DEQ MONTANA ENERGY OFFICE

2023-2024 SMART SCHOOL CHALLENGE SYMPOSIUM

WELCOME TO THE 2024 SMART SCHOOL SYMPOSIUM!

--- Kyla Maki

Energy Planning Section Supervisor,

Energy Office, Department of Environmental Quality

Where We've Been and a Look to the Future

--- Bonnie Rouse

Energy Resource Professional

Energy Office, Department of Environmental Quality

2023-2024 SMART SCHOOLS

Save Money and Resources Today

- Boulder Elementary School
- Arlee High School
- Cohagen School
- Columbia Falls High School
- Broadwater High School
- Sunnyside Intermediate School
- Central School
- Kalispell Middle School
- Capital High School
- Kessler Elementary School
- Red Lodge High School
- Butte High School
- Clark Fork School

Wendy Dew
Outreach and Education Coordinator,
U.S. Environmental Protection Agency,
Region 8

EPA PRESENTAION

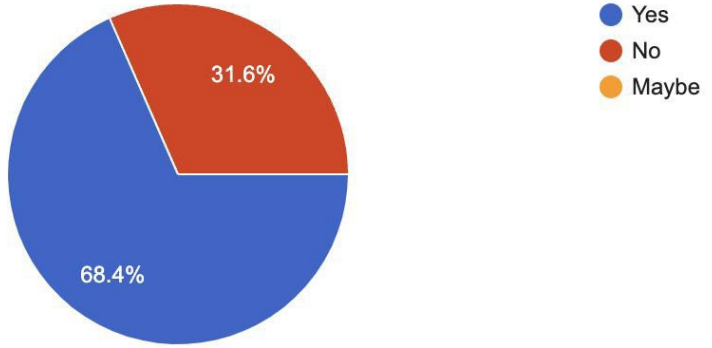
Red Lodge High School
Green Team

Smart Schools Symposium 2023 - 2024

Baseline Survey Upcycling

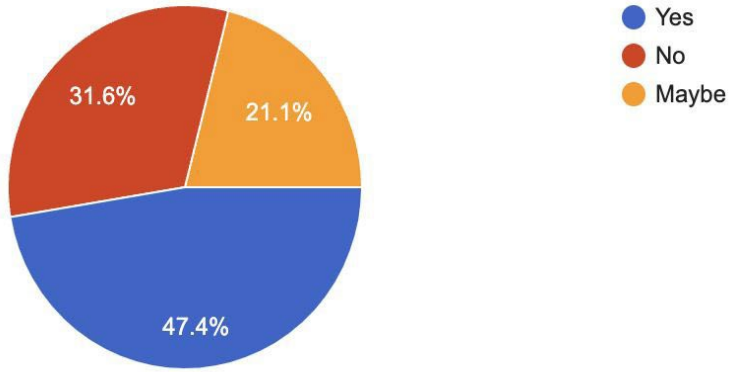
Did you bring clothes today to donate?

19 responses



Have you ever participated in a clothing swap?

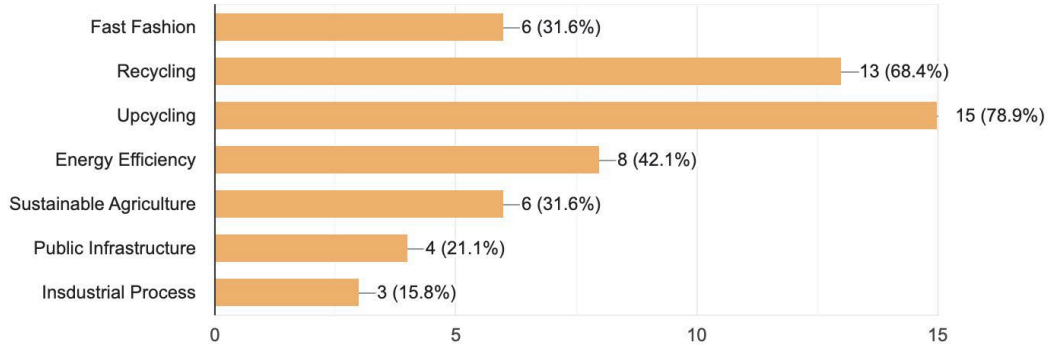
19 responses



Please check all that apply.
What is a clothing swap characterized as?

