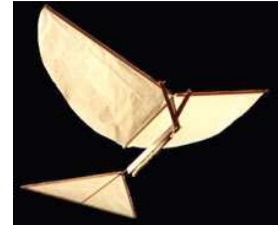


# Planning Grid (Scope and Sequence)

## 1. Make the Sample Ornithopter

- Introduce the project and explain how it works (first lesson)
  - Video clip of flight profile
  - Show demonstration flight of completed model
  - Market the race day
  - Outline expectations, assessment, and introduce project brief package
  - **Objective:** Every student will understand the project and what is expected of them to achieve success and be stimulated to do their best.
- Do the safety unit (first Demonstration)
  - Demonstrate and go through safety stuff for the drill press, glue gun, and scroll saw
  - Use the demos to show how to cut and make the body parts for the sample Ornithopter
  - Test the safety while it is still fresh
  - Hand out base material package to each group as listed on 'Resources' sheet
  - **Objective:** Every student will know and demonstrate safe work practices. Every student will also know how to make the body components
- Make the motor and assemble (second Demonstration)
  - Show the class how to bend wire
  - Show the class how to assemble the body and add the motor
  - Show the class how to cut and add wings and tail to body
  - **Objective:** Every student will know how to assemble the power unit and make wings and tail and join entire unit together
- Make sure the test Ornithopters fly in some sort of fashion and that everyone has contributed. Evaluate them based on the Rubric.
  - **Objective:** Every student should demonstrate some level of fabrication skill so that they will have a better chance of success with their own design.



## 2. Develop and Build the Unique Ornithopter

- Give lesson outlining ideation package (second lesson)
  - Research site tips
  - Performance affecting tips
  - Explain each ideation step with examples
  - **Objective:** Each student is able to explore the properties of the Ornithopter and develop several possible designs that aim for optimization.
- Give a lesson on 3-D rendering (third lesson)
  - Explain 2 point perspective briefly
  - Introduce simple shading and color
  - **Objective:** Each student is able to artistically render their final design
- Give a lesson on orthographic rendering (fourth lesson)
  - Views of each part needed to scale
  - Only one view needed as all parts basically 1-D shapes on different thicknesses of Balsa/other materials
  - Hand out base materials package to each student as they meet checkpoints in Ideation Package
  - **Objective:** Each student is able to make their parts drawings
- Assess package and final product according to rubric. Allow a few extra classes time for students to come in out of class to finish up details.

## 3. Race Day

- Pick a day that is good with your schedule and the administration to best highlight your class and promote the work of the kids and the program. Minimal setup is required, as each flight can be measured easily with a tape from the starting line marker.

