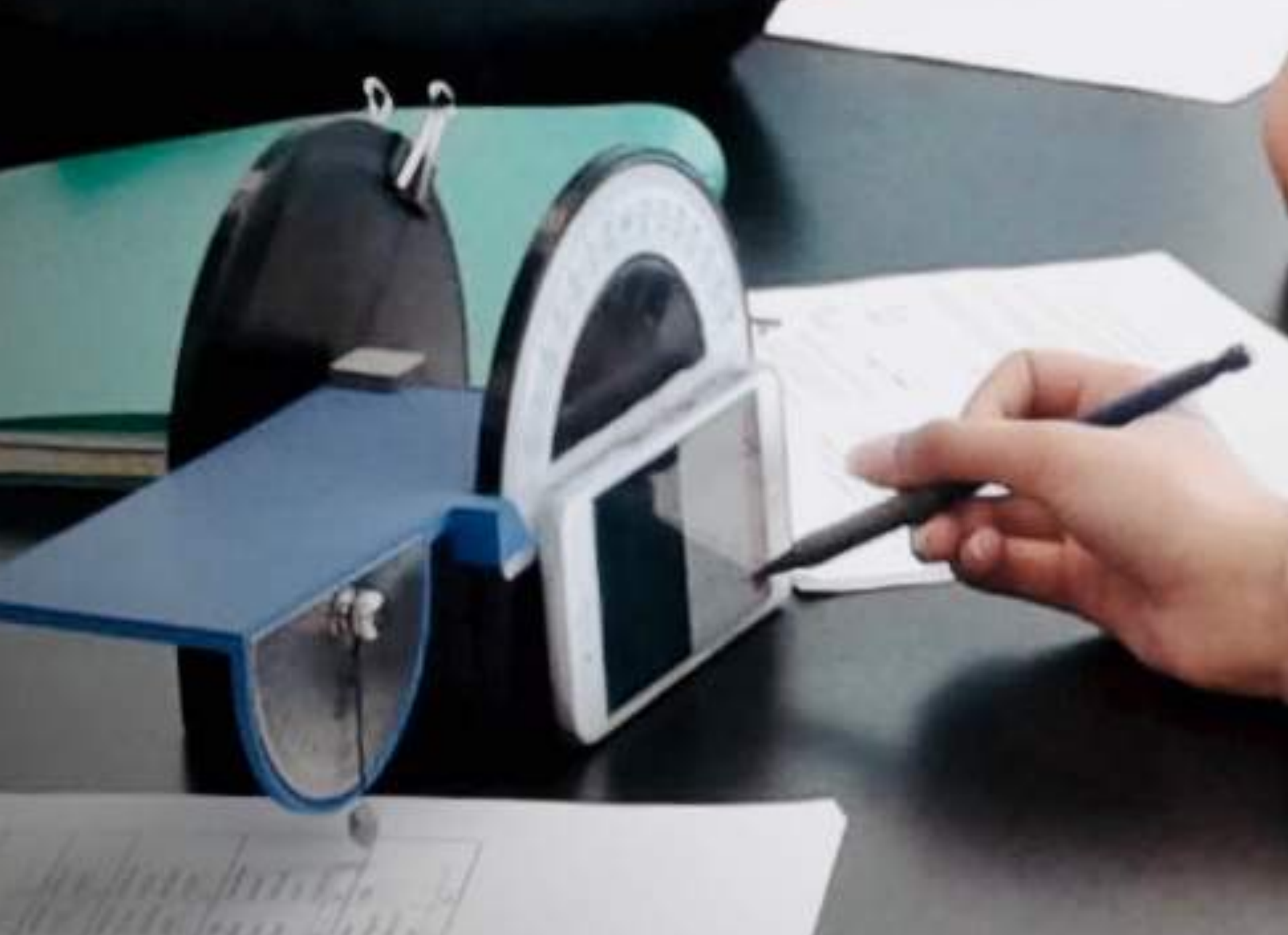


Laboratoires de physique avec téléphones intelligents







OBVIA

- Récemment créé à Montréal (2020)
- 'impacts sociétaux'
- > 200 chercheurs
- Plusieurs axes de recherche

Why Accelerometers?

- Acceleration
 - the “bread-and-butter” of physics
- Recent accelerometer technology
 - reliable ; affordable
- Smartphones
 - convenient workflow ; student identity
- Millennials
 - ** immersed in a digital landscape **

