Team #14
Adaptive Equipment
for Samantha Gillard

Jeff Peterson
Kelly O’Neill
Kevin Franzino
Background – Rett Syndrome

* Samantha Gillard is a 2½ year old with Rett Syndrome.
* Rett Syndrome is a MECP2 x-chromosomal mutation that affects Samantha’s neurological function.
* Rett Syndrome is characterized by poor muscle motor control and language expression and reception skills.
* While development begins as normal, Rett Syndrome is characterized by a developmental reversal around 6–18 months of age.
* Symptoms typically include: lack of balance, repetitive hand motions (ticks), and inability to speak.
• Symptoms typical of most girls diagnosed with Rett Syndrome

• Strong language reception skills
  • aware of what is being communicated to her, despite being unable to use verbal communication

• Involuntary tick that causes her to frequently put her hands in her mouth
  • difficulty eating
  • arms must be restrained so that she is able to consume food and doesn’t injure herself

• Weekly physical therapy
  • learning to hold herself upright through low resistance exercise
  • hopefully one day, she will be able to crawl and walk
The Pragmatic Organization Dynamic Display is a binder containing a picture based language developed by Boardmaker®. The pictures are organized in a logical and easy to navigate way, so that the aide can turn the pages and point to the columns of images and ask yes-no questions until the desired outcome is reached.
Purpose

To design and construct equipment that will help Samantha carry out day to day activities such as eating, reading, laptop usage, and the use of her P.O.D.D.

Also to provide Samantha with a fun outlet, so that she may be able to safely enjoy “going fast” and the outdoors, which are currently two of her favorite things. Geoff and Jenny Gillard are avid ski enthusiasts, and want to see Samantha hit the slopes with them soon.
The adaptive position chair must:

- Provide considerable core support for Samantha, as she has difficulty holding herself upright.
- Have a series of tray tables to be used in conjunction with her P.O.D.D. and other activities.
- Contain adequate restrain to prevent Samantha from making unplanned movements.
- Be stable and not tip over.
- Collapse down small enough to be considered portable.
Construction: Adaptive Chair

Key Components:
- General purpose carbon steel tubing for frame
- Acrylic for tray tables
- Nylon for restraint harness
- Polyurethane foam padding
## Adaptive Position Chair Budget

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
<th>Estimated Cost</th>
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<tbody>
<tr>
<td>Seat</td>
<td>Nylon, polyurethane foam</td>
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<tr>
<td>Tray(s), Foot Rest</td>
<td>1-1.5” Acrylic</td>
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<tr>
<td>Frame</td>
<td>Extruded Channel Aluminum</td>
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<tr>
<td>Hardware</td>
<td>Misc.</td>
<td>$50.00</td>
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<tr>
<td>Harness</td>
<td>Nylon</td>
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<tr>
<td><strong>Sub-Total</strong></td>
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<td><strong>$450.00</strong></td>
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</table>
With Geoff and Jenny Gillard itching to hit the slopes with their daughter, Samantha will need a custom Assisted Skiing Device to provide support and protection from both the cold weather, and potential spills.

Samantha will need an aide to assist her at all times while she is using the Assisted Skiing Device, but it will still allow her the thrill and excitement of skiing down the mountain.
Construction:
Skiing Device

Key Components:
- General purpose carbon steel tubing for frame
- Nylon for restraint harness
- Booster seat for seat base
- Existing skis and bindings
## Assistive Skiing Device Budget

<table>
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<tr>
<th>Component</th>
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<td>Seat</td>
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<td>Harness</td>
<td>Nylon</td>
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<tr>
<td>Skis and Bindings</td>
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<tr>
<td>Hardware</td>
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</table>
The final design concept is one that will get Samantha outside and “going fast” in the warmer months.

The objective is to take an existing Power Wheels® car and retrofit it to Samantha’s needs.

Modifications will consist of:
- Remote Control (by an adult)
- 5 point restraint harness
- Roll bars
- Safety cut-offs for electronics
Ride-On Remote Controlled Car

Key Components:
- Existing Power Wheels® vehicle
- Use of servo motors for steering
- Nylon for 5 point harness
- Steel Tubing for roll bars
- Integration of Radio Controller
  - Receiver
  - Transmitter
  - Failsafe
# Ride-On Remote Control Car Budget

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
<th>Estimated Cost</th>
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<tbody>
<tr>
<td>Car</td>
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<td>RF Controller</td>
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<td>6 Channel Micro Receiver</td>
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<td>Stepper Motor and Controllers</td>
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<td>Harness</td>
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<td>Roll Bar</td>
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<td><strong>Grand Total For All Products</strong></td>
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Questions?