

# Flight Technology

## Module Activity Sheet

Name \_\_\_\_\_ Block \_\_\_\_\_

**Enter Date example: Oct. 25**

### **Session # 1**

Module Guide Score = \_\_\_\_\_ / 10 ..... Date Completed \_\_\_\_\_  
Basic Aerodynamics Activity ..... Date Completed \_\_\_\_\_  
Basic Aerodynamics Worksheet (Pg. 9)..... Date Completed \_\_\_\_\_  
Assessment Answers Completed in Packet (Pg. 2).. Date Completed \_\_\_\_\_  
Review Game (Bloop or Critter Cross Played) ..... Date Completed \_\_\_\_\_

### **Session # 2**

RCA 's Score = \_\_\_\_\_ / 30 ..... Date Completed \_\_\_\_\_  
Wing Construction Design (Pg. 10)..... Date Completed \_\_\_\_\_  
Vocabulary Page Completed in Packet (Pg. 5) ..... Date Completed \_\_\_\_\_

### **Session # 3**

RCA's Score = \_\_\_\_\_ / 30 ..... Date Completed \_\_\_\_\_  
Making Your Wing Activity ..... Date Completed \_\_\_\_\_  
Technical Writing Page Completed in Packet(Pg. 6) Date Completed \_\_\_\_\_

### **Session # 4**

RCA's Score = \_\_\_\_\_ / 30 ..... Date Completed \_\_\_\_\_  
Wing Testing Activity ..... Date Completed \_\_\_\_\_  
Wing Testing Worksheet (Pg. 11)..... Date Completed \_\_\_\_\_  
Assessment Answers Completed in Packet (Pg. 3)... Date Completed \_\_\_\_\_  
Career Sheet Page Completed in Packet (Pg. 7) ..... Date Completed \_\_\_\_\_

### **Session # 5**

RCA's Score = \_\_\_\_\_ / 30 ..... Date Completed \_\_\_\_\_  
Flight Simulator Activity ..... Date Completed \_\_\_\_\_  
Word Search Page Completed in Packet (Pg. 8) ..... Date Completed \_\_\_\_\_

### **Session # 6**

Test Review "Game" ..... Date Completed \_\_\_\_\_  
Basic Flying Maneuvers Activity (Pg. 12)..... Date Completed \_\_\_\_\_  
Test Review Page Completed in Packet (Pg. 14)..... Date Completed \_\_\_\_\_

### **Session # 7**

Post Test Score = \_\_\_\_\_ / 100 % ..... Date Completed \_\_\_\_\_  
Navigation Activity (Pg. 13)..... Date Completed \_\_\_\_\_  
Assessment Answers Completed in Packet (Pg. 4)... Date Completed \_\_\_\_\_  
I Have Inspected My Packet – It is Complete..... Date Completed \_\_\_\_\_

# Flight Technology

## Assessment Worksheet for Session 1

*Instructions:* On the session day indicated above, please write the answers to the assessment questions.

**If you need more room to write a response – use the back of this page.**

### Session 1 – Basic Aerodynamics

1. **Explain** the Bernoulli's principle and the effect of velocity on pressure.

1. **Bernoulli's Principle –**

2. **Effects of velocity on pressure -**

2. **Explain** how stall affects an airfoil.

3. **List 3 factors that affect the lift of an airfoil. Use the Foilsim program to find answer.**

1.

2.

3.

4. **List and explain** the 4 forces acting on an airplane during flight.

1.

2.

3.

4

# Flight Technology

## Assessment Worksheet for Session 4

*Instructions:* On the session day indicated above, please write the answers to the assessment questions.

**If you need more room to write a response – use the back of this page.**

### Session 4 – Wing Testing

1. **Explain** the step-by-step procedures for placing the wing into the tester and balance the wing prior to testing.
  
  
  
  
  
  
  
  
  
  
2. **Explain** why the wing rises when the fan is turned on. (Hint: discuss the shape and angle of attack of wing)
  1. **Shape** –
  
  
  
  
  
  
  
  2. **Angle of Attack** -
  
  
  
  
  
  
  
  
  
  
3. **Describe** how you calculated the number of grams your wing can carry.
  
