iFLY Education Program
Middle Years Standards Alignment

Field Trip Activity	Standard
Interactive Presentation: • Students use the pitot-static tubes in the wind tunnel to observe and record the velocities of different objects in the wind tunnel. • Use a free body diagram of a skydiver to discuss the forces acting on his/her body • Discuss that when forces are balanced (net force = 0), acceleration is zero, and a skydiver achieves "terminal velocity" • Discuss the differences between objects falling through air vs. a vacuum. Conclude that in a vacuum, mass has no effect on acceleration or velocity. • Discuss the difference in frames of reference between the wind tunnel and skydiving, i.e, in the wind tunnel the flyer is still and the air is moving, while in free flight the air is still and the skydiver is moving • Identify when the gravitational force or the force of air drag is dominant. Discuss the effect this has on a skydiver's velocity and acceleration. • Discuss that when forces are balanced (net force = 0), acceleration is zero, and a skydiver achieves "terminal velocity". • Discuss the differences between objects falling through air vs. a vacuum. Conclude that in a vacuum, mass has no effect on acceleration or velocity. • Educator leads a discussion about engineering careers, the engineering process as applied to the design of iFLY tunnels, and other applications of wind tunnels in STEM	AC Science ACSSU117, ACSSU155, ACSHE119, ACSHE120, ACSHE121, ACSHE134, ACSHE135 ACSHE136, ACSIS164, ACSIS165, ACSIS166, ACSIS169, ACSIS170, ACSIS198, ACSIS199, ACSIS200, ACSIS203 ACSIS204
LAB ACTIVITY • Students break into small groups and brainstorm ways to measure the variables required for solving the lab activity • Students measure the mass and circumference of various objects using scales and tape measures. They use geometric formulas to calculate surface area. All calculations are made using SI units. • Students use Microsoft Excel to create class graphs depicting the relationship between mass, surface area, and velocity. • The educator leads the class through an analysis of the scatter plots, asking students to interpret the shapes of the plots and determine if a relationship exists between the variables and whether or not there is a linear relationship • The class makes connections between the lab activity and the activities of professional scientists and engineers	AC Science ACSSU117, ACSSU155, ACSHE119, ACSHE120, ACSHE121, ACSHE134, ACSHE135 ACSHE136, ACSIS164, ACSIS165, ACSIS166, ACSIS169, ACSIS170, ACSIS198, ACSIS199, ACSIS200, ACSIS203 ACSIS204 AC Mathematics ACMNA156, ACMNA158, ACMNA175, ACMNA177, ACMMG159, ACMSP169 ACMNA183, ACMMG195, ACMMG197, ACMNA232, ACMNA234, ACMMG242
Post-field trip classroom activity • Students measure their mass and surface area to calculate their predicted terminal velocity in the wind tunnel. • Students compare their predicted velocities to known velocities of other people and objects and determine if they have arrived at a reasonable solution. • Students brainstorm possible reasons for error in their theoretical values.	AC Science ACSIS126, ACSIS130, ACSIS131, ACSIS132, ACSIS133, ACSIS141, ACSIS145, ACSIS146, ACSIS148 ACSIS234, ACSIS165, ACSIS169, ACSIS170, ACSIS199, ACSIS203 ACSIS204 AC Mathematics ACMNA156, ACMNA175, ACMNA177, ACMMG159, ACMNA183, ACMMG195, ACMMG197, ACMNA232, ACMNA234, ACMMG242