

Financial Models and estimating sales volume

11 Mar 2025
Dr. Hassan

Today:

- Two examples of commercializing a prototype like yours
- This would probably be a “Meets Expectations” model, if you’re really going for “Exceeds”, add more detail

Let's do a NPV for one of my favourite products



Roll over image to zoom in



Vastar 5 Pack Drain Snake Hair Drain Clog Remover Cleaning Tool

Brand: Vastar



2,976 ratings | 7 answered questions

Price: **\$14.99** ✓prime FREE One-Day

Get up to **5% back** at Amazon.ca, grocery stores, and restaurants for 6 months upon approval for the **Amazon.ca Rewards Mastercard**.

New (5) from **\$13.99** ✓prime FREE One-Day

Size : **5Pack**

- 5 pack of plastic plumbing snake drain auger about 19.6 inch.
- Long enough flexible barbed wand with tiny hooks can easily grab & remove food, clustered hair, garbage, and other obstructions. Let your drain come back cleaning.
- Vastar hair drain clog remover great for kitchen, bathroom toilets & floor drains, bathtubs and showers.
- Drain cleaning tool more environmental and less expensive than toxic chemical drain cleaners
- Note: Do not use with sewer dredging agent. And when there are too many blockages, clean up a few times

Why is this a favourite?

- I have long hair and “heritage” plumbing so clogged shower drains are common. Overusing Drano is risky and ineffective, so this is a functional favourite for me.
- ...but teaching this class I started thinking, maybe this product is a great business for whoever designed it?
- Let's run the numbers and see how good of a business it is
- It's probably quite similar to the business model for your individual project if you chose something simple

Financial Analysis Workflow

- Complete Business Model Canvas
- Build your base case NPV model
- Run your sensitivity analysis
- Repeat as needed (as conditions or assumptions change)










The Business Model Canvas

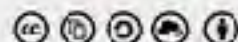
Designed for:
DRAIN SNAKE

Designed by:

Date:

Version:

<p>Key Partners </p> <p>AMAZON CONTRACT MANUFACTURER</p>	<p>Key Activities </p> <p>FABRICATE DELIVER</p> <p>Key Resources </p> <p>RAW MATERIALS (PLASTIC) TOOLING PACKAGING WAREHOUSE PATENT?</p>	<p>Value Propositions </p> <p>CLEAN, WELL RUNNING DRAINS WITH NO CHEMICALS OR SPECIAL EQUIPMENT</p>	<p>Customer Relationships </p> <p>PURCHASE REVIEW RECOMMEND</p> <p>Channels </p> <p>AMAZON</p>	<p>Customer Segments </p> <p>PEOPLE WITH DRAINS PEOPLE WITH LONG HAIR</p>
<p>Cost Structure </p> <p>RAW MATERIALS TOOLING FABRICATION, PACKAGING, PACKING LABOUR FULFILMENT STORAGE SHIPPING</p>		<p>Revenue Streams </p> <p>SALE OF DEVICE</p>		



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DESIGNED BY: Strategyzer AG
The makers of Business Model Generation and Strategyzer

Strategyzer
strategyzer.com









The Business Model Canvas

Designed for:
DRAIN SNAKE

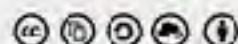
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Our NPV model needs these elements



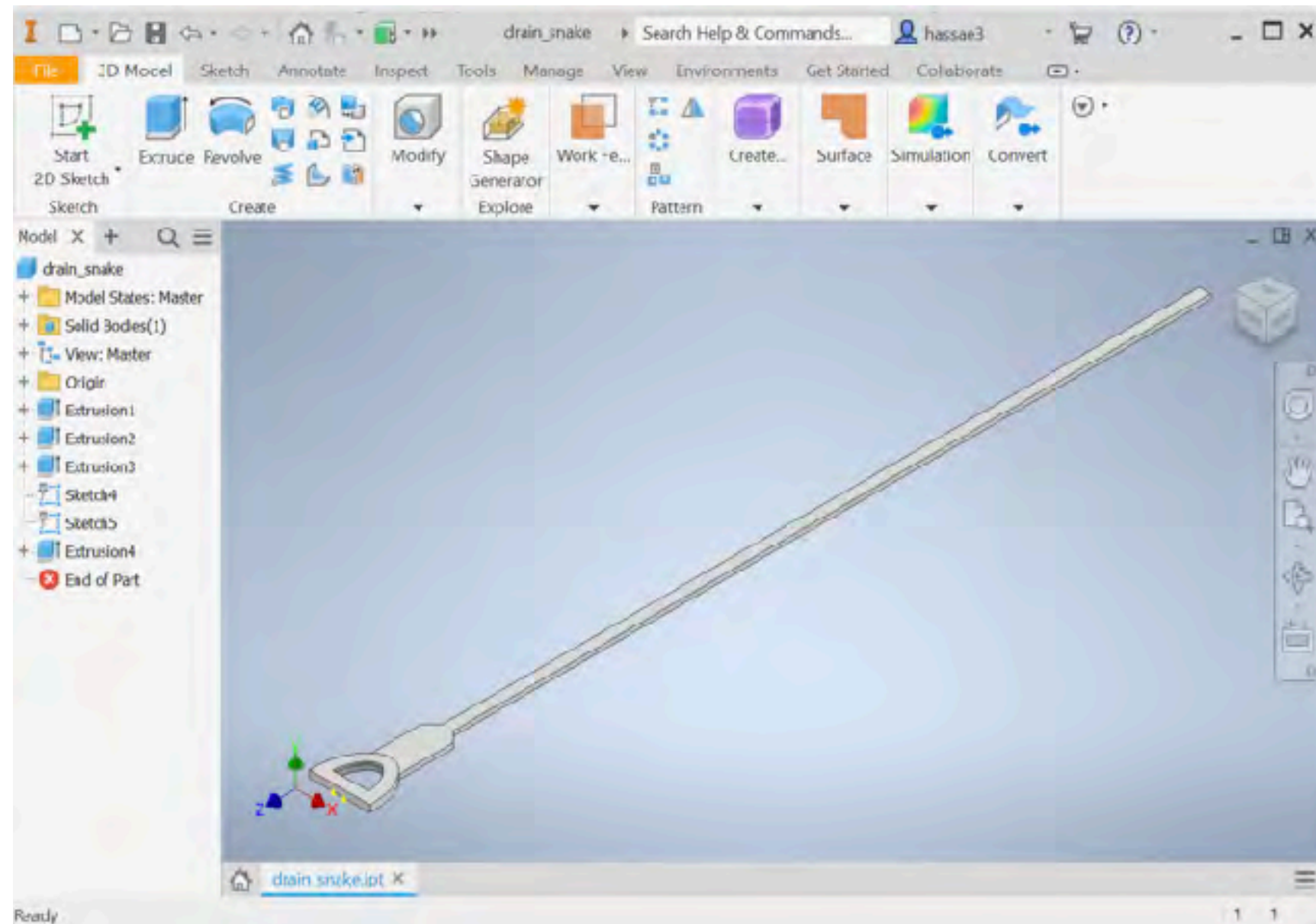
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Strategyzer
strategyzer.com

How much will this cost to make?

- I used callipers to make a rough CAD model to estimate volume and cross sectional area
- Used CAD model to enter values in Injection molding estimator
- You can do the same with your CAD models
- We'll cover design for injection molding in a later class



To estimate costs based on size

- There are various online calculators for injection molding, I think this one is pretty good:
- <https://www.custompartnet.com/estimate/injection-molding/>
- These numbers are based on industry averages, so individual companies or regions might have different numbers, but I think it's a good starting point

Cost Estimator

New Estimate ▾

Save

Share

Units ▾

Injection Molding

Reports

Additional Processes ▾

Part Information

[Rapid tooling?:](#) ☐ Yes ☒ No

[Quantity:](#) 500000

[Material:](#) Polypropylene, Molded [Browse...](#)

[Envelope X-Y-Z \(in\):](#) 1.5 x 21.26 x .11

[Max. wall thickness \(in\):](#) .08

[Projected area \(in²\):](#) 7.016 or 22 % of envelope

[Projected holes?:](#) ☒ Yes ☐ No

[Total Area \(in²\):](#) .62 or 1.94 % of envelope

[Volume \(in³\):](#) 2.640 or 75.26 % of envelope

[Tolerance \(in\):](#) Not critical (> 0.02) [↕](#)

[Surface roughness \(μin\):](#) Not critical (Ra > 32) [↕](#)

[Complexity:](#) Very Simple [↕](#) [Show advanced complexity options](#)

Process Parameters

Material

Cost

[Update Estimate](#)

Material: \$74,013 (\$0.148 per part)

Production: \$71,433 (\$0.143 per part)

Tooling: \$40,225 (\$0.080 per part)

Total: \$185,671 (\$0.371 per part)

[Feedback/Report a bug](#)

