/students-educators/Careers-in-Aerospace>.
- Flying for a Career, AOPA, <https://www.aopa.org/training-and-safety/learn-to-fly/flying-for-a-career>
- Oklahoma Aerospace: Building on a Rich Tradition, Oklahoma Department of Career and Technology Education, <https://www.okcareertech.org/business-and-industry/aerospace-and-aviation>

Activity-Specific Resources

- "Birds and planes," Science Learning Hub (New Zealand), <https://www.sciencelearn.org.nz/resources/317-birds-and-planes>
- Learning on the fly with United, United Airlines, <https://hub.united.com/united-home-aviation-activities-kids-2645719248.html>

TEACHER INSTRUCTIONS

Part A

1. Direct the students' attention to birds and fish. Arouse an interest in the similarity of birds and fish as they compare to airplanes. Use the student handouts, "An Airplane is Like a Bird" and "An Airplane is Like a Fish."
2. Ask questions like the following:
 - How is a bird like an airplane?
 - What parts of the bird are like airplane parts?
 - What parts of the bird gave people ideas for building airplanes?
 - How is a fish like an airplane?
 - What parts of the fish are like airplane parts?
 - What parts of the fish gave people ideas for building airplanes?
3. Emphasize that birds and fish have many parts. Each part does something special. It takes all parts working together to allow the bird to fly and the fish to swim. To clarify, ask questions like these:
 - What happens if a bird loses the feathers on one wing?
 - What happens if a bird breaks a leg?
 - What happens if a fish loses part of its tail or part of a fin?
4. Explain that a bird has a tail, feet, body and wings as an airplane has.
5. Explain that a fish has a body and a tail as an airplane has.
6. Ask students to draw an airplane by combining the bird parts and the fish parts.
7. Use the student handout, "Bird Parts and Fish Parts Together." Say that if we put the bird parts and the fish parts together, we get the parts of an airplane. To make the airplane fly, we add an engine to make it go and a pilot to steer it.

TEACHER INSTRUCTIONS

Part B

1. Transfer the students' knowledge of fish and bird parts to airplane parts. Use the student handout, "Bird Parts and Fish Parts Together." Create interest in the airplane parts by asking questions like these:
 - What parts on the airplane are like the parts of a fish or the parts of a bird?
 - Do you think that airplane parts work the same as the parts of a fish or a bird?
 - Do you see any parts that seem different?
 - What makes these parts different?

2. Explain each airplane part. Use the "Teacher Script for Airplane Parts" (provided) or a similar source for definitions. Consider the students' grade level:

Grades K-1: fuselage, wings, tail, wheels (landing gear), propeller, engine.

Grades 1-3: fuselage, wings, landing gear, propeller, engine, cockpit, ailerons, elevator, rudder, flaps.

3. Have the students color the airplane parts. Use the student handout, "Color the Airplane Parts." Give students directions based on their grade level (two separate student handouts are provided):

- Grades K-1:

Color the wings red.

Color the fuselage green.

Color the tail blue.

Color the wheels black.

- Grades 1-3:

Color the flaps brown.

Color the fuselage blue.

Color the landing gear green.

Color the propeller black.

Color the ailerons orange.

Color the elevators purple.

Color the rudder red.

Color the wings yellow.

4. For grades 2-3, use the optional student handout for labeling the parts of an airplane.

Answers: 1 cockpit, 2 rudder, 3 elevator, 4 fuselage, 5 flaps, 6 aileron, 7 landing gear, 8 wings, 9 propeller

Extension Activities

- A. Draw a large airplane on poster board. Cut out each labeled part. Ask students to assemble the puzzle.
- B. Make a name card for each airplane part. Place the cards in a box. Have students select a card from the box. Ask students to identify the word, locate the part on the airplane model and demonstrate the part's function.
- C. Using the parts of the airplane as vocabulary words, ask the students to write the words in alphabetical order and to write a sentence that uses each word.

