

# TROLL RESEARCH STATION

## First project proposals

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**!! TITLE**

**IAP Workshop**

**Spring semester 2026**

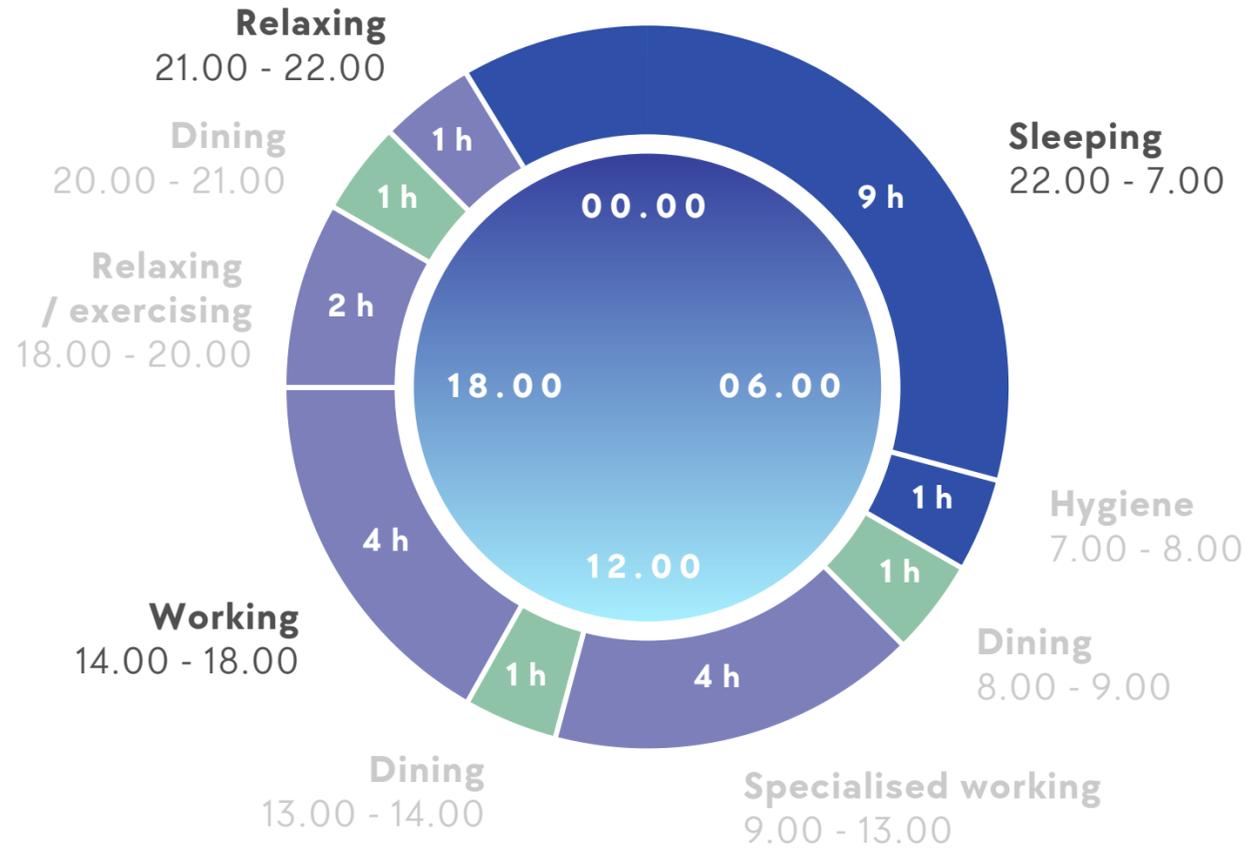
Prof. Henriette Bier, Arwin Hidding, Lisa-Marie Mueller, Vera Laszlo



