

WEIGH THE ISSUES

# RE-IMAGINE MEASURING



Imagine

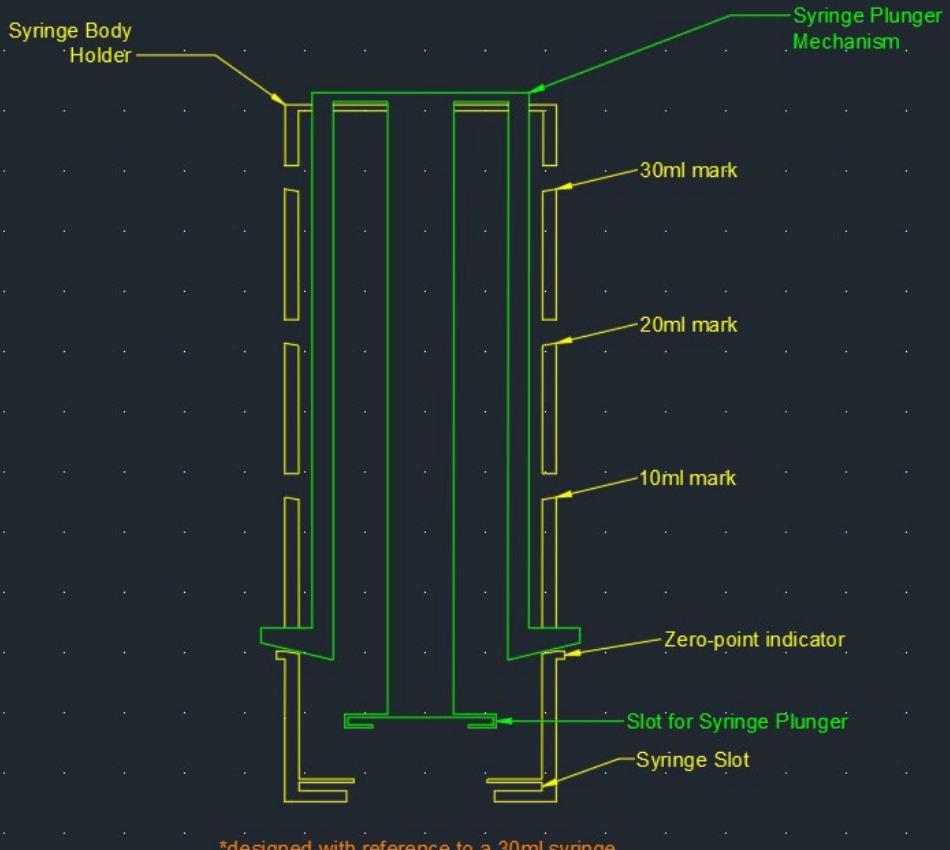
Rethink

Create



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## Initial Idea



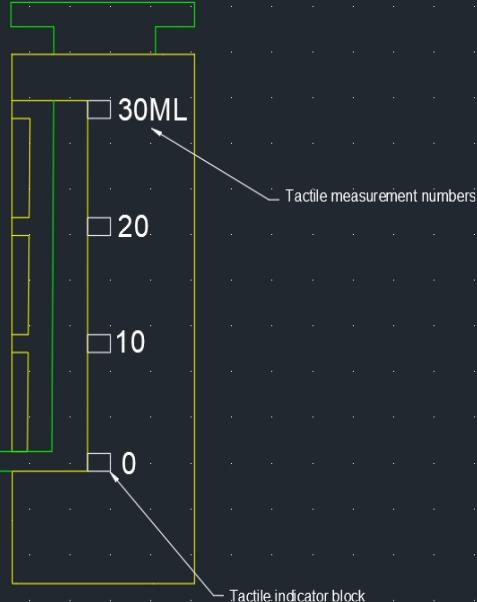
## Click-n-Measure

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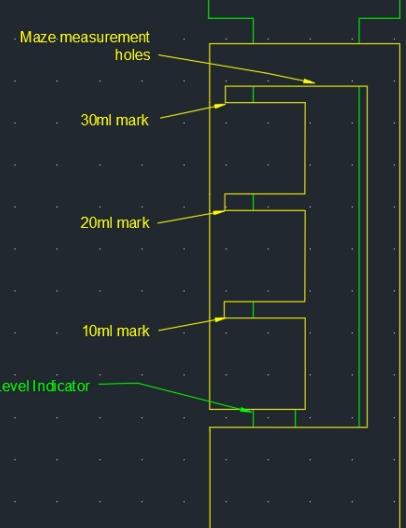
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# Upgraded Idea

