



# Principles of Flight



## Lesson Plan: Classify Machines That Fly!!!

**Grade Level:** 8

**Subject Area:** Science

**Time Required:** *Preparation:* 15 minutes  
*Activity:* 60 minutes

**National Standards Correlation:**

*Science (grades 5-8)*

- Science as Inquiry Standard: Abilities necessary to do scientific inquiry.
- Unifying Concepts and Processes Standard: Evidence, models, and explanation.
- Unifying Concepts and Processes Standard: Systems, order and organization.

**Summary:** Students will design their own dichotomous key for the eight airplanes given. After students have designed their keys they will exchange papers and check each other's keys for accuracy.

**Objectives:** Students will:

- Learn the definition of a dichotomous key
- Classify objects into groups
- Make a dichotomous key

**Background:** To classify means to group objects by their similarities and/or their differences. A dichotomous key is used to classify things by dividing a group into two by characteristics. First, the group is divided into two parts. Next, each of those parts are divided again. This process continues until the groups are single objects. Dichotomous keys are very helpful in studying how to classify objects with numerous characteristics. The key is then used to identify individual objects.

**Materials:** You will need:

- Pencil
- Paper
- Handout of the different aircraft to be classified
- Diagram for dichotomous key

**Procedure:**

**A. Warm-up**

1. Discuss the different types of aircraft. An aircraft is given a two-part symbol consisting of a letter and a number. There are several types of aircraft and 3 types are used for this activity. These are:  
  
B (Bomber) They are designed to carry bombs, torpedoes or missiles.  
C (Cargo) They carry cargo or passengers.  
F (Fighter) They are designed to intercept and destroy other aircraft or missiles.
2. The number tells the model of the aircraft. For example:  
  
(F-16) a fighter plane with the model number of 16 (F-16C) a newer version of the original F-16



3. Have students review what the symbols stand for.

**B. Activity**

1. Have students study the pictures of the aircraft.
2. Direct them to divide the aircraft into 2 large groups. Write the characteristic of one group on the top line of the diagram and the characteristic of the other group on the bottom line. Refer to Figure 1. Often, the second characteristic is “no” of the first characteristic.
3. Divide the top group into 2 more groups. Write the characteristics on the lines. See Figure 1.
4. Divide the group into 2 more groups and write the characteristic of the groups on the lines. Do the same for the other group.
5. Then tell students to start with the bottom group, and follow the above procedure for the remaining aircraft.

**Assessment/  
Evaluation:**

Students may exchange papers and see if they can follow each other's dichotomous keys.

**Extensions:**

The information from the dichotomous key can be put into column form to use as a key to check answers.

A.	_____	_____
B.	_____	_____
C.	_____	_____
D.	_____	_____
E.	_____	_____
F.	_____	_____
G.	_____	_____
H.	_____	_____
I.	_____	_____
J.	_____	_____
K.	_____	_____
L.	_____	_____
M.	_____	_____
N.	_____	_____

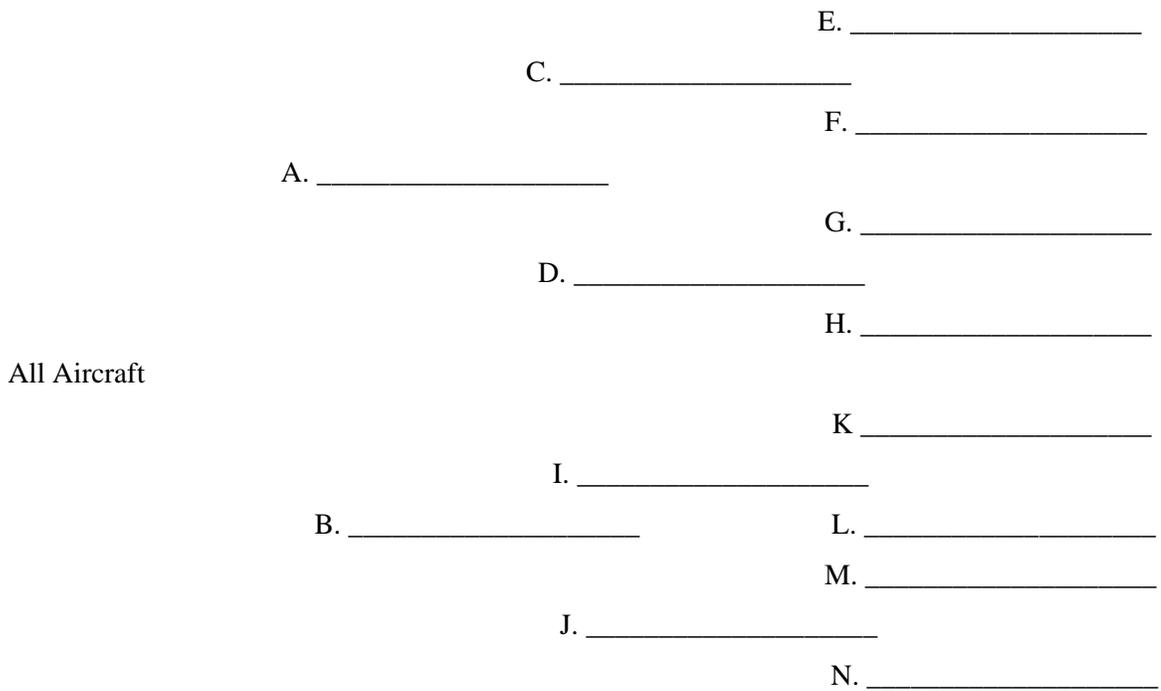
In the left column, write the characteristics used to divide each group. In the right column, write “Go to” clues. These clues will tell someone using the key where to go to search for the names of the aircraft.