Overview

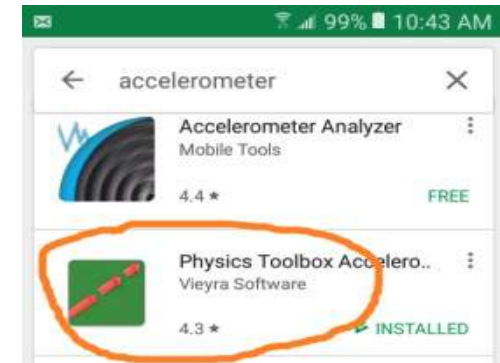
- 2 categories of lab activities
 - Static (inclined planes)
 - Dynamic (circular motion)
- 2 types of apparatus
 - TiltTray
 - SpinFrame

iOS

AppTools

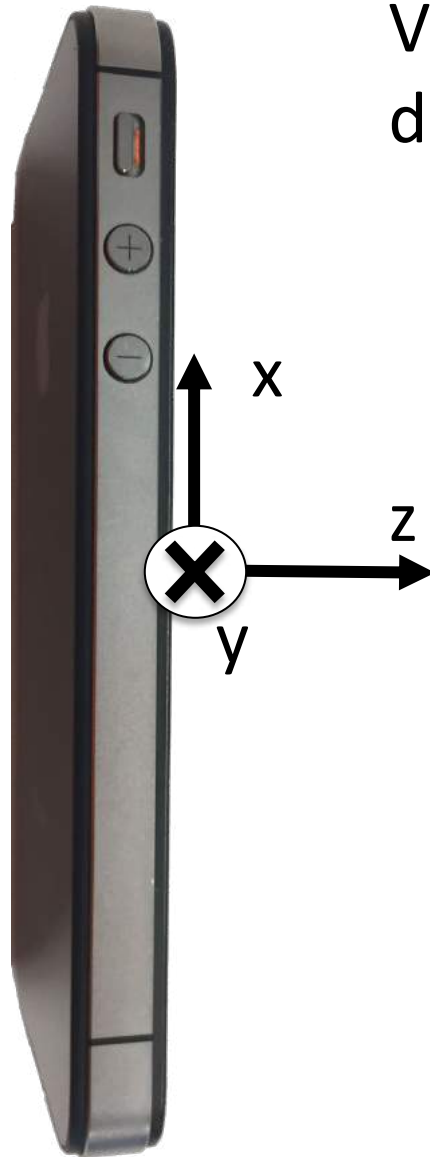
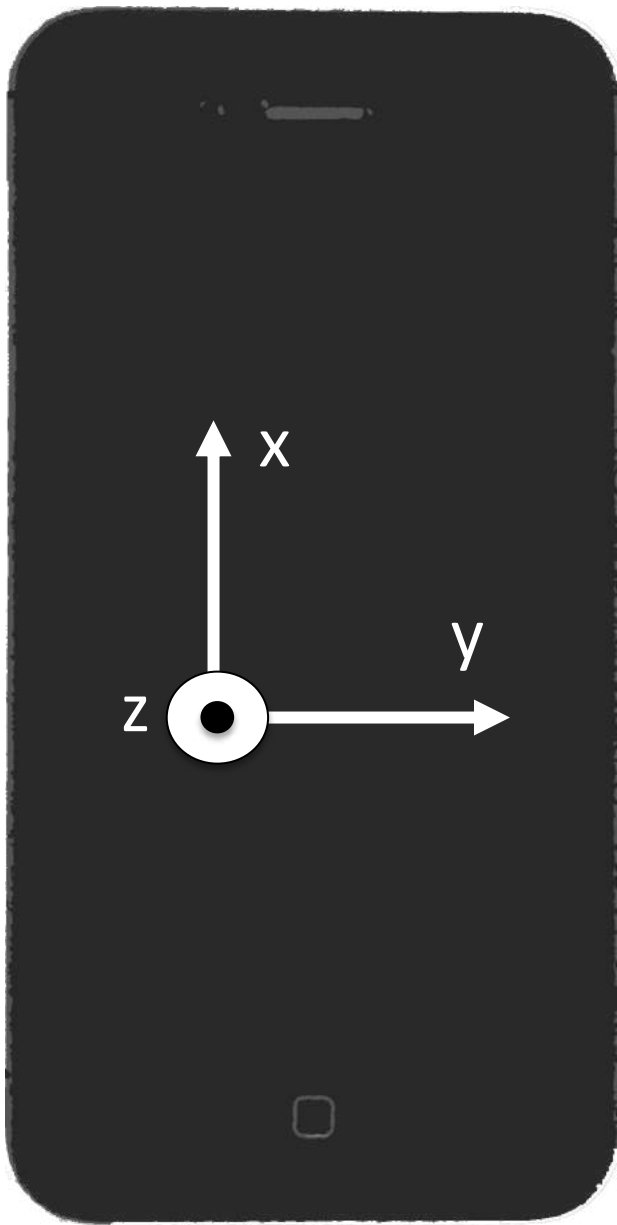
- instructions
- sample data
- excel template