TEACHER SCRIPT FOR AIRPLANE PARTS

Fuselage

“The fuselage is the central (middle) part of the airplane. Pilots, passengers and cargo are carried inside the fuselage. The wings, engine, tail and landing gear are attached to the fuselage. Old airplanes had an outside covering made of fabric. Airplanes today use different materials for the fuselage.”

Wings

“Air flowing over the wings helps lift the airplane into the air. Most airplanes today have a wing attached to each side of the fuselage. These planes are called monoplanes because they have one set of wings. Some airplanes have two sets of wings attached to each side of the fuselage. These planes are called biplanes because they have two sets of wings.”

Landing gear

“The landing gear includes the wheels and the parts that attach the wheels to the fuselage. The landing gear supports the airplane while it is on the ground. The landing gear is also used to taxi, take off and land. The landing gear is not needed for flying the airplane when the airplane is in the air. When a larger airplane is flying, the landing gear can be folded up into the wings or the fuselage. This helps to make the airplane aerodynamic, or sleek in shape. Some airplanes do not have landing gear that folds up.”

Propeller

“The propeller is a rotating blade that is attached to the engine at the front of the airplane. The engine turns the propeller and the propeller pulls the airplane through the air. If an airplane has more than one engine, a propeller is attached to each engine.”

Engine

“The engine is the part that provides the power that moves the airplane through the air.”

Cockpit

“The cockpit contains the instruments that tell the pilot how the airplane systems are working. The instruments also tell the pilot if the airplane is on course.”

Ailerons

“The ailerons are moving parts that are attached to the back edge of each wing. When the pilot moves the ailerons, the airplane will tilt and roll to the left or the right.”

Elevators

“The elevators are moving parts that are attached to the horizontal section of each side of the tail. When the pilot moves the elevators, the airplane climbs (goes upward) or descends (goes downward).”

Rudder

“The rudder is a moving part that is attached to the vertical section of the tail. When the pilot moves the rudder, the airplane turns to the left or to the right.”

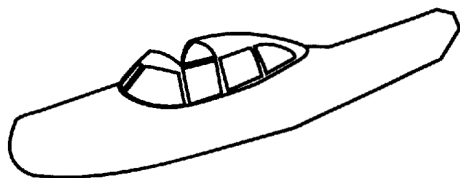
Flaps

“Flaps are moving parts that are attached to the back edge of each wing, like the ailerons. Flaps help to reduce the distance that the airplane needs for takeoff and they slow the airplane down for landing.”

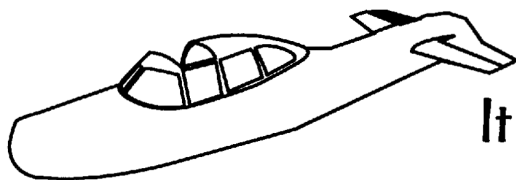
AN AIRPLANE IS LIKE A BIRD



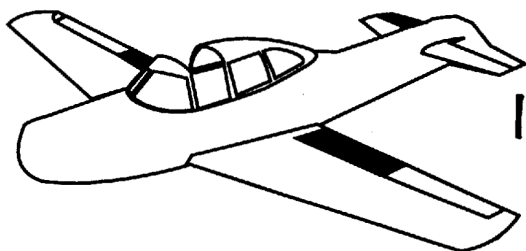
AN AIRPLANE IS LIKE A BIRD



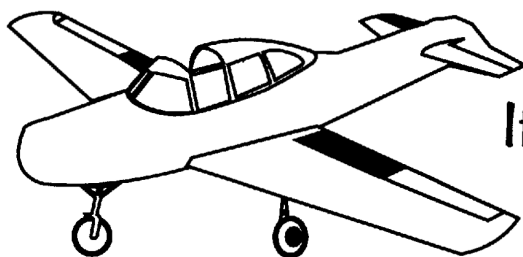
It has a body.



It has a flat tail.



