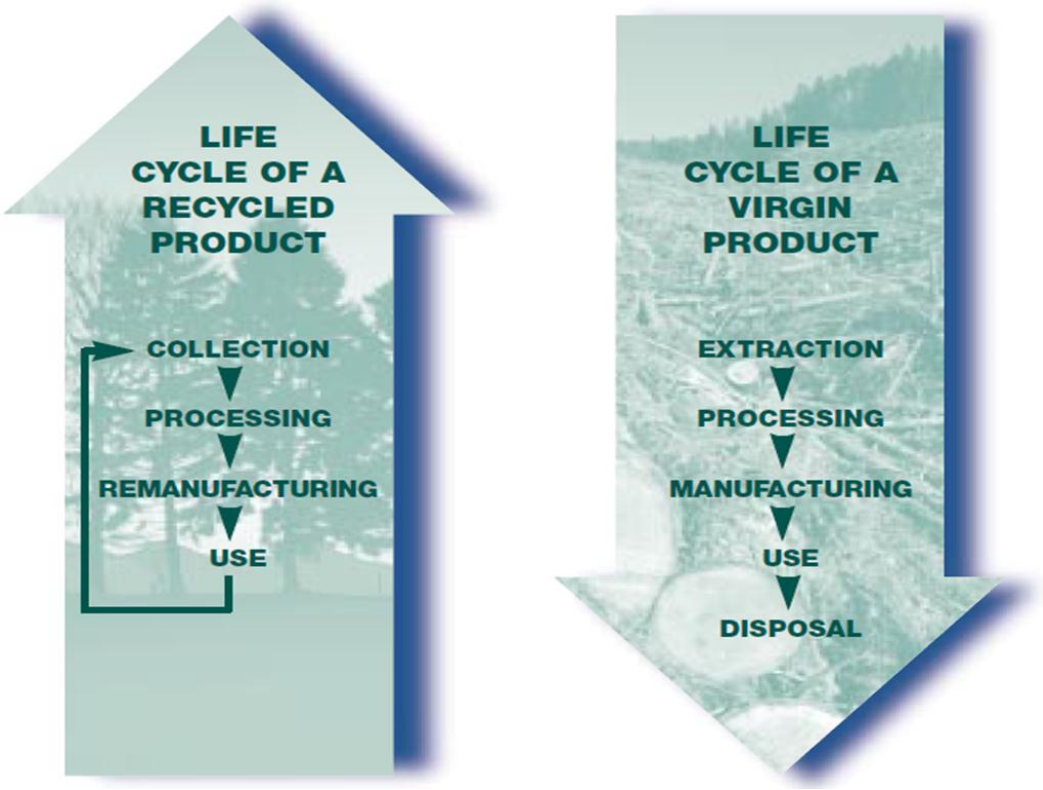
The amount of Aluminum cans that America throws out each day can drive a mildly fuel efficient car around the earth 5,647 times. Our robot encourages people to recycle Aluminum cans that normally get thrown away. Many towns require their cans to be crushed which is difficult for many people so they end up throwing their cans away.

Making new Aluminum cans maims the environment. 50% of aluminum cans in the US alone are not recycled. This 50% of aluminum amounts to 1.5tonnes of aluminum needing to come from fresh mineral sources. It is a huge problem because to produce a recycled can it takes 95% less energy than making it from scratch using bauxite. With the energy it takes to make just one new aluminum can from bauxite ore, you can make 20 recycled aluminum cans. By not recycling, we consume new cans. Additionally, Bauxite mining has left scars in the earth and killed the ecosystems of surrounding rivers and streams. Old bauxite mine pits can also be a safety hazards as people drown in the left over pits each year.

The Autodesk sustainability workshops showed us the life cycle assessments of materials in our designs. The normal flow of aluminum would be to recycle the aluminum to be put back into the material stream. However, statistics show us so many aluminum cans are not recycled . The Amory Lovins TED talk from the Autodesk sustainability website showed us that our power comes primarily from non-sustainable sources such as oil, coal, and nuclear. Displacing electric intensive aluminum production with low energy recycling is

key to reducing greenhouse gasses.



Massive amounts of electricity are consumed in the processing of bauxite ore into aluminum. In Australia 90% of all the electricity generated originates from coal fired power stations. Smelting uses 15% of the total electricity generated in entire country of Australia. If we could get more people to recycle their cans it would mean less dependency on coal fired power plants and the greenhouse gasses to generate the electricity. Australia is an example is that they export about 1.5M tons of aluminum each year, and with their 90% coal fired electricity, it produces 27 metric tons of CO_2 emissions that could be eliminated along with perfluorocarbons- some of the most caustic greenhouse gasses that are created in the smelting process.

Our mechanism seeks to alter the last stage of the lifecycle of an aluminum can. Instead of sending it to the grave we want to use it again. As previously stated 50% of cans are recycled while the other half are sent to landfills ending their usefulness.

We were inspired by the Autodesk workshop to improve the lifecycle of an aluminum can. The Life Cycle Assessment showed that at the end of the product's life it was thrown out or recycled. That made us think of what we can do to improve the lifecycle of this everyday object. We brainstormed different strategies to achieve this goal and decided building a can crusher would motivate people to recycle. This would solve the problem because many places require people to crush their cans. Crushing them manually can be labor intensive and difficult for the elderly. By making this task easier, more people will be persuaded to recycle.

Our robot uses two linear slide assemblies to crush the aluminum can after two pincers indent the can to make the job easier. If the can is not indented the force required to crush the can is much greater than if the can in slightly dented.

The crushing motion is driven by two high strength 393 motors geared for strength on linear slides with a mechanical synchronization shaft to keep them in line. The ends are supported by a piece of metal to push down on the can. A c-channel keeps the can from moving forward during the crush. The side pinch mechanism is driven by a 393 geared for strength driving a gear train of 7:1 strength ratio of a 12-84 tooth reduction. The 84 tooth gears have pincers enhancing the force inflicted upon the can by a 6 inch moment arm created by L channels attached to the gears.

The joysticks control the crush and clip actions on two joysticks. The crush is on the Y-axis of the left joystick while pinching motion is controlled on the X-axis on the opposite joystick. Safety stickers are affixed to the robot to ensure proper usage and noone's hands get crushed inadvertently. 9