In Inches

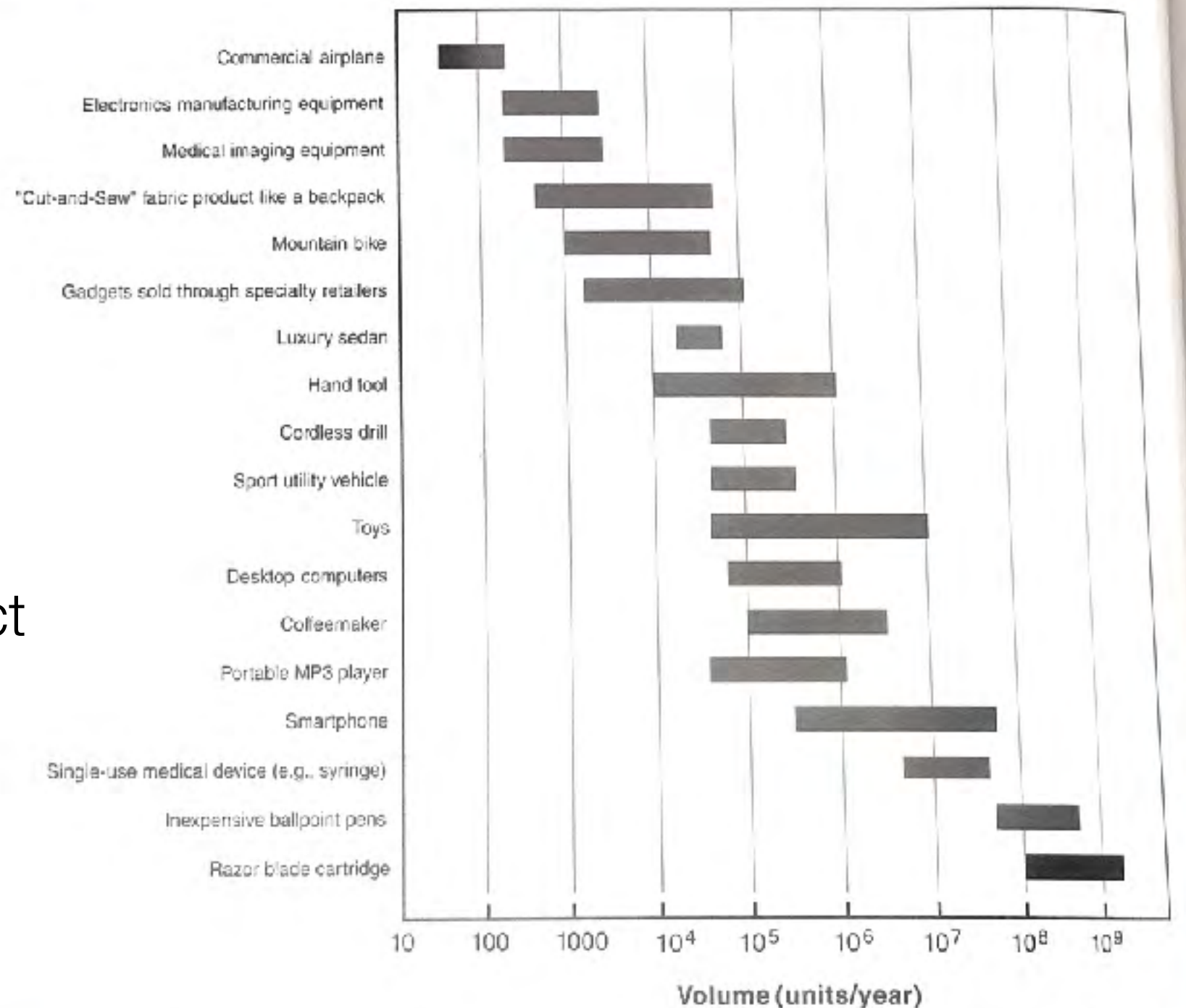
From Inventor

Leave Defaults

\$USD

How to estimate sales volume?

- From Ulrich and Eppinger 2016
- I made a conservative guess of about 500,000 units for our product
- We can also base on online tools, we will do this on Thursday



Source: Various

EXHIBIT 9-12 Approximate annual sales volume of miscellaneous products. These figures represent the volume of a typical single model produced by a single manufacturer.

Production

- If we make 500,000, the cost per part is quite reasonable, \$0.37 USD



Cost

Update Estimate

Material: \$74,013 (\$0.148 per part)

Production: \$71,433 (\$0.143 per part)

Tooling: \$40,225 (\$0.080 per part)

Total: **\$185,671 (\$0.371 per part)**

[Feedback/Report a bug](#)

Packing and Packaging

- This product is sold in a package of 5
- We have to pay some to assemble them and put them in a large box for shipping
- Doesn't include shipping
- Rate is independent of # of units
- Together, just under 10 cents (US) per part



Cost

Additional:	\$0 (\$0.000 per part)
Setup:	\$15 (\$0.000 per part)
Labor:	\$25,000 (\$0.050 per part)
Markup:	\$0 (\$0.000 per part)
Total:	\$25,015 (\$0.050 per part)

[Feedback/Report a bug](#)



Cost

Update Estimate

Material:	\$13,666 (\$0.027 per part)
Production:	\$10,417 (\$0.021 per part)
Total:	\$24,083 (\$0.048 per part)

[Feedback/Report a bug](#)

NPV Base Case Model

MECHENG 4B03 - NPV Calculator - Net Present Value								
Annual Discount Rate		0.07	* this represents opportunity cost, interest					
Quarterly Discount Rate		0.0175	interest/4					
	Year 1				Year 2			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
n=	1	2	3	4	5	6	7	8
Inflows								
Drain Snake Sales		\$150,000	\$165,000	\$181,500	\$199,650	\$219,615	\$241,577	\$265,734
Total Revenue		\$150,000	\$165,000	\$181,500	\$199,650	\$219,615	\$241,577	\$265,734
Outflows								
Labour	\$161,595							
Advertising		\$1,000					\$1,000	
Storage + Fulfillment		\$61,067	\$65,692	\$73,670	\$76,376	\$82,532	\$89,304	\$96,974
Tooling	\$53,499							
Materials	\$98,420							
Total Costs	\$313,514	\$62,067	\$65,692	\$73,670	\$76,376	\$82,532	\$90,304	\$96,974
Quarterly Cash Flow	-\$313,514	\$87,933	\$99,308	\$107,830	\$123,274	\$137,083	\$151,273	\$168,760
Quarterly NPV	-\$313,514	\$84,935	\$94,272	\$100,601	\$113,031	\$123,531	\$133,974	\$146,890
Total NPV	\$483,720							
Supporting Calculations								
Drain Snakes per unit	5							
Price per unit	15	CAD						
Material cost per snake	0.148	USD						
Labour cost per snake	0.143	USD						
Packing cost per snake	0.1	USD						
			quarterly growth	10	percent			

Profit ~ \$0.96 CAD per snake

Sensitivity analysis

- What problems could occur?
- Often delays and sales volume are a good place to start

What if I only make 1 000?

- If I only make 1 000 units, the economics are far worse, total costs are \$10.706 USD per part
- Tooling dominates this number
- Therefore, this needs to be a high volume product to cover the high initial costs if the price is low
- I didn't do a NPV for this scenario, it's obviously not viable



The screenshot shows a software window titled "Cost" with a green icon. It contains a table of cost estimates and a link for feedback.

Update Estimate	
Material:	\$127 (\$0.127 per part)
Production:	\$626 (\$0.626 per part)
Tooling:	\$9,953 (\$9.953 per part)
Total:	\$10,706 (\$10.706 per part)

[Feedback/Report a bug](#)

What if I only sell one per package?

- Sales might go up (I doubled them in this example)
- But, since fulfillment and shipping is per unit, having more parts in a unit spreads these costs out, increases unit cost
- We lose about \$1.58 every time we sell a snake
- It's not financially viable to ship such an inexpensive product, this is why we see large packages on Amazon

MECHENG 4B03 - NPV Calculator - Net Present Value					
Annual Discount Rate		0.07	* this represents opportunity cost, interest rate		
Quarterly Discount Rate		0.0175	interest/4		
	Year 1				Year 2
	Q1	Q2	Q3	Q4	Q1
n=	1	2	3	4	
Inflows					
Drain Snake Sales		\$60,000	\$66,000	\$72,600	
Total Revenue		\$60,000	\$66,000	\$72,600	
Outflows					
Labour	\$161,595				
Advertising		\$1,000			
Storage + Fulfillment		\$115,911	\$126,465	\$141,824	
Tooling	\$53,499				
Materials	\$98,420				
Total Costs	\$313,514	\$116,911	\$126,465	\$141,824	
Quarterly Cash Flow	-\$313,514	-\$56,911	-\$60,465	-\$69,224	
Quarterly NPV	-\$313,514	-\$54,970	-\$57,399	-\$64,583	
Total NPV	-\$780,707				
Supporting Calculations					
Drain Snakes per unit	1				exchange rate
Price per unit	3	CAD			
Material cost per snake	0.148	USD			
Labour cost per snake	0.143	USD			
Packing cost per snake	0.1	USD			
			quarterly growth		10 p

What if we manufacture continuously rather than all at once?