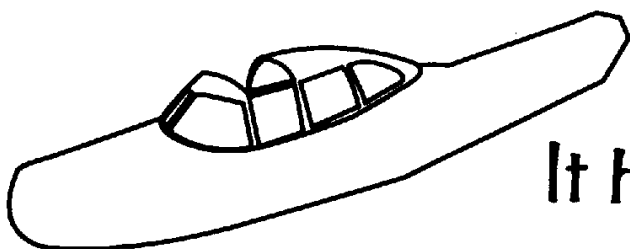
It has wings.



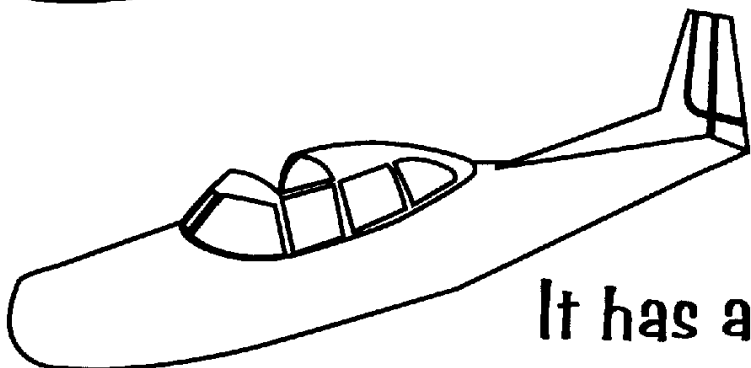
Its wheels are like feet.

