College Life’s (Team 5) Presentation
Engineering / Management Collaborative Project
Marketing team: R. Red, B. Blue, G. Green
Engineering team: O. Orange, Y. Yellow, P. Purple

Part one: Overview
1 | Task

**Goals:**

- Determine a perceivable hole in the college-age consumer market
- Find a marketable product that would bridge that gap
- Research customer needs
- Adhere to strict safety statutes
- Make dorm life more productive and enjoyable.

Part two:

Introduction
3| Product Comparison

- **Concept one**: Jelly Mattress pad
  - Based off "egg crate" pads/water beds.
  - Dimensions of the mattress
  - 3-4 inches thick
  - filled with an jelly material that is both flame retardant and reforming

- **Concept two**: Fold up loft
  - Meant to conserve space
  - Loft folds up parallel to the wall when not in use
  - Reminiscent of fold up cots seen in old war movies

- **Concept three**: Laptop Desk
  - Universal trends: laptops and lofts
  - College kids are lazy and devoted to their beds
  - Screen to block light

3| Product Analysis

- Laptop desk

- Attributes (On a scale of 1-10)
  - Convenient- 7
  - Lightweight- 3
  - Multipurpose- 10
  - Comfort- 8

Overall Rank- 1
3| Focus group

Our focus group was drawn from 18-25 year olds representing or living in all of the locations marked with a red star.

Part four:

Concept Analysis
4 | General Concept

- Concept has drastically evolved
- First prototype
- Weight issue
- Find better way to attach unit

4 | Finalized Concept
Part five: Marketing Programs

5| Slogan/Product name

- “You’re going to spend the rest of your life getting up to go to work…Why not stay in bed as long as you can!”
- College Life’s Laptop Desk
Selling Price = Total Fixed Costs + Annual Costs

\[
\text{Selling Price} = \frac{1,022,102 + 5,241,984}{326,400}
\]

\[
\text{Selling Price} = \$19.20
\]
5| Break even volume

- Break Even Volume - Selling Price (x) = Total Fixed Costs + Variable Cost/Unit (x)

- Break Even Volume -
  $19.20x = $1,022,102 + $16.06x

$3.14x = $1,022,102

**Break Even Volume** = 325,511.00 units

5| Year’s production

- We believe that a reasonable estimate of laptop desks that could be produced in 1 hour is 160.

(160 units an hour) x (8 hours a day) x (5 days a week) x (51 weeks per year) =

**326,400 Units Produced Per Year**
### Cost structure

- **Fixed Costs**
  - Building Lease: $270,000
  - Equipment Lease: $200,000
  - Overhead: $12,000
  - Team Member's Salary: $280,000
  - Insurance: $60,000
  - Health Insurance: $70,200
  - Start up/ Licensing Taxes: $500
  - Wage Tax: $36,402
  - Office Staff Salary: $25,000
  - Managers Salary: $50,000
  - Office Equipment: $18,000

- **Variable Costs**
  - Labor Costs: $571,200
  - Materials: $3,427,200
  - Transportation: $1,243,584

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### Part six:

Production processes
Injection Molding

- Most widely used polymeric fabrication process
- Evolved from metal die casting
- Unlike molten metals, polymer melts have high viscosity
- Can not simply be poured into mold
- Large force used to inject polymer into hollow mold cavity
- More melt must be packed into mold during solidification to avoid shrinkage in mold

Reciprocation Screw Injection Molding Machine
- Reciprocation screw injection molding machine
- Most common injection unit used
- Screw rotates and axially reciprocates
- Rotation produced by hydraulic motor
- Acts to melt, mix, and pump polymer
- Hydraulic system controls axial reciprocation of screw
- Moves melt forward for injection
- Valve prevents back flow of melt from mold cavity

Clamping Unit
- Clamping unit holds mold together
- Opens and closes mold automatically
- Ejects the finished part
- Mechanism may be of several designs
  - Mechanical
  - Hydraulic
  - Hydro-mechanical.
6 | Why we chose Injection Molding

- **Advantages**
  - High production rates
  - Design flexibility
  - Repeatability within tolerances
  - Can process a wide range of materials
  - Relatively low labor
  - Little to no finishing of parts
  - Minimum scrap losses

- **Disadvantages**
  - High initial equipment investment
  - High startup and running costs possible
  - Part must be designed for effective molding

6 | Resin Prices

- **Injection Medium**
  - *Impact ABS*
  - Used to make desk
  - Thermoplastic material
  - Comes in resin pellets
  - Cost: 72 - 75 US cents per pound
  - Appropriate for use in injection molders
Injection Molding

1. Melting the plastic resin
2. Injection of the melt into the mold
3. Cooling the mold
4. Removing the part
5. Recycling unused resin

6. Injection Molding

Diagram:
- 1. Plasticating screw
- 2. Diverter valve
- 3. Injection plunger
- 4. Other parts
Work Flow Diagram

1. **Injection Molding of Desk**
2. **Insert Elastic Strips**
3. **Apply Velcro**
4. **Bolt Cap to Desk**
5. **Sew Screen Material**
6. **Attach Velcro**
7. **Melt Arm Pieces and Elbow**
8. **Place on Wire Frame**
9. **Melt on Cap**
10. **Package and Shipping**
Part seven:

Conclusion