**Intro/Instructions**  
What you build a structure out of is just as important as how you build it! Different materials have vastly different properties. Select a material from the table, and put it to the test.

**Wood Properties**  
Type: Spruce (softwood)

**Wood Pros+Cons**  
Strengths: Cheap, lightweight, moderately strong in compression and tension  
Weaknesses: Rots, swells and burns easily

**Wood Applications**  
Bridges, houses, two- to three-story buildings, roller coasters  
Example: Son of Beast -- Cincinnati, Ohio

**Wood Compression Message**  
You squeezed this block easily, but it took a lot of effort to make it break. Wood is cheap and pretty strong in compression. That's why people build houses out of wood!

**Wood Tension Message**  
It wasn't easy to break this block of wood because wood is strong when you pull it in the direction of its fibers. It would have been three times easier for you to break this block if you'd stretched it from the top and bottom, across the direction of its fibers.

**Plastic Properties**  
Type: High-strength plastic fabric Ingredients: Long chains of molecules

**Plastic Pros+Cons**  
Strengths: Flexible, lightweight, long-lasting, strong in compression and tension  
Weaknesses: Expensive

**Plastic Applications**  
Umbrellas, inflatable roofs over sports arenas  
Example: Georgia Dome -- Atlanta, Georgia

**Plastic Compression Message**  
Compared to steel, you squeezed this plastic block easily, but it took a lot of effort to make it break. The long chains of molecules that make up plastic can be pulled and pushed in many directions without failing.

**Plastic Tension Message**  
You stretched this plastic pretty far before it finally broke. The long chains of molecules that make up plastic can be pulled in many directions without snapping. That's one of the reasons why circus tents are made of plastic fabric!

**Aluminum Properties**  
Type: Aluminum alloy Ingredients: Aluminum with magnesium & copper

**Aluminum Pros+Cons**  
Strengths: Lightweight, doesn't rust, strong in compression and tension  
Weaknesses: Expensive

**Aluminum Applications**  
Airplane wings, boats, cars, skyscraper "skin"  
Example: Petronas Towers -- Kuala Lumpur, Malaysia

**Aluminum Compression Message**  
It was pretty hard for you to break this aluminum block. That's because the magnesium and copper inside this block makes it almost as strong as steel!

**Aluminum Tension Message**  
It wasn't easy to break this aluminum block. That's because aluminum, when combined with metals like magnesium and copper, is almost as strong as steel!

**Brick Properties**  
Type: Ordinary brick Ingredients: Burned clay

**Brick Pros+Cons**  
Strengths: Cheap, strong in compression  
Weaknesses: Heavy, weak in tension

**Brick Applications**  
Walls of early skyscrapers and tunnels, domes  
Example: Original Thames Tunnel -- London, England

**Brick Compression Message**  
You had to push this brick very hard to make it crumble. Bricks are very strong in compression. That's why early houses were made of brick!

**Brick Tension Message**  
You pulled this brick apart easily! That's because bricks are very weak in tension.

**Concrete Properties**  
Type: Fine-grain concrete Ingredients: Cement, water, small stones

**Concrete Pros+Cons**  
Strengths: Cheap, fireproof and weatherproof, molds to any shape, strong in compression  
Weaknesses: Cracks with temperature changes, weak in tension

**Concrete Applications**  
Early arch bridges and domes  
Example: Pantheon - Rome, Italy

**Concrete Compression Message**  
You had to squeeze this concrete block really hard to make it break. That's because concrete is very strong in compression.

**Concrete Tension Message**  
You pulled apart the small stones and cement in this concrete block easily. That's because concrete is weak in tension.

**Reinforced Concrete Properties**  
Type: Fine-grain concrete with high-strength steel Ingredients: Steel bars hidden in concrete

**Reinforced Concrete Pros+Cons**  
Strengths: Low cost, fireproof and weatherproof, molds to any shape, strong in compression and tension  
Weaknesses: Can crack as it cools and hardens

**Reinforced Concrete Applications**  
Bridges, dams, domes, beams and columns in skyscrapers  
Example: Hoover Dam - Nevada/Arizona border

**Reinforced Concrete Compression Message**  
You had to squeeze this block really hard to make it break. That's because concrete and steel are both very strong in compression.

**Reinforced Concrete Tension Message**  
It was hard to pull this concrete block apart because the steel bars inside make it very strong in tension. That's why some of the tallest skyscrapers in the world are made of reinforced concrete.

**Iron Properties**  
Type: Cast iron Ingredients: Iron with lots of carbon

**Iron Pros+Cons**  
Strengths: Molds to any shape, strong in compression  
Weaknesses: Weaker than steel in tension, breaks without warning

**Iron Applications**  
Arch bridges, cannons, historic domes  
Example: Iron Bridge - Shropshire, England

**Iron Compression Message**  
It wasn't easy for you to squeeze this cast-iron block. Cast iron is strong in compression. That's why early arch bridges were made of cast iron.

**Iron Tension Message**  
It was easy for you to pull this cast-iron block apart. That's because cast iron is brittle -- it snaps without warning.

**Steel Properties**  
Type: High-strength steel  
Ingredients: Iron with a touch of carbon

**Steel Pros+Cons**  
Strengths: One of strongest materials used in construction, strong in compression and tension  
Weaknesses: Rusts, loses strength in extremely high temperatures

**Steel Applications**  
Cables in suspension bridges, trusses, beams and columns in skyscrapers, roller coasters  
Example: Sears Tower - Chicago, Illinois

**Steel Compression Message**  
You had to push extra hard on this steel block to make it bend and break. Steel is stronger than any other material in compression. That's why engineers choose steel beams and columns to support most skyscrapers.

**Steel Tension Message**  
You had to pull this block incredibly hard to make it break because steel is stronger than any other material in tension. That's why the cables in the Golden Gate Bridge are made of steel.