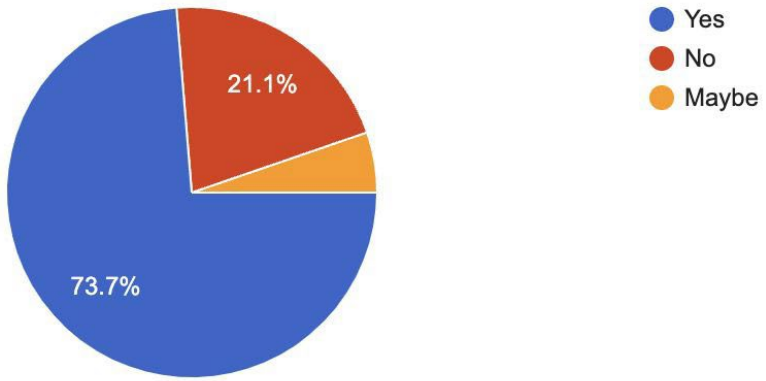
Copy

19 responses

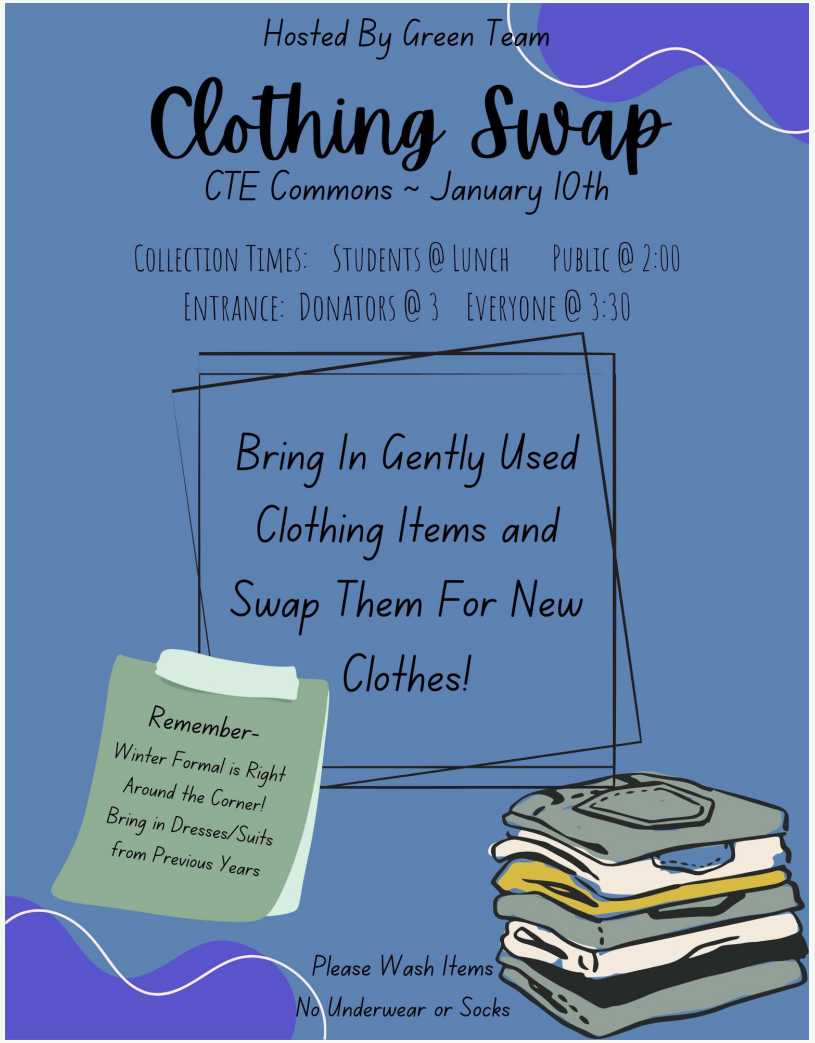


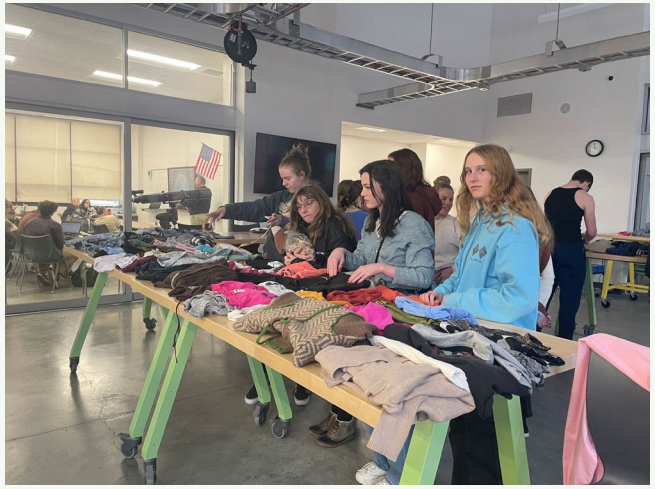
Do you shop typically shop at thrift stores?

19 responses

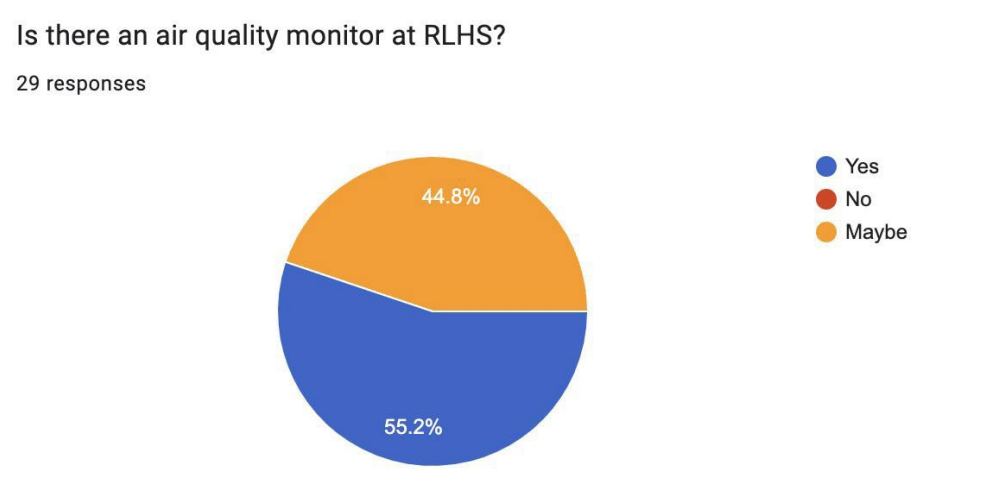


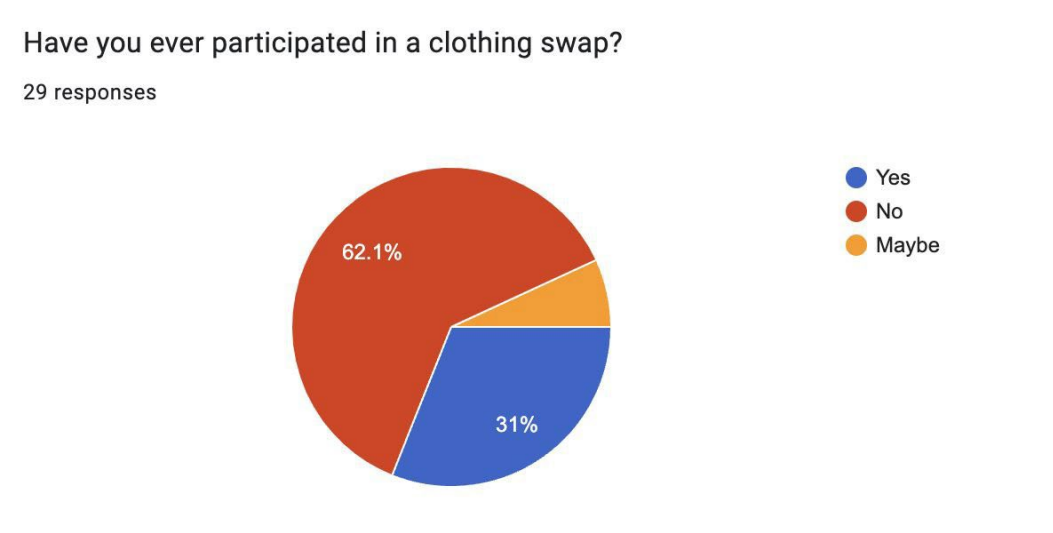
UPCYCLING


Hosted By Green Team
Clothing Swap
CTE Commons ~ January 10th
Collection Times: Students @ Lunch Public @ 2:00
Entrance: Donators @ 3 Everyone @ 3:30
Bring In Gently Used Clothing Items and Swap Them For New Clothes!
Remember-
Winter Formal is Right Around the Corner!
Bring in Dresses/Suits from Previous Years
Please Wash Items
No Underwear or Socks