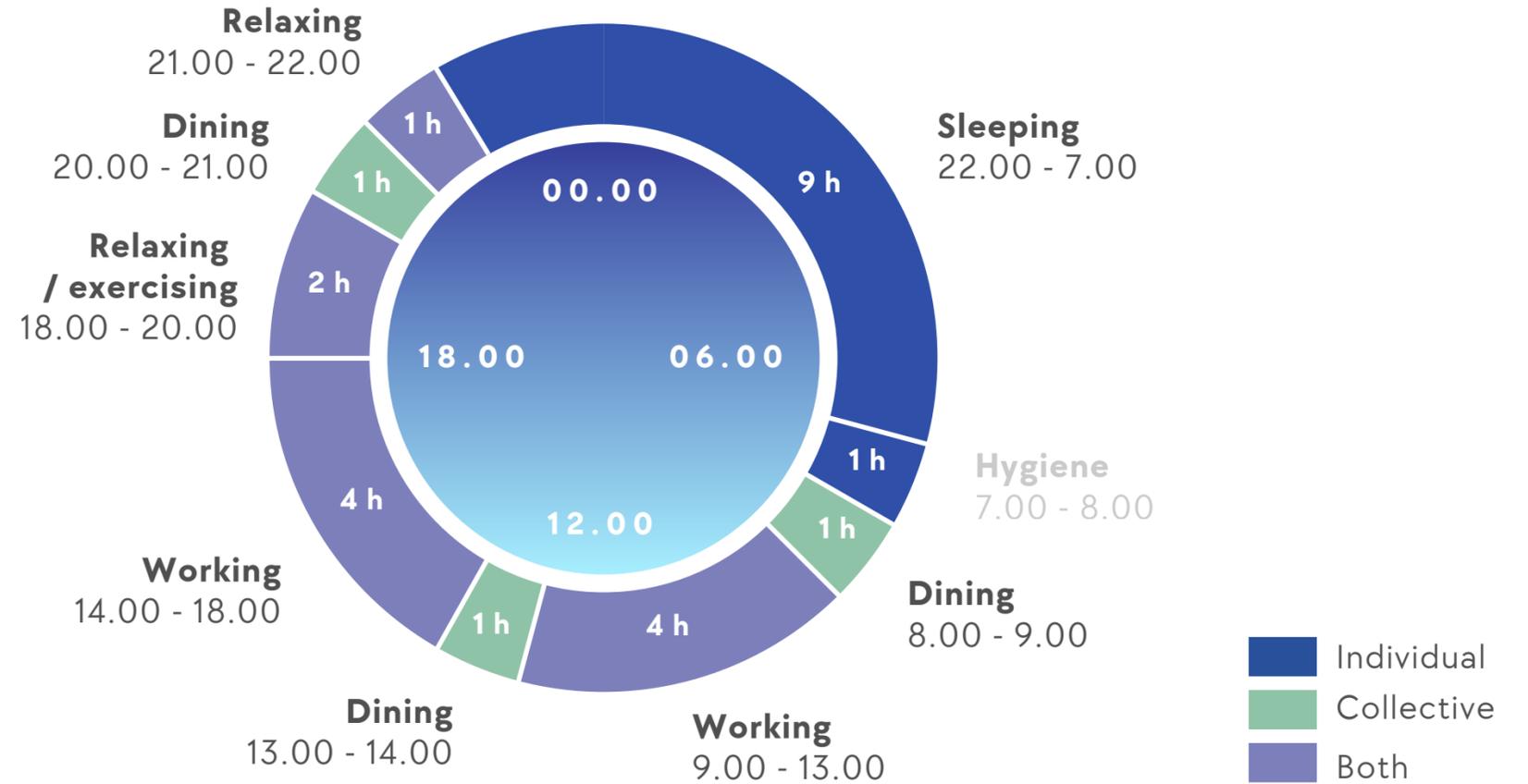
# 01

## 24/7 ACTIVITY MAPPING - TIME !! LOOK AT OVERLAPPINGS

### ORDINARY USE



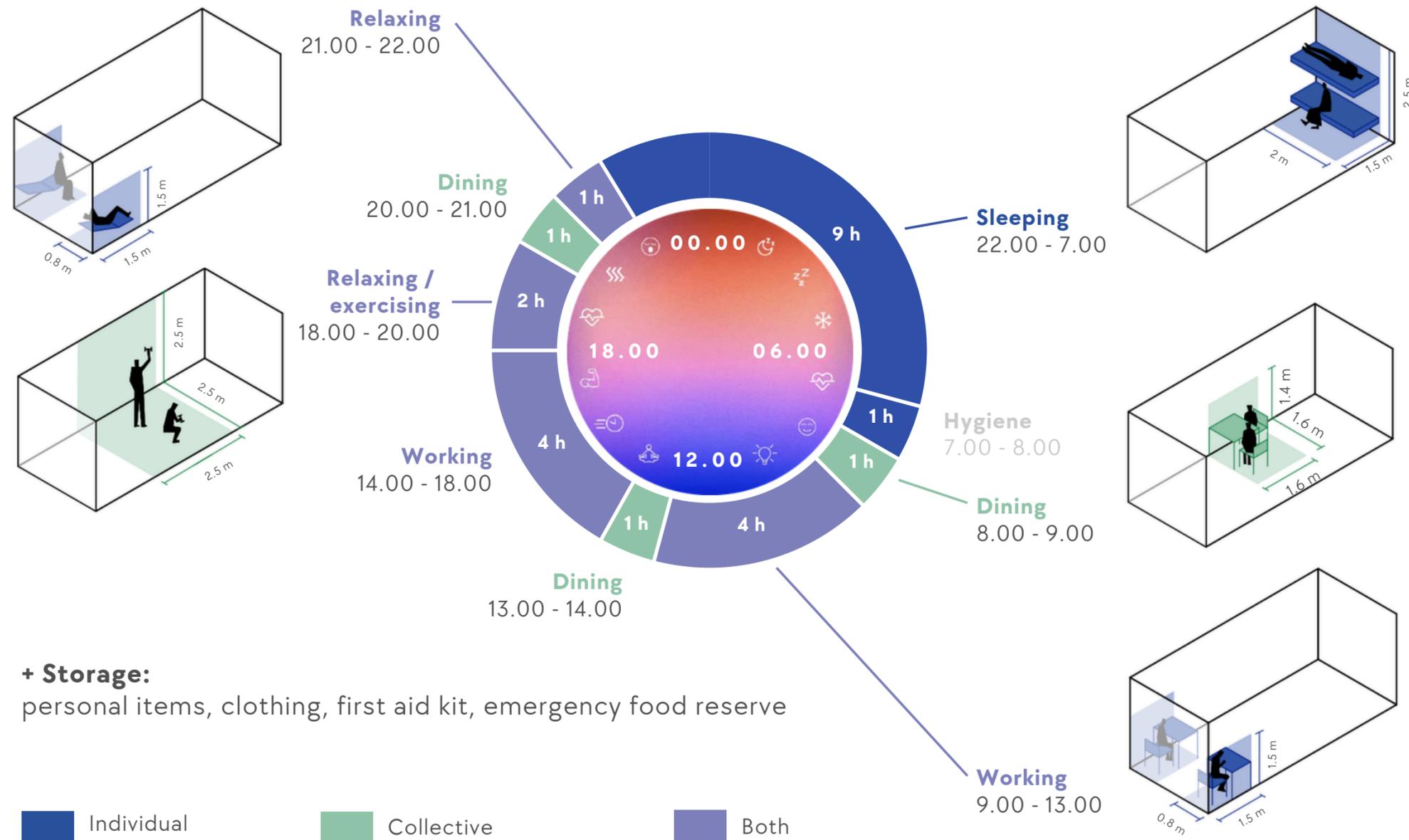
### EMERGENCY USE



+ **Storage:** personal items, clothing, first aid kit, emergency food reserve

**Conclusions:** Sleeping and working: primary time-occupancy functions. Dining: highest frequency, hence must be more easily accessible. Working, relaxing, exercising: must allow both collective and private fruition, hence at least two configurations each.

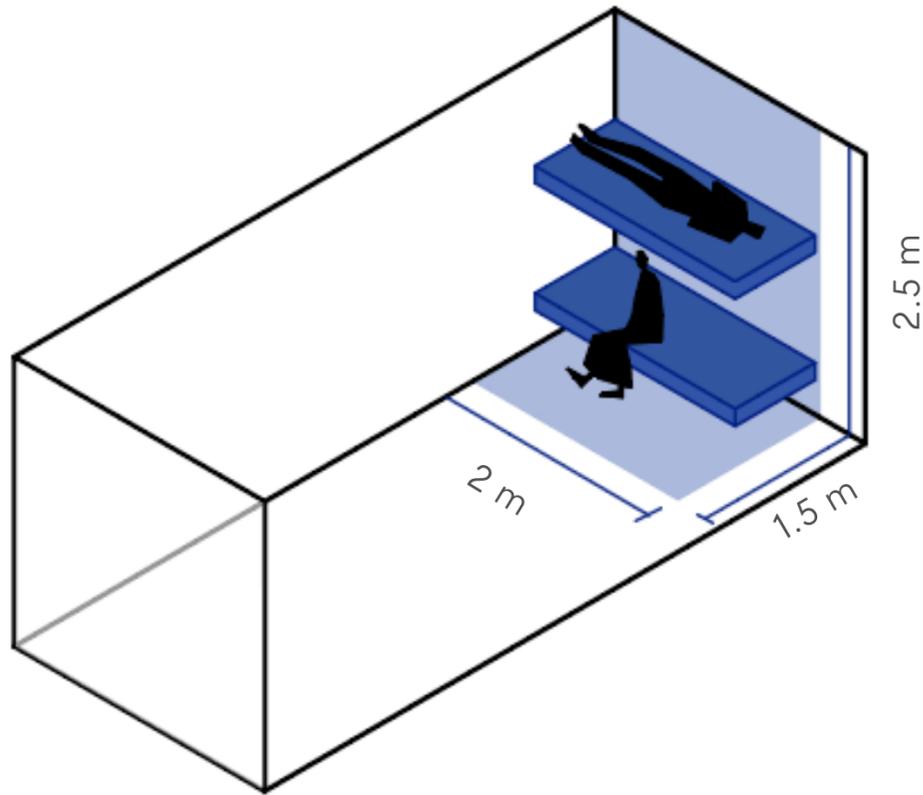
# 01 24/7 ACTIVITY MAPPING



**Conclusions:** Sleeping: primary time-occupancy function. Dining: highest frequency, hence must be more easily accessible. Working, relaxing, exercising: must allow both collective and private fruition, hence at least two configurations each.

