

# Environmental Sustainability Board Newsletter December, 2023



## Engineering a Greywater System (Bathroom)



Living sustainably can look like a challenge. It seems like to live sustainably you have to do everything: compost, save plastic, recycle glass, limit energy use, and save water. In reality, to be sustainable you do not have to do all of these things. Just recycling or just composting or just reusing is a step in the right direction, and when everyone does just one thing, instead of nothing, the world will become a more sustainable place. Being sustainable does not have to be a hassle, instead, it can be a good deed that will save your money and, along with it, environmental resources.

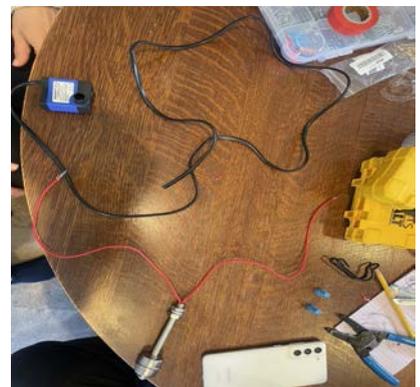
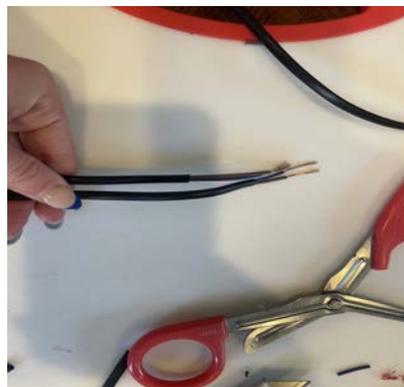
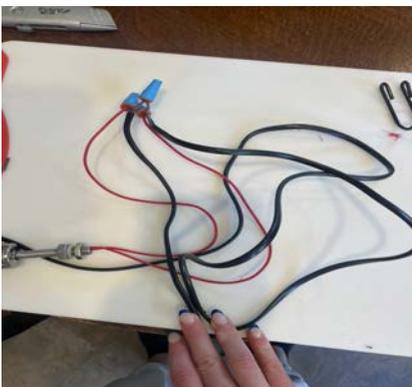
In this edition, I will be taking you through my process of engineering a greywater system that reuses sink water as water to flush your toilet with. This project is one that is easy to follow and will continue to save water and decrease the number on the water bills forever. Preserving the world's resources in different ways will eventually provide a better and healthier world to live in. Therefore, doing projects like this will help us all and inform us about helping the environment.

# The Process

Throughout this process of creating a system that uses greywater from my sink to flush my toilet, I have learned many things about problem solving and engineering. I explored my interests and discovered more about the environment and saving wasted water.

Most people flush their toilet then turn on the sink and leave it on while they wash their hands, brush their teeth, and wash their face. The amount of water used daily from just flushing toilets and daily hygiene is over 25 gallons of water (19-24 coming from flushing toilets). Therefore, reducing the amount of water used from flushing toilets helps the daily average water use to drop significantly.

In my process, I had to look up different methods and figure out how to connect and pump my sink water into my toilet. To do so, I knew I needed a bucket to collect the sink water, a pump to pump the water from the bucket to the toilet, a tube which is connected to the pump and runs the water from the bucket to the toilet, and a float switch that tells the pump when to pump and when not to pump the water into the toilet.



To sum it up, I wired the float switch to the pump so that when you flush the toilet the float switch will activate the pump and pump water through the tube that I previously attached to the pump. Additionally, in the bucket that collects the greywater, I made a hole near the top of the bucket that was connected to the sink drainage so there was no spillage. Finally, I put everything together by putting the pump into the bucket and the float switch and the tube into the toilet tank. After this step, the system was fully working, and the greywater from the sink is pumped through the tube whenever the toilet is flushed and the float switch is activated.

Click this [link](#) to view the entire process.



# Results

I named this greywater system the “water renewer” for the obvious reason that it reuses/ renews water. The results of this project were more than saving water. By engineering this system, I learned how important saving resources is and by doing so it saves money! This project is easy to do for anyone who wants to be environmentally friendly or save money; both of which end up reducing waste.

To see the system in action, visit this [link](#).



This project had its strengths and weaknesses, but overall it produced a working system that saves water daily without any extra thought. It is also simple to build and applicable in many homes, considering all you need is a sink and a toilet already installed. In this project, I realized some things that could come in handy if trying to replicate this project. Firstly, use a powerful pump because there will need to be a large force to push the water from the bucket into the toilet. Additionally, to improve this already working system, using a larger reservoir/ bucket will help with storing more water and if possible, using water from the shower, as well, will increase the amount of water saved and amount of water stored for the toilet. All in all, this system saves water and is more sustainable than it previously was.

# Financial Costs:

Although it was needed to spend money on these materials, in the long run the amount of water saved through reusing sink water will add up to save money. In this project, the materials I used are easily accessible and found at local hardware stores.

Itemized Budget List

Item	Price
initial pump	\$9.99
bucket	0
wire covers	0
float switch	\$18.99
pipng	0
metal ring	0
rubber ring sheets	0
waterproofing tape	0
second pump	\$18.99

This budget list shows that I only spent \$47.97; however, as you can tell, most of the items were not bought, but reused. I used an old bucket that I had laying around and found piping from asking my family what supplies they had. A large amount of money does not need to be spent to create a sustainable project, and reusing materials is an amazing way to do so. There are many ways - like this greywater system - to help the environment and decrease unnecessary waste!

# Conclusions

In the long run, my parents will be saving money on water bills, the environment will be happier, and I will have the knowledge I gained in this process of saving water and engineering something out of bare materials into a working system. If many people make this simple project or others like it, there will be much more water saved and water bills reduced. As global warming and processes like it are on the rise, reducing our emission and waste in any way possible will provide some sort of solution. If one person does a project and tells their friend and this continues, soon everyone will be saving resources and reusing when they can and the environment will not continue on the path it is on. Saying that one person cannot make a difference is never a good mindset to have because one person can make a difference. If every one person on the earth thinks they can make a difference, then it is not just one person anymore, it is everyone. It starts with just one. Make a difference and start saving the environment!



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