Post Survey Upcycling



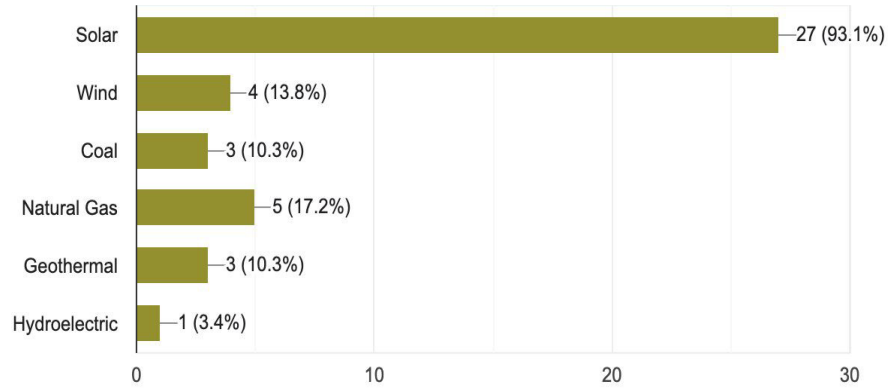


Please check all that apply.

What renewable resources are being used at RLHS?

29 responses

Copy

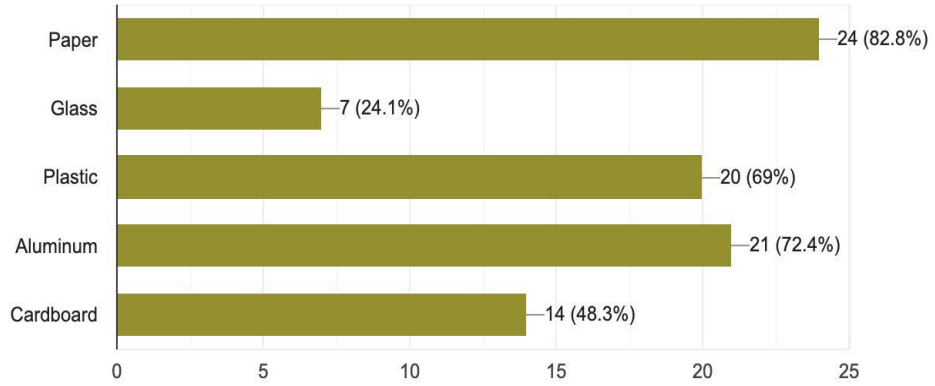


Please check all that apply.

What can be recycled at the RLHS?

29 responses

Copy



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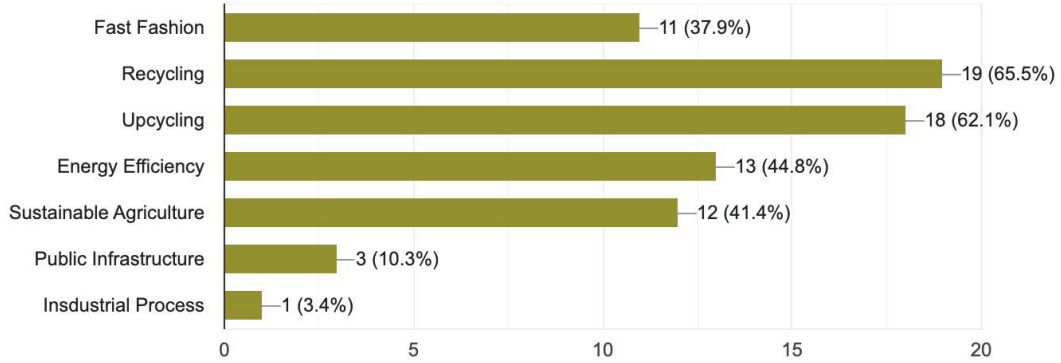