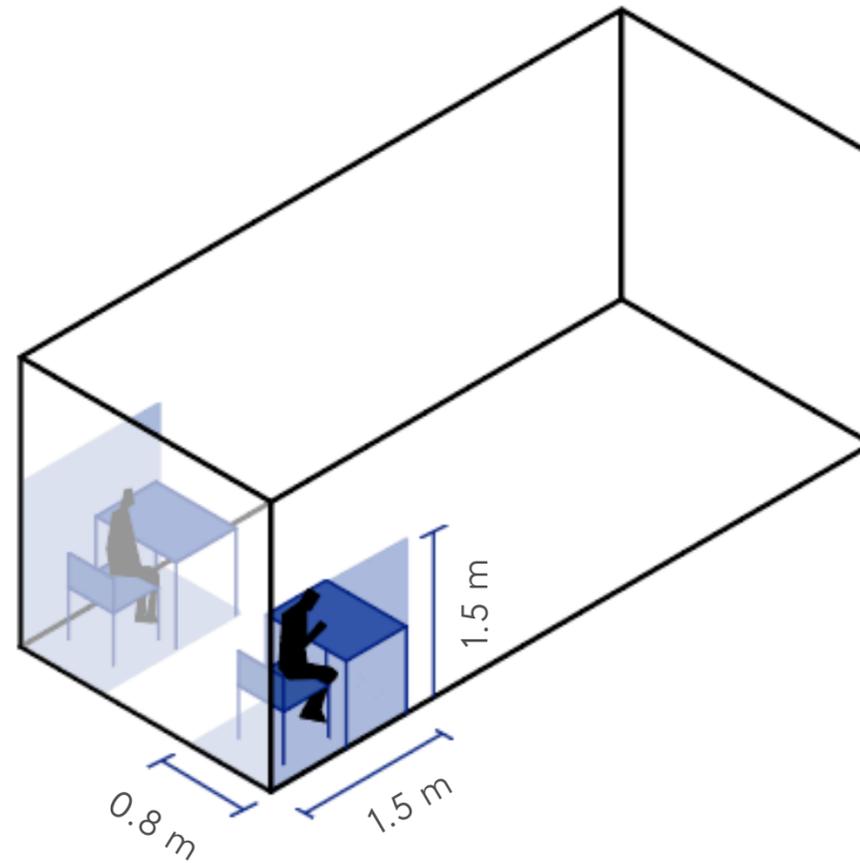
# 02 24/7 ACTIVITY MAPPING - SPACE

**INDIVIDUAL ACTIVITIES** During individual use, occupants tend to appropriate peripheral zones.



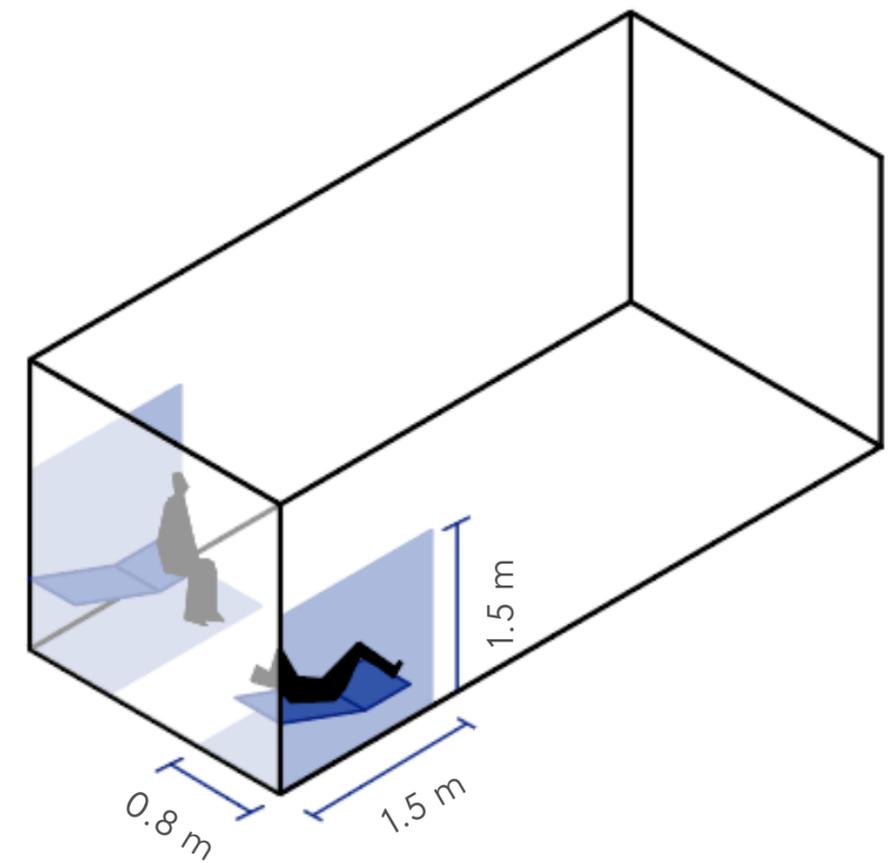
## Sleeping

Bunk beds for maximum privacy.  
At one extremity of the container to minimise daytime circulation interference, creating an "alcove" enhancing privacy, while allowing visual control over the room (Prospect-refuge theory).



## Working

Opposite side of sleeping area to ensure physical and psychological separation.  
Visual control over the room.