Android

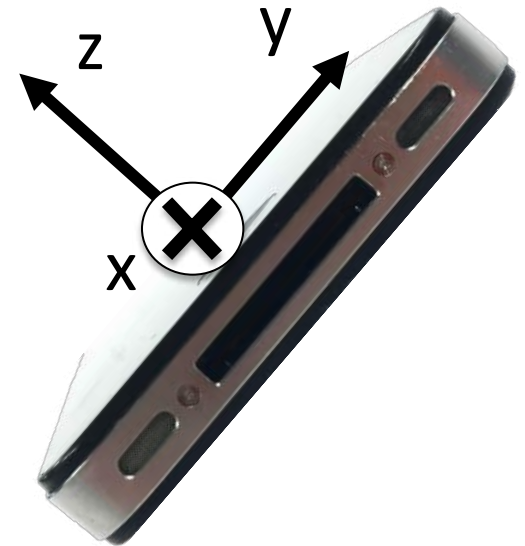


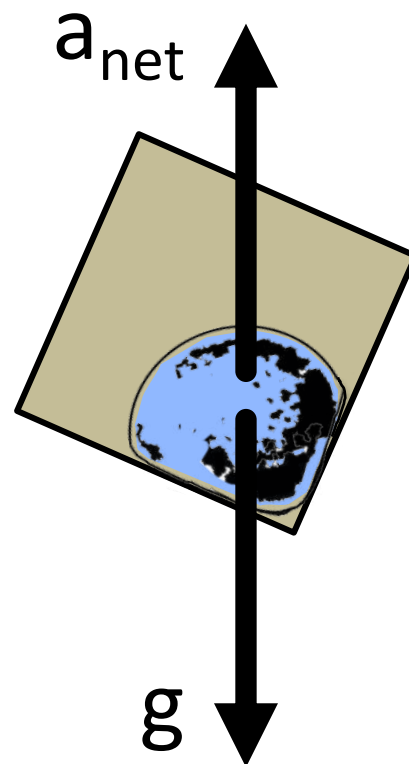
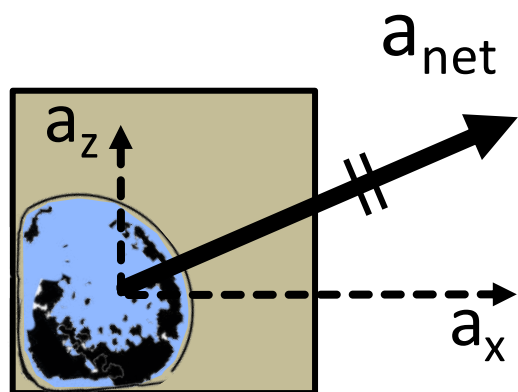
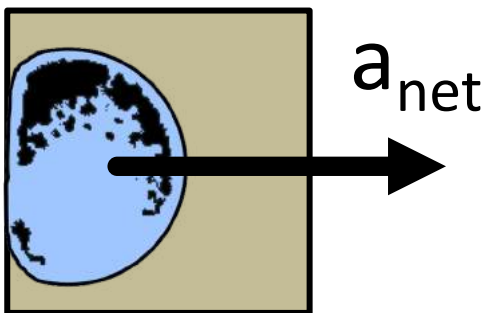
	A	B	C	
1	index	x	y	z
2	0	0.012436	0.002197	-1.0
3	1	0.014542	0.004089	-1.0
4	2	0.013824	0.003693	-1.0
5	3	0.014221	0.004288	-1.0
6	4	0.019531	-0.002029	-1.0
7	5	0.027802	0.016296	-1.0





