# Aerospace – Level Advanced (Grades 9-12)
## Record Sheet

Record for Year _____
A completed record sheet is due by the last business day of May to exhibit each project at the fair.
Use any 4-H publications, the internet, the library, or a professional to help you prepare your responses.

## The Basics

Name _____ 4-H Club _____

Years in 4-H _____ Grade _____ Years in Project _____

## Research, Design, and Development

The altitude of an aircraft is determined by using this formula:

*Altitude = Angular tangent x base line*

Use the Angular tangent (tan(a)) table to the right to calculate the altitudes.

1. Angle = 40°
   Baseline = 42,000 ft.
   Altitude = _____ x _____ = _____

2. Angle = 32°
   Baseline = 42,000 ft.
   Altitude = _____ x _____ = _____

3. Angle = 46°
   Baseline = 35,000 ft.
   Altitude = _____ x _____ = _____

| Angle | tan(a) | Angle | tan(a) | Angle | tan(a) | Angle | tan(a) |
|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 25.0 | .4663 | 46.0 | 1.0355 | 71.0 | 2.9042 |
| 1.0 | .0175 | 26.0 | .4877 | 47.0 | 1.0724 | 72.0 | 3.0777 |
| 2.0 | .0349 | 27.0 | .5095 | 48.0 | 1.1106 | 73.0 | 3.2709 |
| 3.0 | .0524 | 28.0 | .5317 | 49.0 | 1.1504 | 74.0 | 3.4874 |
| 4.0 | .0699 | 29.0 | .5543 | 50.0 | 1.1918 | 75.0 | 3.7321 |
| 5.0 | .0875 | 30.0 | .5773 | 51.0 | 1.2349 | 76.0 | 4.0108 |
| 6.0 | .1051 | 31.0 | .6009 | 52.0 | 1.2799 | 77.0 | 4.3315 |
| 7.0 | .1228 | 32.0 | .6249 | 53.0 | 1.3270 | 78.0 | 4.7046 |
| 8.0 | .1405 | 33.0 | .6494 | 54.0 | 1.3764 | 79.0 | 5.1446 |
| 9.0 | .1584 | 34.0 | .6745 | 55.0 | 1.4281 | 80.0 | 5.6713 |
| 10.0 | .1763 | 35.0 | .7002 | 56.0 | 1.4826 | 81.0 | 6.3138 |
| 11.0 | .1944 | 36.0 | .7265 | 57.0 | 1.5399 | 82.0 | 7.1154 |
| 12.0 | .2126 | 37.0 | .7535 | 58.0 | 1.6003 | 83.0 | 8.1443 |
| 13.0 | .2309 | 38.0 | .7813 | 59.0 | 1.6643 | 84.0 | 9.5144 |
| 14.0 | .2493 | 39.0 | .8098 | 60.0 | 1.7321 | 85.0 | 11.430 |
| 15.0 | .2679 | 40.0 | .8391 | 61.0 | 1.8040 | 86.0 | 14.301 |
| 16.0 | .2867 | 41.0 | .8693 | 62.0 | 1.8907 | 87.0 | 19.081 |
| 17.0 | .3057 | 42.0 | .9004 | 63.0 | 1.9626 | 88.0 | 28.636 |
| 18.0 | .3249 | 43.0 | .9325 | 64.0 | 2.0503 | 89.0 | 57.290 |
| 19.0 | .3443 | 44.0 | .9657 | 65.0 | 2.1445 | 90.0 | infinite |
| 20.0 | .3640 | 45.0 | 1.000 | 66.0 | 2.2460 | | |
| 21.0 | .3839 | | | 67.0 | 2.3559 | | |
| 22.0 | .4040 | | | 68.0 | 2.4751 | | |
| 23.0 | .4245 | | | 69.0 | 2.6051 | | |
| 24.0 | .4452 | | | 70.0 | 2.7475 | | |

Describe what you plan to exhibit.

_____

_____

_____

We do not necessarily care what you spent constructing your exhibit, but it is good for you to understand that things have a cost. Even poster boards are not free. Approximately how much did you spend constructing your exhibit or think you'll spend once it is complete? Circle one.

$0.00-$5.00     $5.00-$15.00     $15.00-$30.00     $30.00-$50.00     Greater than $50.00

## Preparing for Take Off

How old must you be to begin obtaining a Private Pilot's License or Certificate? _____

How many flight hours are required to become a Private Pilot? _____

Name two navigation methods that pilots use. _____

Define payload. How does it relate to aerospace and rocketry? _____
_____
_____

Pilots use the International Phonetic Alphabet to communicate clearly with one another and with air traffic control. Use the chart to the right to decode the message being sent to the tower: "Papa India Lima Oscar Tango Mike Charlie Mike Uniform Romeo Papa Hotel Yankee India Sierra India November Charlie Alfa Romeo Delta India Afla Charlie Alfa Romeo Romeo Echo Sierra Tango. Whiskey Echo Mike Uniform Sierra Tango Lima Afla November Delta India Mike Mike Echo Delta India Alfa Tango Echo Lima Yankee."

| | | |
|---|---|---|
| A - | Alpha . . . . . . . . . . . | (Al-fah) |
| B - | Bravo . . . . . . . . . . . | (Brav-voh) |
| C - | Charlie . . . . . . . . . | (Char-lee) |
| D - | Delta . . . . . . . . . . | (Dell-tah) |
| E - | Echo . . . . . . . . . . | (Eck-oh) |
| F - | Foxtrot . . . . . . . . . | (Foks-trot) |
| G - | Golf . . . . . . . . . . | (Golf) |
| H - | Hotel . . . . . . . . . | (Hoh-tell) |
| I - | India . . . . . . . . . . | (In-Dee-aH) |
| J - | Juliett . . . . . . . . . | (Jew-lee-ett) |
| K - | Kilo . . . . . . . . . . | (Key-loh) |
| L - | Lima . . . . . . . . . . | (Lee-mah) |
| M - | Mike . . . . . . . . . . | (Mike) |
| N - | November . . . . . . . | (No-vem-ber) |
| O - | Oscar . . . . . . . . . | (Oss-cah) |
| P - | Papa . . . . . . . . . . | (Pah-pah) |
| Q - | Quebec . . . . . . . . . | (Keh-beck) |
| R - | Romeo . . . . . . . . . | (Row-me-oh) |
| S - | Sierra . . . . . . . . . | (See-air-rah) |
| T - | Tango . . . . . . . . . | (Tang-go) |
| U - | Uniform . . . . . . . . | (You-nee-form) |
| V - | Victor . . . . . . . . . | (Vik-tah) |
| W - | Whiskey . . . . . . . . | (Wiss-key) |
| X - | X-ray . . . . . . . . . | (Ecks-ray) |
| Y - | Yankee . . . . . . . . . | (Yang-key) |
| Z - | Zulu . . . . . . . . . . | (Zoo-loo) |

_____
_____
_____
_____
_____

## Blast Off

Name three to five careers or career fields that use aeronautical principles. _____
_____
_____
_____

In what way does this project apply to your life, or why is this subject matter important to you? _____
_____
_____

## Flight Analysis

What was the most challenging part about preparing this year's exhibit? _____
_____

What is one thing you learned or sparked your interest as a result of completing this project? _____
_____