- That should reduce our storage costs and reduce our initial labour and materials costs
- But if we are importing from abroad, freight costs might dominate. I haven't accounted for that, but it's something to consider

MECHENG 4B03 - NPV Calculator - Net Present Value							
Annual Discount Rate		0.07	* this represents opportunity cost, interest				
Quarterly Discount Rate		0.0175	interest/4				
	Year 1				Year 2		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3
n=	1	2	3	4	5	6	
Inflows							
Drain Snake Sales		\$150,000	\$165,000	\$181,500	\$199,650	\$219,615	
Total Revenue		\$150,000	\$165,000	\$181,500	\$199,650	\$219,615	
Outflows							
Labour	\$9,510	\$10,460	\$11,506	\$12,657	\$13,923	\$15,315	
Advertising		\$1,000					
Storage + Fulfillment		\$55,215	\$59,921	\$67,256	\$72,586	\$80,660	
Tooling	\$53,499						
Materials	\$9,842	\$8,140	\$8,954	\$9,849	\$10,834	\$11,918	
Total Costs	\$72,851	\$74,815	\$80,382	\$89,763	\$97,344	\$107,893	
Quarterly Cash Flow	-\$72,851	\$75,185	\$84,618	\$91,737	\$102,306	\$111,722	
Quarterly NPV	-\$72,851	\$72,621	\$80,327	\$85,587	\$93,806	\$100,678	
Total NPV	\$617,144						
Supporting Calculations							
Drain Snakes per unit	5				Exchange rate	1.33	
Price per unit	15	CAD					
Material cost per snake	0.148	USD					
Labour cost per snake	0.143	USD					
Packing cost per snake	0.1	USD					
					quarterly growth	10 percent	

Profit ~ \$1.23 CAD per snake

14641
80525.5
13674.1

What if I use my own storage unit instead if Amazon's?

- Amazon's storage costs are relatively high
- BUT that also means I need to pay someone to pack and ship my orders, in addition to a storage space
- If these costs are low, like in this example, it's a positive effect on NPV, if the costs were different, it might be negative

MECHENG 4B03 - NPV Calculator - Net Present Value					
Annual Discount Rate		0.07	* this represents opportunity cost, interest		
Quarterly Discount Rate		0.0175	interest/4		
	Year 1				Year 2
	Q1	Q2	Q3	Q4	Q1
n=	1	2	3	4	
Inflows					
Drain Snake Sales		\$150,000	\$165,000	\$181,500	\$1
Total Revenue		\$150,000	\$165,000	\$181,500	\$1
Outflows					
Labour	\$16,160	\$17,775	\$19,553	\$21,508	\$
Advertising		\$1,000			
Own warehouse		\$800	\$800	\$800	
warehouse labour		\$1,920	\$1,920	\$1,920	
Shipping		\$22,500	\$24,750	\$27,225	\$
Tooling	\$53,499				
Materials	\$9,842	\$8,140	\$8,954	\$9,849	\$
Total Costs	\$79,501	\$52,135	\$55,977	\$61,303	\$
Quarterly Cash Flow	-\$79,501	\$97,865	\$109,023	\$120,197	\$1
Quarterly NPV	-\$79,501	\$94,527	\$103,494	\$112,139	\$1
Total NPV		\$820,437			
Supporting Calculations					
Drain Snakes per unit	5			Exchange rate	
Price per unit	15	CAD			
Ma					
La					
Pa					
Profit ~ \$1.64 CAD per snake					
Sales Volume (units)	0	10000	11000	12100	

Is this a great business?

- I think so, as long as sales volume fairly high
- Approximate 30% profit margin in the base case
- If you sold more, or reduced costs you'd do even better
- Simple product, inexpensive to ship

What am I leaving out?

- I didn't account for freight: if part of my business model is production overseas this can be really substantial
- I didn't pay taxes or insurance yet
- I didn't pay for packaging or branding yet
- **Include these in your model!**

Another “product”

- Due to COVID-19 it didn't seem worth the risk for my daughter to trick or treat at Hallowe'en in 2020
- Solution: 3d printed pumpkins for an “easter egg hunt” at home
- These are sized for mini chocolate bars and the lid is easy for her to grab





"You should sell these!"

- My family says this to me all the time when I make goofy things like this
- And I always respond:

"They would have to sell for like \$100, only my kid is worth this effort lol"

-but are they right and I'm wrong?
- Let's do a business model and find out

The Business Model Canvas






Designed for:

3D PRINTED PUMPKIN

Designed by:

Date:

Version:

<p>Key Partners </p> <p>AMAZON PUMPKIN PATCH DELIVERY PARTNER FILAMENT SUPPLIER PRINTER SUPPLIER CONTRACT MANUFACTURERS</p>	<p>Key Activities </p> <p>FABRICATE DELIVER TO PATCH DELIVER TO AMAZON</p> <hr/> <p>Key Resources </p> <p>FILAMENT PACKING SUPPLIES</p>	<p>Value Propositions </p> <p>COULD SAVE HALLOWEEN ACTIVITY FOR YOUNG KIDS</p>	<p>Customer Relationships </p> <p>PURCHASE REVIEW RECOMMEND</p> <hr/> <p>Channels </p> <p>AMAZON.CA. LOCAL PUMPKIN PATCH INSTAGRAM ADS</p>	<p>Customer Segments </p> <p>FAMILIES WITH YOUNG KIDS.</p>
<p>Cost Structure </p> <p>PAY CONTRACT MFR BUY PRINTERS, FILAMENT, PACKING PAY AMAZON FULFILLMENT ADVERTISING</p>		<p>Revenue Streams </p> <p>SALE OF PUMPKINS</p>		



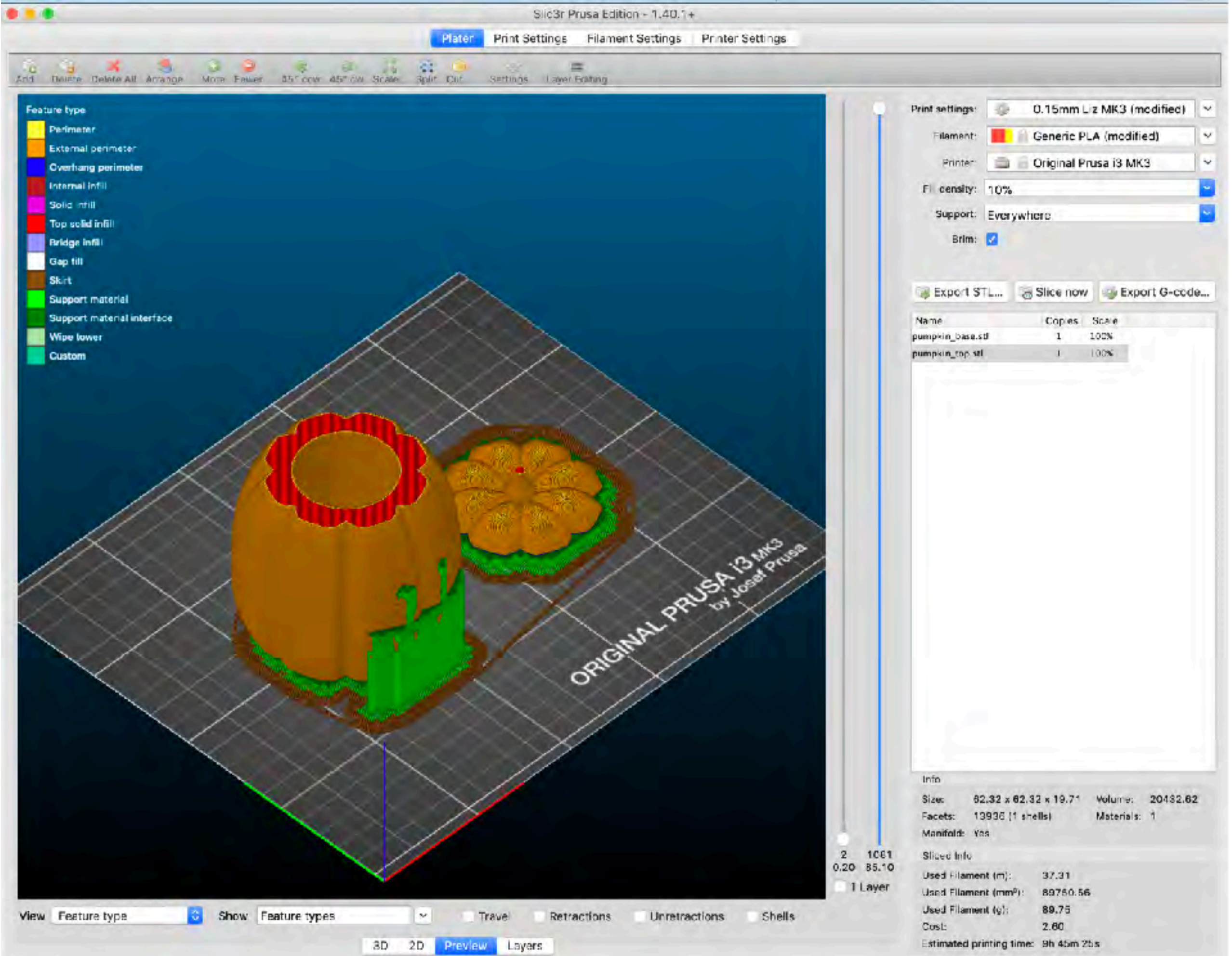
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DESIGNED BY: Strategyzer AG

The makers of Business Model Generation and Strategyzer

Step 1: Estimate actual prototype cost

- You can use my 2c04 spreadsheet or Prusa software
- You can ignore design efficiency if you want, it's for my other class
- ...but it is a good indicator of manufacturability so you might find it useful