AN AIRPLANE IS LIKE A FISH

AN AIRPLANE IS LIKE A FISH

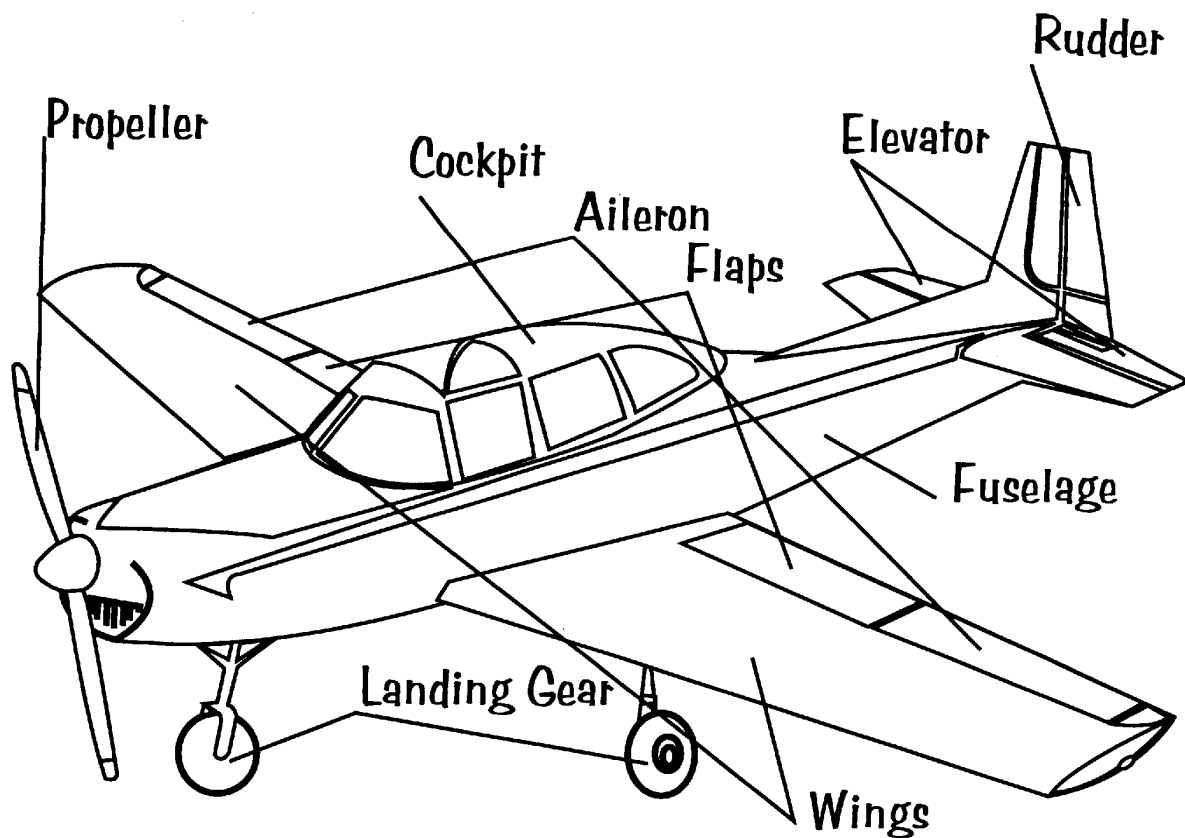


It has a body.



It has a tail called a rudder.

BIRD PARTS & FISH PARTS TOGETHER



COLOR THE AIRPLANE PARTS

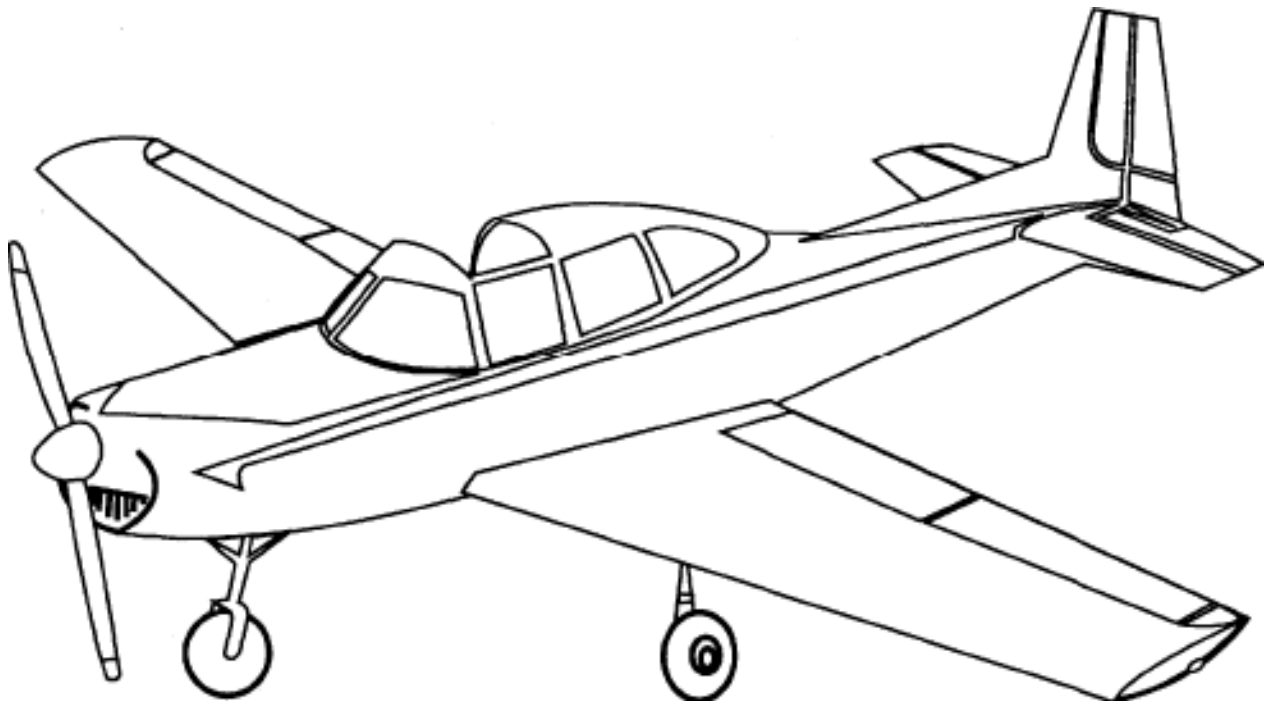
Name: _____

Color the wings red.

