Concept Generation

Team 510

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Concept Generation Process

1.1 Concept Generation

Concept generation is used to inspire innovative solutions for a problem which is a crucial phase in the design process. Systematic processes such as brainstorming and ideating promote creativity and collaborative thinking allowing ideas to build on one another. A list of one hundred designs concepts were created, each representing a potential way to achieve the projects' goal. By embracing a variety of generation tool guides for the project, unconventional solutions were created and encouraged. The concepts created will be analyzed and divided into different concept fidelity levels: low, medium, and high. The feasibility of the concept will be determined by the team based on prior knowledge, existing technology, and engineering intuition.

1.2 Concept Generation Techniques

1.2.1 Morphological Chart

A morphological chart is a technique that aids in generating a large number of concepts quickly. It lists the critical functions of the design, along with numerous independent solutions that carry out each function, putting them all into one matrix. Combining different solutions allowed for logical changes in concept design, all while ensuring that the design still performs each critical function. This can be found in Appendix A.

1.2.2 SCAMPER

SCAMPER, which stands for substitute, combine, adapt, modify, put to another use, eliminate, and reverse, is a technique that allows for modification of the pre-existing ZombieLock to fit the new design parameters and goals. The ideas yielded by this technique keep the parts of the ZombieLock that accomplished critical functions while improving or changing parts that were subpar for the new design goals.

1.3 Concept Fidelity

Low fidelity concepts are concepts that are not feasible. This could be due to time, budget costs, technological constraints, or inability to do a key function. All low fidelity concepts can be found in the complete concept generation list in Appendix B. Medium fidelity concepts are concepts that are plausible, capable of successfully completing all targets and metrics, but may be unattainable. These concepts could still be pursued if any of the high-fidelity concepts prove unworthy but should not be given a large amount of effort until then. The medium fidelity concepts are displayed in Table 1.3.1. For high fidelity concepts, they meet all design function requirements and have the highest potential success. These concepts are shown in Table 1.3.2.

Table 1.3.1: *Medium Fidelity Concepts*

Concept Number	Description	Reasoning
15	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by a physical key. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.	Matches all customer needs and accomplishes all functions from the hierarchy chart. Weight may be an issue due to the use of stainless steel. Deadbolt lock will also increase weight.
30	A sealed lock mechanism made of an	Matches all customer needs and accomplishes all

	aluminum alloy uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using oil and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using springs. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with physical chains.	functions from the hierarchy chart. The internal battery may be problematic in extreme weather and will add unnecessary weight to the end of the gate. Oil could cause build up in the lock inhibiting proper function of the lock mechanism. External release arm sacrifices security for customer convenience. Physical chains are not practical as they add weight and are inconvenient for the customer.
33	A sealed lock mechanism made of an aluminum alloy uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using a universal tube bracket kit. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a spring-loaded latch.	Matches all customer needs and accomplishes all functions from the hierarchy chart. Internal battery and external release arm will add weight to the end of the gate. Grease is known to trap dirt and dust which could lead to problems with the lock mechanism properly latching.
87	An adaptation of the current zombie lock mechanism made of aluminum. The receiver and lock are swapped, but the receiver has two rotating “latch” members like French doors.	Matches all customer needs and accomplishes all functions from the hierarchy chart. Lock mechanism will have more moving parts requiring more weight, more power and larger housing.
98	An adaptation to the current receiver design of the ZombieLock. Swap the receiver and latch functions. Create a sliding cylindrical bolt that triggers top-down once the gate is within range. The receiver on the gate is now a circular opening bound of the receiver. The design is similar to a pool gate.	Matches all customer needs and accomplishes all functions from the hierarchy chart. Moving the receiver to the gate post will require the wiring to be exposed or buried underground. This may inconvenience the user.

Table 1.3.2: *High Fidelity Concepts*

Concept Number	**Description**	**Reasoning**
53	A latch mechanism that uses the pre-existing ZombieLock gate attachment but adds an angle adjusting arm that the user can adjust when needed.	Matches all customer needs and accomplishes all functions from the hierarchy chart. The arm can account for sag by matching the expected angle due to sag. The arm will add more weight but will be accounted for when calculating the angle for the arm.
67	Keeping the pre-existing ZombieLock design but adding a small ramp attached to the receiver at the end to guide the gate to a closed position.	Matches all customer needs and accomplishes all functions from the hierarchy chart. The ramp will be attached to the receiver and will therefore not add weight to the gate. It will not keep the gate from sagging but will lift the gate into position as it reaches the catch. Need to check power of arm to ensure arm is able to follow the ramp.
71	Making a modified version of ZombieLock that has a series of magnets on both the gate and gate post. When at rest, the magnets on the gate side will be aligned with the magnets on the gate post side, causing them to be magnetically attracted to one another. When unlocking, an electric DC motor will be used to misalign the magnets, voiding the magnetic attractive force.	Matches all customer needs and accomplishes all functions from the hierarchy chart. The magnets will be on both the receiver and the gate attachment. It allows the magnets to guide to each other using magnetic attraction, and will hold force. Have to check the weight of electromagnets to see if they will cause sag. Check power of motor to see if it can accommodate moving strong magnets.