Using Shop Rates

Overall budget per device		Assembly Index * calculated per lecture slides * also called design efficiency	
Purchased Parts	\$0.00	<div>15.0%</div>	
Material	\$193.70	Assembly Index = (Total Theoretical Part Count)*3/(Total Assm Time)	
Labour	\$28.11	Total Theoretical Part Count	1
Total	\$221.81	Total Assm Time	20
Purchased Parts			
Part Name	Part Cost (CAD/per)	Number	Assembly Labour Cost
	\$0.00		\$0.00
Subtotal		\$0.00	\$0.00
Manufactured Parts			
Part Name	Material Cost (CAD/per)	Number	Assembly Labour Cost
Top	\$18.70	1	\$28.11
Base	\$174.99	1	\$0.00
Subtotal		\$193.70	\$28.11
Pumpkin Top - 3d printed part Part volume 20432 mm^3 Part volume 1.246837139 cubic inches Material Cost \$18.70 CAD/part Print Time 7200 sec/part			

At home production

Overall budget per device			Assembly Index * calculated per lecture slides * also called design efficiency					
Purchased Parts	\$0.00		15.0%					
Material	\$2.58		Assembly Index = (Total Theoretical Part Count)*3/(Total Assm Time)					
Labour	\$4.09		Total Theoretical Part Count	1				
Total	\$6.67		Total Assm Time	20				
Purchased Parts								
Part Name	Part Cost (CAD/per)	Number	Theoretical Part Count	Assembly Time per part (s)	Total Assembly Time (s)	Assembly Labour Cost		
	\$0.00	0	0	0	0	\$0.00		
Subtotal			\$0.00	0	0	\$0.00		
Manufactured Parts								
Part Name	Material Cost (CAD/per)	Number	Total part material cost	Manufacturing Time (s)	Theoretical Part Count	Assembly Time per part (s)	Total Assembly Time (s)	Total Labour Cost
Top	\$0.35	1	\$0.35	900	0	20	20	\$4.09
Base	\$2.23	1	\$2.23	0	1	0	0	\$0.00
Subtotal			\$2.58	900	1	20	20	\$4.09
<i>Pumpkin Top - 3d printed part</i>								
Part weight	12 g	* from Inventor or Slicer						
Material Cost	\$0.35 CAD/part							
Print Time	6120 sec/part							

Not bad

MECHENG 4B03 - NPV Calculator - Net Present Value

Annual Discount Rate 0.07 * this represents opportunity cost, interest
Quarterly Discount Rate 0.0175 interest/4

	Year 1				Year 2				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
n=		1	2	3	4	5	6	7	8
Inflows									
Pumpkin Sales			\$18,000	\$9,000	\$0	\$0	\$36,000	\$18,000	
Total Revenue			\$18,000	\$9,000	\$0	\$0	\$36,000	\$18,000	
Outflows									
Labour	\$23,040	\$23,040	\$23,040	\$36,000	\$36,000	\$36,000	\$36,000	\$36,000	
Advertising			\$1,000				\$1,000		
Storage + Fulfillment	\$400	\$400	\$5,585	\$2,819	\$400	\$400	\$11,169	\$5,639	
Printers	\$21,280			\$11,970					
Filament	\$7,800	\$7,800	\$7,800	\$11,700	\$11,700	\$11,700	\$11,700	\$11,700	\$0
Total Costs	\$52,520	\$31,240	\$37,425	\$62,489	\$48,100	\$48,100	\$59,869	\$41,639	
Quarterly Cash Flow	-\$52,520	-\$31,240	-\$19,425	-\$53,489	-\$48,100	-\$48,100	-\$23,869	-\$23,639	
Quarterly NPV	-\$52,520	-\$30,175	-\$18,439	-\$49,903	-\$44,103	-\$43,345	-\$21,140	-\$20,575	
Total NPV	-\$280,201								

Yikes!

Supporting Calculations

Pumpkins per unit	6				Exchange rate	1.33		
Price per unit	18 CAD							
Material cost per pumpkin	2.6 CAD			Per Prusa Software				
Sales Volume (units)	0	0	1000	500	0	0	2000	1000
Pumpkins to be fabricated	3000	3000	3000	4500	4500	4500	4500	0
Fabrication Time per pump	9 h							
Cost per printer	1000 USD per Prusa							
	1330 CAD							
90 days/quarter, 2 pumpkins/printer/day = 180 pumpkins/printer								
Need 3 printers to make 500/quarter, 6 for 1000								
n Printers	16			9				
\$ Printers	21280			11970				
Labour	23040	23040	23040	36000	36000	36000	36000	36000
* assume 1h/day to print deburr, maintain per printer, \$16/hour								
Materials	7800	7800	7800	11700	11700	11700	11700	0
Storage	400	400	400	400	400	400	400	400
* assume one storage unit								
Advertising								
Instagram Ads								
Amazon Fulfilment per un	5.44							
Amazon Storage per 1000	24	24	24	33	24	24	24	33
Storage and Fulflment per	5.584578313	5.584578313	5.584578313	5.638795181	5.584578313	5.584578313	5.584578313	5.638795181
* assume stored in styorage unit when not being sold by amazon								

When do I make money with 3d printing?

- At \$100 per pumpkin set of 6 I am at \$52k NPV
- BUT my sales volume would suffer
- ...but it looks like my initial random guess of “\$100 to make money” was pretty close

This product highlights the problems of 3D printed products as they scale

- 3D printing is a fairly time intensive process compared to molding techniques
- The raw material (filament) is more expensive per weight than bulk plastic used for molding because filament is more processed
- To get the volume needed to make money, you need a lot of printers and a lot of labour

Step 2: Estimate Mass production costs

- You can assume parts or materials that are purchased in large volume would be at a 50% discount
- If you purchase from Digikey etc, volume discounts are specified
- Your design might change to reflect new production methods





The Business Model Canvas

Designed for:
INJECTION MOLD
~~3D PRINTED PUMPKIN~~

Designed by:

Date:

Version:

<p>Key Partners </p> <p>AMAZON PUMPKIN PATCH DELIVERY PARTNER FILAMENT SUPPLIER PRINTER SUPPLIER CONTRACT MANUFACTURERS MATERIAL + TOOLING SUPPLIER</p>	<p>Key Activities </p> <p>CONTRACT FABRICATE DELIVER TO PATCH DELIVER TO AMAZON MARKETING</p> <p>Key Resources </p> <p>FILAMENT PACKING SUPPLIES</p>	<p>Value Propositions </p> <p>COULD SAVE HALLOWEEN ACTIVITY FOR YOUNG KIDS</p>	<p>Customer Relationships </p> <p>PURCHASE REVIEW RECOMMEND</p> <p>Channels </p> <p>AMAZON . CA . LOCAL PUMPKIN PATCH INSTAGRAM ADS</p>	<p>Customer Segments </p> <p>FAMILIES WITH YOUNG KIDS.</p>
<p>Cost Structure </p> <p>PAY CONTRACT MFR BUY PRINTERS, FILAMENT, PACKING PAY AMAZON FULFILLMENT ADVERTISING</p>		<p>Revenue Streams </p> <p>SALE OF PUMPKINS</p>		



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DESIGNED BY: Strategyzer AG

The makers of Business Model Generation and Strategyzer

 **Strategyzer**
strategyzer.com

What if I injection mold it?

- Using online calculator: <https://www.custompartnet.com/estimate/injection-molding/>
- You'll have to convert to inches and USD

Cost Estimator

New Estimate

Save

Share

Units

Injection Molding

Packing

Reports

Additional Proce

Part Information

Rapid tooling?:

☒ Yes ☐ No

Quantity:

1000

Material:

Acrylonitrile Butadiene Styrene (ABS), Molded [Browse...](#)

Envelope X-Y-Z (in):

3.5 x 3.5 x 3.5

Max. wall thickness (in):

.25

Projected area (in²):

9.800 or 80

% of envelope

Projected holes?:

☐ Yes ☒ No

Volume (in³):

34.300 or 80

% of envelope

Tolerance (in):

Not critical (> 0.02)

Surface roughness (µin):

Not critical (Ra > 32)

Complexity:

Simple

[Show advanced complexity options](#)

Process Parameters

Cost

[Update Estimate](#)

Material: \$2,398 (\$2.398 per part)

Production: \$1,562 (\$1.562 per part)

Tooling: \$15,857 (\$15.857 per part)

Total: \$19,817 (\$19.817 per part)

[Feedback/Report a bug](#)


In Inches

From Inventor

Leave Defaults

\$USD

Production

 **Cost Estimator**

New Estimate

Save


Share

Units

Injection Molding

Packing

Reports

 **Part Information**

[Rapid tooling?](#)

☒ Yes ☐ No

[Quantity:](#)

1000

[Material:](#)

Acrylonitrile Butadiene Styrene (ABS), Molded

Browse...

