iFLY Education Program Teacher Guide Primary Years Foundation - 6

Program focus

The Primary School Education Program at iFLY uses iFLY's unique vertical wind tunnel facility to make STEM exciting, relevant, and accessible to students. Our curriculum has been designed by STEM educators and scientists to support STEM learning in your classroom. Every iFLY field trip includes:

- Interactive STEM presentation, delivered by iFLY STEM Educator
- Physics demonstration in the wind tunnel
- Classroom experiment to investigate the effects of parachute parameters on flight performance
- Flying instruction & safety training
- Flying time, with one-on-one supervision from a highly-trained and certified instructor
- Pre and post-field trip activities to conduct in your classroom

Learning objectives

- Increasing awareness of exciting STEM careers
- Learning how STEM is used in the real-world
- Understanding the differences between solids and fluids
- Analyzing the effects of different forces on an object
- Planning investigations and defining variables in an experiment
- Measuring and recording data
- Interpreting results
- Understanding variability, uncertainty, and error in experimental results

Program synopsis

Lecture and Demonstration

The program begins with a lecture and discussion with iFLY STEM Educators to introduce STEM concepts related to the wind tunnel. Students will discuss the differences between solids and fluids. They will identify air as a fluid and learn that air can exert a force on objects. The STEM Educator will discuss the different forces at work in the wind tunnel, and how changing the shape or "frontal area" of an object will affect its speed in the wind tunnel. Educators will also introduce engineering careers and how engineers use wind tunnels to test their designs.

The wind tunnel demonstration segment uses various objects such as inflatable balls to show how the "terminal velocity" (the air velocity required to "fly" the object) depends on an object's size, shape, and weight.

Classroom Experiment

Students break into 2's and 3's to experiment with small parachutes. They write an "Experiment Plan", where they decide which variables (i.e. parachute size, shape, string length, weight, etc.) they will alter, and which variables they will hold constant.

They carry out their experiment, record their results, and share with the entire group. Together, the class builds a common understanding of how parachutes work, incorporating the concepts of force and terminal velocity learned during the lecture. Students can take home their Experiment plans and parachutes. Teachers will take home a document that covers the "Science of Parachutes" to facilitate further classroom discussion.

Flight Experience

All students are given flight instruction by a certified flight instructor, including an individual flight experience in the iFLY tunnel.

Grade level appropriateness

Our curriculum has been specifically designed to support the following standards:

Science

Year	Science Understanding	SU sub strands	*Science inquiry skills*
Foundation	The way objects move depends on a variety of factors, including their size and shape (ACSSU005)	Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE013)	Pose and respond to questions about familiar objects and events (ACSIS014) Participate in guided investigations and make observations using the senses (ACSIS011) Engage in discussions about observations and represent ideas (ACSIS233) Share observations and ideas (ACSIS012)
1 **2**	A push or a pull affects how an object moves or changes shape (ACSSU033)	Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE021) & (ACSHE034)	Pose and respond to questions, and make predictions about familiar objects and events (ACSIS024) & (ACSIS037) Participate in guided investigations to explore and answer questions (ACSIS025 & ACSIS038) Use informal measurements to collect and record observations, using digital technologies as appropriate (ACSIS026 & ACSIS039) Use a range of methods to sort information, including drawings and provided tables through discussion, compare observations with predictions (ACSIS027) & (ACSIS040) Compare observations with those of others (ACSIS213) & (ACSIS041) Represent and communicate observations and ideas in a variety of ways (ACSIS029) & (ACSIS042)
3 **4**	Forces can be exerted by one object on another through direct contact or from a distance (ACSSU076)	Science involves making predictions and describing patterns and relationships (ACSHE050) & (ACSHE061)	With guidance, identify questions in familiar contexts that can be investigated scientifically and make predictions based on prior knowledge (ACSIS053) & (ACSIS064) With guidance, plan and conduct scientific investigations to find answers to questions, considering the safe use of appropriate materials and equipment (ACSIS054) & (ACSIS065) Consider the elements of fair tests and use formal measurements and digital technologies as appropriate, to make and record observations accurately (ACSIS055) & (ACSIS066) Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends (ACSIS057) & (ACSIS068) Compare results with predictions, suggesting possible reasons for findings (ACSIS215) & (ACSIS216) Reflect on investigations, including whether a test was fair or not (ACSIS058) & (ACSIS069) Represent and communicate observations, ideas and findings using formal and informal representations (ACSIS060) & (ACSIS071)
5 **6**		Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE081) & (ACSHE098)	With guidance, pose clarifying questions and make predictions about scientific investigations (ACSIS231) & (ACSIS232) Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks (ACSIS086) & (ACSIS103) Decide variables to be changed and measured in fair tests, and observe, measure and record data with accuracy using digital technologies as appropriate (ACSIS087) & (ACSIS104) Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate (ACSIS090) & (ACSIS107) Compare data with predictions and use as evidence in developing explanations (ACSIS218) & (ACSIS221) Reflect on and suggest improvements to scientific investigations (ACSIS091) & (ACSIS108) Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts (ACSIS093) & (ACSIS110)

Mathematics

Year	Measurement and Geometry	Statistics and probability
1	Measure and compare the lengths and capacities of pairs of objects using uniform informal units (ACMMG019)	Choose simple questions and gather responses and make simple inferences (ACMSP262) Represent data with objects and drawings where one object or drawing represents one data value. Describe the displays (ACMSP263)
2	Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units (ACMMG037)	Identify a question of interest based on one categorical variable. Gather data relevant to the question (ACMSP048) Collect, check and classify data (ACMSP049) Create displays of data using lists, table and picture graphs and interpret them (ACMSP050)
3	Measure, order and compare objects using familiar metric units of length, mass and capacity (ACMMG061)	Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording (ACMSP068) Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies (ACMSP069) Interpret and compare data displays (ACMSP070)
4	Use scaled instruments to measure and compare lengths, masses, capacities and temperatures (ACMMG084) Compare objects using familiar units of area and volume (ACMMG290)	Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs where one picture can represent many data values (ACMSP096)
5	Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108)	Pose questions and collect categorical or numerical data by observation or survey (ACMSP118) Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies (ACMSP119) Describe and interpret different data sets in context (ACMSP120)
6	Connect decimal representations to the metric system (ACMMG135) Solve problems involving the comparison of lengths and areas using appropriate units (ACMMG137)	Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147) Interpret secondary data presented in digital media and elsewhere (ACMSP148)

Making the most of your field trip

1. Deliver the “Pre Field Trip” slides found on our website (iflyworld.com.au) to your students. This presentation will show students what to expect when they arrive at the wind tunnel. It will also introduce some of the vocabulary and STEM concepts we will cover in the field trip. There is even a “script” that you can read word-for-word to your students. No preparation necessary!

2. If you have questions before, during, or after your field trip, please do not hesitate to contact iFLY staff. We are happy to answer any questions that will make your students’ experience better!

3. Arrive on time. Students’ flight times are prescheduled and cannot be rearranged. Arriving promptly will ensure that your students do not miss any portions of their education experience.

4. During the classroom activity, the STEM Educator may ask for your assistance to help students with certain portions of their investigation. Please encourage parents and other field trip chaperones to jump in and lend a hand!

5. Help us improve and strengthen our program by completing the Teacher Survey. We value your feedback!

6. Please visit our website, iflyworld.com, for post field trip activities. Having a follow-up discussion or activity with your students after the field trip will help support the concepts they learned during their visit.