



Process

Plan

Research

Design

Test

Redesign

Problem Statement

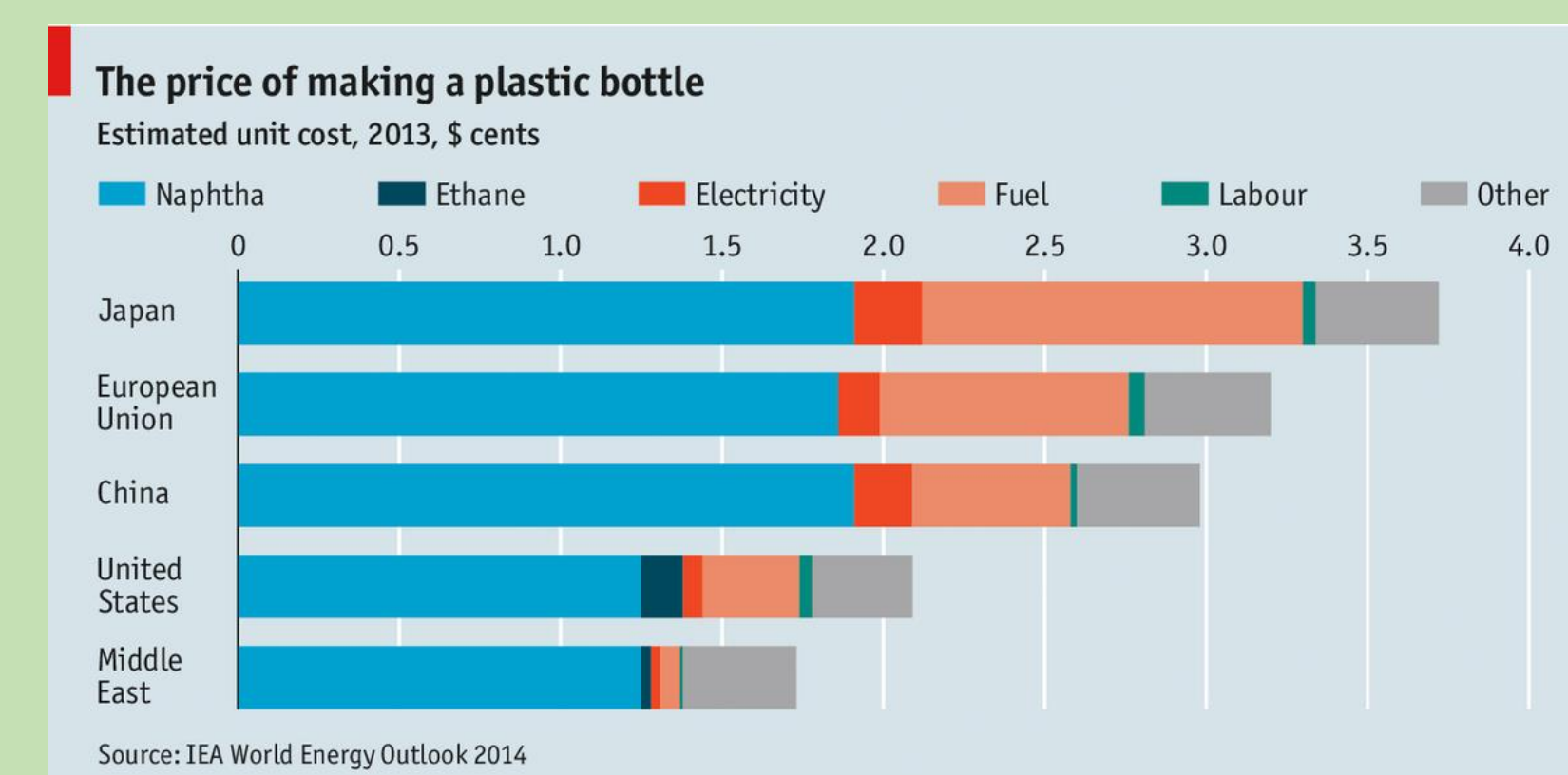
At WPI and many other communities, one of the **most popular items** that end up in the **trash** and **recycling** are **disposable, single use plastic water bottles**.

Why is this an issue?

A **copious amount** of plastic is **disposed** of and **recycled** **impurely/improperly**, leading to **further plastic production and demand**.

This **demand** for plastic is **destructive to our environment**, leaving plastic in landfills for up to **500 years...**

What We found



The diagram above demonstrates that the price to manufacture plastic bottles varies based upon material availability and labor costs in different locations. This means that the price will only increase

Why Bamboo?