[Envelope X-Y-Z \(in\):](#)

2

x 2

x 75

[Max. wall thickness \(in\):](#)

75

[Projected area \(in²\):](#)

3.200

or 80.00

% of envelope

[Projected holes?:](#)

☐ Yes ☒ No

[Volume \(in³\):](#)

2.400

or 80.00

% of envelope

[Tolerance \(in\):](#)

Not critical (> 0.02)

[Surface roughness \(µin\):](#)

Not critical (Ra > 32)

[Complexity:](#)

Simple

Show advanced complexity options

 **Process Parameters**

 **Cost**

Update Estimate

Material

\$258 (\$0.258 per part)

Production:

\$946 (\$0.946 per part)

Tooling:


\$10,650 (\$10.650 per part)

Total:

\$11,855 (\$11.855 per part)

[Feedback/Report a bug](#)

Top

 **Cost Estimator**

New Estimate

Save


Share

Units

Injection Molding

Packing

Reports

 **Part Information**

[Rapid tooling?](#)

☒ Yes ☐ No

[Quantity:](#)

1000

[Material:](#)

Acrylonitrile Butadiene Styrene (ABS), Molded

Browse...

[Envelope X-Y-Z \(in\):](#)

3.5

x 3.5

x 3.5

[Max. wall thickness \(in\):](#)

.25

[Projected area \(in²\):](#)

9.800

or 80

% of envelope

[Projected holes?:](#)

☐ Yes ☒ No

[Volume \(in³\):](#)

34.300

or 80

% of envelope

[Tolerance \(in\):](#)

Not critical (> 0.02)

[Surface roughness \(µin\):](#)

Not critical (Ra > 32)

[Complexity:](#)

Simple

Show advanced complexity options

 **Process Parameters**

 **Cost**

Update Estimate

Material:

\$2,398 (\$2.398 per part)

Production:

\$1,562 (\$1.562 per part)

Tooling:

\$15,857 (\$15.857 per part)

Total:

\$19,817 (\$19.817 per part)

Base

Production

- Both part costs dominated by Tooling at 1000 units production
- Total cost for both parts: \$31.672 USD per pumpkin
- This is WAY too high

Top Cost	
Update Estimate	
Material	\$258 (\$0.258 per part)
Production	\$946 (\$0.946 per part)
Tooling	\$10,650 (\$10.650 per part)
Total	\$11,855 (\$11.855 per part)
Feedback/Report a bug	

Base Cost	
Update Estimate	
Material	\$2,398 (\$2.398 per part)
Production	\$1,562 (\$1.562 per part)
Tooling	\$15,857 (\$15.857 per part)
Total	\$19,817 (\$19.817 per part)
Feedback/Report a bug	

Packing

- For both parts a total of \$0.212 per unit (2 parts)
- Top and base will come in separate boxes, we'd have to pay some to assemble them
- Doesn't include shipping
- Rate is independent of # of units

Injection Molding

Packing

Reports

Process parameters

Material

Box type:

Corrugated: Single-wall (200# Test)

Box size (in):

15.00 x 15.00 x 15.00

Number of boxes:

38

Box price (\$/box):

0.95

Override

Filler:

☒ Yes

☐ No

Volume of filler (ft³):

49

Filler price (\$/ft³):

1.25

Override

Production

Part spacing (in):

1

Pack time per part (s):

5

Packing rate (\$/hr):

35

Cost

Update Estimate

Material:

\$97 (\$0.097 per part)

Production:

\$49 (\$0.049 per part)

Total:

\$146 (\$0.146 per part)

[Feedback/Report a bug](#)

Cost

Update Estimate

Material:

\$17 (\$0.017 per part)

Production:

\$49 (\$0.049 per part)

Total:

\$66 (\$0.066 per part)

[Feedback/Report a bug](#)

Disclaimer: The above cost analysis uses data based on industry averages and typical manufacturing practices, costs may vary based on the specific manufacturer, equipment, geographical location, and prevailing market con

What if I injection mold 10,000 units?

- I need \$72,987 USD up front for this
- But my per unit cost goes down to \$7.298 USD per pumpkin
- This is more reasonable, but still high, maybe I should optimize my design to have thinner walls
- If I did this I would get down to \$6.36 USD per pumpkin

Cost	
Update Estimate	
Material:	\$2,581 (\$0.258 per part)
Production:	\$7,478 (\$0.748 per part)
Tooling:	\$10,650 (\$1.065 per part)
Total:	\$20,710 (\$2.071 per part)
Feedback/Report a bug	

Cost	
Update Estimate	
Material:	\$23,972 (\$2.397 per part)
Production:	\$12,448 (\$1.245 per part)
Tooling:	\$15,857 (\$1.586 per part)
Total:	\$52,277 (\$5.228 per part)
Feedback/Report a bug	

NPV for injection molded

MECHENG 4B03 - NPV Calculator - Net Present Value

Annual Discount Rate * this represents opportunity cost, interest
 Quarterly Discount Rate interest/4

	Year 1				Year 2			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
n=		1	2	3	4	5	6	7
Inflows								
Pumpkin Sales			\$180,000	\$90,000			\$360,000	\$180,000
Total Revenue			\$180,000	\$90,000			\$360,000	\$180,000
Outflows								
Labour	\$715,686		\$5,333	\$2,667			\$10,667	\$5,333
Advertising			\$1,000				\$1,000	
Storage + Fulfillment	\$800	\$800	\$55,846	\$28,194	\$800	\$800	\$111,692	\$56,388
Tooling	\$34,895							
Materials	\$953,411							
Total Costs	\$1,704,792	\$800	\$62,179	\$30,861	\$800	\$800	\$123,358	\$61,721
Quarterly Cash Flow	-\$1,704,792	-\$800			-\$800	-\$800	\$236,642	\$118,279
Quarterly NPV	-\$1,704,792	-\$773			-\$734	-\$721	\$209,580	\$102,951
Total NPV	-\$1,227,468							

Still Yikes

Supporting Calculations

[illegible]

What if I injection mold 100,000 units?

- I need \$300,097 USD up front for this
- But my per unit cost goes down to \$3 USD per pumpkin

Cost	
Update Estimate	
Material:	\$16,211 (\$0.162 per part)
Production:	\$9,955 (\$0.100 per part)
Tooling:	\$18,626 (\$0.186 per part)
Total:	\$44,793 (\$0.448 per part)
Feedback/Report a bug	

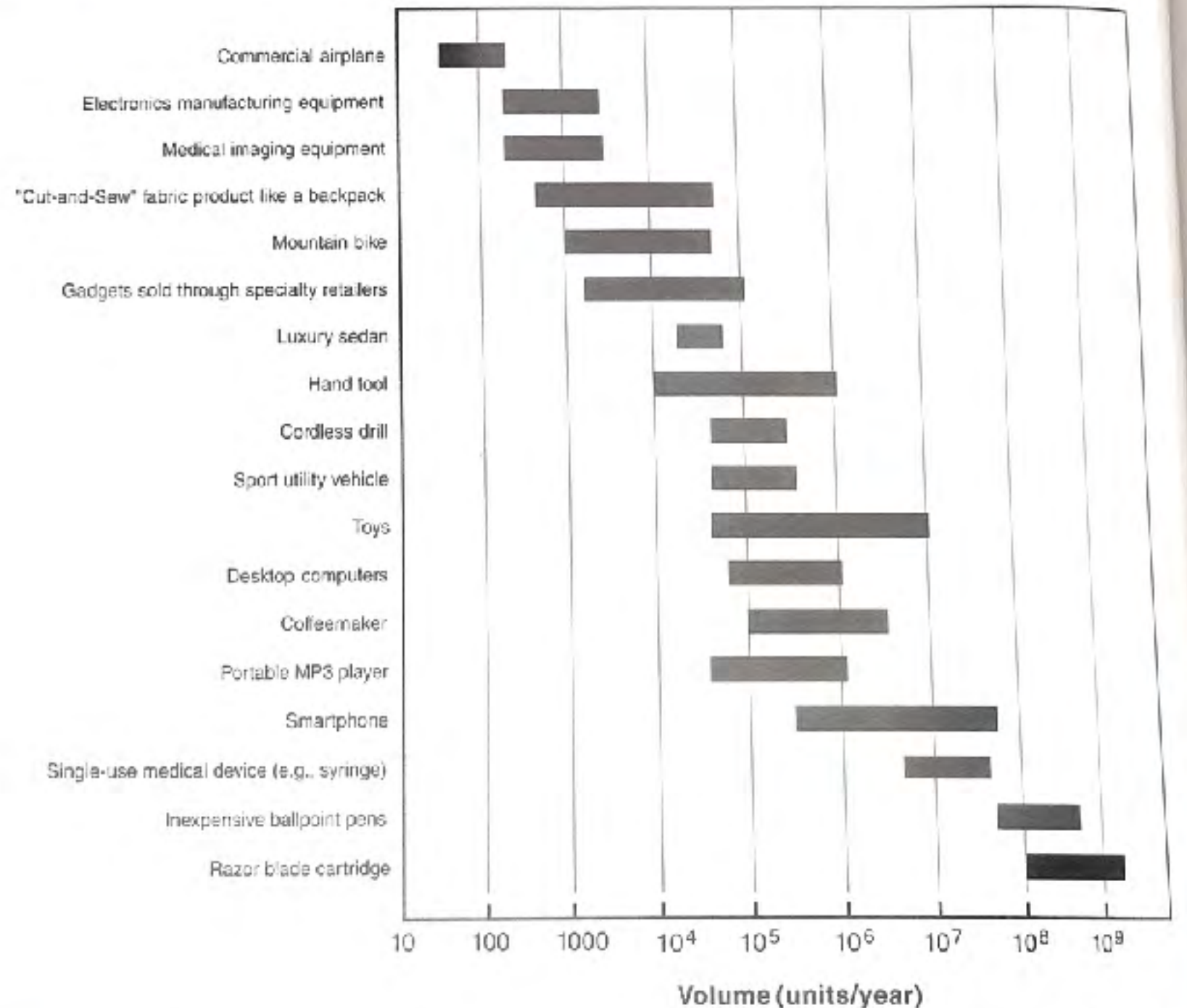
Cost	
Update Estimate	
Material:	\$210,135 (\$2.101 per part)
Production:	\$18,074 (\$0.181 per part)
Tooling:	\$27,095 (\$0.271 per part)
Total:	\$255,304 (\$2.553 per part)
Feedback/Report a bug	

Step 3: Build financial model

- Don't forget:
 - Rent and utilities
 - Taxes
 - Staff
 - Paying yourself
 - Tooling costs
 - Shipping, Fulfilment

How to estimate sales volume?