BACK



RIGHT SIDE



\*Cyan color are hidden lines of the measurement holes

designed with reference to a 30ml syringe

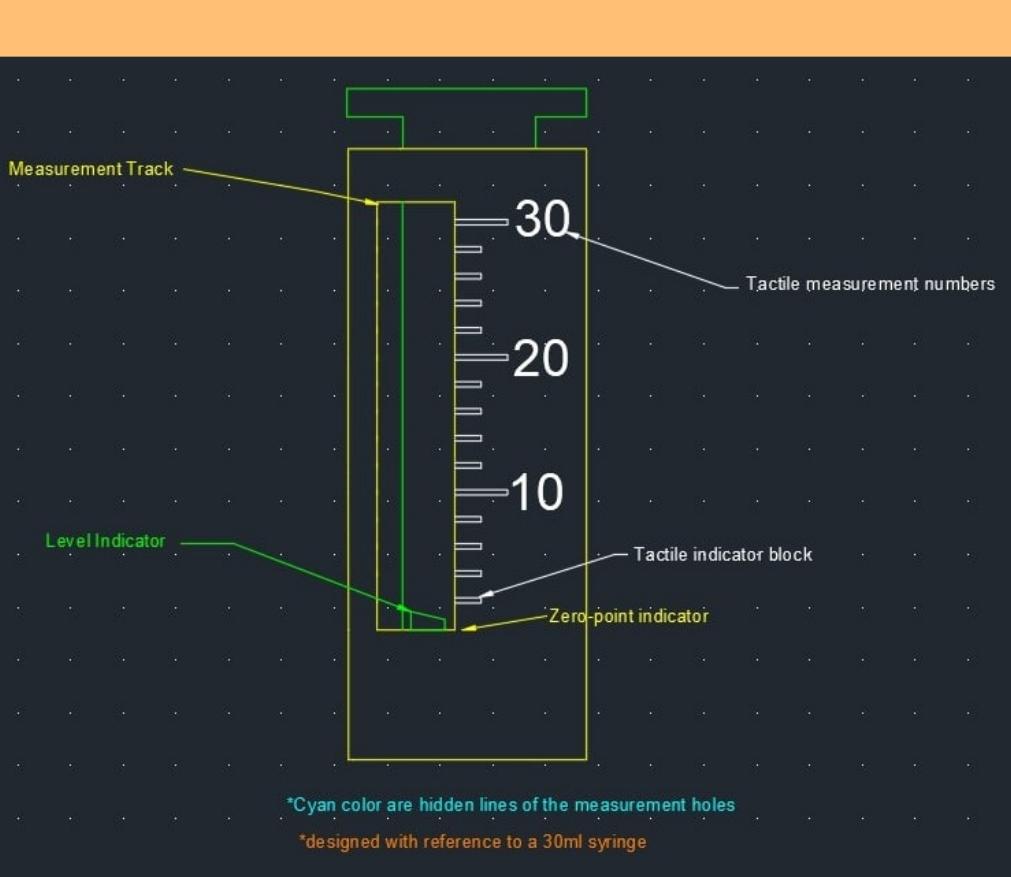
# Turn-in-Pull

Ting

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# Finishing Touches



