

Safe Landing Checklist

Name: _____

Name: _____

Name: _____

Name: _____

Scenario

Airdrop designers consider how to ensure supplies are not damaged during freefall or landing. In this project, a ping pong ball (representing important supplies) is placed in a paper cup and dropped. The cup must land upright inside a 2ft diameter round ‘landing zone.’ The ping pong ball will experience freefall as they drop.

Use the Problem Pivot problem identification method to explore the original problem statement and a reframed problem statement.

Original Problem Statement: The ball experiences too large an impact force during the free-fall landing.

Objective: Design and build a safe landing method to make sure that the cup is positioned upright, and the ball stays inside of the cup after it lands from the drop.



Criteria ☐ Ball remains inside cup without tape or glue ☐ No lids. Ball must be easy to load and unload from the cup without disassembly (ball drops out if cup is turned over) ☐ Cup lands upright ☐ Cup lands in a 2 ft diameter circle ☐ Ball remains in the cup after landing	Checklist ☐ Problem Identification: Problem space mapping using Problem Pivot and why/why else (staple) ☐ Group Sketch (staple) ☐ Photos of Prototype ☐ Video of Prototype ☐ Project Report Slides
---	--

Safe Landing PI Calculation

Material	Cost	Maximum Quantity		Quantity 6ft Drop	Your Cost 6ft Drop		Quantity 12ft Drop	Your Cost 12ft Drop
Ping Pong Ball (cat)	\$0	1		1	0		1	0
Paper Coffee Cup	\$0	1		1	0		1	0
5x7 in Cardboard	\$20	1						
Masking Tape	\$1/in.	24						
Paper	\$5/page	4						
Balloon	\$20 ea.	4						
Popsicle Sticks	\$5 ea.	5						
Plastic Bag	\$20	1						
Weight (washer or nut)	\$1 ea.	10						
String	\$1/ft.	3						
Cotton Ball	\$2 ea.	10						
Rubber Band	\$2 ea.	10						
COST: Add up values				6ft Drop:			12ft Drop:	
Performance				Possible Score	Your Score 6ft Drop		Possible Score	Your Score 12ft Drop
Ball remains inside the cup without tape or glue AND No lids. Ball must be easy to load and unload from the cup without disassembly				PASS/FAIL			PASS/FAIL	
Cup lands upright				100			100	
Lands in 2 ft diameter circle				25			25	
PERFORMANCE SCORE: Add up values				6ft Drop:			12ft Drop:	
Performance Index (PI) PERFORMANCE SCORE / TOTAL COST				6ft Drop:			12ft Drop:	