- From Ulrich and Eppinger 2016



Source: Various

EXHIBIT 9-12 Approximate annual sales volume of miscellaneous products. These figures represent the volume of a typical single model produced by a single manufacturer.

Step 4: Sensitivity analysis

- Let's tinker with selling volume and price

What if I double sales volume for 3d printed parts?

- Much like the “Michael Scott Paper Company”, the more I sell, the worse I do


MECHENG 4B03 - NPV Calculator - Net Present Value

Annual Discount Rate
Quarterly Discount Rate

0.07	* this represents opportunity cost, interest
0.0175	interest/4

	Year 1				Year 2				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
n=		1	2	3	4	5	6	7	8
Inflows									
Pumpkin Sales			\$36,000	\$18,000	\$0	\$0	\$72,000	\$36,000	
Total Revenue			\$36,000	\$18,000	\$0	\$0	\$72,000	\$36,000	
Outflows									
Labour	\$47,520	\$47,520	\$47,520	\$72,000	\$72,000	\$72,000	\$72,000	\$72,000	
Advertising			\$1,000				\$1,000		
Storage + Fulfillment	\$400	\$400	\$11,169	\$5,639	\$400	\$400	\$22,338	\$11,278	
Printers	\$43,890			\$22,610					
Filament	\$15,600	\$15,600	\$15,600	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$0
Total Costs	\$107,410	\$63,520	\$75,289	\$123,649	\$95,800	\$95,800	\$118,738	\$83,278	
Quarterly Cash Flow	-\$107,410	-\$63,520			800	-\$95,800	-\$46,738	-\$47,278	
Quarterly NPV	-\$107,410	-\$61,354			840	-\$86,329	-\$41,393	-\$41,151	
Total NPV	-\$561,341								

Super Yikes!



Super Yikes!

What if I halve 3d printer filament cost?

- It has a trivial impact, labour is my big cost

MECHENG 4B03 - NPV Calculator - Net Present Value									
Annual Discount Rate	0.07		* this represents opportunity cost, interest						
Quarterly Discount Rate	0.0175		interest/4						
	Year 1				Year 2				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
n=		1	2	3	4	5	6	7	8
Inflows									
Pumpkin Sales			\$18,000	\$9,000	\$0	\$0	\$36,000	\$18,000	
Total Revenue			\$18,000	\$9,000	\$0	\$0	\$36,000	\$18,000	
Outflows									
Labour	\$23,040	\$23,040	\$23,040	\$36,000	\$36,000	\$36,000	\$36,000	\$36,000	
Advertising			\$1,000				\$1,000		
Storage + Fulfillment	\$400	\$400	\$5,585	\$2,819	\$400	\$400	\$11,169	\$5,639	
Printers	\$21,280			\$11,970					
Filament	\$3,900	\$3,900	\$3,900	\$5,850	\$5,850	\$5,850	\$5,850	\$5,850	\$0
Total Costs	\$48,620	\$27,340	\$33,525	\$56,639	\$42,250	\$42,250	\$54,019	\$41,639	
Quarterly Cash Flow	-\$48,620	-\$27,340				-\$42,250	-\$18,019	-\$23,639	
Quarterly NPV	-\$48,620	-\$26,408				-\$38,073	-\$15,959	-\$20,575	
Total NPV	-\$247,557								

Similar Yikes!

Similar Yikes!

At 10x the sales volume

MECHENG 4B03 - NPV Calculator - Net Present Value

Annual Discount Rate * this represents opportunity cost, interest
 Quarterly Discount Rate interest/4

	Year 1				Year 2			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
n=	1	2	3	4	5	6	7	8
Inflows								
Pumpkin Sales			\$180,000	\$90,000			\$360,000	\$180,000
Total Revenue			\$180,000	\$90,000			\$360,000	\$180,000
Outflows								
Labour	\$715,686		\$5,333	\$2,667			\$10,667	\$5,333
Advertising			\$1,000				\$1,000	
Storage + Fulfillment	\$800	\$800	\$55,846	\$28,194	\$800	\$800	\$111,692	\$56,388
Tooling	\$34,895							
Materials	\$953,411							
Total Costs	\$1,704,792	\$800	\$62,179	\$30,861	\$800	\$800	\$123,358	\$61,721
Quarterly Cash Flow	-\$1,704,792	-\$800			-\$800	-\$800	\$236,642	\$118,279
Quarterly NPV	-\$1,704,792	-\$773			-\$734	-\$721	\$209,580	\$102,951
Total NPV	-\$1,227,468							

Uber Yikes!

Options:

- Reduce my fulfilment costs
- Reduce my per unit material and labour costs by producing overseas
- If I cut these by half I'm still -\$265,000 NPV
- What about a price increase?

What if higher price?

MECHENG 4B03 - NPV Calculator - Net Present Value

Annual Discount Rate **0.07** * this represents opportunity cost / interest
 Quarterly Discount Rate **0.0175** interest/4

	Year 1				Year 2			
n=	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	1	2	3	4	5	6	7	8
Inflows								
Pumpkin Sales			\$500,000	\$250,000			\$1,000,000	\$500,000
Total Revenue			\$500,000	\$250,000			\$1,000,000	\$500,000
Outflows								
Labour	\$357,843		\$2,667	\$1,333			\$5,333	\$2,667
Advertising			\$1,000				\$1,000	
Storage + Fulfillment	\$800	\$800	\$27,923	\$14,097	\$800	\$800	\$55,846	\$28,194
Tooling	\$34,895							
Materials	\$476,705							
Total Costs	\$870,244	\$800	\$31,590	\$15,430	\$800	\$800	\$62,179	\$30,861
Quarterly Cash Flow	-\$870,244	-\$800	\$468,410	\$235,570	\$800	\$800	\$937,821	\$469,139
Quarterly NPV	-\$870,244	-\$773	\$444,844	\$235,570	\$721	\$800	\$830,575	\$408,344
Total NPV	\$1,029,943							

Happy Yikes!

Supporting Calculations

Pumpkins per unit	5
Price per unit	100 CAD
Material cost per pumpkin	2.655 USD
Labour cost per pumpkin	1.993 USD
Packing cost per pumpkin	0.21 USD

Exchange rate 1.33

Per inj mold

What if higher price?

- At 100\$ per 6 pumpkins I make money, if I can sell 22,500 sets
- BUT I would need to check my assumptions and market research
- If I only sell 1000 units I break even: are there 1000 people who want expensive pumpkins?

Conclusion:

- Maybe I should just enjoy my pumpkins with my kid :)

Estimating sales volume and sourcing

To estimate sales volume on Amazon:

- <http://cleartheshef.com/amazon-sales-rank-chart/>
- Total = total number of sellers
- Top 0.5% - if your rank is less than 16,573, you're in the top 0.5% in Automotive, for example
- Lower rank = more sales


Canada Amazon Sales Rank Chart (Updated November 1st, 2021)

Category	Top .5%	Top 1%	Top 3%	Top 5%	Top 10%	Top 25%	Total
Automotive	16,573	33,147	89,441	165,734	331,469	826,672	1,314,687
Baby	3,105	6,210	18,631	31,052	62,105	155,262	621,048
Beauty & Personal Care	9,284	18,567	55,702	92,836	185,673	464,182	1,856,726
Books	87,956	175,912	527,736	879,560	1,759,119	4,397,790	17,591,194
Clothing, Shoes, & Accessories	105,290	210,580	631,741	1,052,901	2,105,802	5,264,506	21,056,023
Electronics	29,529	59,057	177,172	295,286	590,573	1,476,432	5,905,728
Everything Else	10,179	20,358	61,075	101,792	203,584	508,960	2,035,841
Grocery & Gourmet Food	2,407	4,813	14,440	24,067	48,135	120,337	481,347
Handmade	285	570	1,710	2,850	5,701	14,252	57,008
Health & Personal Care	11,442	22,884	68,652	114,420	228,840	572,099	2,288,397
Home & Kitchen	93,951	187,901	563,704	939,507	1,879,015	4,697,536	18,790,145
Industrial & Scientific	4,734	9,468	28,405	47,342	94,683	236,709	946,832
Jewelry	11	22	65	108	217	542	2,167
Luggage & Bags	2	4	12	19	39	97	388
Movies & TV	4,084	8,169	24,507	40,845	81,689	204,223	816,892
Music	10,017	20,033	60,099	100,165	200,330	500,825	2,005,304
Musical Instruments, Stage, & Studio	1,960	3,920	11,759	19,598	39,196	97,991	391,964
Office Products	6,445	12,889	38,667	64,445	128,890	322,226	1,288,903
Patio, Lawn, & Garden	8,713	17,425	52,276	87,127	174,255	435,637	1,742,547
Pet Supplies	8,198	16,397	49,191	81,985	163,970	409,924	1,639,697
Shoes & Handbags	22	45	135	225	449	1,123	4,493
Sports & Outdoors	24,327	48,654	145,961	243,268	486,536	1,216,339	4,865,355
Tools & Home Improvement	26,069	52,138	156,413	260,688	521,376	1,303,440	5,213,758
Toys & Games	9,469	18,938	56,753	94,688	189,376	472,941	1,891,762
Video Games	1,710	3,420	10,259	17,098	34,196	85,489	341,957
Watches	6	12	36	60	119	298	1,193
Totals	475,817	951,634	2,854,901	4,758,168	9,516,336	23,790,839	95,163,356

