

Final Syllabus for Flight Science

		WHAT (skills, goals, knowledge, concepts, readings)	HOW (activities)
Day 1 (Monday)	Morning	I. Introduction II. Rule and Procedures III Lab Safety Video	I. Classroom Introductions II. Flight specific safety procedures discussed III. Viewed Lab Safety Video required by CTY
	Afternoon	I. What Flies? – Classroom discussion and brainstorming activity II. Aircraft parts and Vocabulary	I. Students all come to the board and fill it with things that fly from aircraft to helicopters and Superman to pigs. We discuss them all but concentrate on Superman, pigs, etc... Until they figure out what makes them fly, IMAGINATION!!! II. Discussion and Lecture
	Late Afternoon	I. Scientific Method	I. Discussed the steps in the scientific method; Wrote instructions to make a peanut butter and jelly sandwich to demonstrate the importance of clarity in science; Used student examples to illustrate concepts.
Day 2 (Tuesday)	Morning	I. Flight of Birds and Insects	I. Discussion and Lecture
	Afternoon	I. Newton's Laws of Motion – Applied to aircraft	I. Discussion and Lecture
	Late Afternoon	I. Basic Balsa Aircraft Construction Techniques	I. Midwest Products Flip Glider Construction
Day 3 (Wednesday)	Morning	I. Lift Theory – Newton Vs. Bernoulli	I. Discussion and Lecture; Show them that Bernoulli's Principle exists in flight but Newton's Laws govern Flight; airfoil shape, angle of attack, air and fluids.
	Afternoon	I. Aircraft Motion	I. Discussion and lecture of yaw, pitch, and roll
	Late Afternoon	I. Introduction to Technical Drafting	I. Discussion and Lecture; Have Students do a 3 view drawing of their notebook.
Day 4 (Thursday)	Morning	I. Flight Dynamics and Stability	I. Control Surfaces; Active and Passive Stabilizing Devices; Center of Gravity Lab
	Afternoon	1. Unconventional Aircraft	I. Research Project on Unconventional aircraft

	Late Afternoon	I. Study Session	I. Students Catch up on readings, labs, and projects.
Day 5 (Friday)	Morning	I. Egg Drop Container design and construction	I. Project completed with SCEN; Students used knowledge of aircraft design, high drag devices, gravity, and Newton's Laws of Motion to construct a container in which an egg would be dropped; Goal is to build the most effective container with the least amount of materials.
	Afternoon	I. Egg drop container testing and analysis	I. Containers were tested by dropping them 2 nd , 3 rd , and 4 th floor windows. After drop we discuss what were the advantages and disadvantages of the students container.
(Sunday)	Late Afternoon	I. "The Invisible Force" video	I. Students watched video on gravity and answered questions; Discussion after video is completed.
Day #6 (Monday)	Morning	I. Construction of Foam Wing Gliders	I. Student build gliders using blue; they cut out specific airfoil shapes and test them to see which creates more lift
	Afternoon	I. Building Continued	I. Student build gliders using blue; they cut out specific airfoil shapes and test them to see which creates more lift
	Late Afternoon	I. Building Continued	I. Student build gliders using blue; they cut out specific airfoil shapes and test them to see which creates more lift
Day #7 (Tuesday)	Morning	I. Gravity worksheet II. Lift Formula	I. Students discussed the gravity video and went over the worksheet II. Discussion & Lecture – $L = .5\rho v^2 s C_l$ and how the variables relate to each other and Newton's 2 nd law
	Afternoon	I. Sports Science	I. Discussion and lecture – Why does a curve ball curve, top spin, Frisbees, boomerangs, golf balls, soccer balls, footballs
	Late Afternoon	I. Flight test of Balsa Gliders	I. Flight Test Gliders and observe aircraft motion, make change necessary to fly straight
Day #8 (Wednesday)	Morning	I. Field Trip – New England Air Museum	I. Students Learn about the history of flight, Montgolfier to the Wright Brothers
	Afternoon	I. Field Trip – New England Air Museum	I. Student see actual Aircraft and Sit in cockpit of DC-3 and move the control surfaces

	Late Afternoon	I. Field Trip – New England Air Museum	I. Students learn about and see aircraft engines
Day #9 (Thursday)	Morning	I. Rocketry	I. Student read a Rocketry packet; discussion and lecture of rocketry basics and history
	Afternoon	I. Rocket Design and Construction	I. Students design and build model rockets with SCEN
	Late Afternoon	I. Rocket Design and Construction	I. Students design and build model rockets with SCEN
Day #10 (Friday)	Morning	I. Altitude Tracking	I. Basic right triangle Trigonometry to track altitude of rockets; Construct altimeters out of protractors
	Afternoon	I. Aircraft Design Project	I. Students use skills learned in class to design an aircraft that will fly out of foam and balsa wood
(Sunday)	Late Afternoon	I. Video – ABC Special on the Columbia tragedy	I. Discussion on why the Columbia crashed
Day #11 (Monday)	Morning	I. Launch Rockets	I. Launch Rockets and track altitude using trig and altimeter; Student compare their answers with the SCEN class who calculate height using the distance formula
	Afternoon	I. Continue Aircraft design project	I. Students use skills learned in class to design an aircraft that will fly out of foam and balsa wood
	Late Afternoon	I. Continue Aircraft design project	I. Students use skills learned in class to design an aircraft that will fly out of foam and balsa wood
Day #12 (Tuesday)	Morning	I. Finish Aircraft Construction II. Finish Unconventional Aircraft Poster III. Museum Report IV. Read Chap. 7 TRFE	I. Finish Building II. Finish poster on Unconventional Aircraft III. Finish Report on what they saw and liked and disliked in the museum IV. Invading Mars chapter in preparation for Mission to Mars project

	Afternoon	I. Mission To Mars Poster Project	I. Students have to design and launch an aircraft from earth, that can fly in the Martian atmosphere; Student do research in computer lab
	Late Afternoon	I. Finish Aircraft Construction II. Finish Unconventional Aircraft Poster III. Museum Report IV. Read Chap. 7 TRFE V. Finish Mission to Mars Project	I. Finish Building II. Finish poster on Unconventional Aircraft III. Finish Report on what they saw and liked and disliked in the museum IV. Invading Mars chapter in preparation for Mission to Mars project VI. Students have to design and launch an aircraft from earth, that can fly in the Martian atmosphere
Day #13 (Wednesday)	Morning	I. Design and Construct Bottle Rockets	I. Student design and construct Bottle Rockets learning from earlier mistakes
	Afternoon	I. Design and Construct Bottle Rockets	I. Student design and construct Bottle Rockets learning from earlier mistakes
	Late Afternoon	I. Mission To Mars Poster Project	I. Students have to design and launch an aircraft from earth, that can fly in the Martian atmosphere; Student do research in computer lab
Day #14 (Thursday)	Morning	I. Launch Rockets and Test Fly airplanes	I. Test fly all rockets and airplane to get them to fly well
	Afternoon	I. Student Program Evaluations II. Mission to Mars project	I. Student evaluate Course II. Finish Mars project
	Late Afternoon	I. Mission to Mars	I. Finish Mars Project
Day #15 (Friday)	All Day	I. Student Presentation to Class	I. Students present Mission to Mars and Unconventional airplane project to class