Appendix

Appendix A - Morphological Chart

Functions	**Solution 1**	**Solution 2**	**Solution 3**	**Solution 4**	**Solution 5**	**Solution 6**
Resist Mechanical Wear	Grease	Graphite	Oil	Use a Teflon coating	Electroplating	Nitriding
Account for Thermal Expansion	Flexible items (i.e. springs)	Use stainless steel	Use brass	Use Teflon	Use an aluminum alloy	Use a ceramic material
Resist Environmental Factors	Waterproof seals and gaskets	Corrosion Resistant Coating	Paint	Use UV resistant materials	Drains	Non-Metallic Materials
Release Passively	Spring loaded release	Physical key	Thermal release	Use exterior magnets	Release button	Removable pin
Engage Lock	Spring loaded hinge	Electric motor	Insertable pin	Physical key	Use exterior magnets	Sliding Bolt
Relieve Gate Weight from the Hinge	Lift the gate end up while latching	Lift the gate end up after latching using electric motor	Attach a jack to the gate	Use shock absorbers to lift the gate end up	Physically lift the gate into a high latch	Tensioned guy wire from lock to post
Draw Power to Release Latch	Use an internal battery with electric motor	Wire into the existing 12-volt battery with electric motor	Use an internal battery with electric solenoid	Wire into the existing 12-volt battery with electric solenoid	Electromagneti c release	Pneumatic lock release
Mount to Gate Post	Directly bolt/screw to post	Weld to post	Use cable ties	Adhesive	Universal tube bracket kit	Mounting plate
Mount to Gate	Directly bolt/screw to gate	Weld to gate	Use cable ties	Adhesive	Universal tube bracket kit	Mounting plate
Keep Gate Closed	Deadbolt	Physical Chains	Strong electromagnets	Spring loaded latch	Insertable pin	Pneumatic lock
Account for Bounce in Horizontal Axis	Shock absorbers	Springs	Padding	Cross braces stiffen to stiffen gate	Guy wire attachment	
Account for Sag in Vertical Axis	Shock absorbers	Springs	Padding	Lift the gate end up while latching	Lift the gate end up after latching using electric motor	Add cross braces to stiffen the gate

Appendix B - 100 Concepts

Concept Number	Concept Description
1	A corrosion resistant coated lock mechanism made of stainless steel utilizes an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
2	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
3	A lock mechanism made of stainless steel and UV resistant materials utilizes an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
4	A lock mechanism made of stainless steel and featuring drain holes to prevent moisture retention utilizes an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
5	A sealed lock mechanism made of stainless steel utilizes an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
6	A sealed lock mechanism made of brass utilizes an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from

	the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
7	A sealed lock mechanism made of Teflon utilizes an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
8	A sealed lock mechanism made of an aluminum alloy utilizes an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
9	A sealed lock mechanism made of a ceramic material utilizes an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
10	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
11	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using graphite and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
12	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using oil and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.

13	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using Teflon coatings and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
14	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
15	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by a physical key. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
16	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by removing a pin. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
17	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by removing an exterior magnet. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
18	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by pressing a release button. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
19	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by a physical key. The lock will be mounted to the gate via direct mounting using bolts or screws, while the catch will be mounted to the gate post using universal tube brackets. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.