To estimate sales volume more precisely

- Scroll down on a competing product Amazon page to find ASIN and sellers rank
- Here's the example for our drain snake

Additional Information

ASIN	B06XRVDLSC
Customer Reviews	4.2  1,508 ratings 4.2 out of 5 stars
Best Sellers Rank	#1,801 in Tools & Home Improvement (See Top 100 in Tools & Home Improvement) #9 in Drain Augers
Date First Available	March 19 2018

To convert sales rank to estimated monthly sales:

- <https://www.junglescout.com/estimator/>

The screenshot shows the Jungle Scout website's Amazon Sales Estimator tool. The header includes the Jungle Scout logo and navigation links for Solutions, Products, Pricing, and Resources. A search bar and Log In button are also present. Below the header, a banner encourages users to use the tool in the app. The main heading is "Amazon Sales Estimator", followed by a description of the tool's purpose. The tool displays an "Estimated Number of Sales per Month" of 3,570. Below this, there are three input fields: "Best Seller's Rank Number" (set to 100), "Amazon Marketplace" (set to Canada), and "Amazon Product Category" (set to Health & Personal Care). At the bottom, there are "Reset" and "Estimate sales" buttons.

JungleScout Solutions ~ Products ~ Pricing Resources ~ Log In Sign Up

Already a Jungle Scout user? [Use this tool in app to get more searches!](#)

Amazon Sales Estimator

Our Estimator Tool is a great way to check average monthly sales numbers for specific Amazon categories, help aid product launches and a simple way to spy on your competitors.

Estimated Number of Sales per Month **3,570**

Best Seller's Rank Number

Amazon Marketplace

Amazon Product Category

Amazon Sales Estimator

Our Estimator Tool is a great way to check average monthly sales numbers for specific Amazon categories, and help a product launches.

**Estimated Number
of Sales per Month**

450

Best Seller's Rank Number *

1801

Amazon Marketplace *

Canada

Amazon Product Category *

Tools & Home Improvement

Estimate sales

Repeat if your
product is
ranked in
more than
one category

Repeat for
any markets
you plan to
sell in (this is
Canada, .ca)

Amazon Sales Estimator

Our Estimator Tool is a great way to check average monthly sales numbers for specific Amazon categories, and help aid product launches.


**Estimated Number
of Sales per Month**

5,340

Best Seller's Rank Number *

1010

Amazon Marketplace *

 United States of America

Amazon Product Category *


Tools & Home Improvement

Free

Estimate sales


For detail info on competing products:

- <https://www.profitguru.com/calculator/fba>

 ProfitGuru [Tour](#) [Pricing](#) [Free Tools](#) [Resources](#) [Blog](#) [Contact](#) [Login](#) | [Signup](#)

[x Clear Results](#) [Search Product](#)

CarbonKlean Peeps Eyeglass Lens Cleaner - Efficient and Durable Carbon Microfiber Technology - Exclusively Used by NASA - 500 Uses (Injected Black)




ASIN: B019M9NEAW

Package Dimensions: 1.06 X 5.24 X 2.05 inches

Unit Weight: 0.09 pounds

Category: Health & Household

Brand: Peeps (6 wholesale suppliers found) [View Details](#)

Reviews:  (5125 reviews)

[View on Amazon](#)

of Sellers: 3

of FBA Sellers: 1

	Price History	Sales Rank	Estimated Sales	
Current	\$19.99	469	23,010	Select
7-Day Avg.	\$19.99	720	16,530	Select
30-Day Avg.	\$19.99	1,590	10,710	Select

Regular

Sell Price \$ 19.99

Selling on Amazon Fees \$3.00

Regular

Total Revenue \$19.99 x 23010 = \$459,969.90

Edit Price Edit Sales Revenue



B0GXRVDI SC

x Clear Results

Search Product

Vastar 4 Pack 25 Inch Drain Snake Hair Drain Clog Remover Cleaning Tool



ASIN:	B0GXRVDI SC
Package Dimensions:	1.57 X 7.64 X 5.98 inches
Unit Weight:	0.11 pounds
Category:	Tools & Home Improvement
Brand:	Vastar View Details
Reviews:	★★★★★ (4088 reviews)

[View on Amazon](#)

of Sellers:

1

of FBA Sellers:

1

	Price History	Sales Rank	Estimated Sales ⓘ	ⓘ
Current	\$6.77	1,380	4,088	Select
7-Day Avg.	\$6.77	1,212	4,088	Select
30-Day Avg.	\$6.77	1,405	3,695	Select

Sell Price

\$ 6.77

Referral Fee

\$1.02

FBA Fees

\$3.77

Storage Fee

\$0.10

Shipping To Amazon

\$ 0

Seller Proceeds

\$1.88

Cost Price

\$ 0

Net Profit

\$1.88

Net Margin %

27.8%

Total Revenue

\$6.77

x

4088

=

\$27,675.76

Sell Price

Est. Sales

Revenue

Total Profit

\$1.88

x

4088

= \$7,685.44

Net Profit

Est. Sales

Profit

Revenue Per Seller

\$27,675.76

/

1

=

\$27,675.76

Total Revenue

Sellers

Revenue per Seller

Profit Per Seller

\$7,685.44

/

1

= \$7,685.44

Total Profit

Sellers

Profit per Seller

Sales per Seller

4,088.00

/

1

= 4,088.00

Est. Sales

Sellers

Sales per Seller



B0GXRVDI SC

x Clear Results

Search Product

Vastar 4 Pack 25 Inch Drain Snake Hair Drain Clog Remover Cleaning Tool



ASIN:	B0GXRVDI SC
Package Dimensions:	1.57 X 7.64 X 5.98 inches
Unit Weight:	0.11 pounds
Category:	Tools & Home Improvement
Brand:	Vastar View Details
Reviews:	★★★★★ (4080 reviews)

[View on Amazon](#)

of Sellers:

1

of FBA Sellers:

1

	Price History	Sales Rank	Estimated Sales ⓘ	ⓘ
Current	\$6.77	1,380	4,088	Select
7-Day Avg.	\$6.77	1,212	4,088	Select
30-Day Avg.	\$6.77	1,405	3,695	Select

These are US (.com) values

Sell Price	\$ 6.77
Referral Fee	\$1.02
FBA Fees	\$3.77
Storage Fee	\$0.10
Shipping To Amazon	\$ 0
Seller Proceeds	\$1.88
Cost Price	\$ 0
Net Profit	\$1.88
Net Margin %	27.8%

For accurate profit numbers, fill these in

Total Revenue	\$6.77	x	4088	=	\$27,675.76
	Sell Price		Est. Sales		Revenue
	\$6.77	x	4088	=	\$27,675.76
	Profit		Est. Sales		Profit
	\$1.88	x	4088	=	\$7,685.44
Revenue Per Seller	\$27,675.76	/	1	=	\$27,675.76
	Total Revenue		Sellers		Revenue per Seller
Profit Per Seller	\$7,685.44	/	1	=	\$7,685.44
	Total Profit		Sellers		Profit per Seller
Sales per Seller	4,088.00	/	1	=	4,088.00
	Est. Sales		Sellers		Sales per Seller

To estimate fulfillment costs on Amazon

Fulfilment fees

Fee per unit includes picking and packing your orders, shipping and handling, customer service, and product returns. Fees are based on the weights and dimensions of your product.

Size tier ¹	Shipping weight ²	Fulfillment fee (June 30, 2023 to October 14, 2023)	Peak period fulfillment fee (October 15, 2023 to January 14, 2024)
Envelope fulfillment fee per unit	First 100 g	CAD \$4.32	CAD \$4.58
	100+ to 200 g	CAD \$4.65	CAD \$4.91
	200+ to 300g	CAD \$4.99	CAD \$5.25
	300+ to 400g	CAD \$5.28	CAD \$5.54
	400+ to 500g	CAD \$5.45	CAD \$5.71
Box fulfillment fee per unit	First 100 g	CAD \$5.92	CAD \$6.37
	100+ to 200 g	CAD \$6.12	CAD \$6.57

To estimate storage costs on Amazon

FBA storage fees *

Inventory storage fees are charged monthly based on the daily average volume (measured in cubic metres) for the space your inventory occupies in Amazon fulfillment centers. The volume measurement is based on unit size when properly packaged and ready to ship.

Month	Standard size ¹	Oversize
January - September	CAD \$33 per cubic metre	CAD \$23 per cubic metre
October - December	CAD \$53 per cubic metre	CAD \$34 per cubic metre

¹ Includes standard-size and envelope, as defined in Product size tiers.