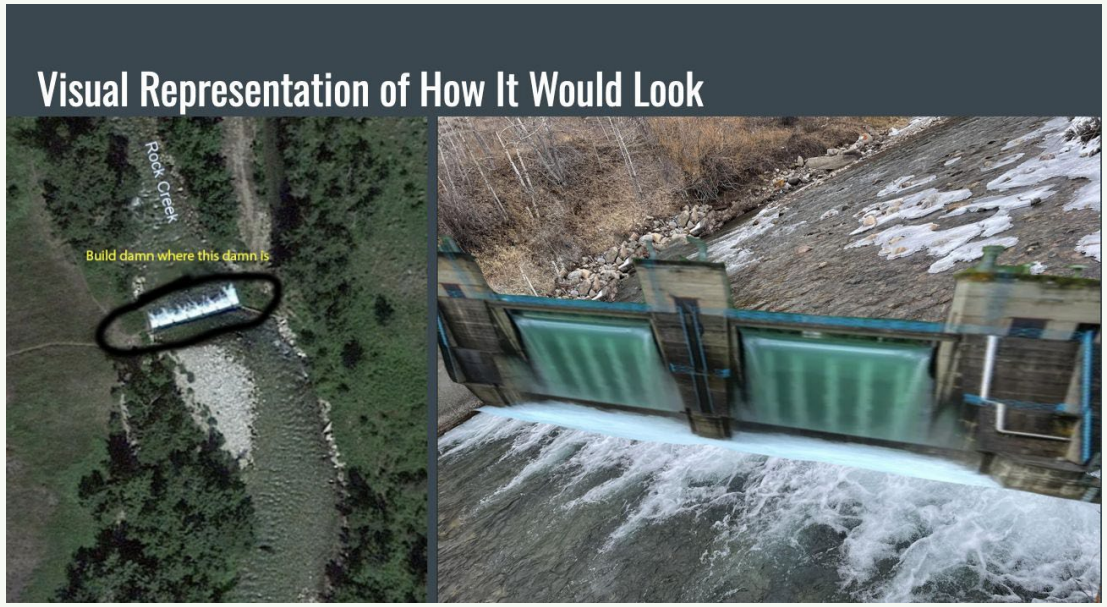
RENEWABLEENERGY

NorthWestern Energy

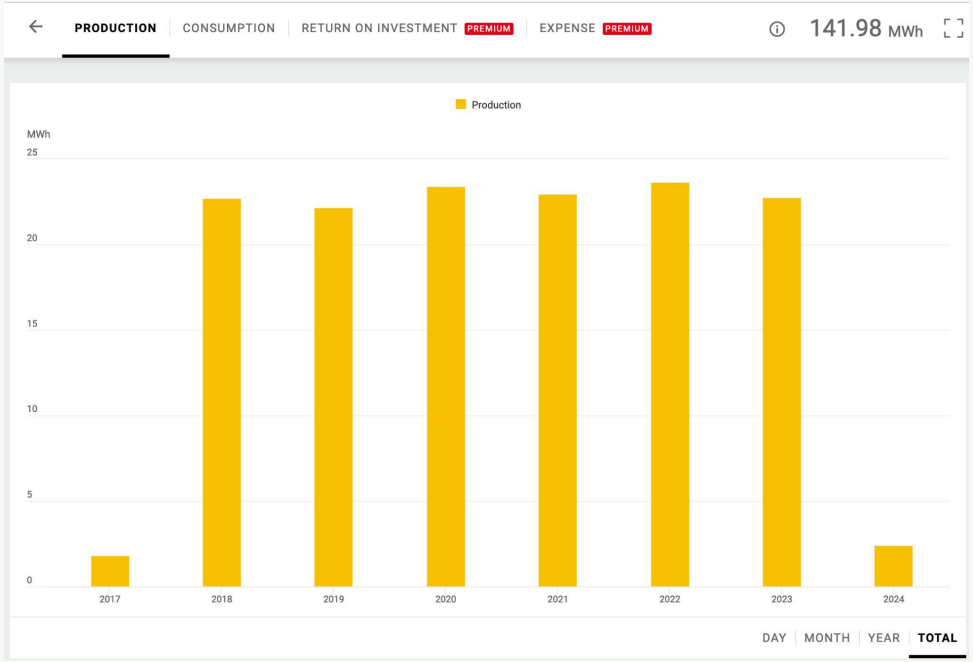
Delivering a Bright Future

POWER OUR SCHOOLS

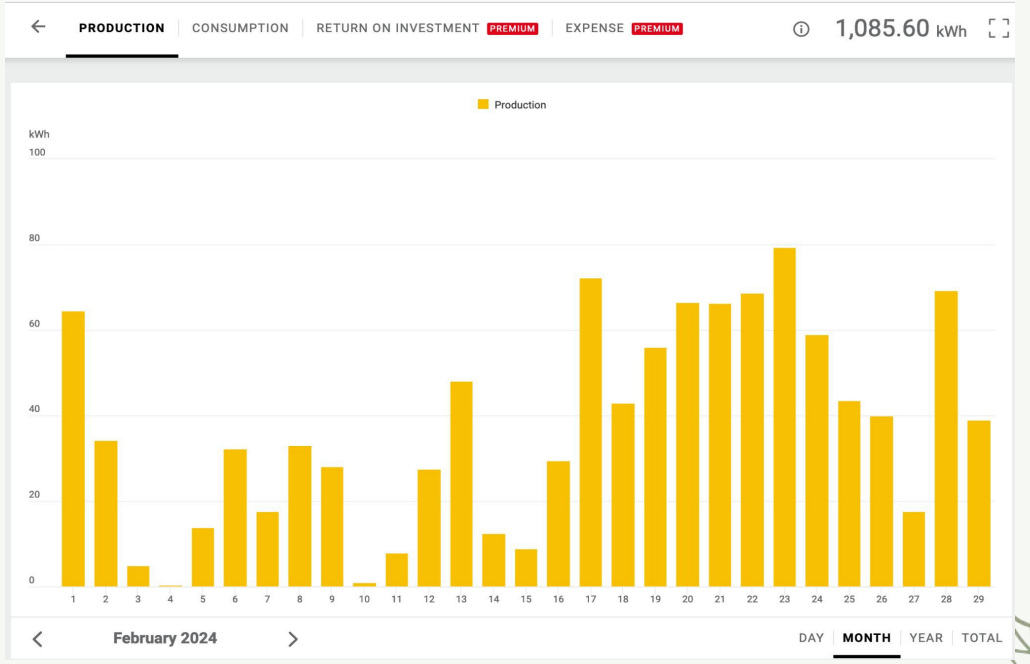
What is the goal of Power Our Schools?



