UNIT PLAN TEMPLATE

Title of Unit	Air + Aerodynamics and Flight	**Grade Level**	Grade 6
Curriculum Area(s)	Science (Elementary)	**Time Frame**	5–6 weeks (Feb 28—Apr 13)
Developed by	Morgan Saunders		

IDENTIFY DESIRED RESULTS

Programs of Study Foundations

What program foundations form the emphasis of the unit? What big ideas from the program of studies will you include?

This is a modified grade 6 curriculum at [redacted] for the Flight + Air and Aerodynamics Unit. Please see the Unit Plan Outcomes on Page 2 for all General and Specific Outcomes. All of the modified curriculum outcomes are based directly on the Alberta Program of Studies (and are worked out alongside Alberta Education). The outcomes are adjusted for the nature of the students at our school and the variety of grade levels and abilities.

Essential Question
What is the big, overarching question guiding your unit plan?

How do machines (planes, parachutes, hot air balloons, gliders, and rockets) fly and what forces and factors affect them?

Unit Plan Outcomes
What are the program of studies general outcomes and specific competencies to be covered in your unit?
What will students understand, be able to do, be able to apply?

Specific Outcomes:

Students will…

- Understand how a plane flies (how it gets into/stays in the air)
- Recognize the importance of stability and control to aircraft flight
- Apply appropriate vocabulary to major components/controls of aircraft
- Conduct tests of glider designs (paper airplanes)
- Be able to build different flying machines and test them
    - Modify their designs to achieve different results (go further, fly longer, fly in specific directions, do flips or loops)
- Construct/test propellers and other devices for propelling a model aircraft
- Describe the design of a hot air balloon
- Describe the principles by which hot air balloons (rising and falling) are controlled
- Recognize that in order for devices or living things to fly, they must have sufficient lift to overcome the downward force of gravity.
- Describe differences in design between aircraft and spacecraft, and identify reasons for the design differences. Note: Model aircraft or rockets may be constructed and used as part of this topic. It is recommended that these models be simple devices of the student's construction, not prefabricated models. Propulsion of rockets by chemical fuels is neither required nor recommended, due to safety considerations.
    - ^Prefabricated model used for safety and due to specific students making a stomp rocket for their science fair (as well as time constraints due to science fair prep/experiments)

General outcomes:

- Be able to construct devices that move through the air
- Identify adaptations for controlling flight
- Describe properties of air and the interactions of air with objects in flight.
- Construct devices that move through air, and identify adaptations for controlling flight.

UNIT PLAN RESOURCES

What resources will you require? Will there be guest speakers/field trips to plan for? Will you need particular resources/materials/technologies?		
Resources: Worksheets including a Flight sort (does it fly), Paper Airplane experiment sheet, Hold to Fold Paper Airplane sheets with instructions, Plane labelling exercise, worksheet on Plane directions/Flight vocab, Pre-Museum KWL (filled out post museum as well), Post-Museum Questions/Feedback sheet, Rocket/Space shuttle labelling, Balloon rocket experiment, and final Multi-Station Worksheet with Stomp Rocket Experiment.	**Materials/Tech:** Videos across the unit/every lesson (see links per lesson), projector, speakers, computer, iPad for worksheet creation, student ipads (sometimes for activities or videos).	**Field Trips:** Hangar Flight Museum (March 20th)

UNIT PLAN SUMMATIVE ASSESSMENT

What will you accept as evidence that learning has occurred at the conclusion of this unit?	
What is the summative performance assessment for the unit?	Summative Assessments were not used as often as is typical (being in a non-traditional school with varied grades, abilities, and behaviour plans in the class); however our worksheets throughout the unit, the responses of children to questions at the flight museum, and assessing their collected work with the Janus-based marking system (regarding the level of prompting required) would be the closest we had.

What is the goal of your summative performance assessment as framed within the outcomes and competencies? What do you hope to learn?	I hoped to learn how much the students retained, how much of this retained/learned knowledge they could use to answer theoretical questions or hypothesize about flight to apply their knowledge, and whether they could apply scientific thinking and the Scientific Method to their learning and/or experiments.
How will this assessment inform student learning and your practice?	It will inform my practice by showing me if I am pushing too much information, too fast, as well as the connections they are making between the vocab and the theories/concepts. It also allows me to see how/if they are using the scientific method during our experiments and their observations.

LESSON PLAN SEQUENCE/OUTCOMES

For each lesson in the unit, consider the primary topic/activities, outcome and assessment. Does each lesson build on the next? Consider the following questions as you plan your sequence of lessons:

What events will help students engage with, explore, explain, elaborate on and evaluate the big idea in the unit?
How will you help guide students to reflect, rethink and refine their work/ideas/understandings?
How will you help students to exhibit and self-evaluate their developing skills/knowledge/understandings?

Lesson #	What is the primary objective of this lesson in your own words?	What are the primary activities in this lesson?	How will you assess whether learning has occurred in each lesson? How will you employ formative assessment?
1. Feb 28	Introduction to flight	Video introduction to flight targeting what it is, how it works in nature etc. Students will do a "Does it fly?" sort.	Completion with as minimal prompting as possible, and/or being able to verbally tell me, physically show me what they know. After they need to put at least 3-5 of their answers (for what does and doesn't fly) on the sorting worksheet.

