

Paper Airplane Factory

Students engage in rapid prototyping, using critical problem-solving to overcome challenges including the risk of failure. Designing, testing and flying paper airplanes with the goal of making their airplane company profitable.

Prep Time:	60 minutes
Activity Time:	90 minutes
Foundational Principle(s):	<ul style="list-style-type: none"> • Opportunity • Sound Judgment • Win-Win
SEL Tag(s):	<ul style="list-style-type: none"> • Responsible Decision-Making • Self-Awareness
Empowered Currency Needed:	\$\$\$
Key Term(s):	<ul style="list-style-type: none"> • Rapid Prototyping • Innovation • Risk Competition • Feedback • Humility • Trade-offs • Scarcity • Sunk Cost • Comparative Advantage
Materials Needed:	<ul style="list-style-type: none"> • Copy paper for students • Digital Timer • Paper Airplanes Rules Sheets for each group • Paper Airplanes Test Flight Record Sheet for each group • Clipboard with Paper Airplanes Score Sheet for you to record attempts and successes • Empowered Dollar/Points Exchange (Paygrade, Class Dojo, etc.) - Virtual



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Why it works:

Teachers can highlight or expand on the methodology components throughout all stages of this activity! Students are highly incentivized by the Empowered currency that will be awarded for successful flights but not without risking the trial fee. To complete the activity successfully, students will need to work together well, discovering and applying their innate abilities and comparative advantages. This will take practice of agency and purpose. Finally, how students accomplish the task will incorporate principles and action - will their decisions represent responsibility, sound judgment, win-win focus to name a few? Will they feel fueled by the incentive of making a lot of Empowered \$\$ or will they feel stifled and conserve their money for another day or auction?

Preparation:

- Determine which platform you will use to share the activity with students.
- Review the activity guide.
- Ensure students will have enough copy paper prior to the date you plan to play the activity. Consider mailing 25 sheets to every student with other classroom supplies as needed. If you would like to save on the cost of postage, consider ways to send materials home if students are picking up meals from the school at any time. If you plan to send a tape measure, please include this in your materials to the students at this time.
- Even if a student doesn't use their paper, they can keep it handy for other activities!
- Upload worksheets and rules sheets to your classroom platform for students to access.
- Determine how you will engage students in the debrief following the activity.
- **Pro-tip:** Give all instructions prior to sending students to breakout room.

Introduction:

Share with your class that today they are going to be airplane manufacturers for your Airplane purchasing company. There is an increased demand for airplanes that can fly long distances (10 ft) with great accuracy. However, you need the airplanes made FAST! You are going to pay each group 10 Empowered Dollars for any plane that successfully hits their computer screen but (pause for dramatic effect) each test flight will cost them 5 Empowered Dollars.

Steps:

Step 1.

SETTING THE STAGE

- Tell students that they will be randomly grouped together in groups of 4-5 and sent to break out rooms once directions are completed.
- Remind them that today they are forming companies that are designing, testing, flying, and if successful, selling paper airplanes.
- Tell students that you, the teacher, are the customer and that you will buy any airplane that can be successfully flown from the launch area (10 ft. away from their computer at home) and touches their computer screen.
- Remind them that for every successful plane flown, the group will receive \$10 Empowered Dollars. However, for every attempt, they will pay \$5 Empowered Dollars. All group accounts will be settled at the end of the activity.
 - Note for the educator – it is completely up to you how you reconcile any group that ends up owing you at the end. Make sure you treat all groups equally in this regard. It is encouraged that you do not simply provide a “bailout” to groups who ended up in the negative at the end. If you play this activity after students have built up

wealth from other activities, make sure to impress upon them at the beginning of the activity that you DO plan to collect any negative balances so make financial choices wisely.

- Finally, share with students that because of the safety issues involved in testing experimental aircraft, there are very important rules that they must follow, and all violations will be strictly punished according to the rule sheet.

Step 2.

Read aloud all rules from the Paper Airplane Sheet

- Ask students if they have any questions before sending them to breakout rooms.
- Remind students that you will give them 2 minutes to strategize, and they may NOT handle or manipulate the paper. Because they will be in breakout rooms, remind students that one Foundational Principle is Integrity – together they will be using an honor system to ensure this specific rule is followed. If you find out that a group did not follow the rule, one suggested consequence is to charge them double for flying that pre-folded airplane and not awarding any money if it is successful.
- After 2 minutes of strategizing, you will bring them back into the main room and share with them that they will have 5 minutes for folding their stash of airplanes they wish to fly. Prior to sending them to breakout rooms, explain that each student will have a role within the company
 - The following roles will need to be selected/assigned
 - 1-2 Research & Development staff (I.e., Can use the internet to find paper airplane resources)
 - 1 Folder/Flyer
 - 1 Accountant – manages the attempt and success sheet
 - 1 Compliance Officer – ensures the rules are adhered to
- Ask for any remaining questions and start the 2-minute strategy session.

Debrief:

Methodology

Agency:

- When working in teams, it is important to have shared vision. Was it easy or difficult to work with your team today? What challenges or successes might you have had working alone?
- How did you decide who would take on each role? Did you change roles between rounds? Why or why not? Did your group have a comparative advantage over other groups? What was it and how did you use it to your advantage?

Principles:

- There might have been debate today about Principled behavior between and amongst the groups.
 - Were there times that you noticed groups “stealing ideas”/“cheating”? What behaviors were exhibited when this took place? (I.e., how did you know that person was stealing ideas?)
 - Does this happen in the market? Do entrepreneurs “steal” ideas from one another? (Connect with FP Freedom)
 - Does this help or hurt the market? (Connect with FP Win-Win or Opportunity)
- How can you protect your ideas? (Connect to FP Responsibility)

Incentive:

- While we may have impeccable decision-making skills, decisions are not made in a vacuum. What role did scarcity play in your decision making? In what way did your group experience scarcity? How did your team deal with the issue of scarcity?

Action:

- This activity is all about rapid prototyping – “Fail fast, fail cheap.” Why is it important for a company to understand and operate in this manner?
 - How is this way of thinking different from your typical way of working through problems?
- What steps might you need to take to overcome any barriers to action when considering “Fail fast, fail cheap?”

Purpose:

- When you feel connected to an idea or purpose, you naturally contribute more value toward the goal. In today’s activity, how did you decide to divide the profit? Were all roles valued equally?
- How is value rewarded in the “real world” through careers, community, relationships/marriages, etc.? Are there careers where all people are paid the same regardless of their value creation? How might this impact staff’s contribution to their work production?

Content

- What strategy did you choose? Did your strategy change and why? Why not?
- Intellectual Property - Should they bring up “stealing ideas”/“cheating”? Does this happen in the market? Do entrepreneurs “steal” ideas from one another? Does this help or hurt the market? Can you protect your ideas?
- Opportunity Cost - What was the opportunity cost of investing in research and development vs. testing more planes?
- Opportunity Cost - Opportunity cost is the value of the next best thing you give up when you make a decision. What was an opportunity cost you encountered in this activity?
- Comparative Advantage - The ability to produce a particular good or service at a lower marginal and opportunity cost over another. What was your comparative advantage?