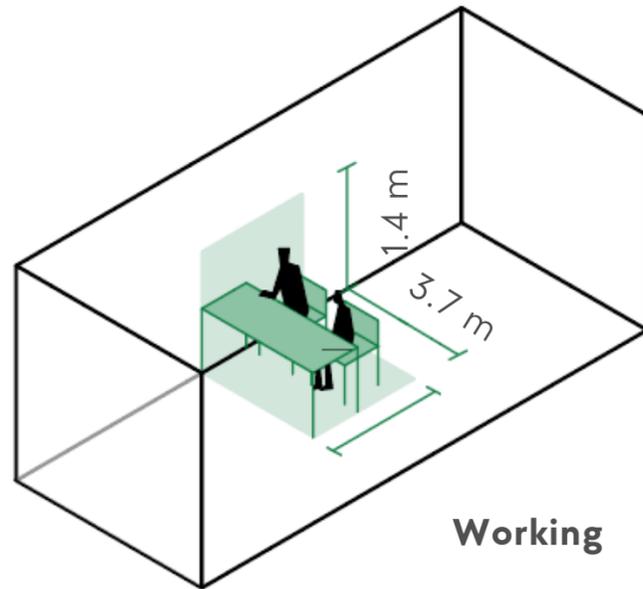


## Relaxing

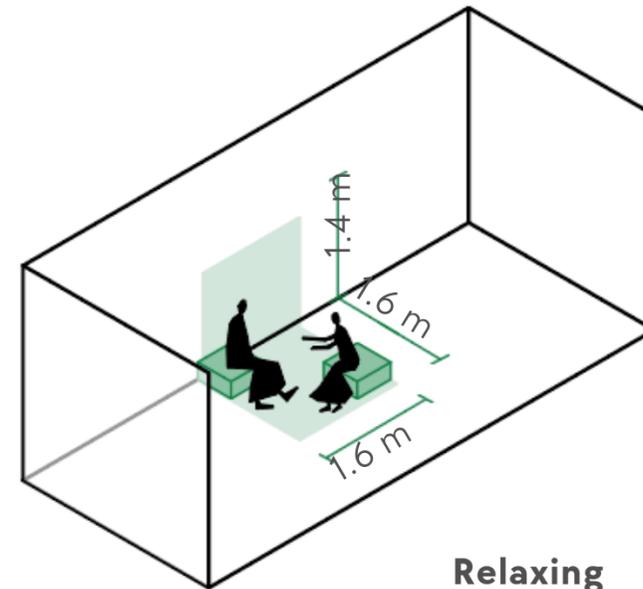
As an alternative function, place in same space of the working area, supporting spatial efficiency.

# O2 24/7 ACTIVITY MAPPING - SPACE

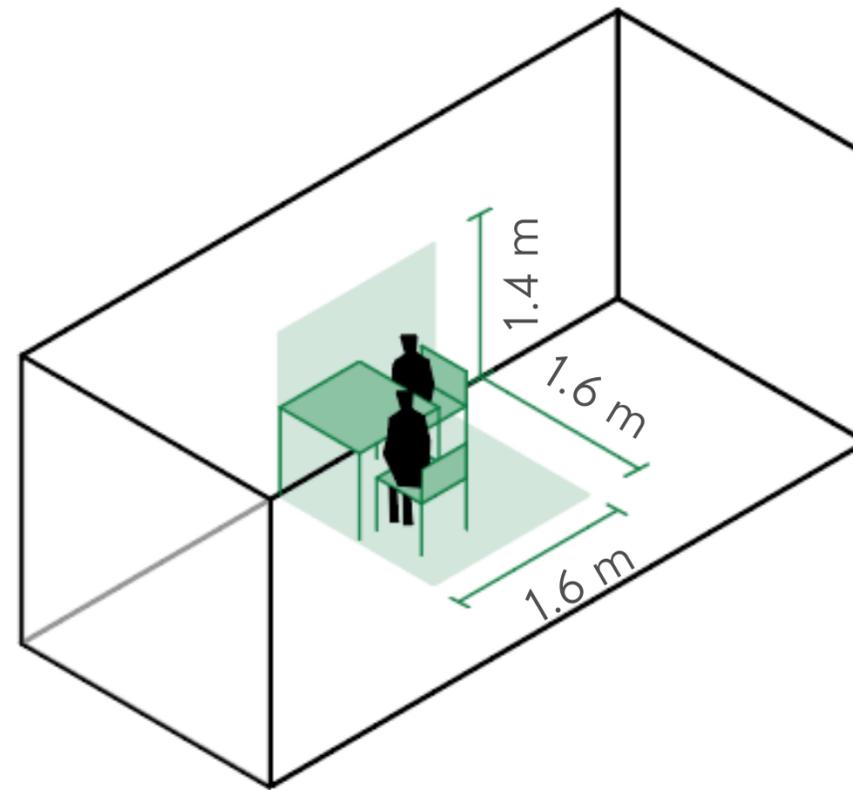
**COLLECTIVE ACTIVITIES** During social activities, occupants gravitate toward the centre, naturally acting as buffer between sleeping and working areas.