- One Time Cost
- Easy to Reproduce
- Minimal Legislation for Cultivation in MA
- Ultimately Self Sustaining

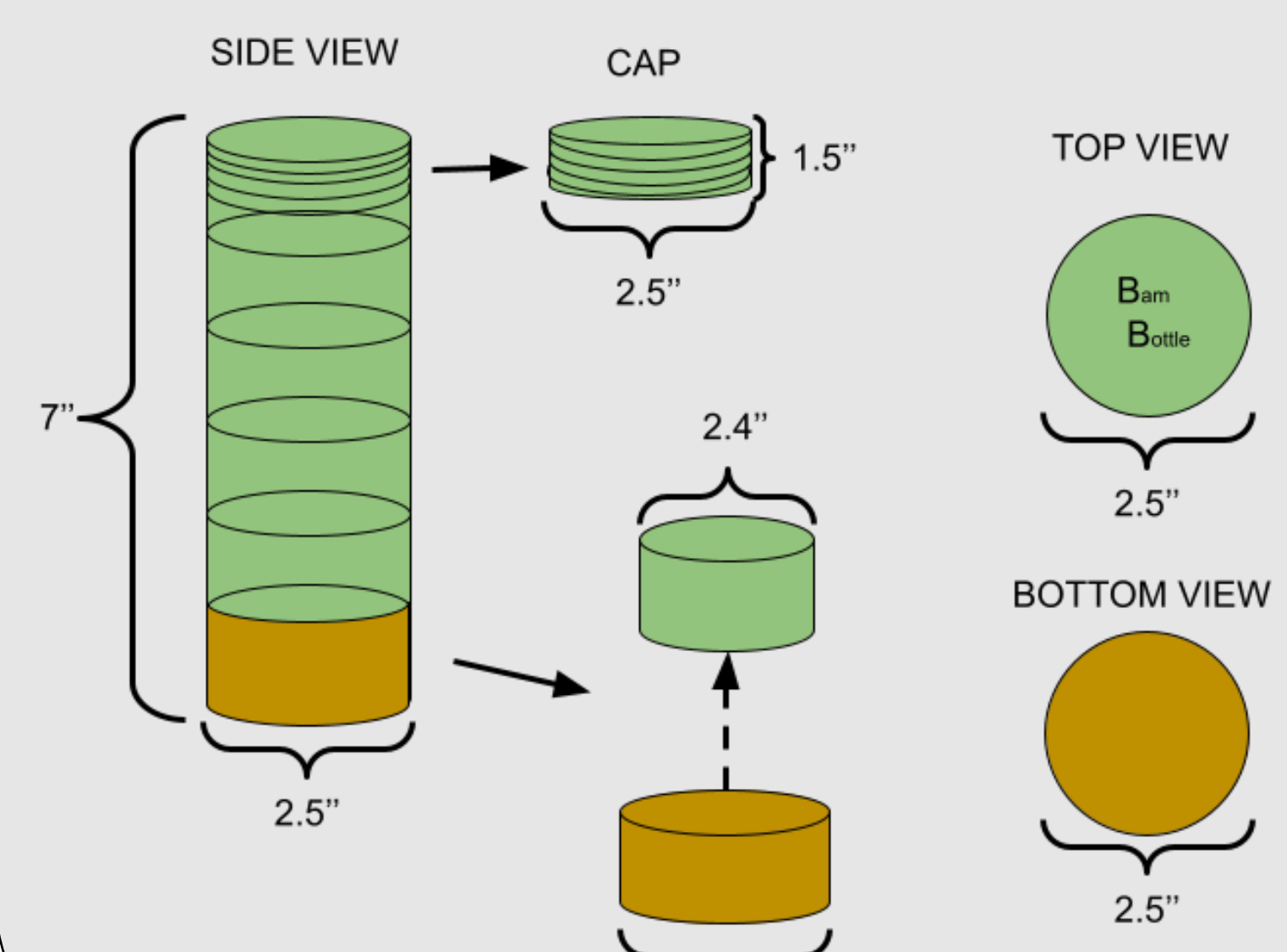
Data & Research

For Further Information:

