Example Brief

Manual Sorting Ramp Mechanism

Scenario

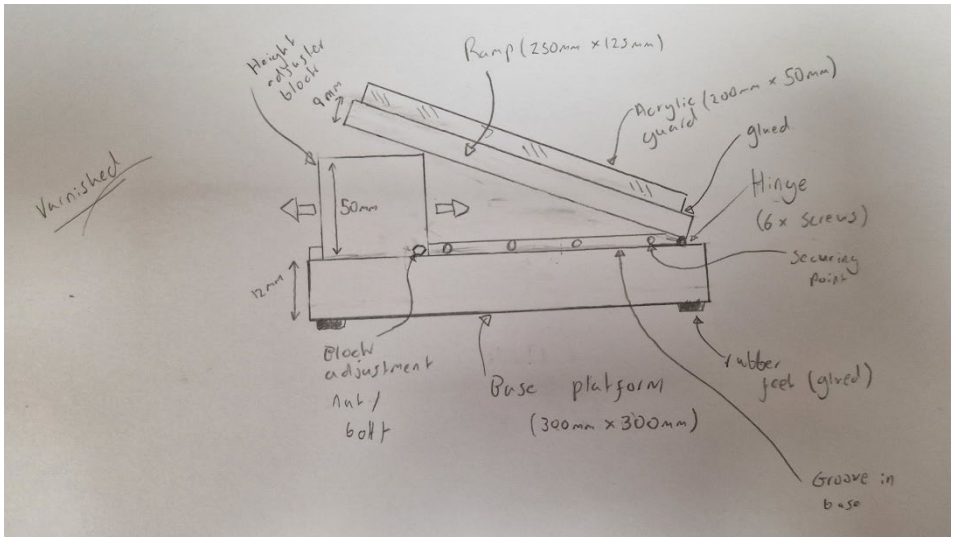
A small materials lab needs a manual device that lets operators sort small test samples (wooden cubes, acrylic pieces, bolts, etc.) by rolling or sliding them down a ramp into one of three collection bins. Because the samples can't be handled directly, the ramp's angle and direction must be adjustable behind a clear acrylic guard.

The device should demonstrate controlled motion, repeatable alignment, and mechanical adjustment, all made using wood, screws, and some acrylic or metal fittings.

Functional Requirements

- Manually operated (no motors).
- Adjustable ramp angle (0–30°) using a screw or lever mechanism.
- Rotating chute selector that diverts samples into one of three bins.
- Safety screen (400 × 200 mm acrylic) between operator and ramp.
- Must handle a 200 g sample rolling/sliding down without jamming.
- Device must be stable, safe, and repeatable.

My Design



Example BoM

Item No.	Part Name/Description	Material	Qty	Dimensions	Process	Unit cost	Cost used (£)	Justification
1	Base Platform	12mm plywood	1	300x200mm	Hand cut, drilled, router for groove	£12 per 600x400 sheet	3	Provides rigid support and attachment surface with a groove for the adjustment block
2	Adjustable Ramp	9mm MDF	1	250x125mm	Laser-cut edges and grooves for guards	£10 per 600x400 sheet	1.30	Smooth sliding surface for samples
3	Ramp Hinge	75x75mm door hinge	2	Steel	Purchased	£6 per 10	1.2	Allows adjustable tilt
4	Wood screws for hinge	Steel, Zinc plated	12	4x30mm	Purchased	£0.05 each	0.60	Fixes the hinge to the ramp and the base
5	Height adjuster block	Softwood (pine)	1	50x50x50mm	Band Saw, Drilled	£3 per meter	0.25	Supports ramp angle
6	Adjustment block bolt and nut	Carbon Steel	1	M6x70	Purchased	£5.07 per 10	0.51	Secures the height adjuster block in a position
7	Acrylic Guard	3mm clear acrylic	2	200x50mm	Laser-cut	£15 per A4 sheet	4.81	Protects the sample from slipping off the ramp, protecting user
8	Rubber Feet	Neoprene pads	4	Ø 15x3mm	Purchased	£3 per sheet of 6	2	Prevents sliding and absorbs vibration
9	Adhesive	PVA wood glue	-	-	Consumable	£5 per Bottle	0.25	Joins parts together
10	Finish	Danish oil / varnish	-	-	Consumable	£6 per tin	0.30	Protects and seals surfaces