20	A painted lock mechanism made of stainless steel utilizes an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by a physical key. The lock will be mounted to the gate via direct mounting using bolts or screws, while the catch will be mounted to the gate post using cable ties. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
21	A sealed lock mechanism made of brass uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using graphite and can be released passively by holding a lighter or match close to the mechanism, as the latch is engaged by a thermal release. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for by using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is in the process of being latched. Once latched, the gate will be kept closed with an insertable pin.
22	A sealed lock mechanism made of brass uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using oil and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using springs. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with strong electromagnets.
23	A sealed lock mechanism made of brass uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using Teflon coating and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via welding to the posts. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with physical chains.
24	A sealed lock mechanism made of Teflon uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using oil and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with strong electromagnets.
25	A sealed lock mechanism made of Teflon uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using cable ties. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using padding. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with an insertable pin.
26	A sealed lock mechanism made of Teflon uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using graphite and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate

	post, respectively, via direct mounting using adhesive with the gate post. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a spring-loaded latch.
27	A sealed lock mechanism made of a ceramic material uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using oil and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with strong electromagnets.
28	A sealed lock mechanism made of a ceramic material uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using padding. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a spring-loaded latch.
29	A sealed lock mechanism made of a ceramic material uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using Teflon coating and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using cable ties. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with an insertable pin.
30	A sealed lock mechanism made of an aluminum alloy uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using oil and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using springs. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with physical chains.
31	A sealed lock mechanism made of an aluminum alloy uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via welding directly to the post. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using padding. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with strong electromagnets.
32	A sealed lock mechanism made of an aluminum alloy uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using graphite and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be

	kept closed with an insertable pin.
33	A sealed lock mechanism made of an aluminum alloy uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using a universal tube bracket kit. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a spring-loaded latch.
34	A sealed lock mechanism made of an aluminum alloy uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using Teflon coating and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using adhesive to the post. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using springs. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
35	A sealed lock mechanism made of brass uses an electric motor powered by an internal battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by an external release arm, as the latch is engaged by a spring. Both the lock and catch will be mounted to the gate and gate post, respectively, via direct mounting using bolts or screws. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using padding. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with spring loaded latch.
36	A painted lock mechanism made of brass uses an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by a physical key. The lock will be mounted to the gate via direct mounting using bolts or screws, while the catch will be mounted to the gate post using cable ties. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
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38	A painted lock mechanism made of ceramic material uses an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using Teflon coating and can be passively released by a physical key. The lock will be mounted to the gate via direct mounting using bolts or screws, while the catch will be mounted to the gate post using cable ties. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using springs. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
39	A painted lock mechanism made of ceramic material uses an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using graphite and can be passively released by a physical key. The lock will be mounted to the gate via direct mounting using bolts or screws, while the catch

	will be mounted to the gate post using universal tube bracket kit. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using shock absorbers. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with a deadbolt lock.
40	A painted lock mechanism made of ceramic material uses an electric motor powered by an external battery to release the latch. The mechanism resists mechanical wear using grease and can be passively released by a physical key. The lock will be mounted to the gate via direct mounting using adhesive to post, while the catch will be mounted to the gate post using cable ties. While closing, bounce in the horizontal axis and sag in the vertical axis will be accounted for using padding. Additionally, weight will be relieved from the hinges by the catch picking the gate up as it is being latched. Once latched, the gate will be kept closed with physical chains.
41	A UV resistant lock mechanism that features graphite lubrication. A spring-loaded hinge gate engages the latch and passively released using a thermal mechanism. The lock and catch are both mounted to the gate and post respectively using a mounting plate. Horizontal bounce is countered using a cross brace, and vertical sag is handled by lifting the gate after latching. Physical chains will hold the gate closed.
42	A brass-coated lock mechanism uses a spring-loaded hinge to engage and a removable pin for passive release. The system is powered by an internal battery with an electric solenoid. The lock is mounted to the gate using adhesive, and the catch is bolted to the post. Padding is used to account for horizontal bounce, and vertical sag is controlled by physically lifting the gate into a high latch. The gate remains closed using a deadbolt.
43	A waterproof lock mechanism with graphite lubrication engages with a pneumatic release, powered by an internal battery. Passive release is achieved using exterior magnets. The lock is mounted with cable ties, and the catch is bolted to the post. Horizontal bounce is managed with cross-braces, and vertical sag is controlled by shock absorbers. A strong electromagnet will secure the gate.
44	A stainless-steel lock coated in graphite uses an electromagnetic release and is passively disengaged by a removable pin. The lock is mounted to the gate using a mounting plate, and the catch is attached with adhesive. Horizontal bounce is reduced with padding, and vertical sag is handled by physically lifting the gate into a high latch. A deadbolt will keep the gate closed.
45	A stainless-steel lock coated in graphite uses an electromagnetic release and is passively disengaged by a removable pin. The lock is mounted to the gate using a mounting plate, and the catch is attached with adhesive. Horizontal bounce is reduced with padding, and vertical sag is handled by physically lifting the gate into a high latch. Physical chains will hold the gate closed.
46	A UV-resistant lock with oil lubrication uses a sliding bolt to engage the latch. Passive release is achieved by a physical key, and the system is powered by an internal battery. The lock and catch are mounted with universal tube brackets. Padding is used to reduce bounce, while sag is controlled by lifting the gate during latching. Physical chains will hold the gate closed.
47	A ceramic lock mechanism uses a physical key for passive release and a sliding bolt for engagement. The system is powered by a pneumatic release. The lock and catch are mounted to the gate using cable ties. Horizontal bounce is managed with shock absorbers, and vertical sag is controlled by adding cross braces to the gate. Once latched, the gate is held closed with physical chains.
48	A ceramic lock mechanism uses a physical key for passive release and a sliding bolt for engagement. The system is powered by a pneumatic release. The lock and catch are mounted to the gate using cable ties. Horizontal bounce is managed with shock absorbers, and vertical sag is controlled by adding cross braces to the gate. Once latched, a deadbolt will keep the gate closed.