* Storage fees are based on the daily average volume (measured in cubic metres) for the space your inventory occupies in Amazon fulfillment centres.

Amazon has their own Calculator

- Storage and Fulfilment fees are built into this calculator
- https://sellercentral.amazon.ca/revcalpublic?ref_=sd&initialSessionID=145-0695983-4632948&Id=secasoagoog-sitelink-calculator_SOA_PRI_RC2&IdStackingCodes=secasoagoog-sitelink-calculator

Revenue calculator

Provide your fulfilment costs and see real-time cost comparisons between different fulfilment methods

Disclaimer: This Fulfilment by Amazon Revenue Calculator should be used as a guide in evaluating FBA only. Amazon does not warrant the accuracy of the information or calculations in this Revenue Calculator. Independent analysis of the output of this Revenue Calculator should be conducted to verify the results. Please consult the Amazon Services Business Solutions Agreement for up-to-date costs and fees. The New Amazon Fulfilment option reflects your current Selling on Amazon fees and FBA fulfilment fee.

For more information about how to use this calculator, visit our [Help page](#)

Find existing product or enter product information

Search Amazon catalogue

Define product

Estimate in bulk

Generate estimate by entering product information

Manually enter product details to estimate the cost and profitability of selling the product on Amazon

Amazon store



CA

Unit of

measurement

cm

Package dimensions

10

cm

X

10

cm

X

10

cm

Unit weight

0.5

kg

Product category

Tools and Home Impi

Item price

\$

15

Shipping charge

\$

0

Update

Amazon Fulfilment

Item price

\$

15

Select option

Comparison graph

NEW!

Comparison graph

Revenue

Cost

Net profit

What are limitations of these estimates?

- Fulfillment and storage costs are relatively known based on Amazon's own calculators
- ...but they can change anytime, the platform doesn't belong to you. Consider what a small change in either would do to your business model?
- These estimates don't account for "viral" products. It's possible your product could be a runaway hit
- We haven't gotten into advertising or sponsored products and how they could drive sales volume

Sourcing

Warning:

- There aren't very many authoritative sources on this topic
- This is my summary of first person accounts found online
- Definitely do your research and seek out more information if you're commercializing a product

Key Terms and Documents

- NDA - Non-disclosure agreement - agreement not to disclose confidential information
- RFQ - Request for Quote - your specification that you send asking for a quote from manufacturer
- MSA - Master Service Agreement - agreement regarding your relationship with manufacturer (in general)
- PO - Purchase order - agreement regarding your relationship with manufacturer for a specific product/product run

Example of process for a sewn product

- Blog about process for a fabric product
- <https://hackernoon.com/from-idea-to-kickstarter-launch-and-how-much-it-cost-along-the-way-dce10a959745>

Pitch Video:

Kickstarter

- Free if product doesn't get funded
- Takes 5% Kickstarter fee plus payment processing fee (3% +0.20 CAD per pledge if pledge over \$10, 0.05 CAD if under \$10)
- You handle customer fulfillment etc

Step 1: Refine your prototype

- Make a prototype yourself for communication purposes
- Refine with processes like 3d printing
- Get it as close as you can yourself to save time

Homemade Prototype



Step 2: Do your prep work

- Make a bill of materials
- Write a detailed spec - this is the heart of your RFQ
- The spec will dictate the cost of your product
- Think about what codes and standards you would have to meet (e.g. does it need to be CSA approved? Is it a medical device?)
- How many are you going to order? Do you have a target price? A desired launch date?
- Generate cad files and drawings to share with manufacturers

Step 3: Make a short list of manufacturers

- Ideally a referral from someone in your network, reduces the chances of a bad experience
- You can reach out through local incubators like the Forge, MaRS, RIC Centre

Overseas or domestic?

- **Domestic might be better if:**

- You are producing a limited quantity
- You need a lot of factory visits for optimization, quality control
- Your product is very bulky or heavy (hard to ship)
- Your product tariffs are very high

- **Overseas, most likely China if:**

- Your product has a lot of assembly tasks
- You are ordering a large quantity (thousands)

How to find a manufacturer in China

- Referral
- You can work with a service here in North America (an agent) that has connections and experience
- You can search on AliBaba and hope for the best
- You can go to the Canton Fair and look for factories that make similar products and take on custom work

Manufacturers found on Alibaba



Canton Fair



Going to the fair:

- Useful to get an idea of what a factory is currently producing
- Ideally your product would be really similar to their current products
- Gives you a hands on indication of quality without you committing to a prototype

If you manufacture overseas

- A term you might see in the Purchase Order - Freight on Board: FOB
- FOB (China) means on a boat in a port in China, you still need to pay duties, customs, shipping. You'll need a customs broker and freight forwarder to take care of this
- FOB (Los Angeles) means on a boat in Los Angeles, you would have to take care of shipping from Los Angeles to wherever you are selling it

Different entities:

- Most expensive: wholesalers - they sell products already in production, handle more logistics and sourcing
- Medium expensive: Trading Companies - they might claim to be factories but subcontract the work and take a cut.
This is a lot of vendors on AliBaba
- Least expensive: Factories - they actually produce your product but might have less logistics and sourcing support

Evolution of prototypes: At least 6 rounds



Step 4: Getting quotes and samples

- Make your spec as detailed as possible
- Get multiple quotes and samples to verify that the pricing and conditions are sensible before you commit to tooling and a contract
- This stage gives you an indication of how responsive the company will be, if they are hard to work with at this stage they will likely be hard to work with during production
- Multiple rounds of samples are common

Step 5: Torture your samples

- After you have samples from a few companies it's not enough to just look at them
- Torture them to check for durability, quality. The factory will not do this for you. e.g. if it's a clothing product wash it a few times, try and stretch it
- Take detailed notes, measurements and photos to give feedback to your manufacturers for the next round

Finished product

- Result



Step 6: Choose a manufacturer

- Do this based on:
 - Ease of working with them during the sample process
 - Quality of sample
 - Competitive price
 - Factory visit

Questions to ask:

- Who else have they done work for?
- What similar products have they worked on?
- Names of previous customers you can contact
- Do they handle shipping? Do they have warehouse facilities?
- What's the minimum order quantity?
- How is invoicing handled?

Questions to ask:

- Does quote include shipping, tooling, samples?
- Do they have designers and engineers in house?
- Where do they get parts and materials from?
- Do they make their own tooling?
- What are the payment terms?
- What would be a typical turnaround time?
- Do they subcontract?

How long does it take

- Might be a long time, especially if your prototype is immature and you need to go back and forth a few rounds checking your prototype
- This time spent on DFM (design for manufacturing) is worthwhile because it will decrease the rate of failed parts
- Production and shipping could take around 3 months

When do you pay?

- Common to pay injection mold/tooling costs upfront
- A purchase order is a contract between you and the company
- In general, you typically pay 30% at time of purchase order (PO), 30% when it gets on the boat, 40% when it's received at the destination

Summary of Costs

- Initial prototype = \$0 (materials on hand, did it himself)
- Samples from 4 manufacturers = \$305
- 6 prototype iterations = \$785
- Logo = \$0 (did it himself)
- Basic Website = \$95
- Video = \$500 (props only, set and videographer were friends)
- Sent samples to influencers = \$350
- Mailing supplies = \$65
- Product Photos = \$20
- Grand total = \$2005 USD

Potential Issues: Stolen Ideas

- You can partially address this with a NDA (non-disclosure agreement)
- Lots of templates online, you can get help from incubators
- Quite a standard step
- A patent also provides protection, but expensive and difficult to enforce
- Not bulletproof but still worth doing

Potential Issues: They're a scam

- This is why referrals are so helpful
- Google the company + “scam” or “fraud” to see if they have had other problems

Potential Issues: You don't have a warehouse and neither do they

- 3rd party fulfillment is a big business
- You can certainly find a company to do this for you (at a price)

Potential issues: sourcing subassemblies and materials

- The factory is probably better at the supply chain stuff than you are
- This is why China is likely a better place to outsource production than other countries, their infrastructure is more mature

Potential issue: Language

- Actually, none of the founder's stories talked about this being difficult at all
- English is widely spoken by almost everyone, especially agents or at the Canton Fair
- A local agent can help with this


Result:

- Funded to 50% in 48 hours
- Reached \$94,000 in about a month, eventually reaching \$125,000
- Led to expanded brand that exists to this day
- Did a second \$60,000 kickstarter round to launch their Voyage bag


Expanded Brand

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★★★★★

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\$156.00 **\$129.95**



Key aspect: iteration

- Even simple products need iteration
- It's not uncommon to need multiple rounds of prototypes when working with manufacturers (whether domestic or overseas)
- Allow time for that back and forth

Today's in class assignment

- Make a preliminary list of inflows and outflows of cash for your individual product
 - What would you have to spend money on to sell your product? [use your canvas from last week if you have it]
 - What will people give you money for?
- Use the tools provided to estimate your sales volume, fulfillment costs and storage costs for your individual product if you were to sell on Amazon
 - Find 2-3 comparable products and their rank or ASIN #
 - Estimate their monthly sales with the provided tools
 - Would you expect yours to be higher/lower?
 - Based on the size of your product what are your storage and fulfillment costs