**Working**

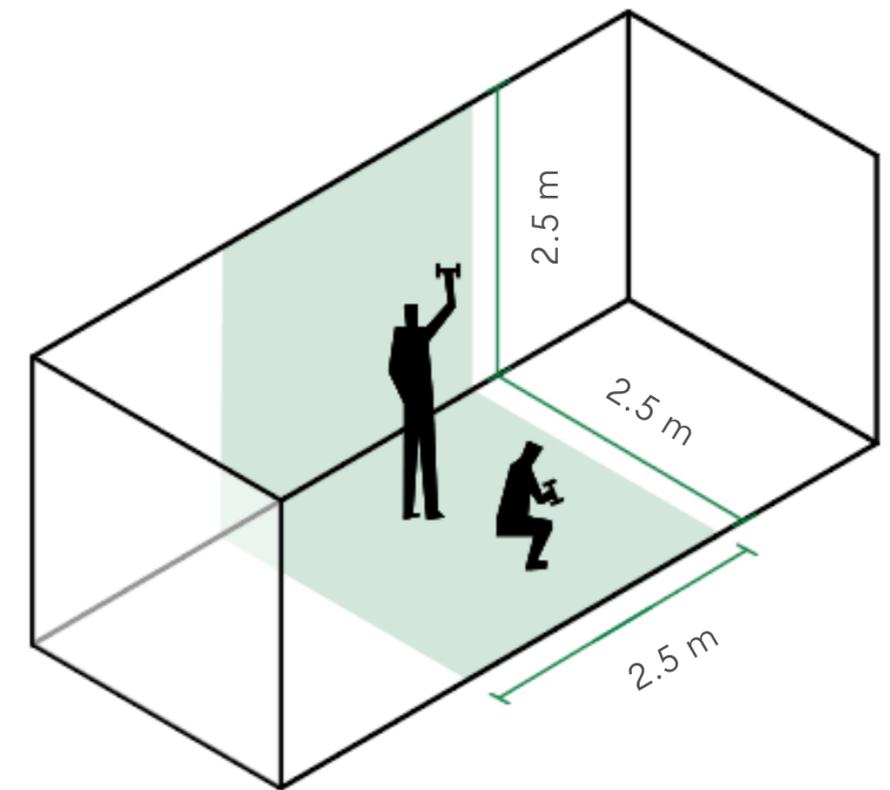


**Relaxing**



**Dining**

Centrally positioned for accessibility and equal reach from all zones, since activity with highest frequency.



**Exercising**

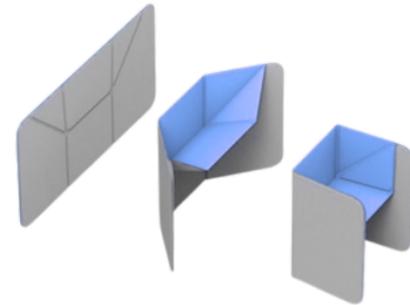
Demands maximum clearance of floor area.

# 03 ADAPTIVE TRANSFORMATION PRINCIPLES

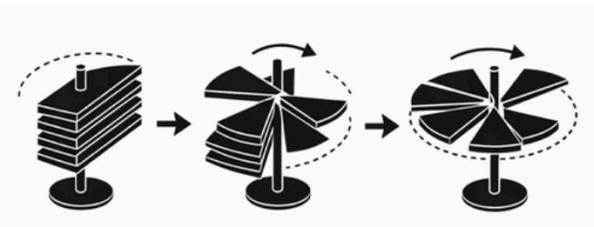
**!! ADD REFERENCES (at different scales)**

**Active change**  
**Changing the shape**  
with a mechanism or manually

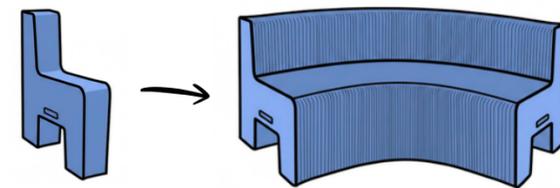
**Folding** - creating a bigger/smaller volume by using a/several hinge point(s)



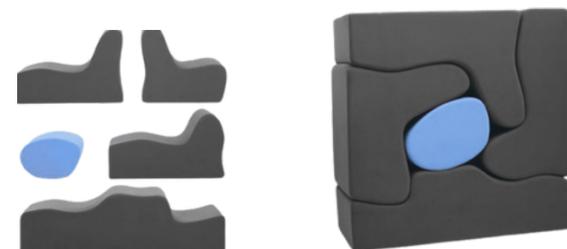
**Rotating** - creating a different shape by rotating.



**Extruding** - creating a bigger/smaller volume by extruding or sliding parts together



**Modular Clustering** - creating a bigger/smaller volume by building something with modules



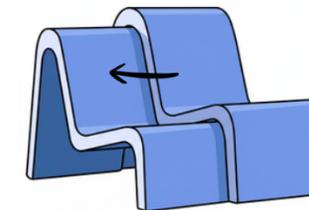
**Passive change**  
**Changing the function**

**Hybridisation** - a multipurpose object, low-tech and for easy use (also Active)



**Zoning** - changing the lighting or color, material or height differences (**layering**).

**Nesting** - taking an object out of another to create several objects/ putting an object inside another to save space



# 04 LIGHTING PRINCIPLES

**Responding to light cycles** - overhead lighting to mimic solar movement

- To prevent the extreme Antarctic light cycles from disrupting circadian health
- Mimics the light color and intensity for that time of day/activity

**Responding to activities** - localized lighting to create activity zones and boost productivity, mood and comfort

- Soft, warm light near the beds, brighter focused light at the desk, etc.
- sensors to track movement for example during the night
- ability to localize lighting

