**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ CLASS: \_\_\_\_\_\_\_**

**KIRBY AEROSPACE -- Wright Brothers Project**

***Inventing a Flying Machine – Research Notes***

**Inventing a Flying Machine –**

**Between 1899 and 1905 –**

**The genius of Wilbur and Orville –**

**1899: Getting Acquainted with Aeronautics –**

**After collecting reference material from the Smithsonian and other sources –**

**During the 1800’s –**

**A letter to the Smithsonian –**

**Aeronautical approaches –**

**The Wrights’ course –**

**Forefathers of flight –**

**Sir George Cayley, 1773-1857 –**

**Otto Lilienthal, 1848-1896 –**

**Lilienthal gliders –**

**An abrupt and tragic end –**

**Fundamental Flight Problems –**

**1.**

**2.**

**3.**

**Stability and control: The influence of the bicycle –**

**The breakthrough concept –**

**The significance of Wing-Warping –**

**Testing Wing-Warping –**

**1899 Wright Kite –**

**Visual thinking –**

**Flight testing the kite –**

**1900 Glider Trials at Kitty Hawk –**

**Designing the 1900 Wright glider –**

**Lift and the center of pressure –**

**Elevator –**

**Canard configuration –**

**Wing profile –**

**Aerodynamics: Aircraft size –**

**Calculating lift and drag –**

**Lift = kV2SC1**

**Drag = kV2SCd**

**Anatomy of the Wright glider –**

**Wingspan –**

**Wing Area –**

**Length –**

**Height –**

**Weight –**

**The framework –**

**The fabric –**

**Kitty Hawk: Testing grounds –**

**The site –**

**An arduous journey –**

**Vacations nonetheless –**

**Test flying the glider –**

**Kiting the glider –**

**Flying the glider –**

**Rare Photos –**

**Back to the drawing board –**

**1901 The Biggest Glider Yet –**

**Poor lift performance of their 1900 glider… –**

**The 1901 Wright Glider –**

**Second and most problematic, in a series of 3 gliders –**

**Similar in structure to the 1900 craft –**

|  |  |
| --- | --- |
| **AIRCRAFT** | **WING AREA** |
| **1901 Wright glider** |  |
| **1900 Wright glider** |  |
| **Lilienthal monoplane glider** |  |
| **1896 Chanute-Herring glider** |  |

**A discouraging flight –**

**Flight testing the 1901 glider –**

**Problems with control arise –**

**Problems with lift persist –**

**Results of the 1901 glider trials –**

**An invitation from Octave Chaunte –**

**Some aeronautical experiments –**

**Wilburs’s speech –**

**Doubts about data –**

**Wilbur and Orville felt it was time to perform their own aerodynamic research –**

**The bicycle apparatus –**

**How it worked –**

**Calculations and results –**

**The Wright Wind Tunnel –**

**Scraps of wallpaper from the wind tunnel –**

**The Wrights large wind tunnel –**

**Wright wind tunnel balancres –**

**Many, many wings –**

**Model wings used in the tunnel –**

**SIZE –**

**CURVATURE –**

**PROFILE –**

**SHAPE -**

**Correcting Smeaton –**

**Recording the wind tunnel data –**

**Correcting Smeaton’s Coefficient –**

**SIZE –**

**CURVATURE –**

**PROFILE –**

**SHAPE -**

**1902 Close to a True Airplane –**

**Better than its’ predecessors –**

**Perfecting the control system –**

**Kiting the 1902 glider –**

**Well digging –**

**Changes to the rudder –**

**The 1902 Glider –**

**The first fully controllable aircraft –**

**Wingspan –**

**Wing Area –**

**Length –**

**Height –**

**Weight –**

**1902 Wright glider: The most advanced glider –**

**World record holders –**

**A picture of success –**

**1903 The First Successful Airplane –**

**On December 17, 1903 –**

**Designing the flyer –**

**Allowing 200 pounds for the propulsion system… –**

**Construction and fabric –**

**Wingspan –**

**Wing Area –**

**Length –**

**Height –**

**Weight –**

**Wing rib construction –**

**Double layer fabric covering –**

**Wing struts –**

**Propulsion System –**

**Engine –**

**The aluminum crankcase: A first –**

**How the Wright engine worked –**

**Propellers & Transmission –**

**Making the propellers –**

**Chain –and-Sprocket transmission system –**

**Flight Controls –**

**A small complement of instruments recorded flight data –**

**The instruments were arranged so all could be turned off –**

**Return to Kitty Hawk –**

**The grand junction railroad –**

**Triumph! –**

**Tossed a coin –**

**The flyer was airborne for only 3 ½ seconds, but –**

**With damage repaired –**

**Back in the air –**

**Patenting –**

**Wright patent –**

**1904 The First Circular Flight –**

**On January 5, 1904 –**

**The 1903 Flyer had only performed short, straight-line flights –**

**Huffman Prairie –**

**Increasing stability –**

**The first circular flight –**

**1905 The First Practical Airplane –**

**Fall of 1905 –**

**They would not fly again for 2 ½ years –**