Visualizing axis
directions in 3D



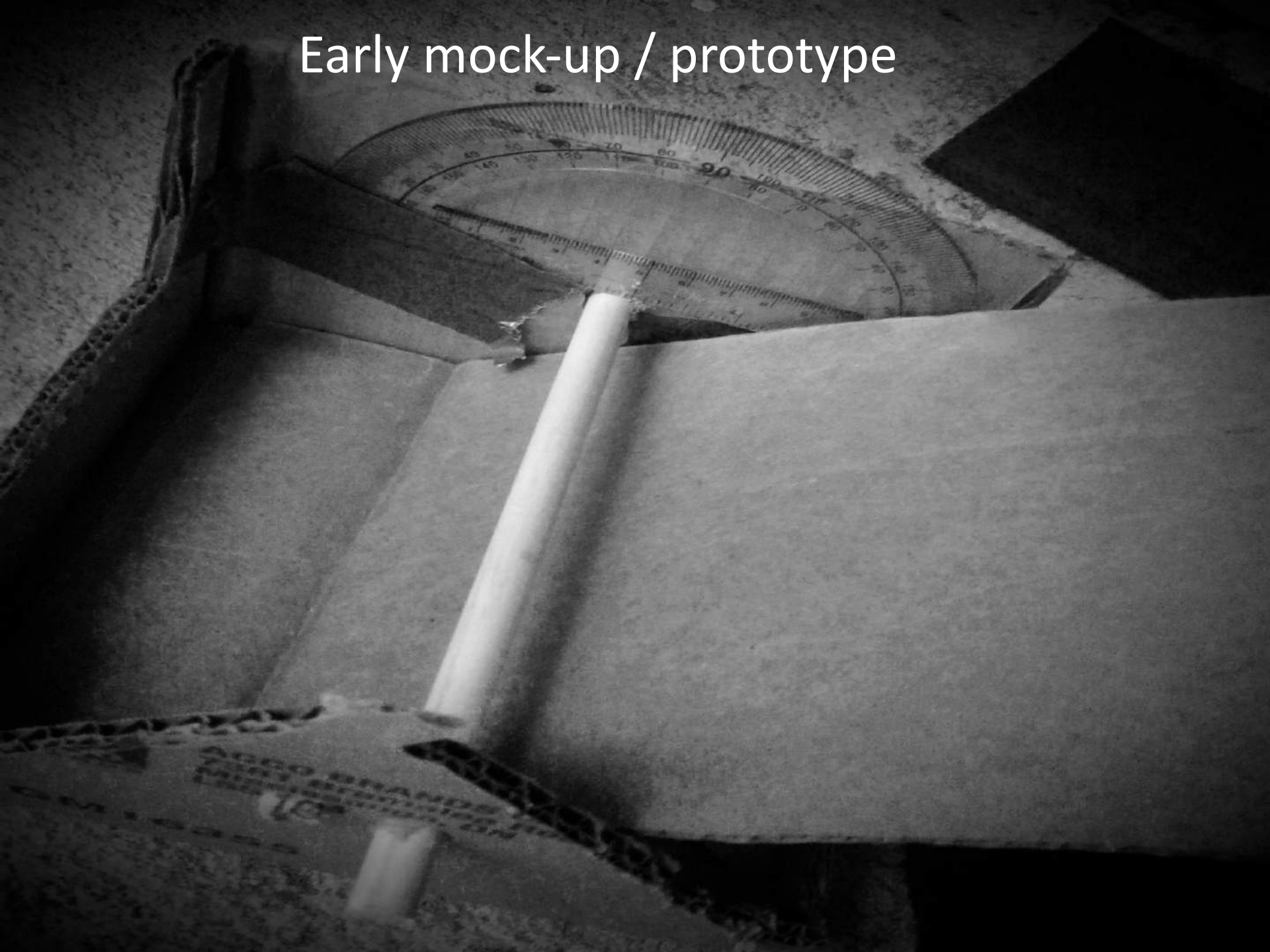


TiltTray:

apparatus and

experiments

Early mock-up / prototype



" Axle and AxleHousing "= 0

"Axle.length" = "Base.InnerWidth"+"FrontPlate.Depth" + "FrontPlate.thickness"

"Axle.Diameter" = 6.35

"Axle.holeDiameter" = "Axle.Diameter"+0.6

"AxleCenterToTrayLowerSurface" = 9

"AxleHousing.notchDepth" = 9.10

" SidePlate "= 0

"SteelProtractor.radius" = 45

"SteelProtractor.baseHeight" = 7

"SteelProtractor.thickness" = 1.2

"TrayPlate.baseHeight" = "SteelProtractor.baseHeight"+"TrayPlate.clearance"