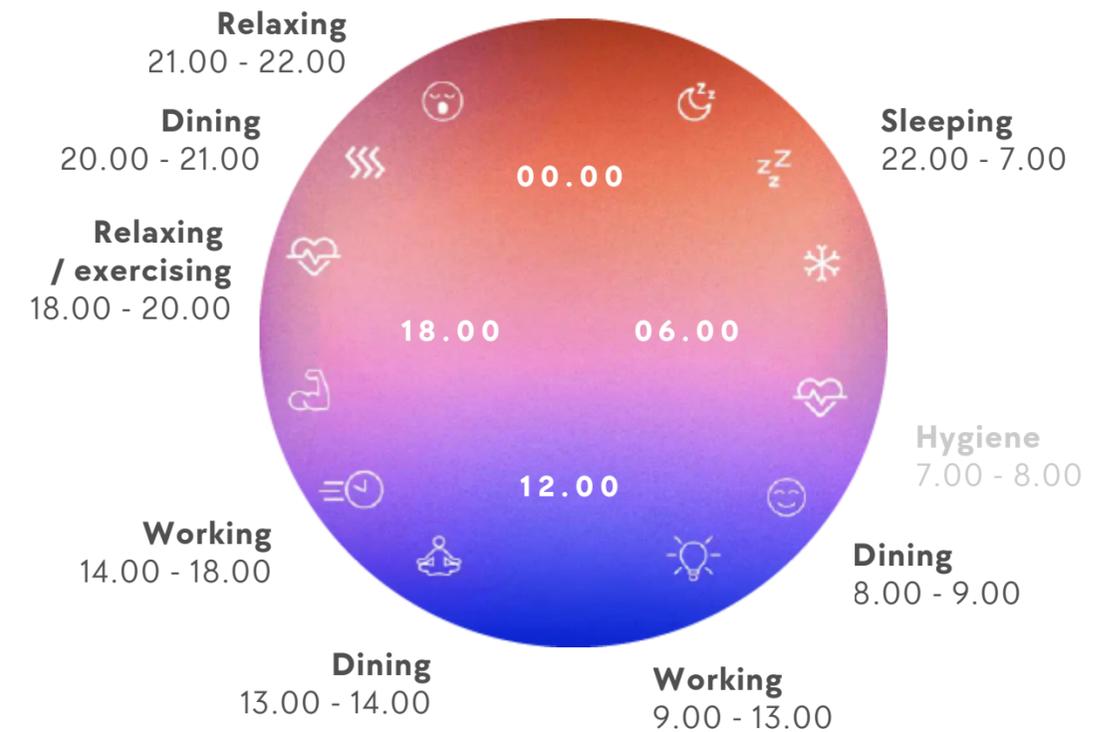
**Responding to health** - To enhance emotional well-being, measure stress levels, alertness and mood, changing the lighting accordingly.

- Elevated stress -> warmer light and reduced intensity
- Alertness during work -> cooler and brighter light
- Before sleep -> amber and gradual dimming