Color the fuselage green.

Color the tail blue.

Color the wheels black.



COLOR THE AIRPLANE PARTS

Name: _____

Color the flaps brown.

Color the fuselage blue.

Color the landing gear green.

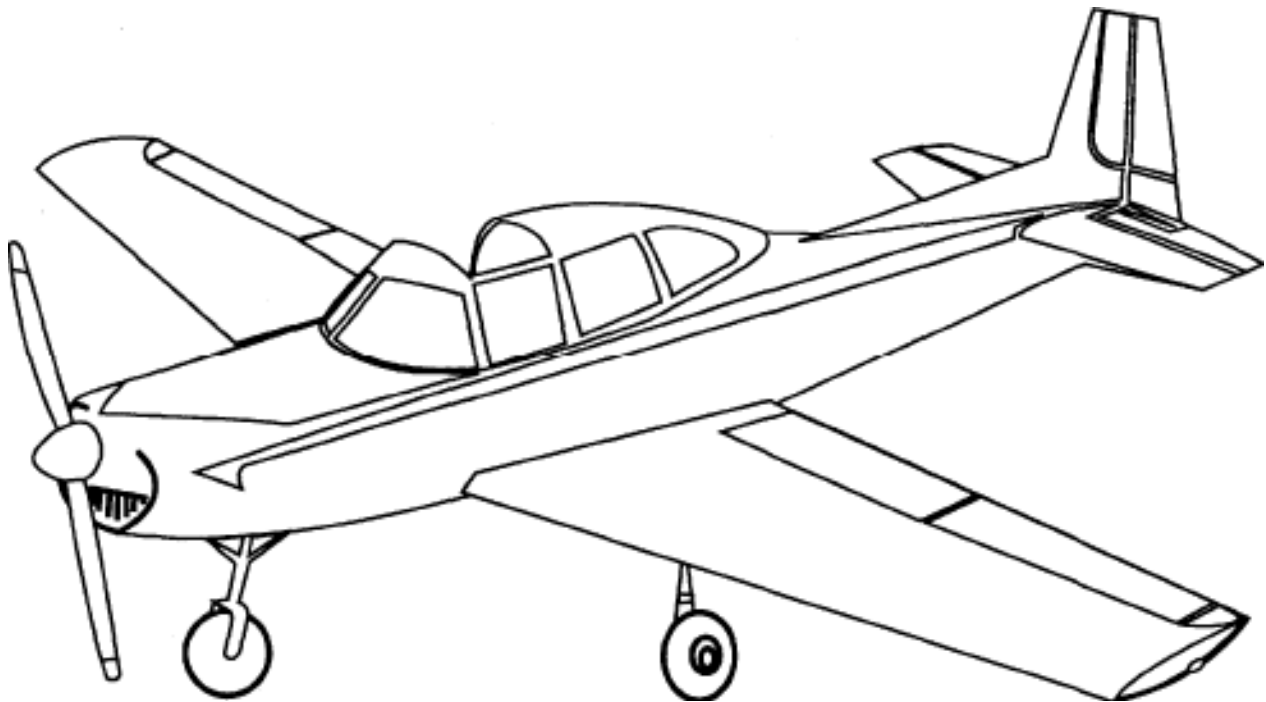
Color the propeller black.

Color the ailerons orange.

Color the elevators purple.

Color the rudder red.

Color the wings yellow.