"TrayPlate.margin" = 2

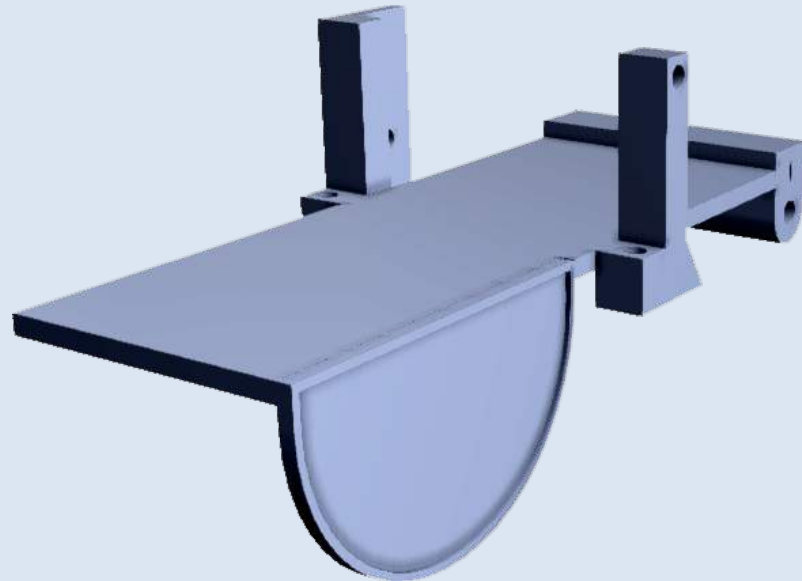
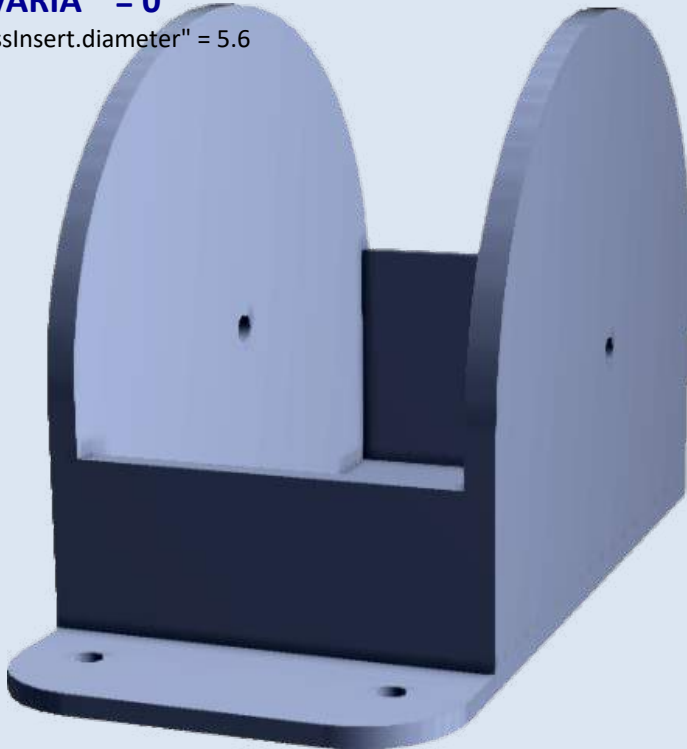
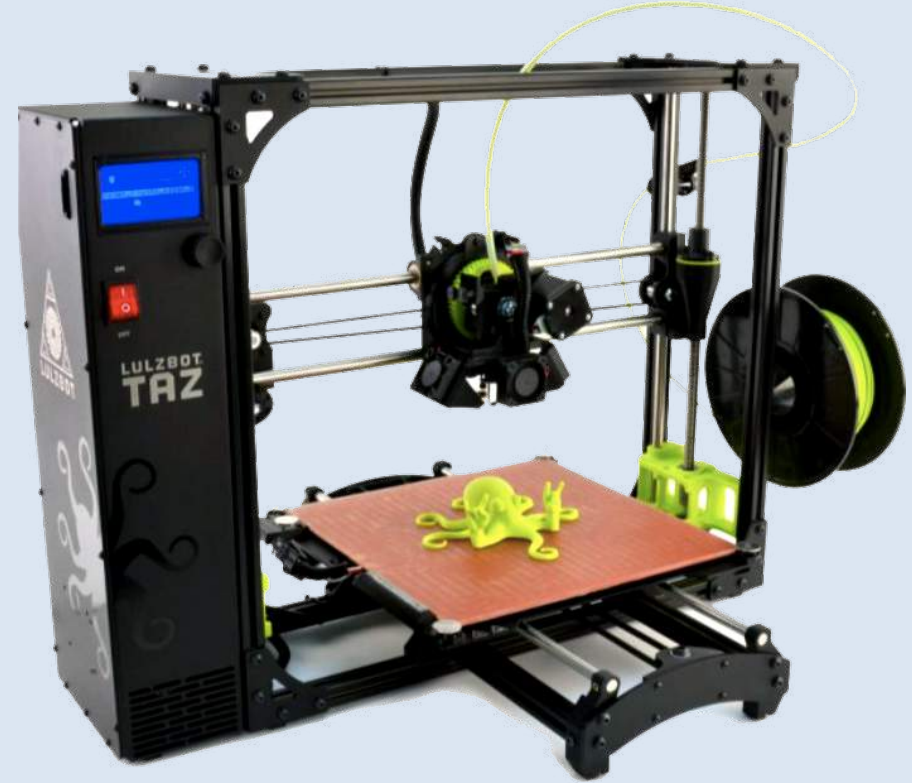
"TrayPlate.thickness" = 4