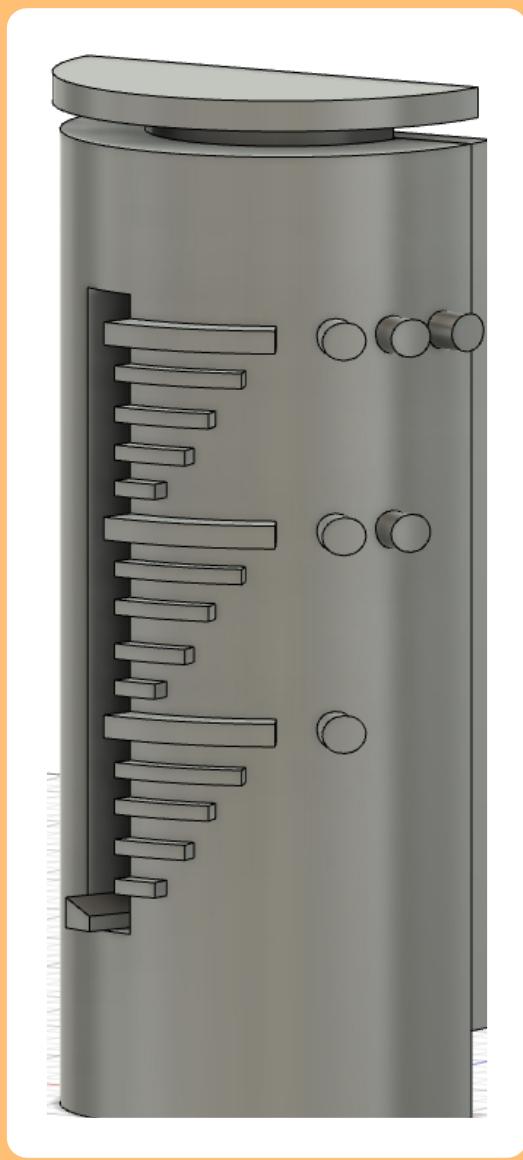
## Pull-n-Measure

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Ting

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## Final Idea

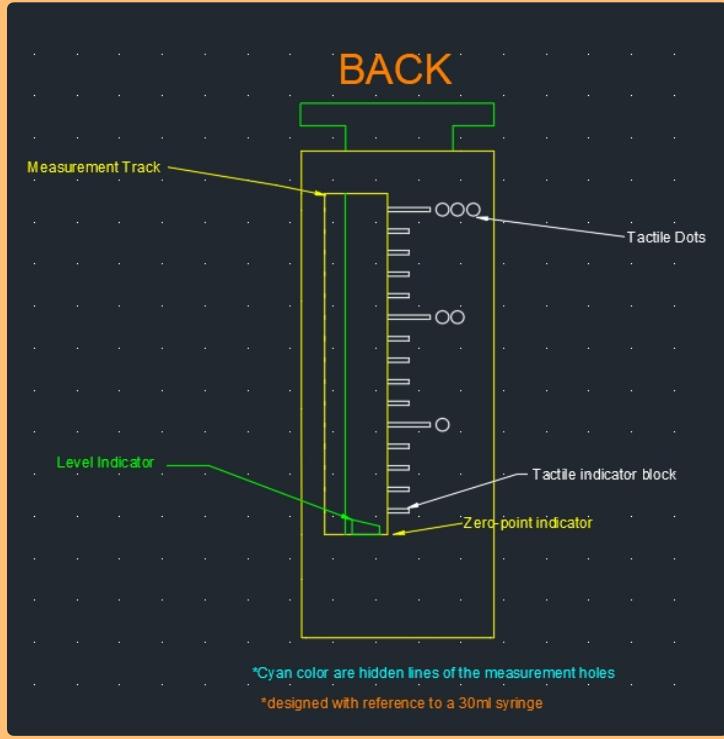
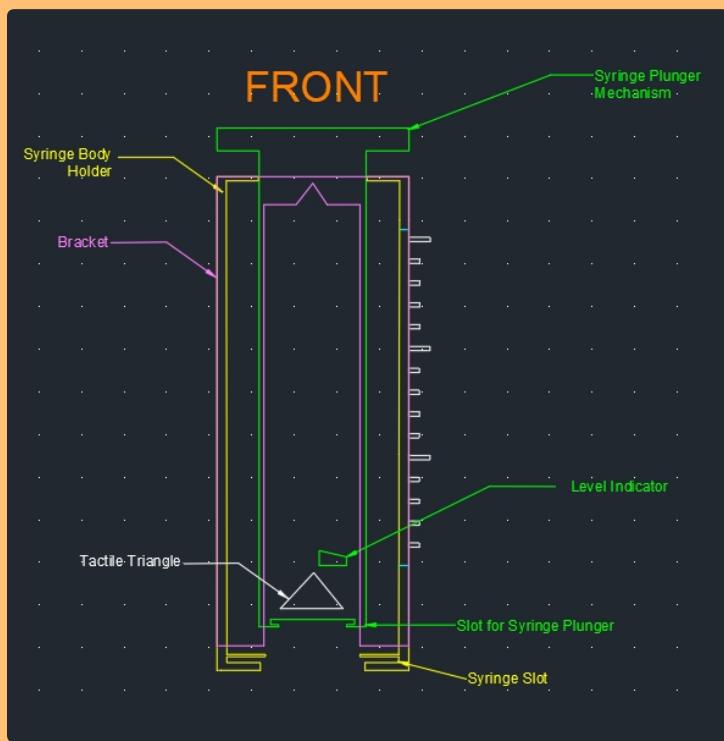