49	A corrosion-resistant lock mechanism featuring an oil-lubricated system uses an electric solenoid powered by an internal battery for latching. Passive release is achieved using a physical key. The mechanism will be mounted to the gate with adhesive, and the catch will be bolted to the post. Horizontal bounce is reduced using padding, while vertical sag is controlled by lifting the gate during latching. The gate remains closed with physical chains.
50	A corrosion-resistant lock mechanism featuring an oil-lubricated system uses an electric solenoid powered by an internal battery for latching. Passive release is achieved using a physical key. The mechanism will be mounted to the gate with adhesive, and the catch will be bolted to the post. Horizontal bounce is reduced using padding, while vertical sag is controlled by lifting the gate during latching. A strong electromagnet will keep the gate closed.
51	A latch mechanism that uses the pre-existing ZombieLock gate attachment and materials, but instead uses a gravity latch to close.
52	A latch mechanism that uses the pre-existing ZombieLock gate attachment but adds cushioned impact absorbers.
53	A latch mechanism that uses the pre-existing ZombieLock gate attachment but adds an angle adjusting arm that the user can adjust when needed.
54	A latch mechanism that uses the pre-existing ZombieLock gate attachment but adds a guided catch into the latch to funnel it in.
55	Keeping the pre-existing ZombieLock design but adding support wheels onto the bottom of the gate to prevent sagging.
56	Adding a robotic arm onto the pre-existing ZombieLock design to stop the gate.
57	A latch mechanism that uses the pre-existing ZombieLock gate attachment but uses a threaded rod that spins to lift gate into place.
58	Keeping the pre-existing ZombieLock design but adding magnets on a track below the gate that repel the gate upward to prevent sag.
59	Keeping the pre-existing ZombieLock design but adding bungee cord tension along the height of the gate, preventing sag.
60	Keeping the pre-existing ZombieLock design but adding tension rods to the latch/lock that come out when the gate is meant to be locked.
61	Keeping the pre-existing ZombieLock design but training Olivia Walton's dog to push the latch shut.
62	Keeping the pre-existing ZombieLock design but adding a sliding receiver to lead it in.
63	Keeping the pre-existing ZombieLock design but adding a large bubble around it to prevent wind/environmental factors from causing sag.
64	Keeping the pre-existing ZombieLock design but adding a pulley system atop each mechanism to weigh them upwards.
65	A latch mechanism that uses the pre-existing ZombieLock gate attachment but instead uses a cam-shaped