Solar Energy Produced

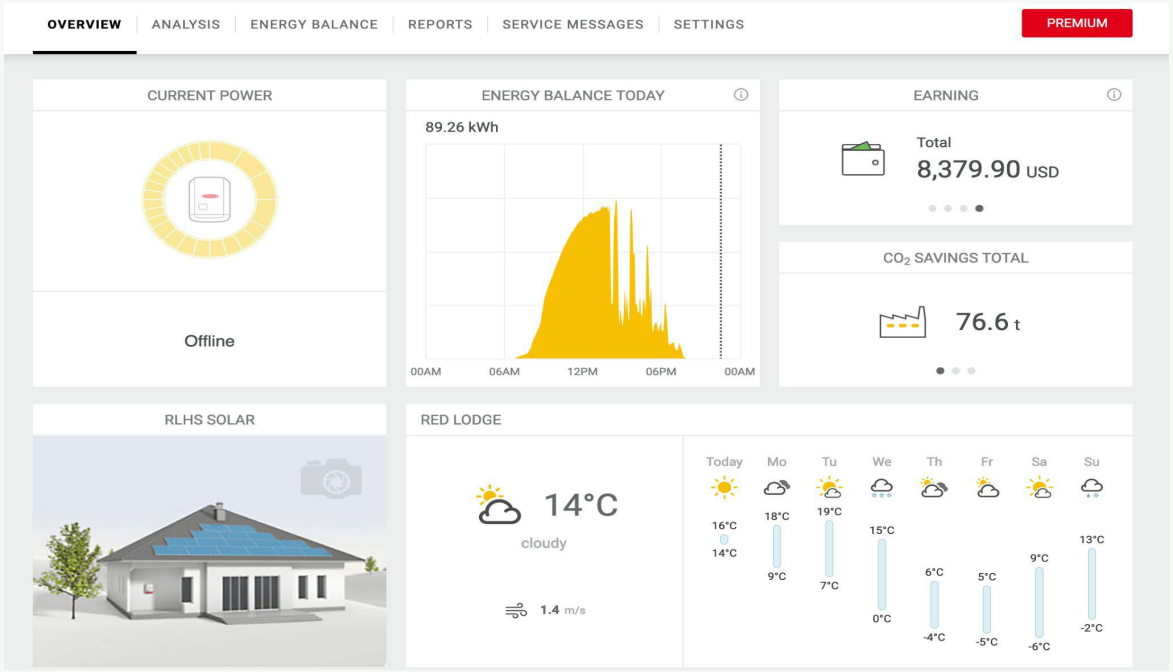


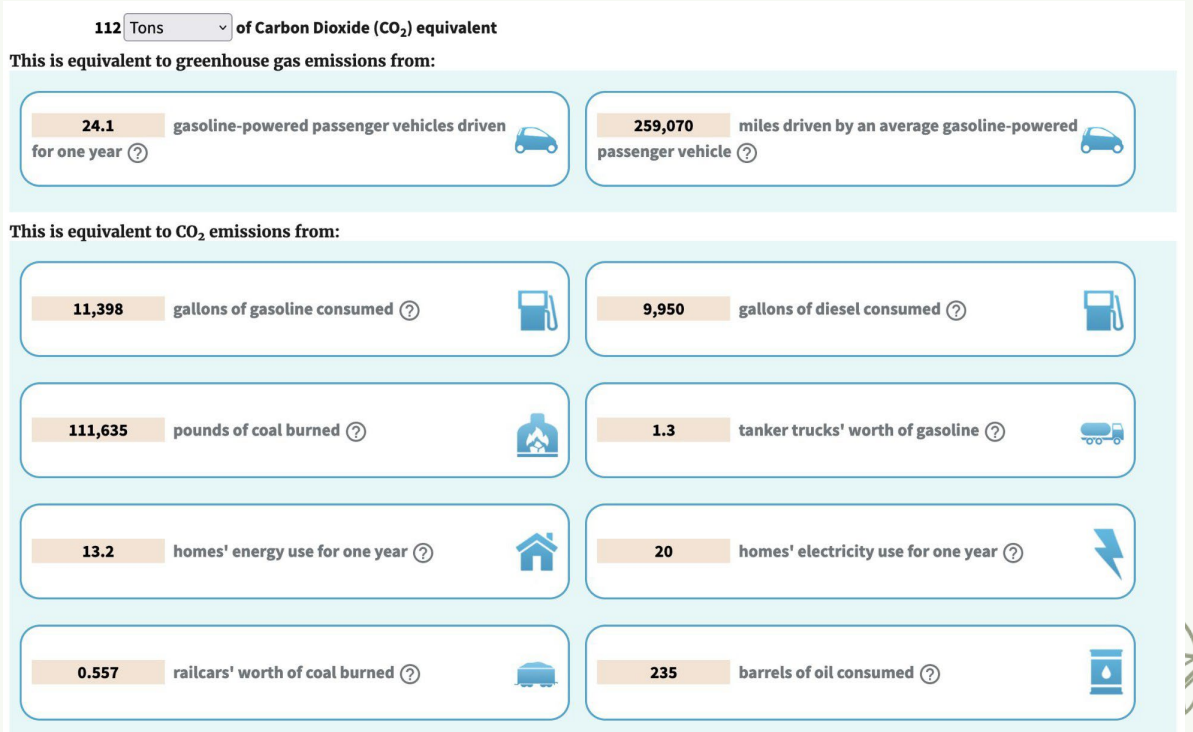
Yearly RLHS Solar Data



February RLHS Solar Data

SAVING MONEY AND RESOURCES





INDOOR AIR QUALITY

INDUSTRIAL PROCESSES/PUBLIC INFRASTRUCTURE

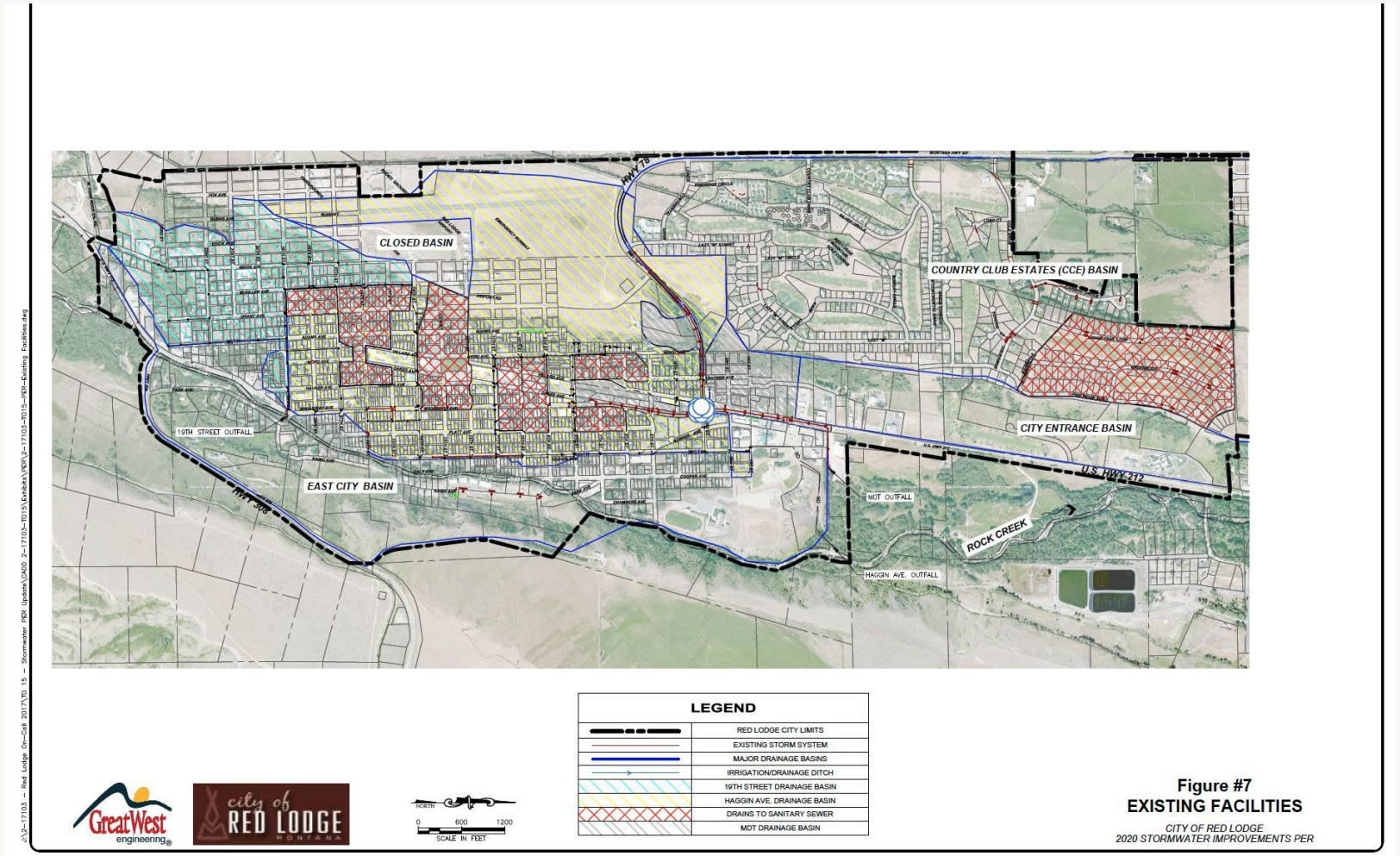
Haggin Avenue Drainage Basin

