Think Like an Engineer Journey

Glossary for Cadettes

Bioinspiration – the process of being inspired by living things. Bioinspired engineering is a new and growing field. It combines knowledge of engineering and natural sciences to develop technologies that are often more sustainable than those not inspired by nature. Many technologies are bioinspired, such as Velcro strips inspired by plant burrs or aerodynamic cars shaped like boxfish.

Biomechanical engineers – people who use what they know about biology and mechanical engineering to solve problems related to health and safety. Biomechanical engineers work on projects such as designing artificial limbs, joint replacements, and safety equipment, like helmets and life jackets.

Constraints – ways that you or your design are limited. For example, you might only have a certain amount of time or materials for your prototype.

Criteria – things you or your design needs to accomplish. For example, if your Design Challenge is "You must create a tower 4 feet tall" or "You must build a structure that can withstand wind for 30 seconds," those are your criteria.

Design Thinking Process – the steps engineers use to design technologies to solve problems. Engineers begin with identifying a problem that needs to be solved and investigating what has already been done. Next, engineers imagine different solutions and plan their designs. Then, they create and test their designs and make improvements based on the test results. Finally, engineers communicate their findings to others.

Empathy – the ability to understand how someone else feels.

Engineers – people who use their creativity and knowledge of math and science to design technologies that solve problems. They create infrastructure like bridges, build clean water solutions like wells, design energy solutions like solar and wind power, build rockets that take aeronauts into space, and so much more.

Form and function – the concept that the form (shape and size) of an object determines how well that object functions (does its job). For example, adding a rudder to a boat helps it to move in specific directions.

Materials engineering – the field of engineering focused on designing materials with desired properties. Materials engineers use their understanding of the properties of different materials (such as metals, plastics, or woods) to design and improve technologies. In particular, materials engineers explore the properties of different materials to help them choose which material will work best to solve the problem.

Model – a representation that helps us to understand an object or concept. Biomechanical engineers sometimes use models of their subjects to help them engineer prototypes before they are ready to test their designs in the real world.

Prosthesis – an artificial device that takes the place of a missing body part.

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Prosthetic – a replacement body part (e.g. A prosthetic device such as an artificial leg).

Prototype – a quick way to show your idea to others or to try it out. It can be as simple as a drawing or it can be made with everyday materials like cardboard, paper, string, rubber bands, etc.

Sustainability – coming up with a solution that lasts and continues to address the problem over time.

Sustainable solution – a solution that lasts. Sustainable solutions often address the root causes of an issue. Sustainable solutions create a difference for those impacted by a problem over the long-term.

Technology – anything created by people to help solve a problem or meet a need. Technology can be things that require electricity, such as computers and phones, or non-electric products, such as pencils, paper, and water bottles.

User-centered design – When engineers practice user-centered design, they involve their users at every stage of the Design Thinking Process. By incorporating the user's needs, concerns, and feedback into their design, engineers are better able to create a product that solves their user's problem and takes into account what's most important to them.