CC Science Cycle 2
E. Nicole Yang
on CC Connected: "nicoleliem"

CC Cycle 2 Science Experiments & Projects: In-Class Lesson Plans & Visuals

I hope these make all the hard work you do a little easier!
(email: nicoleliemyang@gmail.com)

Notes to the Tutor/Teacher:

I have included the Foundations Guide information needed to do each project. My teaching notes are placed within the instructions to help students learn about the topics while they work on the projects.

What to Do Each Week in Class:

Always stress the **Scientific Method** in each experiment by getting the students to orally state what the purpose, hypothesis, materials etc. are in your experiment.

- State the Scientific Method

(ie: sing it to the tune of *Happy Birthday*- "Scientific Method, Purpose, Hypothesis, Materials, Procedure, Results, Conclusion.)

Purpose – stated in the Van Cleeve experiment verbiage
Hypothesis – Typed out as the first of my "More Talking Points".
Materials – Hold them up to the students and ask them to name the materials
Procedure – Go through the steps listed in the experiment together
Results – The "what happened?" of the experiment. Talk about what you saw and if your hypothesis was right or wrong.
Conclusion – The "why did that happen?" of the experiment. Found partially in the Van Cleeve "Why?" segments, and explained more fully in my talking points and images.

Relate it back to Cycle 2: mention how we are studying Ecology, Astronomy and Physics in our experiments and our new grammar pegs. I have done some for you in blue. Find your best way to explain how learning about God's creation is learning more about God's character and what He's done for us.

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Week 19
Project: Paper Airplanes

*Perhaps try making them before class to become familiar with the steps

- **Purpose**– To make paper airplanes and learn how planes fly

- **Hypothesis**- Which plane will fly the farthest? fastest? Which plane will stay aloft longest?

- **Materials**-
  -8.5"x 11" papers for each student
  -The following pages have a few simpler paper airplane models needing only plain white paper. Or you could buy a book with tear-out sheets that have pre-printed fold lines and colorful designs of jet fighters or even Star Wars fliers (Some require tape and scissors).

- **Procedure**:
  -Have the students fold the the paper airplane models you've chosen, or have them invent their own. (For younger students, the first one on the following pages is easy. You, another adult, or older students can create the second two models for the class.) Make sure to stress folding slowly, evenly, and with sharp creases.
  -Write down which plane they think will fly the farthest, which one will fly the fastest, and which one will stay aloft the longest. Make a chart on the whiteboard or a piece of paper as below, and experiment to find the results.

- **Results**: Make a chart on the whiteboard or a piece of paper as below, and experiment to find the results.

Which plane flew the farthest?
Which plane flew the fastest?
Which plane stayed aloft longest?

	Attempt 1	Attempt 2	Attempt 3
Plane A			
Plane B			
Plane C			

- **Conclusion**: Read the following page to explain how planes fly.

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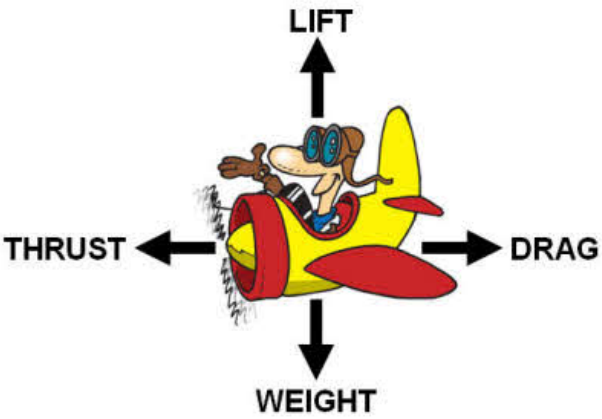
Relating this to Cycle 2 : We are learning more about Physics, or the study of motion. With Newton's 3rd Law of Motion we remember "For every action, there is an equal and opposite reaction". We want to know much force to create backwards to propel the plane forward. We want to know how much force we need to overcome weight as well. To calculate the force, scientists will use Newton's 2nd Law of Motion states that "Force equals mass time acceleration"

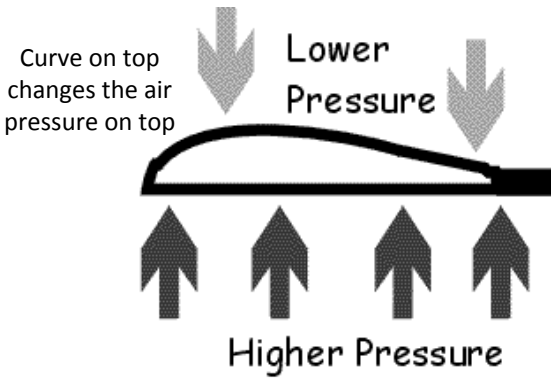
How do planes fly?