## Pull-n-Measure

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# Final Idea



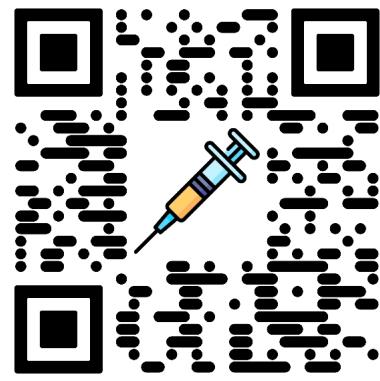
## Pull-n-Measure

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Ting

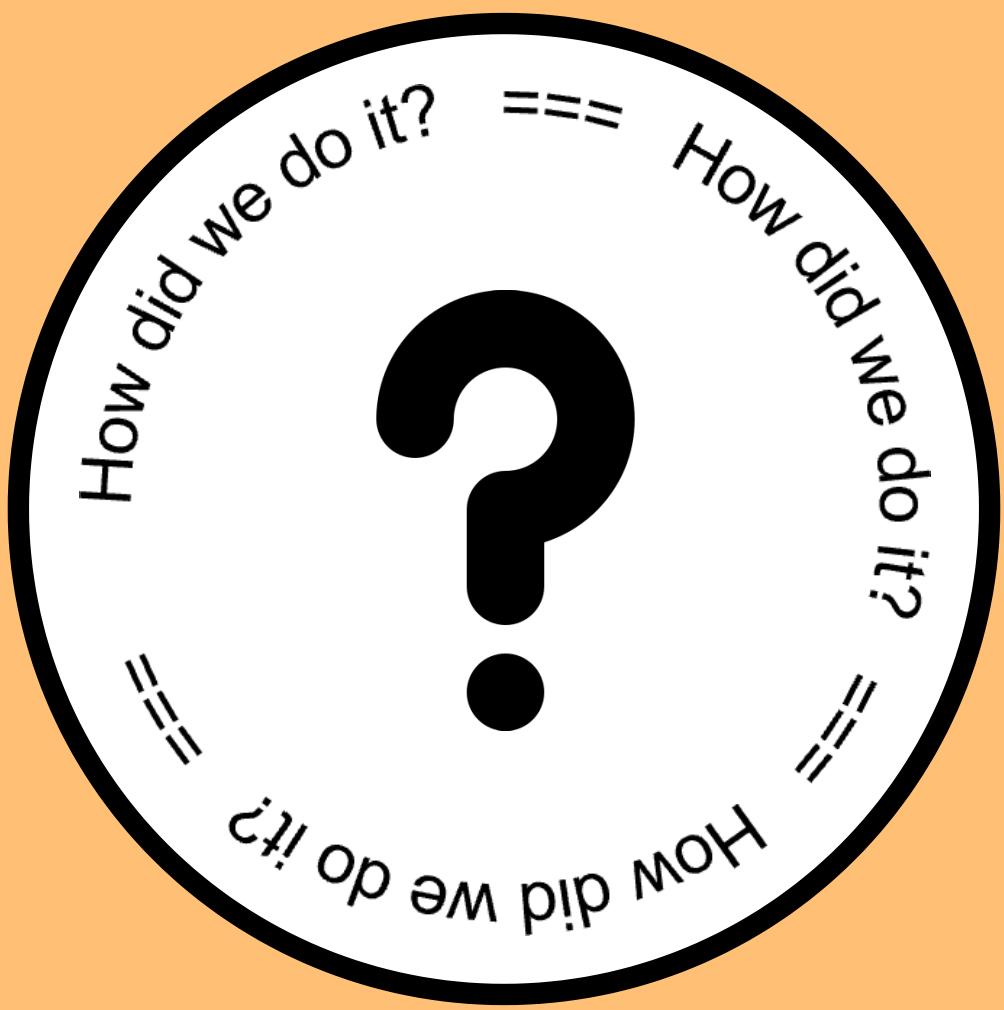
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# TIMELINE



