

PAPER AIRPLANES

Teacher Overview

Paper Airplanes is designed to engage students in the process of rapid prototyping in small groups while dealing with the challenges of scarcity, risk and a high potential for failure. Students are given the seemingly simple task of flying paper airplanes from one line to another with the potential for a 100% profit if they are successful. As the game progresses, however, the rates of success and failure will drive them to change their strategy by creating new opportunities to profit by innovating their approach and redefining, for themselves, what success looks like. Their goal is to make profit by creating a quality paper aircraft that is able to fly the distance. Along with the plane's capability, teams are challenged to streamline their productivity, manage their costs, maintain quality, and seek profitability.

Pro-tip: This activity can be facilitated by one person however, it is recommended that you have another facilitator to help. For large classes, those of 25+ students, having someone keep track of the attempts and successes and someone else designated to enforce the rules in the building area is very helpful. This is a great opportunity to invite a community member, administrator, or an alumni into the classroom.

When to Use This Lesson

This activity is repeatable and can be used as a way to help students form their Market Day groups. It works well during the Intro to Entrepreneurship unit and is an excellent bridge between the Entrepreneurship section and the Innovation & Creative Destruction section.

STUDENTS ARE GIVEN THE SEEMINGLY SIMPLE TASK OF FLYING PAPER AIRPLANES WITH THE POTENTIAL FOR A 100% PROFIT

Time | Depends on # of rounds played



BEFORE CLASS PREPARATION

- > Review activity guide.
- > Create an airplane testing area. This can be in your room, the hallway, or in a large area like the gym or lunch room. The testing area needs to be free from any obstruction or forces that will alter the airplanes flight path such as wind or structural pillars. Place a line of masking tape on the floor to mark the launch area. Approximately 20 feet away, mark a finish line on the floor with another line of tape.
- > Have ready stacks of 20 sheets of paper for each group, each set of 20 is a different color. Do not give them to your students until you have read the rules and explained the activity.
- > If you will be doing Paper Airplanes in your classroom, arrange seating and work tables into groups with the number of possible groups not exceeding the number of different colors of paper you have.
- > Place one Paper Airplanes Rule Sheet on each group table.

LEARNING OBJECTIVES

Principled Entrepreneurship 3a, 3b, 3d, 3f, 4a, 4d, 4l, 4m Innovation 2b, 2d, 3b, 4d

FOUNDATIONAL VALUES

- > Sound Judgment
- > Win-Win Focus
- > Opportunity Obsession

MATERIALS

- > A multicolor ream of paper with at least 5 different colors, 25 sheets each.
- > Paper Airplanes Rule sheets for each group.
- > Paper Airplanes Test Flight Record Sheet for each group.
- > Clipboard with score sheet for you to record attempts and successes.
- > YE currency
- > Masking tape
- > Timer

KEY TERMS

Rapid, Prototyping, Innovation, Risk Competition, Feedback, Humility, Trade-offs, Scarcity, Sunk Cost

ACTIVITY DIRECTIONS | SETTING THE STAGE

- > Ask students to arrange themselves into groups. The number of groups will be determined by the number of different colors of paper you have. 5 different colors of paper = 5 groups
- > Tell students that today they will be 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 (show students the launch area) across the finish line (show students the finish line).
- > Tell students you will pay them \$10 YE for any plane that is successful but (pause for dramatic effect) each test flight will cost them \$5 YE.
 - Because you are a venture capitalist as well as the customer in this activity, you will seed them with 20 sheets of paper per group, give them credit up front for the \$5 YE test flights and all group accounts will be settled at the end of the activity.
 - (It is 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 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 this activity that you do intend to collect any negative balances.)
- > Tell students that at any time during they game, if their group wishes to purchase more paper, they can buy it from you.
- > 5 sheets of paper for \$5 YE or 1 sheet for \$2 YE, but they must pay cash.
- > No credit will be extended for additional resources.
- > If students ask and your school allows it you might allow them to purchase internet usage for \$5 YE.
- > Tell students that because of the safety issues involved in testing experimental aircraft, there are very important rules that they must follow and that all violations will be strictly punished according to the rule sheet.

BECAUSE OF THE SAFETY
ISSUES INVOLVED IN TESTING
EXPERIMENTAL AIRCRAFT, THERE
ARE VERY IMPORTANT RULES
THAT THEY MUST FOLLOW

HERE'S HOW WE PLAY | READING THE RULES

- > Read aloud all rules from the Paper Airplanes Rule Sheet.
- > Ask students if they have any questions. Once all questions are answered, give each group their paper
- > Remind students you will give them 2 minutes to strategize and they may NOT handle paper. You may want to have a consequence for handling paper during the strategy round. A suggested consequence might be to take the paper they handled. Upon the conclusion of 2 minutes, the 4-minute testing/flying round will begin.

HERE'S HOW WE PLAY | STRATEGY SESSION + FLYING ROUNDS

- > Ask for last minute questions. After answering all questions start the 2-minute strategy session.
 - Circulate the area to check for compliance. If you see paper being handled you will want to call out that behavior and perhaps take the paper that was handled.
- > At the end of two minutes start the 4-minute testing/flying round.
 - Keep track of the number of attempts and successes on the Paper Airplanes Score Sheet as they test their paper airplanes. This will make calculating their costs and revenues easier.
 - You will also want to make sure the groups are staying in compliance with the rules. Only one person from each group in the testing area at a time.
 - Each paper airplane must be 4 inches in length and have wings.

HERE'S HOW WE PLAY | STRATEGY SESSION + FLYING ROUNDS CON'T

- > At the end of 4-minutes collect all paper airplanes that have been tested/flown, all paper that has been folded or creased, etc. Students may not handle any paper again until the next 4-minute round.
 - It is beneficial to post each groups productivity on a whiteboard of some kind. This encourages competition amongst the groups. If you have no whiteboard available you can still announce the totals to the class.
- > Repeat the 2-minute strategy rounds and 4-minute testing/flying round until you have completed 4 rounds of testing/flying.
 - Pro-tip: During the rounds you might see students watching how the others are making successful paper airplanes, asking one another for tips or advice, paying one another to make paper airplanes for them. Let these behaviors happen! As long as they are in compliance do not stop them. These behaviors will give you more to discuss during the debrief and throughout the class.
- > After 4 rounds of testing/flying calculate the total profit for each group.
- > Pay each group. Allow each group to determine how they want to divide their profits amongst the group members.

AFTER 4 ROUNDS
OF TESTING/FLYING
CALCULATE THE TOTAL
PROFIT FOR EACH GROUP.

ACTIVITY DEBRIEF

- > What strategy did you go with?
- > Rapid Prototyping - "Fail fast, fail cheap." - Why is it important for a company to understand and implement this way of thinking?
- > Shared Vision - Was it easy or difficult to work with your team? Would it have been better working alone? Why or why not?
- > Specialization - 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?
- > Scarcity - 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?
- > 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 R&D vs. testing more planes?
- > In what way does this activity relate to your real world? How can you use this information when preparing for Market Day? How can you use this information in making business plan decisions?
- > Division of profit - How did you decide to divide the profit? Were all roles valued equally?
- > Opportunity Cost - What were they in this activity? The value of the next best alternative forgone. Or the cost incurred by not enjoying the benefit that would be had by taking the second best choice available.
- > 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?
- > Subjective Value: **dependent on auction results.