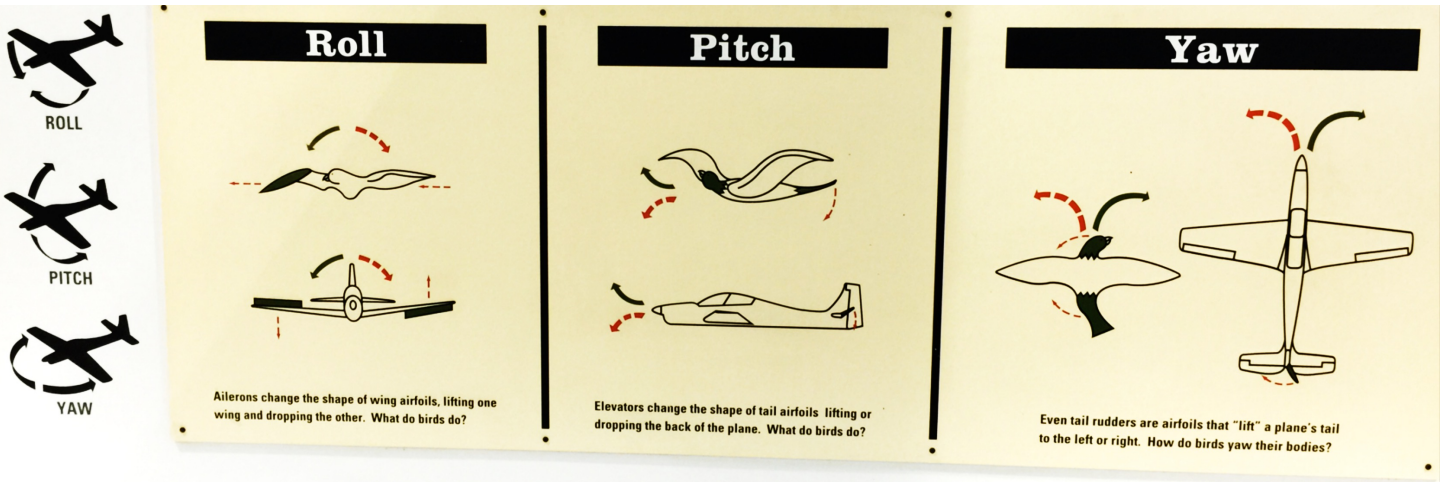
The propeller on a plane is like a a pinwheel or a windmill- the blades are curved in a way that pull the air from the front to the back. An engine in the plane spins those blades. Drag is the force that keeps the plane back . An engine needs to work hard enough to create enough thrust, the force needed to propel the plane forward. Propeller planes do this by pulling air in air with their blades and pushing it backwards. Jet planes create forward thrust with backwards combustion force, like rockets.

All planes have weight, which is the force or pull of gravity on the plane toward the center of the earth. Planes need lift to overcome the force of weight. Scientists design plane wings like bird wings, with the top curved and the bottom flat. As a plane's wing cuts through the air at a fast enough speed, the airflow on top of the wing must curve. That lowers the pressure of the air above the wing. But higher (stronger) pressure is still pushing up under the wing. That makes the plane lift.

Scientists also study birds to help figure out how to maneuver planes. They made movable flaps on the wings, called ailerons, to mimic how a bird can tilt left or right (called "roll"). They made flaps by the tail of the plane, called elevators, to mimic how a bird can lift or drop its tail (called "pitch"). The made a tail flap, called a rudder, to mimic how a bird can turn left or right (called "yaw").







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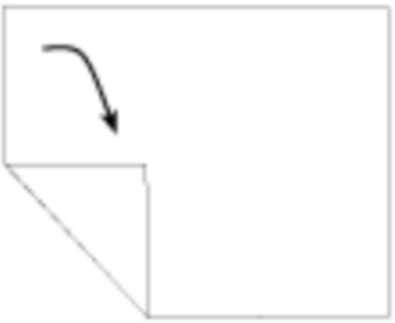
Step 1