	motion to hook gate closed.
66	Keeping the pre-existing ZombieLock design but adding a soft close mechanism similar to a drawer to prevent bounce.
67	Keeping the pre-existing ZombieLock design but adding a small ramp attached to the receiver at the end to guide the gate to a closed position.
68	Keeping the pre-existing ZombieLock design but hiring Dr. McConomy's children to close the gate (paid under the table).
69	Chage the pre-existing ZombieLock receiver to accommodate the sag of the gate by angling the catch with a 3inch diameter to accommodate different gate lengths.
70	Making a modified version of the ZombieLock that includes a magnet on the top of the latch and the inside of receiver box.
71	Making a modified version of ZombieLock that has a series of magnets on both the gate and gate post. When at rest, the magnets on the gate side will be aligned with the magnets on the gate post side, causing them to be magnetically attracted to one another. When unlocking, an electric DC motor will be used to misalign the magnets, voiding the magnetic attractive force.
72	A latch mechanism similar to a push pad lock, but electromechanical. When activated a pin comes out of the lock and when the gate is closing, as it reaches the receiver a button will be pushed inside. The pin is released back into the lock.
73	A latch mechanism that, when released, a latch will pop up allowing for the gate to swing freely. When the gate needs to be closed, there will be a release mechanism that will be activated when enough weight is pressed against a button and the latch will drop down.
74	Using the existing design, modify the placement of the lock to the bottom of the gate. The receiver will be modified with a guide that slopes to will help align the latch into the right place.
75	Using a similar mechanism to a mechanical gravity lock, the moment the gate closes, the weight the gate will activate a latch that will fall down covering the latch and securely lock the gate.
76	Create a locking mechanism similar to a deadbolt. The moment the gate closes, the deadbolt is released into the receiver. This will be done after enough weight of the gate is pushing a button to engage the deadbolt.
77	Created a modified version of the ZombieLock that doubles the latch mechanism. One latch in the upper middle of the gate with the second one near the ground. This concept combines Concept 74 with the original ZombieLock. This concept will implement something similar to a gear train to keep the locks in both latches on the same turn-path.
78	Latching mechanism that is design to be lock a vise grip. The moment the gate closes and the latch is pushed against a button, clamping jaws come down and securely lock the gate.
79	Using a similar design to a multi-pin bolt locking mechanism, there will be three to four bolts that locks the gate at multiple points. This concept will use a weight button to activate and deactivate the bolts.
80	Keeping the pre-existing ZombieLock materials but creating a latch/mechanism that is lies horizontal instead of vertical and allows a guide to lead it in.

81	An adaptation of the current zombie lock mechanism made of aluminum. Instead of a sharp, blocky latch end, the edges are rounded to allow for a slight bit of extra travel along the vertical axis.
82	An adaptation of the current zombie lock mechanism made of aluminum. Instead of the traditional latch, a sliding bolt with a receiver that is simply a slot. The sliding bolt can move up and down a lot more than the current design.
83	An adaptation of the current zombie lock mechanism made of aluminum. The receiving end of the latch is double the height, allowing for more travel in the y-direction.
84	An adaptation of the current zombie lock mechanism made of aluminum. The receiver of the latch lies horizontally and feeds into the lock upon closure.
85	An adaptation of the current zombie lock mechanism made of aluminum. The receiver of the latch lies horizontally, and the lock rotates down onto the receiver to close.
86	An adaptation of the current zombie lock mechanism made of aluminum. The receiver and lock are swapped, the mechanical lock is mounted to the gate and the dumb receiver is mounted to the gate.
87	An adaptation of the current zombie lock mechanism made of aluminum. The receiver and lock are swapped, but the receiver has two rotating “latch” members like French doors.
88	An adaptation of the current zombie lock mechanism made of aluminum. The lock has two of the shaped “latch” members like French doors. Allows for more travel in the x-axis.
89	The receiver is a large opening, and the latch is a large, cubic sliding bolt.
90	A much larger alternative to the current ZombieLock mechanism. The receiver is simply a metal holed slot protruding from the post. The latch mechanism releases a cylindrical bolt into the hole and a magnet or motor will retract the bolt as necessary.
91	Simply, make the receiver slightly bigger vertically, and make the latch component smaller.
92	An adaptation to the current receiver design of the ZombieLock, spring load the bar that lock mechanism latches on to. This would allow for the receiver to play in the x direction.
93	An adaptation to the current receiver design of the ZombieLock, flare the edges of the mount to form a V-shape that will, in effect, move the latch into place.
94	An adaptation of the current zombie lock mechanism made of aluminum. Mounting the mechanism on a hinge at the rear or in the center would allow it to “wobble” a few degrees giving the system a bigger range
95	An adaptation of the current zombie lock mechanism made of aluminum. Allow the locking pin to pivot slightly on its base so that it can adjust to the position of the gate frame as it closes.
96	An adaptation to the current receiver design of the ZombieLock, flare the edges of the mount to be conical to guide the mechanism into the locking position
97	An adaptation to the current receiver design of the ZombieLock. Swap the receiver and latch functions by creating a sliding cylindrical bolt that triggers once the gate is within the, now wider, bounds of the receiver.
98	An adaptation to the current receiver design of the ZombieLock. Swap the receiver and latch functions. Create

	a sliding cylindrical bolt that triggers top-down once the gate is within range. The receiver on the gate is now a circular opening bounds of the receiver. The design is similar to a pool gate.
99	Mount the entire receiver on a plate full of springs that sag and guide the receiver up into a satisfactory lock position.
100	Rubberize receiver or latch so that the materials allow for more play.