

ENGINEERING SMART START GRANT LESSON PLAN

Date: <u>2025-2025</u> Lesson: <u>Airplane Flight</u> Grade: <u>__7/8 mixed grade class__</u>	
<p>Materials and/or Resources:</p> <p>EDP Student Notebook paper scientific calculators measurement tape Building Background Knowledge</p> <ul style="list-style-type: none"> ● weather impact on humans - infrastructure ● force stations ● reading passages ● use of Wayground Eduprotocol Fast and Curious for vocabulary <p>Notice, Wonder, I think template Data Table from Sept flight Classic Dart Classic Dart instructions slide deck student EDB checklist flight calculation page/analysis</p>	<p>Standard Addressed:</p> <p>ETS1A: Defining and Delimiting an Engineering Problem ETS1B: Developing Possible Solutions ETS1C: Optimizing the Design Solution</p> <p>Crosscutting Concepts:</p> <p>MS-PS1-1 and MS-PS1-4 graphs, charts, images, can be used to identify patterns and data MS-PS2-1 and MS-PS2-4 models can be used to represents systems and their interactions such as inputs, processes, and processes and energy and matter flow within a system MP.4 Model with mathematics 6-8RST-7 reading 6-8WST.8 writing</p> <p>Student IEP goals involving math, reading, writing, self regulation</p>
<p>Student-friendly “I Can” Statements:</p> <p>I can...</p> <ul style="list-style-type: none"> ● use flight vocabulary ● identify forces and their impact ● create a solution to the problem ● design and redesign my plan based on data ● compare data/decimals ● answer questions regarding my data verbally and in written form given stem sentences ● add decimals and find an average ● read/record distance measurements using centimeters 	<p>Vocabulary Words: Tier 2 and Tier 3</p> <ul style="list-style-type: none"> ● drag, lift, gravity, thrust ● EDP cycle vocabulary ● infrastructure ● centimeters ● comparing ● data ● constraints ● modify ● specific ● length ● width ● height ● average ● difference ● distance ● meters
<p>Cross-Curricular Link(s):</p> <p>math measurement metric, reading adding, and finding the average using decimals reading/writing vocabulary words, UFLI lesson reinforcement, engagement EdPuzzles, readings topics background of flight, purpose/the why, designers/scientists, sentence stems</p>	<p>Approximate Time to Complete Lesson (in mins): one week, 5 days, to complete the EDP cycle, prior to EDP cycle two day lesson regarding following directions to create classic dart and measurement metric, background knowledge building, 2 days, and prerequisite skills one week, 5 days, prior to EDP unit</p> <p>Based on 40 minute classes 480 minutes</p>

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	Problem/Story
EDP STEP 1: ASK	<p>You are a Communications Engineer for the NYS Disaster Response Unit. You are stationed at a mobile command center on top of the Bristol Hills. There has been a critical infrastructure failure. The "Great Ice Storm of the Century" has snapped all fiber-optic cables and toppled the main cell towers. The entire Honeoye Valley is a Digital Dead Zone. No cell service. No internet. No working landlines.</p> <p>The town below has lost power to their heating grid. The Fire Chief in the valley needs the manual "Override Access Code" to restart the town's backup generator manually. If they don't get this code in 20 minutes, the pipes in the school shelter will burst. The roads are solid sheets of black ice it is too dangerous for cars or snowmobiles. The wind is howling too loud for megaphones.</p> <p>You are standing on the ridge above the town. You must write the 4-digit code on a piece of paper and fly it down to the Fire Chief waiting in the parking lot below.</p> <p>What is the problem we are going to solve to fulfill our mission using the engineering design process? Write this in question format.</p> <p>What were the result of your past airplane test? What do the results show you?</p>
EDP STEP 2: IMAGINE	<p>Past research page the EDP student notebook.</p> <p>Question: Past Research your My Average Data for Classic Dart Table.</p> <p>What were your results of your past airplane test?</p> <p>What do the result show you?</p> <p>Research and Imagine page in EDP notebook. Students will recall, look at, and use background readings with underlining/highlighting, stations regarding lift, drag, gravity, thrust, EdPuzzle,</p>

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EDP STEP 3: PLAN	<p>Plan</p> <p>Materials provided:</p> <ul style="list-style-type: none">-choice of building productsmust chose two different productsconstruction papercardstock aluminum foilgraph paper-scotch tape 20 cm-3 paper clips- a penny <p>Constraints:</p> <ul style="list-style-type: none">- You may only use the supplies provided and the amounts provided-Your plane may not exceed 32 cm in length, 23cm width, or 16 cm height- You will work individually on this project <p>*Mrs. Boyea and Mrs. Sacchitella reserve the right to add more constraints.</p>
EDP STEP 4: CREATE & TEST	<p>Plan - This is your first design.</p> <p>Be sure to label the materials.</p> <p>Design 1:</p> <p>Test your Design</p> <p>Draw a picture of what your plane looked like after you tested it.</p>

Improve your design

Based on the results of your test, think about what you need to improve on your design for your next trial? Draw your redesign below



EVALUATE: Assessment of Student Knowledge:

- *Written responses from Create and Reflect page in EDB notebook
- *Google Form - reflection
- *Data table - sum/average use of calculator - reading and writing measurement readings with correct units.
- *EDP notebook responses/words/drawings
- *Wayground vocabulary work and assessment
- *Flight quiz
- *Verbal responses sharing from note catcher, I notice, I wonder
- *Reading passage and written responses

Create and Reflect

Select which design you are going to create, put the number on the line: _____

Explain why you chose that design below:



Share-Class Discussion Questions

1. Explain how your airplane design solved the problem.
2. What worked well and what did not?
3. What was easy for you? Why?
4. What was challenging? Why?

Homework / Notes / Reflection:

Individual Reflection

Now, think about the EDP process and complete the [Google Form](#).

Use of Mote for Google Form Reflection

Question #1 What surprised you about this EDP?

Question #2 What did you enjoy about the EDP?

Question #3 What frustrations did you have when working on the Flight EDP?

Question #4 If you could add one new material to use for a future design, what would it be and why?