Stormwater runoff in Red Lodge can generally be separated into seven drainage basins:

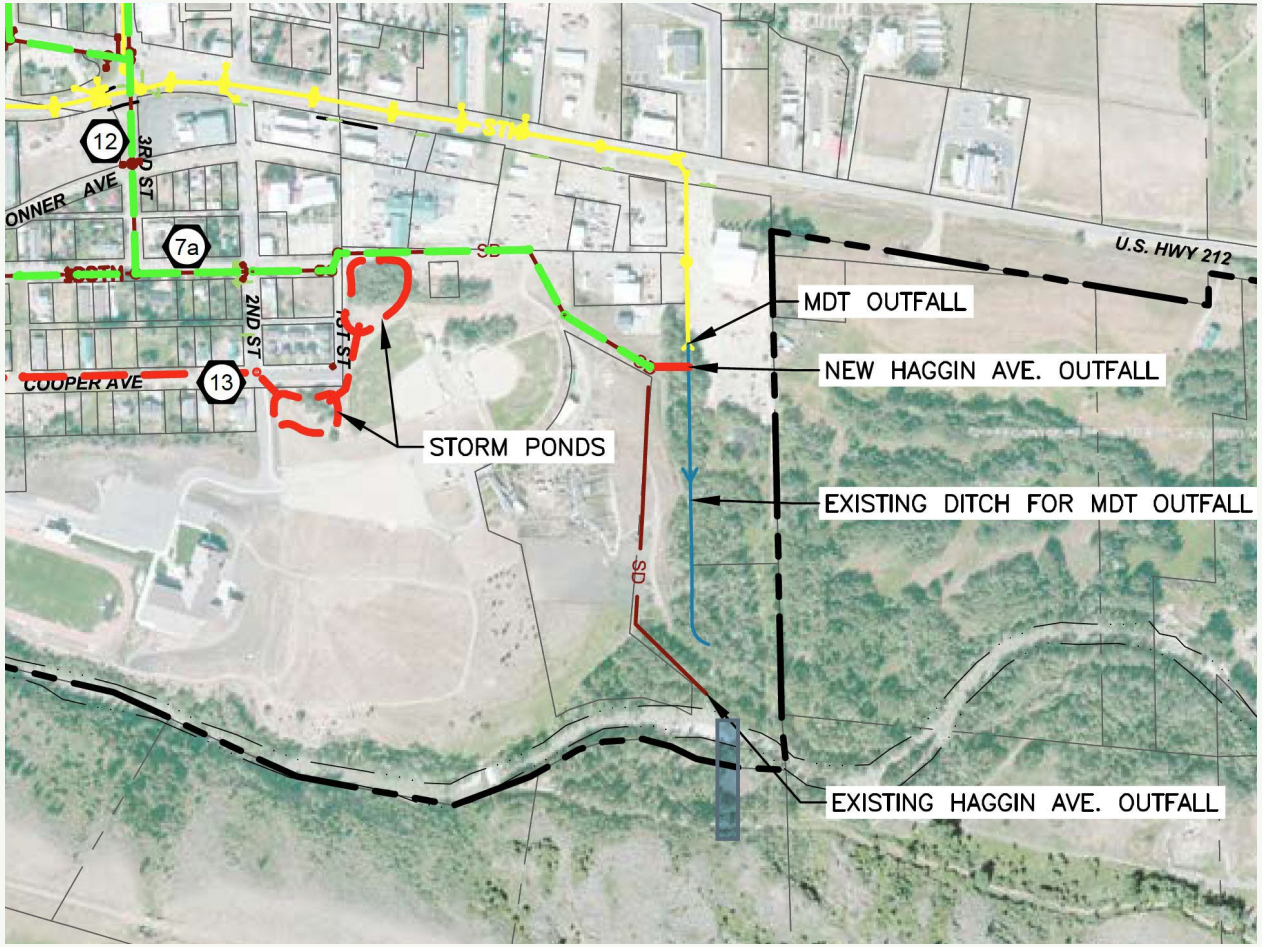
- Haggin Avenue Drainage Basin
- 19th Street Drainage Basin
- Areas that drain to Sanitary Sewer
- City Entrance Drainage Basin
- Country Club Estates (CCE) Basin
- East City Basin
- Closed Basin