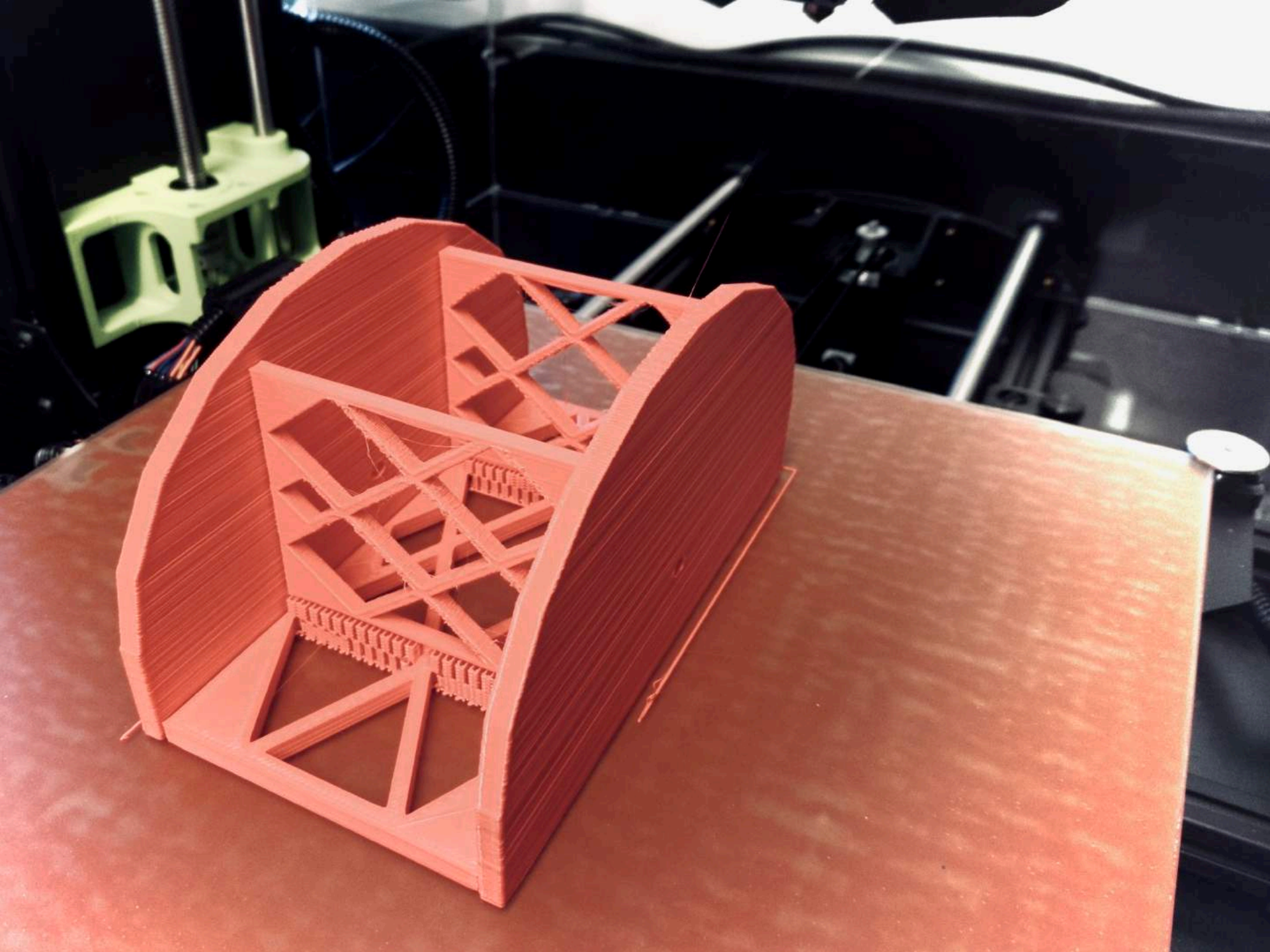
"TrayPlate.outerDiameter" = "TrayPlate.outerRadius"*2

"TrayPlate.TotalHeight" = "TrayPlate.baseHeight" + "TrayPlate.outerRadius"