**Examples**

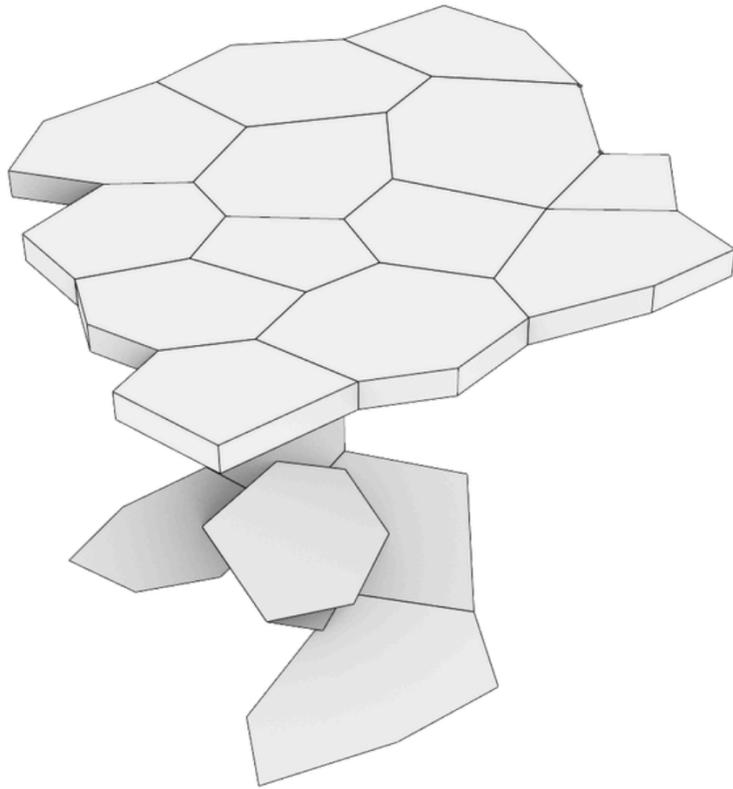


**colours**

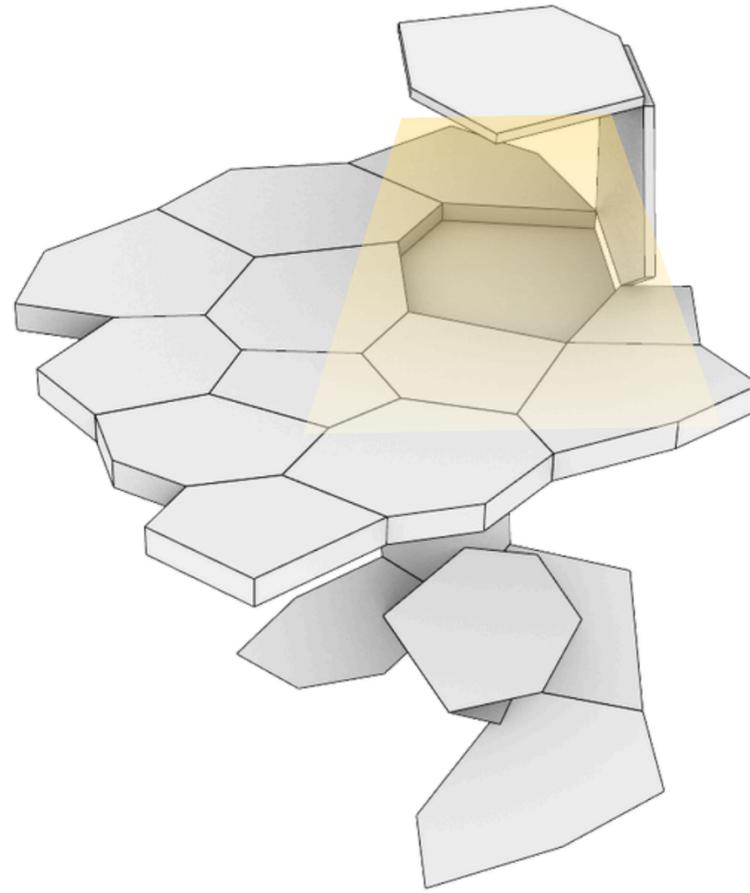


source: SAGA, Circadian lights for ISS

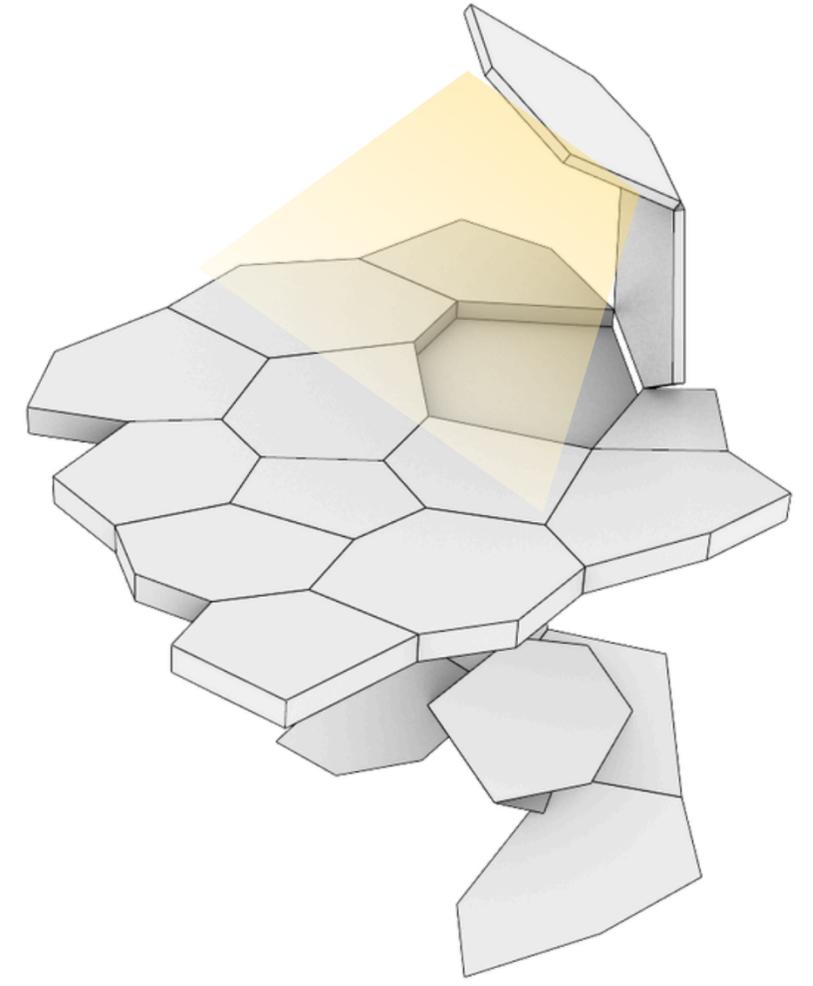
# 05 FURNITURE IDEAS



**Folded table Initial state**  
Voronoi tabletop



**Openable foldable cell panel**  
Emits lights underneath the top panel



**Adjustable inclination of the light**  
Pivot allows better light control

Thank you for your attention !