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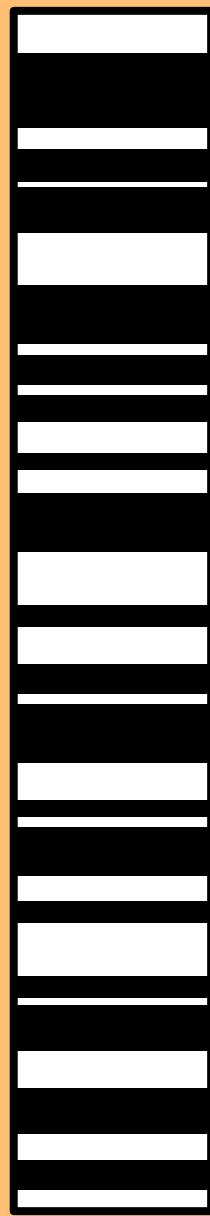
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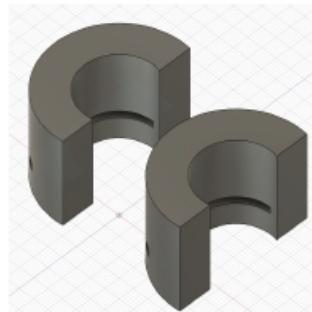
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# 1ST IDEA



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## SUCCESSFUL

**Syringe Slot**  
Version Number: **TPSS1**  
Date of assessment: **05/09/22**

### Observations made:

- ❖ Unable to make a full print due to filament issues
- ❖ Fitment with what was printed was just right

### Conclusion:

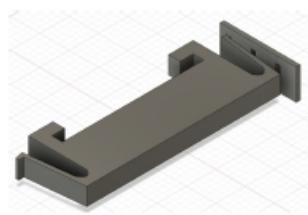
3D model made from this syringe slot was a good fit for the flanges of the syringe body despite not able to make a full print

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## SUCCESSFUL

**Small Plunger Slot**

**Version Number: TPPS1**

**Date of assessment: 05/09/22**

### Observations made:

❖ Just right fit

❖ Small scale of a Plunger slot

### Conclusion:

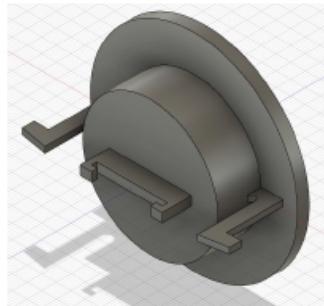
3D model made from this small plunger slot was a good fit  
plunger of the syringe

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## FAILED

**Plunger Slot with Mechanism**

**Version Number: TPPS2**

**Date of assessment: 06/09/22**

### Observations made:

❖ Mechanism legs broke while testing

❖ Mechanism legs are too thin

❖ Plunger slot also broke because it was too thin

### Conclusion:

When trying to model the plunger mechanism with the plunger slot, the legs broke off during testing and the plunger slot broke off too