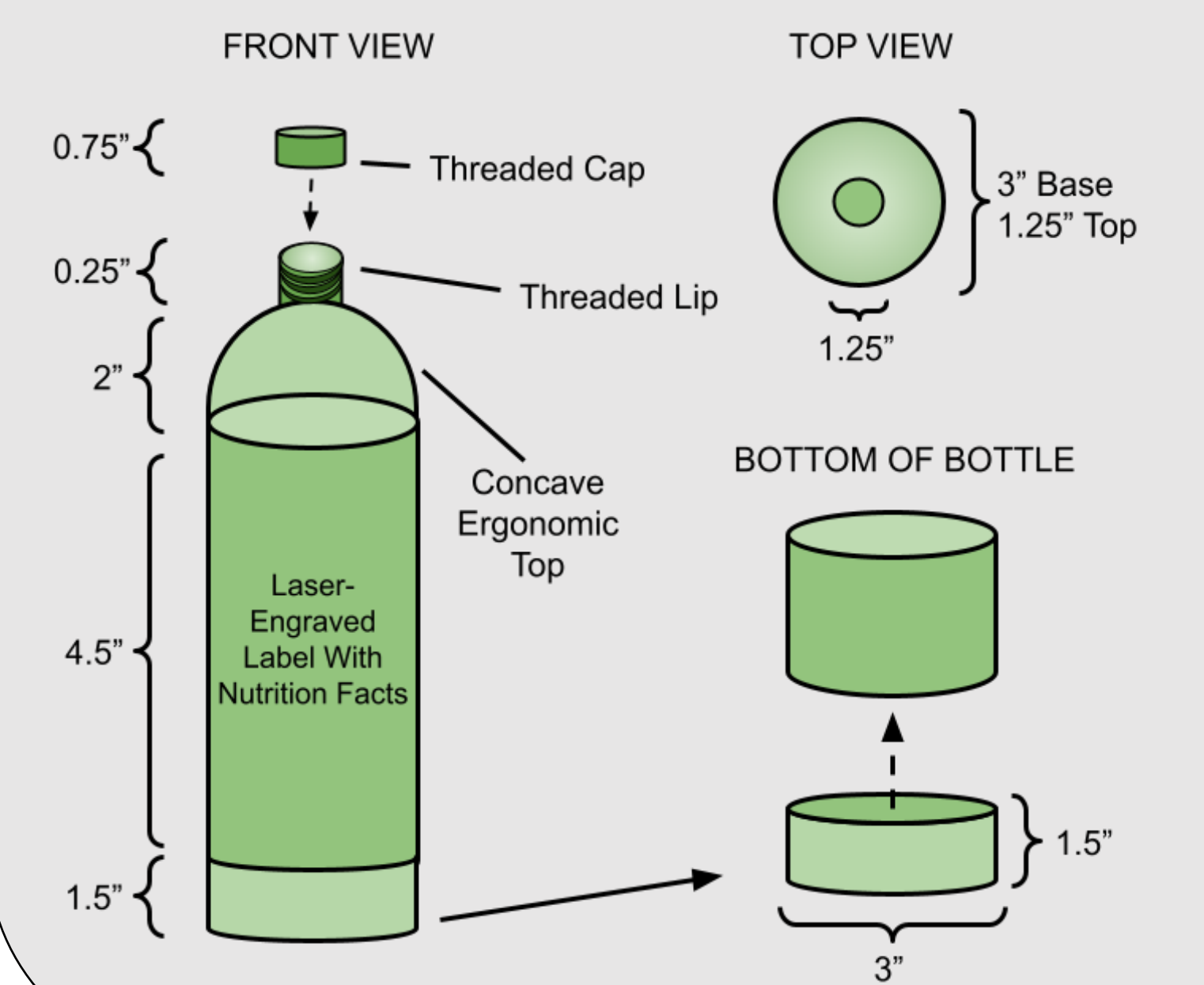


Blueprints

BamBottle Version #1



BamBottle Version #2



Selected Bibliography

Kajikawa, Shohei, and Takushi Iizuka. "Injection Molding Using Only 200°C Steamed Bamboo Powder by Controlling Metal Mold Temperature." *Science Direct*, 2014. <https://www.sciencedirect.com/science/article/pii/S1877705814013678>. Accessed 2 Dec. 2021.

Economist. The "Here's What It Costs to Make a Plastic Bottle in Every Part of the World." *Business Insider*, Business Insider, 15 Nov. 2014. <https://www.businessinsider.com/heres-what-it-costs-to-make-a-plastic-bottle-in-every-part-of-the-world-2014-11>.

Wallin, Craig. "Top 10 Facts about Growing Bamboo for Profit." *Profitable Plants Digest*, Profitable Plants Digest, 1 Jan. 2020. <https://www.profitableplantsdigest.com/top-10-facts-about-growing-bamboo-for-profit/>.

What We Tested



Needs to be watertight, durable, & non-toxic

Soaked In Room-Temp Water	No Cracks?	Dry?	Water-tight?	Durable?
Consistent Temp	✗	✓	✗	✓
Increase Temp	✓	✗	✓	✓
Decrease Temp	✗	✗	✗	✗

Soaked In Salt Water	No Cracks?	Dry?	Water-tight?	Durable?
Consistent Temp	✗	✓	✗	✓
Increase Temp	✓	✓	✓	✓
Decrease Temp	✗	✓	✓	✗

Soaked In Vinegar	No Cracks?	Dry?	Water-tight?	Durable?
Consistent Temp	✓	✓	✓	✗
Increase Temp	✓	✓	✓	✗
Decrease Temp	✗	✗	✗	✗

Testing Photos

For More Photos:



Experimental Approach

Concept #1

- Machining
- Treat and Shape Bamboo
- Seal any openings

Concept #2

- Injection Molding
- Create Bamboo Powder
- Liquify and Cast Powder

Concept #3

- Compression Molding
- Create Bamboo Paper
- Compress Paper into a Bottle Shape

Next Steps