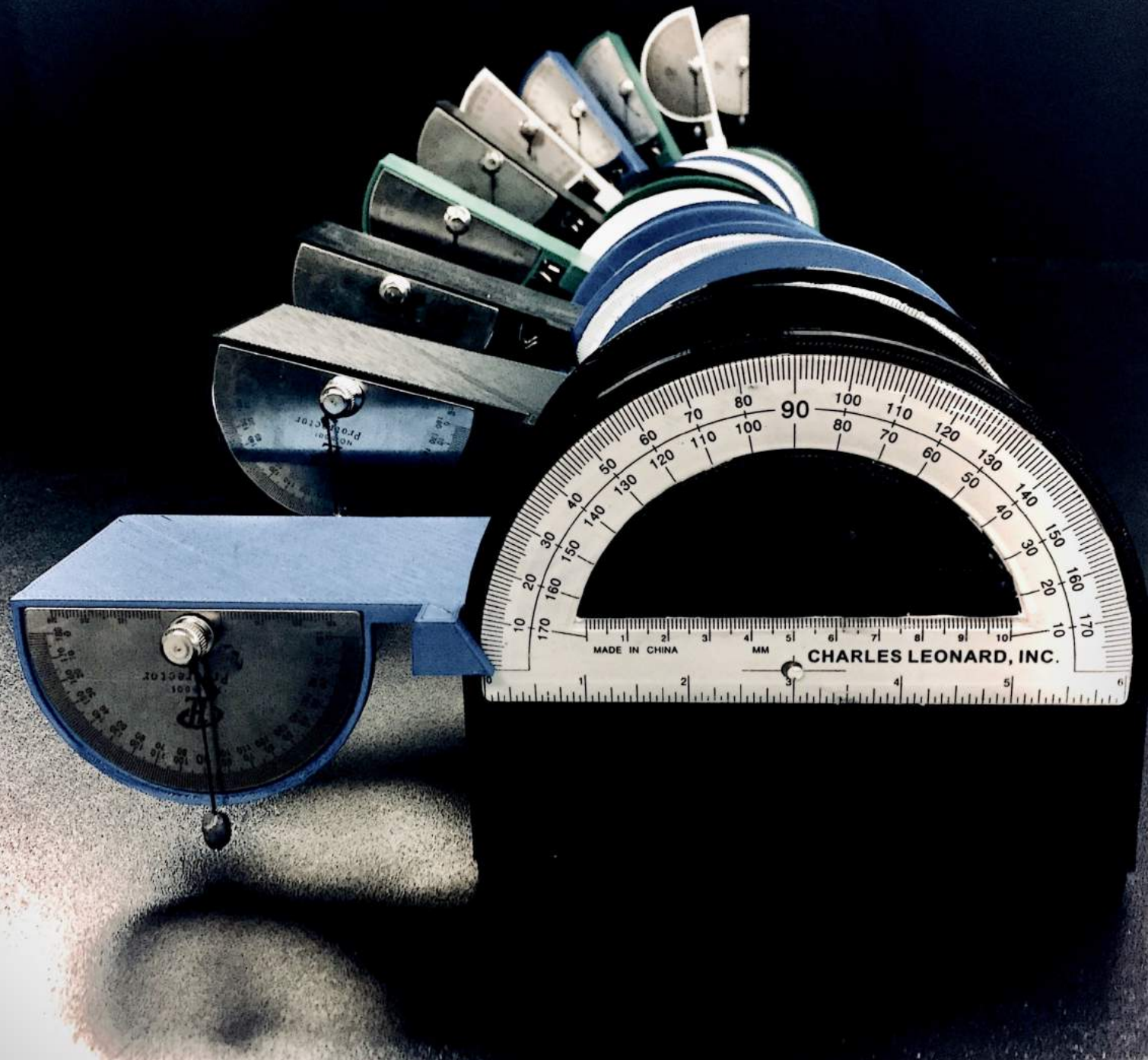
" VARIA "= 0

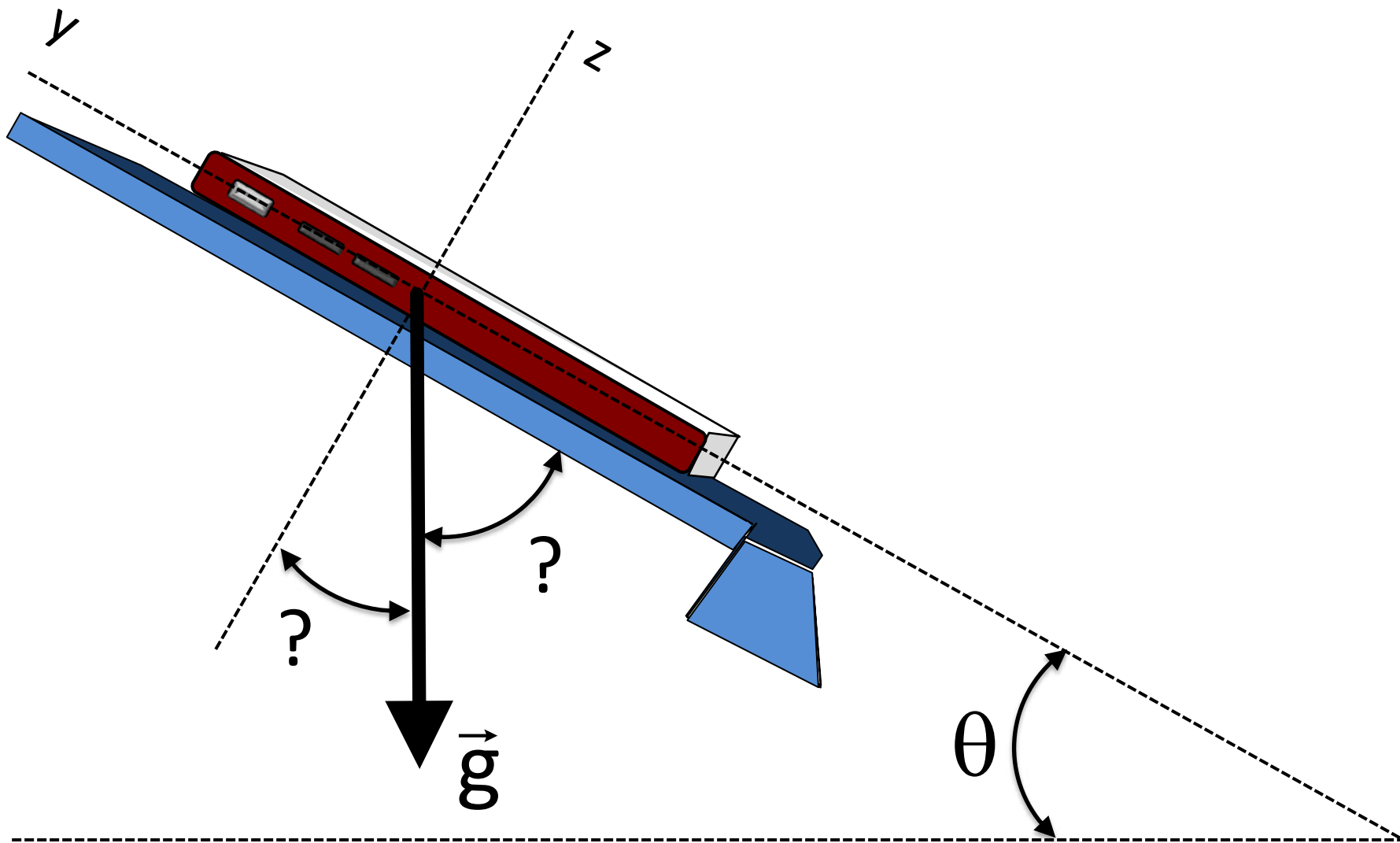
"BrassInsert.diameter" = 5.6

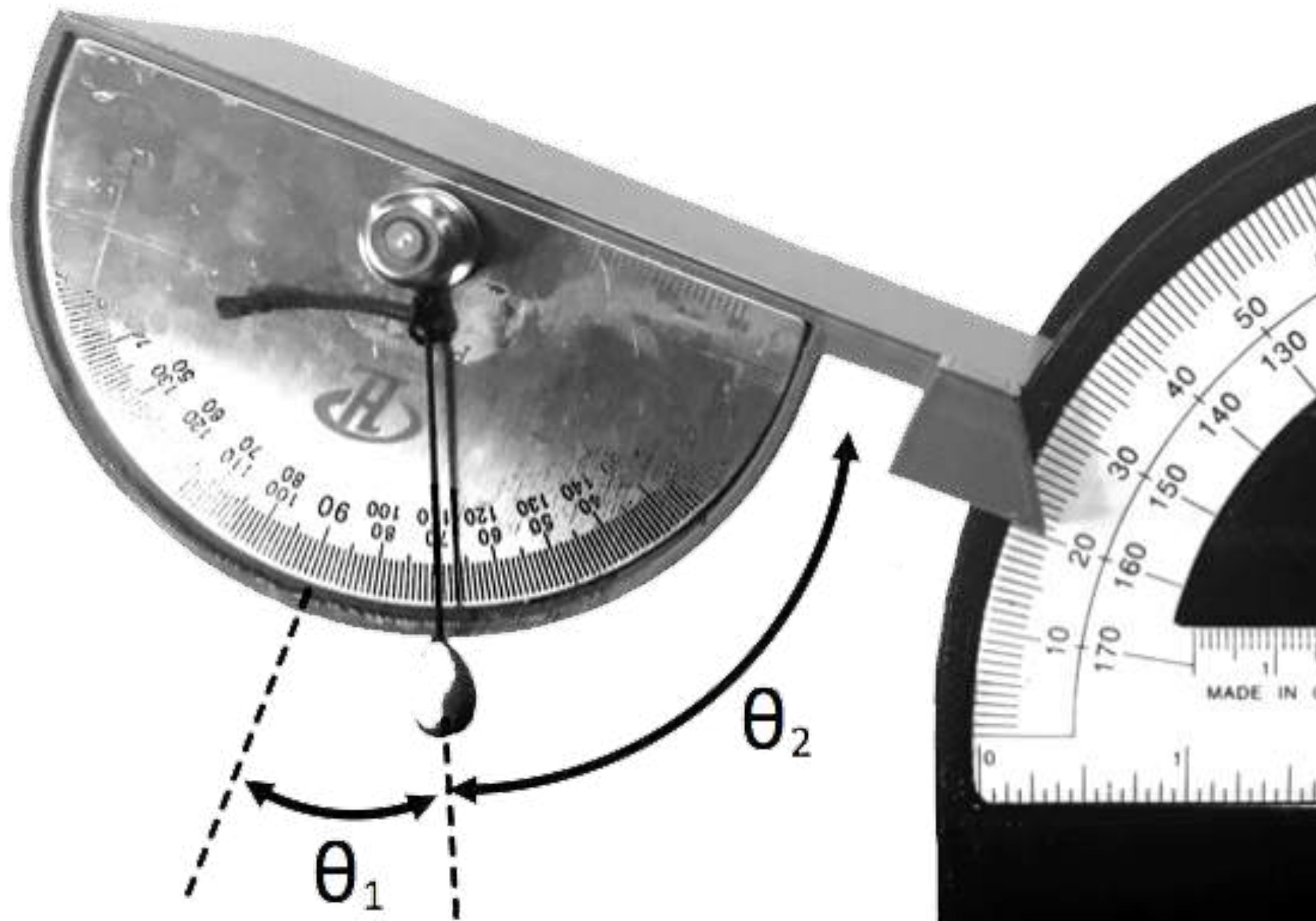












Collaboration: Adopters

- Lab package ready-to-go
 - AppTools
 - Lab procedures
 - Teacher resources
- Apparatus
 - borrow
 - soon: 3D-print yourself!
- Share experiences and variations

Collaboration: Researchers

- What types of conceptual change?
- What can be measured?
- Everyday tool --- object of scientific inquiry
- Understanding millennials
 - the screen is less abstract than a baseball
 - engagement, disenchantment

Some informal responses

- “This is the first lab that felt real.”
- “I feel like a grandmother”
- “Eureka, sir, eureka!”