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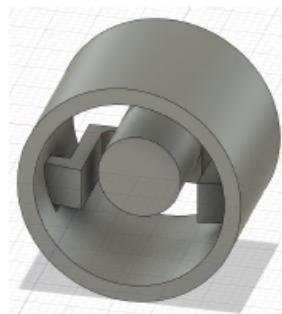


## Plunger Mechanism

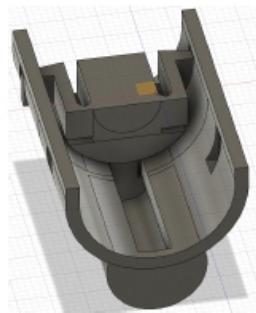
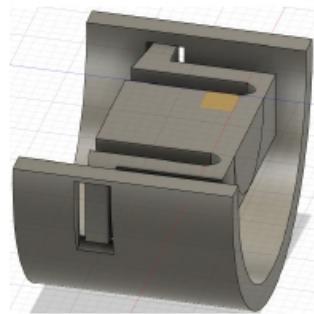
Version Number: TPM1 – TPM3  
Date of assessment: 08/09/2022

**FAILED**

Version Number: TPM1



Version Number: TPM3



Version Number: TPM2



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## Observations made:

### VERSION TPM1

- ❖ Mechanism couldn't fit into the cylinder

### VERSION TPM2

- ❖ Semi-circle cylinder

- ❖ Mechanism legs too thin; easily broken

- ❖ Mechanism legs sides too short to be pushed from the outside of the cylinder

### VERSION TPM3

- ❖ More measurement holes created

- ❖ Added keyhole at the back to hold the plunger of the syringe

- ❖ Keyholes fit well, able to slide up and down

- ❖ Mechanism legs broke off after testing a few times

## Conclusion:

As the mechanism for the 1<sup>st</sup> idea was not working well, we decided to turn to alternative solutions

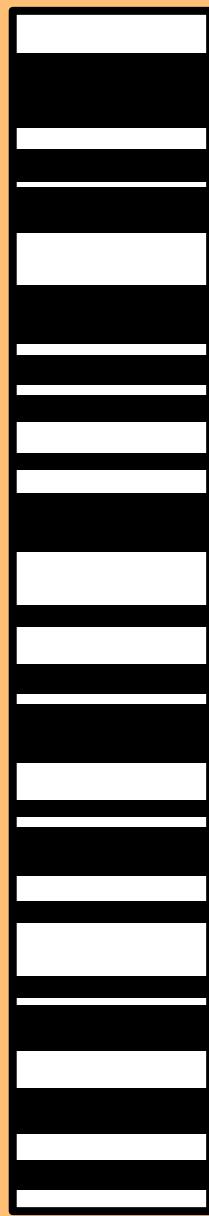
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# 2ND IDEA



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## FAILED

Syringe Body Holder with  
Level Indicator

Version Number: TPL1  
Date of assessment: 10/09/22

### Observations made:

- ❖ Maze measurement hole of the syringe body holder broke off when removing supports after print
- ❖ Hole not wide enough to fit the level indicator

### Conclusion:

Improvements needed on the hole size and improve wall thickness of the body holder

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## FAILED



### Syringe Body Holder with Level Indicator

Version Number: **TPL2**  
Date of assessment: **11/09/22**

#### Observations made:

- ❖ Slot for the plunger added to the level indicator
- ❖ Level indicator might need to be pushed up the match the slot of the plunger

#### Conclusion:

Plunger slot was a good fit, just need to adjust the level indicator slightly higher to match the plunger slot

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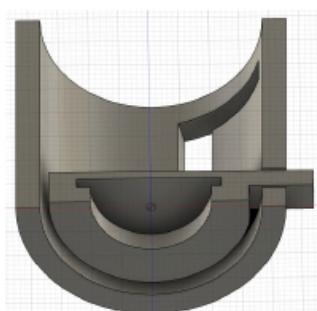
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## SUCCESSFUL