  
  
  
  
  
  
  
  
  
4. **Explain** the purpose of the wing flap and its impact on lift.
  1. **Purpose of wing flap** –
  
  
  
  
  
  
  
  2. **Its impact on lift** -



## Flight Technology Vocabulary Worksheet

**Please write a definition for each vocabulary term.**

1. Altimeter-

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2. Altitude-

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3. Bearing-

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4. Front-

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5. Groundspeed-

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6. Heading-

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7. Latitude-

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8. Load factor-

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9. Longitude-

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10. Microburst-

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11. Drag-

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12. Reciprocal-

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13. Track-

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14. Wind shear-

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15. Gravity-

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## **Flight Technology Career Investigation**

From the ***Occupational Outlook Handbook*** –Look up the career that is assigned to your module topic. Using the information in the book answer the following question about the assigned career. The career for your module is:

### **Aircraft Pilot Flight Engineers and is on Page 642**

1. **Nature of the work** (What does the occupation do?):
  - A.
  - B.
2. **Working conditions** (Ex. inside / outside, clean / dirty, safe / hazardous etc.):
3. **Training or education needed, other qualifications required, and possible advancements / promotions:**
4. **Job Outlook** (In the future, what is the demand / forecast for this job):
5. **Earnings** (What is the average salary / income for this career):
6. **Related occupations** (What other occupations are part of the selected topic):
  - A.
  - B.
7. **Sources of additional information** (Sites, agencies or references to provide more information on your selected occupation):
  - A.
  - B.

## Flight Technology WordSearch

S T A C N E F S S B B M O J R M F C K E  
 A T O F C S O T E T X D J X D K B T R F  
 E N Y X O O B E E T R N X Z A P F M L E  
 G H B N E X Z J T X T O S S A D S D O T  
 R C K X B T E E A R S S P S E Y O A Z O  
 S Q A D T E S H N G G L N R Z C R H D R  
 H X P E O H G K Y M E P T N I O P W E D  
 S M R E A N M T O U X M G A L A A T E D  
 B R O S I E I Y K P E S J I E O E Z P Z  
 M E P D M V E G E C S D F D N M R O S Z  
 A L A D A O L H O F E D U T I T A L D H  
 T E N R W E I E A N X T S T G E Z I N M  
 H A G S I R T U A U I K L S I D T F U E  
 R L X R N N C R F T R A E H S G R T O D  
 U F M S O M G S L R E T T I M S N A R T  
 S J E R R T N A A T B E O R E E O O G I  
 T M F T V V O R P R M E B P S E I S L E  
 E T C L R P N R S R N X G I I O V N W K  
 S A I W O D J O I H W Z N D Z L X N T D  
 H Z S H P C S A S N I P D R O S A X A E

**Find the following hidden words:**

**airmet, altimeter, altitude, bearing, dewpoint, transmitter,  
 groundspeed, front, heading, latitude, load, longitude, yoke, flaps,  
 shear, jet, prop, rotor, airport, thrust, drag, gravity, lift**



# Basic Aerodynamics

## Worksheet

1. After resetting, what is the value of lift? \_\_\_\_\_

	Under Wing			Over Wing		
	In front	Mid-wing	Behind	In front	Mid-wing	Behind
<b>Speed</b>						
<b>Pressure</b>						

2. At angle of attack of 10.0 and camber of 0.5, what is the value of lift? \_\_\_\_\_

	Under Wing			Over Wing		
	In front	Mid-wing	Behind	In front	Mid-wing	Behind
<b>Speed</b>						
<b>Pressure</b>						

3. Explain how your findings relate to Bernoulli's principle. (Bernoulli's principle states that as the speed of a fluid or a gas increases, its pressure decreases.)

# Wing Design

## Worksheet

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On this sheet, design the airfoil (cross sectional) shape of your wing. The airfoil shape is the most important part of a wing's design that makes it fly. The airfoil shape gives the wing lift. Your design can be no larger than the boxes below. You may want to look in some of the Module library books for airfoil ideas. You may sketch several designs. Choose the design that you feel will give your wing the most lift, and use it for your wing pattern.

# Wing Lift

## Worksheet

Use the Wing Tester to gather the data necessary to complete this worksheet.

Airspeed	Low		Medium		High	
Wing Configuration	Number of washers/ number of grams		Number of washers/ number of grams		Number of washers/ number of grams	
Horizontal						
Upward Angle of Attack (spacers in front)						
Downward Angle of Attack (spacers in back)						
Flaps Tilted Upward						
Flaps Tilted Downward						

Conclusion:

1. How does the wing's angle of attack affect lift?
  
2. What effect do flaps have on lift?
  
3. According to the data collected, what wing configuration results in the greatest lift?
  
4. Estimate the number of washers and grams your wing would be able to lift with a horizontal wing configuration if the Wing Tester's maximum airspeed was doubled.
  
5. How did your wing compare with your partner's? What are some ways you could improve the lift of your wing? (Use the back of this worksheet if necessary.)