**Resources/  
References:**

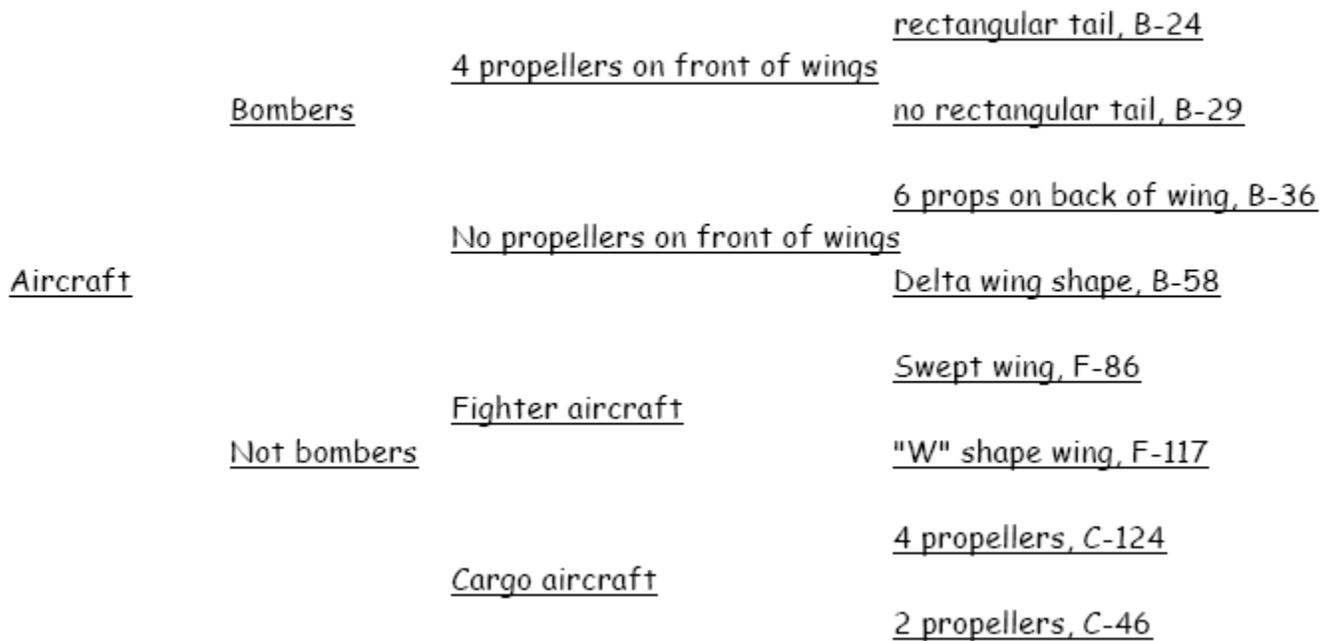
The National Museum of the U.S. Air Force web site, <http://www.nationalmuseum.af.mil>



**Figure 1:**



**EXAMPLE OF DICHOTOMOUS KEY**



### Example of Answer for Extension

A. Bombers	Go to C, D
B. Not Bombers	Go to I, J
C. 4 propellers on front of wings	Go to E, F
D. No propellers on front of wings	Go to G, H
E. Rectangular tail	B-24
F. No rectangular tail	B-29
G. 6 propellers on back of wing	B-36
H. Delta wing shape	B-58
I. Fighter aircraft	Go to K, L
J. Not fighter aircraft	Go to M, N
K. Swept wing	F-86
L. "W" shaped wing	F-117
M. 4 propellers	C-124
N. 2 propellers	C-46