The majority of the City's stormwater is collected by inlets and laterals that convey runoff to one of two discharge points in Rock Creek, 19th Street outfall or Haggin Avenue outfall. There are storm inlets within these two drainage basins that drain to the sanitary sewer. The areas that contribute to these inlets have been identified on Figure 7 with a red cross hatching and need new infrastructure installed to connect them to the City's stormwater infrastructure. The City Entrance and East City Basin consist of newer development that provides onsite retention or is primarily undeveloped. Little stormwater infrastructure exists in these basins and stormwater either infiltrates in the roadside ditch of U.S. Highway 212 or discharges directly to Rock Creek via overland flow. The CCE Basin is one of the newer portions of the City's infrastructure and

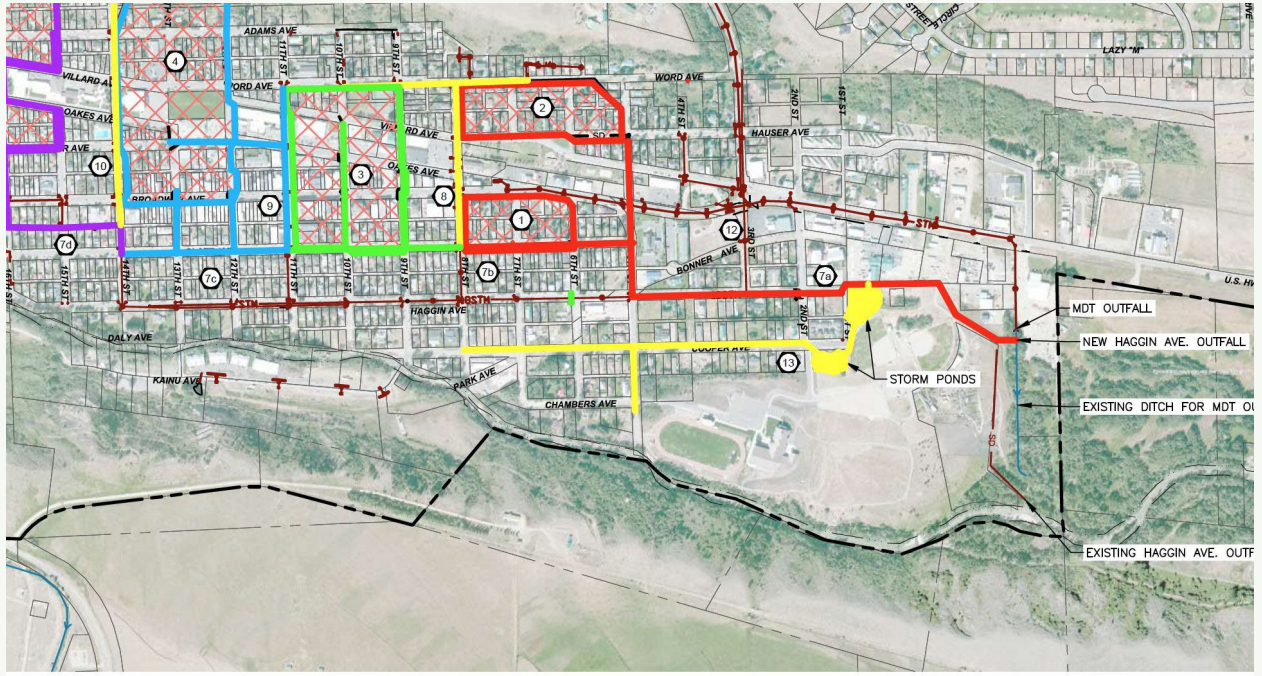
Storm Water Drains



Plans for Drainage System



Phases of Improvement



LEGEND	
1	SITE ID OF IDENTIFIED PROBLEM AREAS
	RED LODGE CITY LIMITS
	PHASE 1 IMPROVEMENTS
	PHASE 2 IMPROVEMENTS
	PHASE 3 IMPROVEMENTS
	PHASE 4 IMPROVEMENTS
	FUTURE PHASE(S) IMPROVEMENTS

Carpooling

2024 Smart Schools Presentation

Capital High School Green Club

Greenhouse and Planting Projects

- Over 1500 seedlings
- Annual Plant Sale
- Indoor/Outdoor Greenhouses being used!
- Upcycled Containers

Festival of Trees and some of our Upcycling

- Green clubs upcycled festival of trees project this year!
- Multiple students pooled together to create upcycled ornaments that were Muppet themed.
- Our Cross-Country team also went to Goodwill and upcycled outfits for a pre-meet theme.

Kessler Composting

- A few students went down to Kessler to teach them about composting through demonstrations and activities to help them get started composting.

- We helped get them composting buckets and compostable bags.

Livingston Climate Summit

- Capital Green Club sent 4 students to the Livingston climate summit held in the fall.
- Students had the opportunity to participate in activities such as speaking to panels and observing sustainable practices by businesses and schools in Livingston

- Upcycled Plexiglass Trophies

  For the Helena hosted 7/7 Cross Country race, Capital High upcycled COVID years plexiglass into cool etched awards (Over 100 of them!!!!).

  Student of the Month awards (4 per month) at Capital High were also implemented with similar etched awards.

Other projects

- REACH pM2.5 conference through the REACH project at University of Montana
  - 50 students are doing air quality projects
- NOgz Gear fabric waste upcycling
- Recycling – National Honors Society recycles – Green Club sponsors a $300 scholarship

Kessler Elementary Upcycle Project- 2024

Presented by Kessler Elementary

3rd Grade Students

Who We Are

- 3rd grade Mrs.Westers and Mrs. Mouledous class Kessler Elementry.
- Presenting- Madi, Penny, Caleb, Maddox , and Dawn.
- The best school participating.

Composting at Kessler

- We are working with Capital High School's Green Club to compost food waste during lunch time every day.
  - Orange peels, apples, bananas
  - We love helping other SMART Schools!

