



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Paloma J. DiMugno	Project Number J0109
Project Title Bird Migration	
Abstract Objectives/Goals Gazing skyward, I have always pondered why groups of birds fly the way they do. The objective of my project was to ascertain whether any formation or migratory pattern offered birds some energetic advantage, enabling them to travel farther and faster, thereby reaching their ultimate destination more efficiently, with less stress and negative effect on their bodies. Methods/Materials Initially, I constructed two bird models with LEGO blocks, proportionately matched to a pink footed goose, a common migratory bird. I connected one bird to a lever system, connected to a scale, while the remaining bird model was movable. I configured a LEGO base plate, and inserted it into a cardboard air tunnel(a large and open cardboard box). Two feet away, I positioned a large fan. I placed the movable bird at various positions along a V-formation on the LEGO plate and blew the fan for 60 seconds, noting changes on the scale, and recorded the averages. I repeated the procedure 29 times, at different sites on the base plate. Results Each time the movable bird was on the V-formation pattern, the scale registered zero grams. In those cases where the movable bird was located at any place on the base plate, away from the V-formation, the scale registered weights of anywhere from .1 to 1.3 grams, on average. Conclusions/Discussion I concluded that the birds flying in a V-formation pattern enjoy an energetic advantage in that they utilize the draft and wing-tip vortexes provided by this formation to minimize energy expended. This enables the birds to consistently remain airborne and strong during long flights.	
Summary Statement My project explores the idea that birds migrate in a V-formation because it offers energetic advantages, making them stronger and faster, and enabling them to travel more efficiently to their ultimate destination.	
Help Received Mother and I discussed theories of bird migration and my observations; Science instructor provided ideas on how to construct Lego birds.	