**Syringe Body Holder with  
Level Indicator**

**Version Number: TPL3  
Date of assessment: 11/09/22**



### Observations made:

- ❖ Slot for the plunger added to the level indicator
- ❖ Level indicator matches the height of the plunger slot
- ❖ Syringe body holder wall made slightly thicker
- ❖ Maze measurement hole is wider, easier to slide the level indicator up and down the track

### Conclusion:

**It is a working mechanism and test print.**

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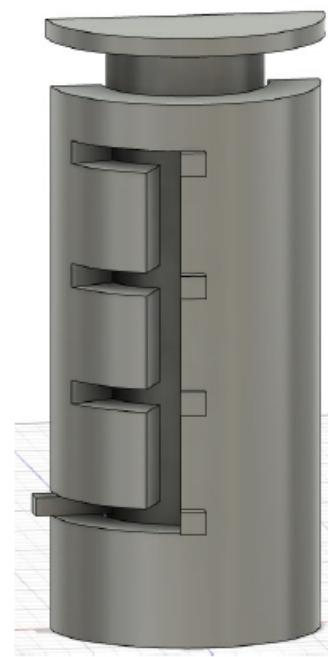
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## Turn – N – Pull Syringe Attachment Holder

Version number: P1

Date of assessment: 13/09/22



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## Observations made:

❖ Level indicator too short

❖ Maze measurement hole needs to be wider

## Conclusion:

First test prototype print came out decent for what was envisioned during the design stage. There were things that needed to be improved and added on such as the potential need for guide indicators for where the syringe plunger thumb rest and flanges get slotted into on the Syringe Body Holder and Syringe Plunger Mechanism.

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## Turn – N – Pull Syringe Attachment Holder

Version number: P2

Date of assessment: 15/09/22



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## Observations made:

- ❖ Printed numerals added for ease of indication of which measurement level the plunger is at
- ❖ Upon physical test of printed prototype; the indicator levels at the 10ml and 20ml were not very precise
- ❖ The measurement indicator fitted nicely and glides along track without much resistance

## Conclusion:

This second printed prototype was improved further based on the first prototype with printed numerals for easy to read measurements and guide arrows for where the plunger and flanges of the actual syringe are supposed to slot in.

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## Turn – N – Pull Syringe Attachment Holder

Version number: P3 & P4  
Date of assessment: 17/09/22 – 19/09/2022



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## Observations made:

- ❖ After making adjustments to the measurement indicators at 10ml and 20ml, the measurements were just right

## Conclusion:

Prototypes 3 and 4 were made back-to-back with very minor differences in terms of either printed numerals or tactile bumps for the purpose of measurement. As prototype 4 was based off prototype 3, both prints came out very well and ready for presentation to our Community Partner.

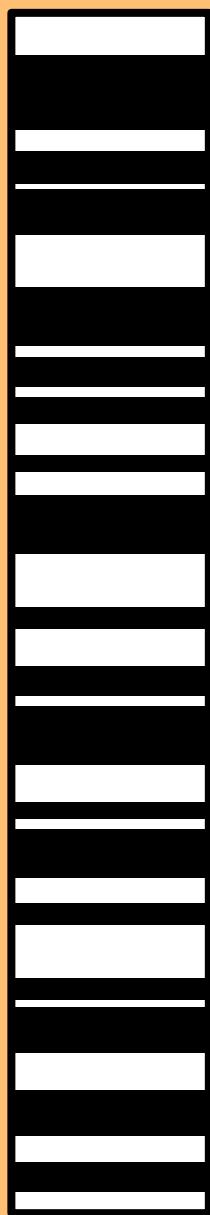
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# 3RD IDEA



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**Measurement Track**  
Version Number: **TPT1 - TPT5**  
Date of assessment:  
**26/09/22 - 27/09/22**

## SUCCESSFUL



### Observations made:

- ❖ Different thicknesses was tested from TPT1 through TPT4 till TPT5 was the right thickness
- ❖ Measurement indicator blocks are adjusted across the different test prints until TPT5 version the measurement were as precise as possible

### Conclusion:

TPT5 version is the most precise measurement track.

