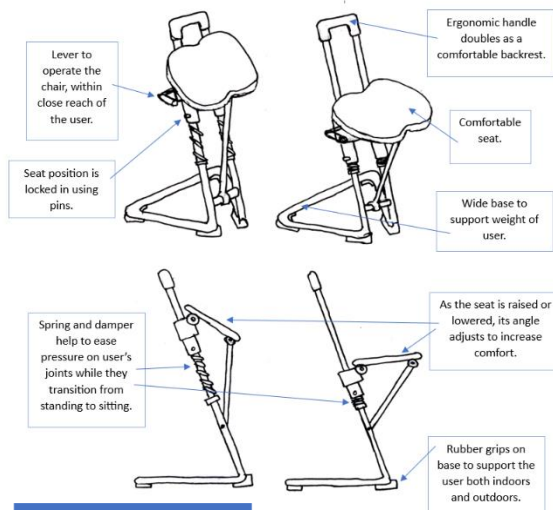


## STANDING POSITION

## SITTING POSITION



## PROS

- Ergonomic design.
- Easy to transport.
- Operates outdoors and in wet weather.
- User can sit and stand hands-free.
- Sturdy design.

## CONS

- May be complicated to operate.
- Robust design, not ideal for storage volume.
- Little room for adjustments in size.
- Design may be heavy.

## CONCEPT 1

This design is a portable chair, which can alternate between sitting and standing positions. The springs and dampers in the legs of the seat help to take off pressure from the user's joints when they are standing UP AND sitting down, which makes the transition between sitting and standing easier for users with joint pain. The standing position supports users in standing up for longer periods of time.

## CONCEPT 2

This design is a walking stick with an additional standing mode to assist with standing for long periods of time. The product aims to create a stand with more stability than a walking stick but be easier to transport than a chair for people with joint pain. The product seeks to be used by people who cannot travel between seating and standing positions easily.

## Pros

- Portable
- No sitting/ standing motion
- Good stability

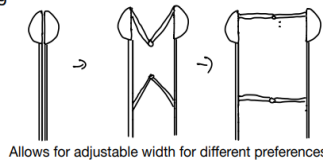
## Cons

- Difficulty in setup
- Comfort while walking
- Potentially heavy for a walking stick

## Walking

## Standing

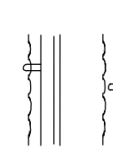
## Expansion mechanism



Initial thought of what 1 half of the stick would look like

## Base deployment mechanism

Pin pushed down to allow for adjustable height for different users

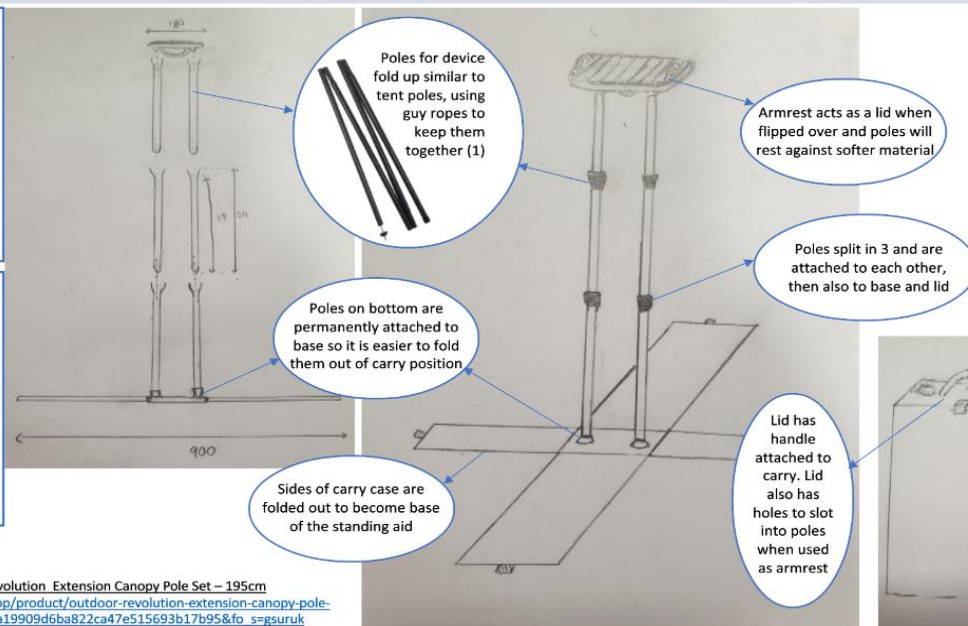


## PROS

- Folds neatly into suitcase to become portable.
- Lid doubles up as handle and comfortable rest.
- Large contact point with floor so base is stable.
- Base and poles cannot be lost as all are connected by guy ropes.
- Carry case is easy to open and close using clips