# Flight Evaluation

## Worksheet

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1. Evaluate your partner's straight and level flying maneuver.
  - a. What were the highest and lowest altitudes reached during the maneuver?
  - b. What were the highest and lowest compass readings during the maneuver?
  - c. For how many seconds during the maneuver was the plane flying with a heading of 180° at an altitude of 2,000 feet?
  - d. What should your partner have done to make the plane fly more level during the maneuver?
  - e. What should your partner have done to make the plane fly straighter during the maneuver?
2. Evaluate your partner's level turn.
  - a. What were the highest and lowest altitudes reached during the maneuver?
  - b. How long did the turn last?
  - c. What was the plane's final heading?
  - d. What did your partner do well during this maneuver?
  - e. How could your partner's performance during this maneuver have been improved?
3. Evaluate your partner's landing.
  - a. Did your partner successfully land the plane?
  - b. Did your partner land the plane on the runway? If not, did your partner return the plane to the runway?
  - c. What could your partner have done to improve the landing?

# Navigation

## Worksheet

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Use the map and navigation plotter provided to complete this worksheet.

1. Find the information requested for a Learjet with an average speed of 480 knots flying from Los Angeles International Airport located in Los Angeles, California, to Chicago O'Hare International Airport in Chicago, Illinois.

Distance of flight: \_\_\_\_\_ (units)  $\times$  25 (miles per unit) = \_\_\_\_\_ (nautical miles)

Or \_\_\_\_\_ (units)  $\times$  25 (miles per unit) = \_\_\_\_\_ (statute miles)

Heading: L.A. to Chicago \_\_\_\_\_ Chicago to L.A. \_\_\_\_\_

Length of flight (in time): \_\_\_\_\_

2. Find the information requested for flying in a Learjet with an average speed of 470 knots from Denver International Airport in Denver, Colorado, to George W. Bush Intercontinental Airport in Houston, Texas.

Distance of flight: \_\_\_\_\_ (units)  $\times$  25 (miles per unit) = \_\_\_\_\_ (nautical miles)

Or \_\_\_\_\_ (units)  $\times$  25 (miles per unit) = \_\_\_\_\_ (statute miles)

Heading: Denver to Houston \_\_\_\_\_ Houston to Denver \_\_\_\_\_

Length of flight (in time): \_\_\_\_\_

3. Find the flight information requested for flying in a Learjet with an average speed of 450 knots from Seattle-Tacoma International Airport in Seattle, Washington to Helena Regional Airport in Helena, Montana.

Distance of flight: \_\_\_\_\_ (units)  $\times$  25 (miles per unit) = \_\_\_\_\_ (nautical miles)

Or \_\_\_\_\_ (units)  $\times$  25 (miles per unit) = \_\_\_\_\_ (statute miles)

Heading: Seattle to Helena \_\_\_\_\_ Helena to Seattle \_\_\_\_\_

Length of flight (in time): \_\_\_\_\_

4. How close to the calculations in No. 3 was your actual flight from Seattle to Helena? Explain any differences on the back of this worksheet.

# FLIGHT TECHNOLOGY

## Test Review

Circle the correct answer while playing the Review Game at the beginning of Session # 6.

- Which of the following best describes the action of the elevator on the tail of an airplane.
  - movable horizontal
  - movable vertical
  - stationary vertical
  - stationary horizontal
- The wing of an airplane is also known as which one of the following terms?
  - aileron
  - elevator
  - airfoil
  - stabilizer
- There are four forces that act upon a plane in flight. Identify the force that enables airplanes to overcome gravity?
  - drag
  - thrust
  - weight
  - lift
- Which of the listed factors has the greatest effect on the magnitude of lift?
  - wing thickness
  - altitude
  - area
  - aileron
- An airplane accelerates or increases in speed when what force is greater than drag?
  - thrust
  - weight
  - lift
  - gravity
- Which principle states that "as the velocity of a fluid increases, its internal pressure decreases"?
  - Newton's principle
  - aerodynamics principle
  - Bernoulli's principle
  - relational fluid principle
- For an airplane to achieve lift, what must the air pressure on the top surface of the wing be in relationship to the bottom surface of the wing?
  - equal
  - less than
  - twice as much
  - greater than
- What is the force that enables planes to stay in the air?
  - thrust
  - lift
  - drag
  - zero gravity
- What force is created when an object moves through a fluid like an aircraft moves through air?
  - weight
  - thrust
  - drag
  - lift
- According to Newton's third law, for every action there is an equal and opposite reaction. Therefore, what is the force that opposes lift?
  - thrust
  - drag
  - speed
  - weight