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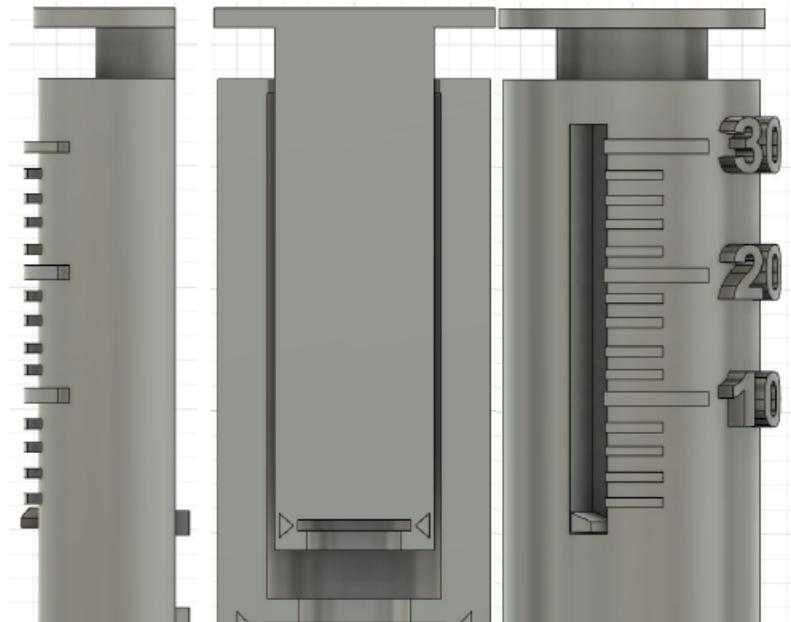


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## Pull – N – Measure Syringe Attachment Holder

Version number: P5 & P6  
Date of assessment: 27/09/22 - 29/09/22



P5

P5 & P6

P6

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## Observations made:

- ❖ Changed maze measurement track to single track
- ❖ Made distinguished printed lines between minor(2ml) and major(10ml) for measurement of other volumes

## Conclusion:

The 5<sup>th</sup> prototype was made after consulting our Community Partner and his comments on how the printed numerals was not necessary as not everyone might be familiar with it, and that if the measurement mechanism was more universal instead of having pre-set volumes. While prototype 6 features all the things that prototype 5 has, the only difference is the re-introduction of the printed numerals

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## Pull – N – Measure Syringe Attachment Holder

Version number: P7  
Date of assessment: 30/09/22



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## Observations made:

- ❖ Measurement indicator blocks lengths are made as staircase style which gets steeper at each measurement
- ❖ Bracket to prevent plunger attachment from falling out
- ❖ Big Tactile triangle end piece for reaching the end of the syringe
- ❖ Tactile dots for major volumes measurement
- ❖ Height of the prototype is slightly taller

## Conclusion:

The final prototype works well.

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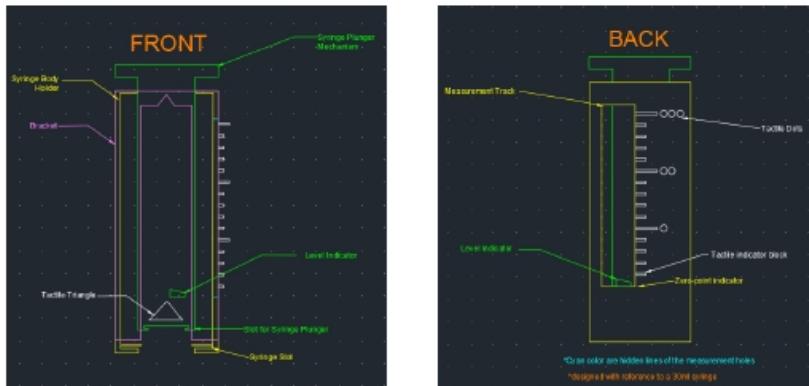
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## P7 Sketch



## Pull - N - Measure Syringe Attachment Holder

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with you



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