Module 3
The Creative Parent’s Toolbox
## What you will learn

<table>
<thead>
<tr>
<th>Pedagogy</th>
<th>Physics Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1 Building a Growth Mindset</td>
<td>Forces</td>
</tr>
<tr>
<td>Module 2 Asking Better Questions</td>
<td>Motion</td>
</tr>
<tr>
<td><strong>Module 3 Engineering Design Process</strong></td>
<td><strong>Structures</strong></td>
</tr>
<tr>
<td>Module 4 Motivating Learners</td>
<td>Flight</td>
</tr>
<tr>
<td>Module 5 Gender Biases</td>
<td>Electricity</td>
</tr>
<tr>
<td>Module 6 Creating an Ideal Learning Environment</td>
<td>Power</td>
</tr>
</tbody>
</table>
Success and the Engineering Design Process

I - Inspiration
P - Plan
R - Reflect
RD - Redesign
B - Build
T - Test
By applying the Engineering Design Process you are building persistence.
We use the Engineering Design Process in the kitchen!
“We learn more by looking for the answer to a question and not finding it than we do from learning the answer itself.”

- Lloyd Alexander, author of the Prydain Chronicles
Structural Strength
Bridges need to be STRONG!
TENSION and Compression
What happens if you apply too much force?
Too much Tension

Snapping!
Too much Compression

Buckling!
So structures need to have... balanced forces!
Forces must be balanced so they don't collapse.

There are some special points in any structure which are critical to its strength. If these fail, the whole structure will fail.
Center of Gravity
Center of Gravity
A larger base = Lower C.G = Greater Stability
Before you start building, don’t forget about EARTHQUAKES!
A civil engineer needs to ensure the tower can survive earthquakes.
Congratulations!

You just finished the third module!
Let’s invent!

**Engineer a Skyscraper for the Wind**
Build a skyscraper that stands strong in the wind and is at least 18 inches tall.

**Build a Suspension Bridge**
Build a suspension bridge inspired by spider webs that spans 10 inches and can hold at least 15 pennies.

**Build an Edible Skyscraper**
Learn from sticky mollusk spores and find the best bio-glue to hold together a graham cracker skyscraper.