## CONS

- Poles could be difficult to put together and may require bending down.
- Packing poles into carry case may require high dexterity
- Base takes up large area when opened
- Product is not adjustable
- Only 2 pole stands could reduce stability of rest



## CONCEPT 3

(1) – California Club, Outdoor Revolution, Extension Canopy Pole Set – 195cm

[https://www.californiaclub.com/shop/product/outdoor-revolution-extension-canopy-pole-set-pol2107fo\\_k=3413&fo\\_k=35a19909d6ba822ca47e515693b17b95&fo\\_s=gsuruk](https://www.californiaclub.com/shop/product/outdoor-revolution-extension-canopy-pole-set-pol2107fo_k=3413&fo_k=35a19909d6ba822ca47e515693b17b95&fo_s=gsuruk)

MULTI-CRITERIA  
DECISION ANALYSIS

To evaluate the concepts, an MCDA method was developed. This involved selecting the key criteria from the requirements list and giving each concept a weighted score based on how well it fitted the criteria.

## Weight:

- 5 – Most important
- 4
- 3
- 2
- 1 – Least important

## Score:

- 4 – Excellent
- 3 – Good
- 2 – Satisfactory
- 1 – Weak
- 0 – Inadequate

| Criteria                                       | Concept 1 |       | Concept 2      |       | Concept 3      |        |
|--|-----------|-------|----------------|-------|----------------|--------|
|  | Weight    | Score | Weighted Score | Score | Weighted Score | Score  |
| <b>Performance</b>                             |           |       |                |       |                |        |
| Assists standing for extended periods of time. | 5         | 3     | 15             | 3     | 15             | 3      |
| Assists in standing up from a seated position. | 4         | 3     | 12             | 3     | 12             | 1      |
| Suitable for users up to 100kg                 | 3         | 4     | 12             | 4     | 12             | 3      |
| <b>Geometry</b>                                |           |       |                |       |                |        |
| Suitable storage volume                        | 2         | 2     | 4              | 3     | 6              | 4      |
| Weighs less than 3kg.                          | 2         | 3     | 6              | 4     | 8              | 4      |
| <b>Materials</b>                               |           |       |                |       |                |        |
| Comfortable                                    | 4         | 4     | 16             | 2     | 8              | 2      |
| Sturdy materials                               | 5         | 4     | 20             | 4     | 20             | 4      |
| <b>Ergonomics</b>                              |           |       |                |       |                |        |
| Usable by both left and right-handed users     | 3         | 3     | 9              | 4     | 12             | 4      |
| Adjustable design                              | 4         | 2     | 8              | 3     | 12             | 1      |
| Usable with one hand                           | 1         | 4     | 4              | 1     | 1              | 2      |
| Easy to transport                              | 3         | 2     | 6              | 3     | 9              | 4      |
| <b>Operation</b>                               |           |       |                |       |                |        |
| Easy to setup                                  | 3         | 2     | 6              | 2     | 6              | 1      |
| Operates outdoors                              | 5         | 4     | 20             | 4     | 20             | 3      |
| Easy to operate                                | 3         | 3     | 9              | 3     | 9              | 4      |
| Requires minimal force to operate              | 4         | 3     | 12             | 3     | 12             | 4      |
| Operates in rain/wet weather                   | 5         | 4     | 20             | 4     | 20             | 3      |
| <b>Weighted Score Total</b>                    |           |       | 179            |       | 182            | 163    |
| <b>Rank</b>                                    |           |       | 2              |       | 1              | 3      |
| <b>% Total</b>                                 |           |       | 34.16%         |       | 34.73%         | 31.11% |

## FINAL CONCEPT CHOICE

Concept 2 scored the highest on the MCDA method. Based on this scoring, it was decided that this concept would be used for the final design. However, this concept scored poorly in comfort, one-handed usage, and ease of setting up. To improve these factors, more consideration was taken into the design of the handles. They were redesigned to have a more ergonomic shape and to be made from a more comfortable material.