Challenge

Planning Notes

- Read the Challenge as a class and review **Master 1 Project Rubric** to make sure students know what is expected.
- Review the meaning of *symmetrical* and *non-symmetrical*. Review area formulas and post them in the classroom.
- Demonstrate how to create a paper airplane. Alternatively, do the paper folding as a teacher-led activity.
- You may wish to use the gymnasium for students to fly their airplanes. Have students build both airplanes and calculate the area of the wings before flying them (#1, #2a), and #3a)).
- If students have difficulty flying their airplanes, have them do three trials instead of five.

Common Errors

- Some students may have difficulty building the airplanes.

R$_x$ Use **Master 8 Centimetre Grid Paper** so they have fold lines for parts of their airplane. Divide students into pairs; one student can make the symmetrical airplane and the other can make the non-symmetrical airplane.

R$_x$ Use pre-made examples for the symmetrical and non-symmetrical airplanes to help visual learners.

The chart below shows the Rubric for the Challenge and provides notes that specify how to identify the level of specific answers for this project.

Score/Level	Holistic Descriptor	Specific Question Notes
5 **(Standard of Excellence)**	❑ Applies/develops **thorough** strategies and mathematical processes for making **significant** comparisons/connections that demonstrate a **comprehensive** understanding of how to develop a complete solution ❑ Uses **efficient** and **effective** procedures that may contain a **minor mathematical error** that does not affect understanding ❑ Uses **significant** mathematical language to explain understanding and provides **in-depth** support for the conclusion	• provides a complete and correct solution **Note:** If all parts of the exercise have been calculated correctly but fewer than five trials are recorded, the paper still scores a 5.
4 **(Above Acceptable)**	❑ Applies/develops **thorough** strategies and mathematical processes for making **reasonable** comparisons/connections that demonstrate a **clear** understanding ❑ Uses **reasonable** procedures that may contain a **minor mathematical error** that may hinder the understanding in one part of a complete solution ❑ Uses **appropriate** mathematical language to explain understanding and provides **clear** support for the conclusion	• provides a complete response with an error or omission in one part of #4 *or* • provides a complete response to the exercise with weak communication in #4
3 **(Meets Acceptable)**	❑ Applies/develops **relevant** strategies and mathematical processes for making **some** comparisons/connections that demonstrate a **basic** understanding ❑ Uses **basic** procedures that may contain a **major mathematical error** or **omission** ❑ Uses **common** language to explain understanding and provides **minimal** support for the conclusion	• provides a correct and complete response to #1 and #2 with a significant start to #3 *or* • provides a complete and correct response to #2 and #3 based on an incorrect #1 *or* • provides correct starts to all parts of the questions
2 **(Below Acceptable)**	❑ Applies/develops **some relevant** mathematical processes for making minimal comparisons/ connections that lead to a **partial solution** ❑ Uses basic procedures that may contain several major mathematical errors ❑ Uses **weak** communcation	• provides a correct and complete response to #1 and calculates one of the two surface areas *or* • provides a correct and complete response to #1 and either #2 or #3
1 **(Beginning)**	❑ Applies/develops an **initial start** that may be **partially correct** or could have led to a correct solution ❑ Communication is **weak** or **absent**	• provides a correct start or complete answer to #1 *or* • provides a correct start to one part of the exercise