			Can they use a guided experiment to start making guesses
2. Mar 2	Our first experiment with paper and flight, and unmodified paper airplanes	A less structured exploration of flight properties of paper (see Worksheet 2) with unmodified paper airplanes used as well.	**(hypotheses) on possible outcomes or variables that may affect the way the paper or plane flies. Also, can they identify basic properties of flight/what helps things to be aerodynamic or fly well through the air?**
3. Mar 7	About airplanes and their parts	Video, then using my enlarged, coloured version of their plane on their worksheet, label the parts together, then do a separate labelling exercise at the end or at the start of the next class.	Can students label an airplane using the vocabulary learned in class? Moving forward will we be able to use these vocabulary words accurately what talking about planes and the functions of these parts?
4. Mar 9	Directions of flight and vocab (for planes)	Watch a video, do physical motions of these diretions of moving, then label on the plane sheet.	Will students be able to recognize these directional words when used in class or on the field trip (Mar 20)? Will they be able to use them when talking about plane movement, or be able to show me the physical motions?
5. Mar 14	Testing unmodified Paper airplanes, then modifying them (add ailerons, flaps, etc) for directional flight.	Video for interest (world record glider/paper airplane flight), then the experiment worksheet (guided)	Using different paper airplane designs and modifying said designs with additional parts (ailerons, rudders, flaps, etc), can students make them fly in the directions we learned about the previous class?
6. Mar 16	Pre-Museum visit and mid-unit review class	KWL chart before Museum, mini review/video on flight and planes, going over expectations for the FT and what they can/can't do there.	The aim here is to review and to prepare students for the different environment we will be learning in next class. It is also a collection of mid unit evidence of learning/ knowledge through the KWL chart.

7. Mar 20	Hangar Flight Museum Field Trip	Go on tour, answer questions if guides ask, ask questions, and participate in tour, get to sit in up to 3 planes.	I will evaluate learning by listening to ~~the questions that students ask, or the~~ tour questions they answer (correctly or otherwise). Also by what they point out on the planes or other items there.
8. Mar 21	Museum Debrief	KWL fill-in post-museum, questions about Museum visit using a feedback worksheet asking about their favourite parts, something learned or 3 new facts, their favourite plane to sit in, etc. Then a fun way to finish off learning about planes (videos by student request). The videos ended up being about stunt planes and the movement they do.	Learning will be shown by students answers to the questions on the post field trip sheet, their comments/ questions after the field trip in class, and their filled in KWL sheet post-museum visit
9. Mar 23	Sneak peek for rockets, and how space flight works (last class before Spring Break)	Rockets video (how they fly, about space flight, etc), as a sneak peek for after Spring Break.	Less focused on learning assessment right before break, instead this is a 'get excited for the learning to come' class
10. Apr 4	Rockets! Introduction to Space Flight!	Rocket introduction (video), the history of space flight, reasons to use rockets/space shuttles (why planes don't work), when/how they fly, the parts of the rocket or space shuttle (labelling activity).	Assessing whether they can label the parts of the rocket ship/shuttle, and tell me why we need to use a rocket and not planes to fly into/in space.

Adapted from Wiggins, Grant & J. McTighe (1998)

11. Apr 6	Rocket experiment! Rockets and propulsion.	Balloon Rocket experiment day, using guided worksheet for the experiment with even more scientific method specific vocabulary, making changes to the rockets themselves and testing which goes faster or covers more distance.	Can students understand propulsion in terms of rockets and space flight? Can students (using more scientific vocabulary) go through a guided experiment with variables to choose and test for when launching their balloon rockets? Can they identify possible reasons for the changes/differences?
		Groups move through 4 centres on rockets and space flight while waiting their turn to do the ~~stomp rocket launch~~.	
12. Apr 11	Stomp Rocket launch/ tests and space flight centres — Day 1	Centre 1 — How rockets fly video with worksheet	
		Centre 2 — Build a rocket (has a body, fins, and a nosecone). or a space shuttle (body or cabin, wings, tail fin, etc) out of Lego, mag tiles, by drawing one, or colouring one (depending on the group and how the day goes)	
13. Apr 13	Stomp rocket launch/test and space flight centres — Day 2, and wrap-up for Unit.		
		Centre 3 — Stomp Rocket Launch (everyone gets to launch it once and choose the colour of rocket)	
		Centre 4 — Experiment sheet (follow up to the ~~stomp rocket launch). Students answer: what did~~ you see, how did the stomp rockets work, what was the procedure for launch, etc	

Adapted from Wiggins, Grant & J. McTighe (1998)

PRE-SERVICE TEACHER SELF-REFLECTION

- **How do you feel your students experienced this unit?**
- **Were they able to make explicit and self-evaluate their growing understanding, skills and/or knowledge?**
- **Were you able to make good use of formative assessment for/of/as learning? How did this information impact your summative assessment?**
- **Were you successful in reaching all students? How do you know? How did you accommodate for diverse learners and those requiring accommodations?**
- **Were there opportunities to address Indigenous, multicultural and interdisciplinary activities and knowledge?**
- **What went well and what needs refinement? What might you do differently next time?**

Adapted from Wiggins, Grant & J. McTighe (1998)

Adapted from Wiggins, Grant & J. McTighe (1998)