LABEL THE AIRPLANE PARTS

Name: _____

Use the words to label the parts:

Fuselage

Landing gear

Flaps

Propeller

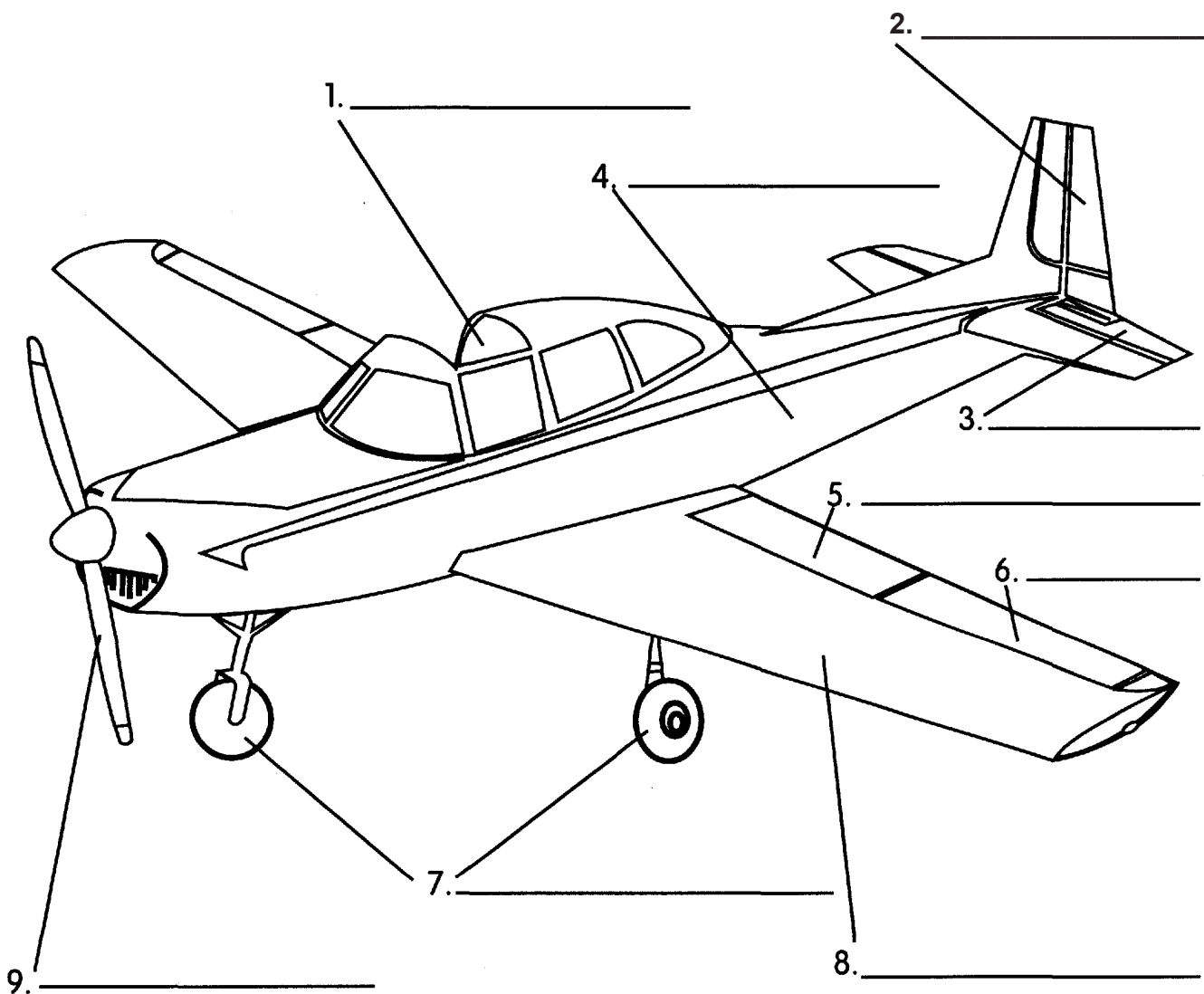
Elevator

Cockpit

Wings

Aileron

Rudder



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