Step 2

Step 3

Step 4

Step 5

The finished plane

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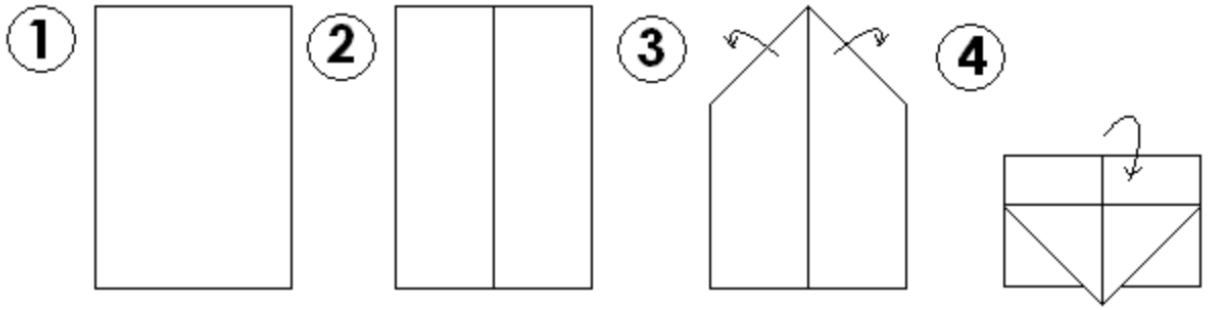
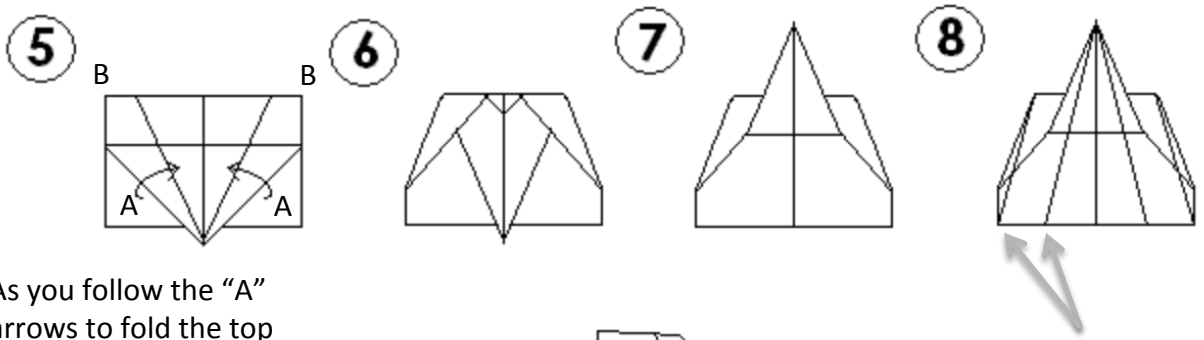
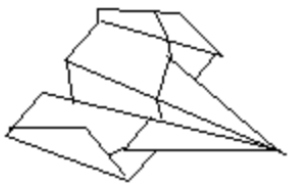




As you follow the “A” arrows to fold the top layer upward and inward toward the middle, the back of the page will start lifting up. Press the “B” corners downward and inward to get it to look like step 6.



Fold here & here on both sides

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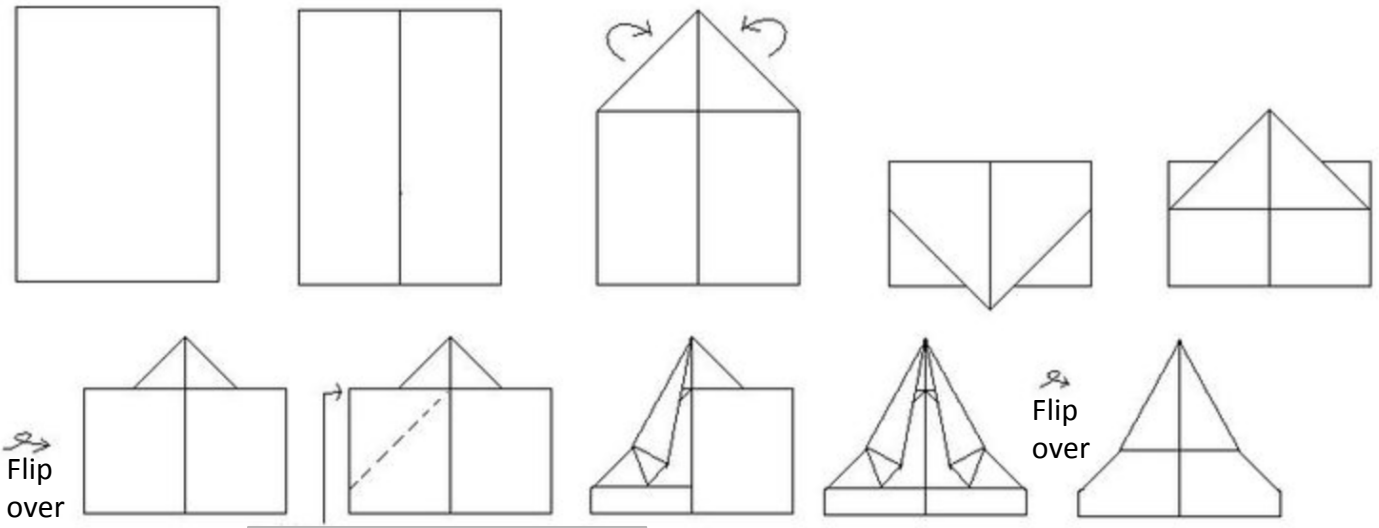

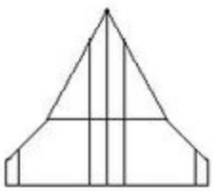

As you hold this corner and fold along dotted line, the top of the paper will come up. Fold that top paper inward to line up with the center crease of the paper and press down to make it look like the next step.