Our Upcycling Project

- Planters, bunny houses, phones, and more
- Up cycling is taking trash and turning it into something better
- Every one created an upsicling progect

The Difference We Made

- About how many items saved from being thrown away:
- We saved 19 cardbord ,1 plate, 2 milk jugs ,2 apple seeds, 14 tin cans, 4 egg cartons,1 chicken wing,1 tolet paper roll, 1 bubler can, 7 plastic bottles,2 bubble wand, 1 glass jar ,and 5 old mail.

Our Goal

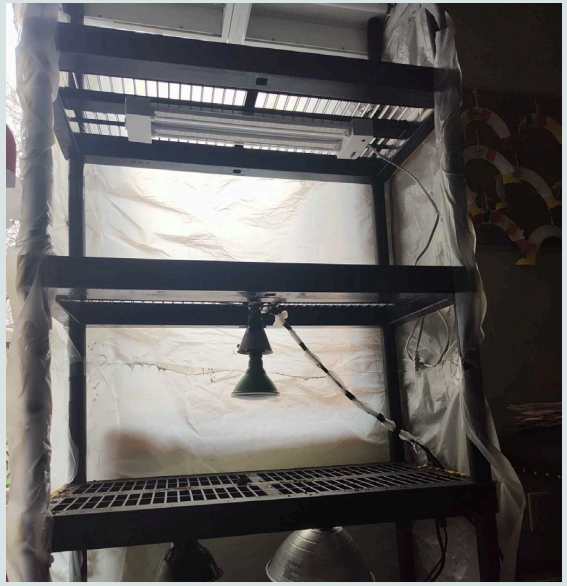
- To reduce waste and improve the inviorment
- To inspire others
- Help animals
- HAVE FUN and createm (being creative helps you learn)

Clark Fork School's Garden Project

We first began by making a germination chamber

What we used to create them:

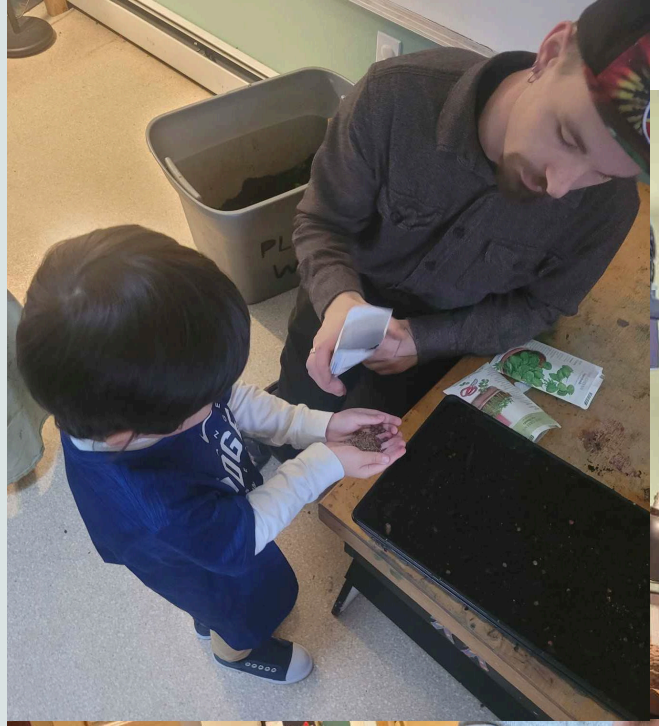
- Metal shelf
- 3 mil plastic
- Grow lights
- Packing tape

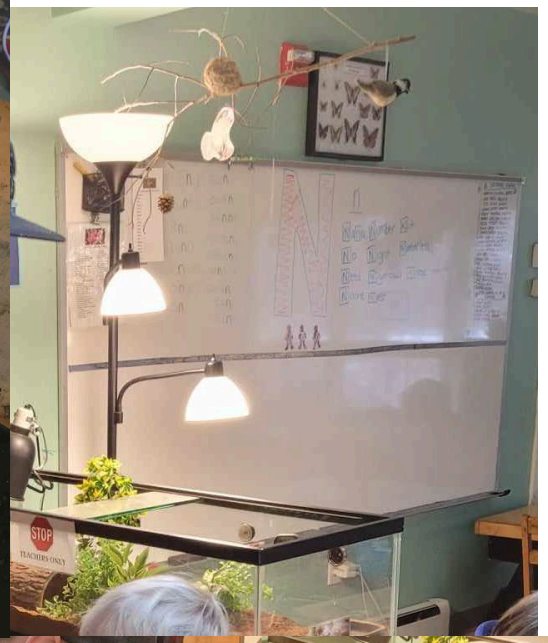


Seeding our plants

-Some of the things we seeded-

- A few varieties of heirloom tomatoes
- A few varieties of heirloom peppers
- Carrots
- Beets
- Sugar snap peas
- Eggplant
- Artichokes
- Corn
- Summer squash
- Cucumbers
- Spinach
- Kale
- Many varieties of flowers







Watering and early maintenance

- Watering is very minimal in the first week of seeding, we only water when it appears to be beginning to dry.
- When the plants start getting a little bigger than watering is about every other day or every three days.

Transplanting the plants to larger pots

- The kids helped transplant the plants from the original seed trays into the larger 3” pots so the roots would have more room to grow as the plants got bigger.


It all starts with a seed.

Moving the plants to the greenhouse

The plants became too large for the germination chambers, and we needed to move them out to the greenhouse. We had planted earlier in the year, so it was too early still to just put them outside with no external source of warmth. We were able to buy and install a heater in the greenhouse that we could monitor the temperature on my phone.

This created a great opportunity for me to be able to creep the temperature down incrementally, so the plants could harden off. To harden off the plants is to expose them to colder temperatures, so they become stronger. Another great way to toughen up the plants is to blow a mild amount of air at them with a fan, so that when it is time for them to go into the ground they are used to the outdoor elements.

Sifting and Aerating the Soil

The kids have been sifting the soil and fluffing it up to prepare the beds for when the plants go into the ground.

While they have been sifting the soil, they have also been conducting a worm count to check the health of the soil.

Butterfly Release Party

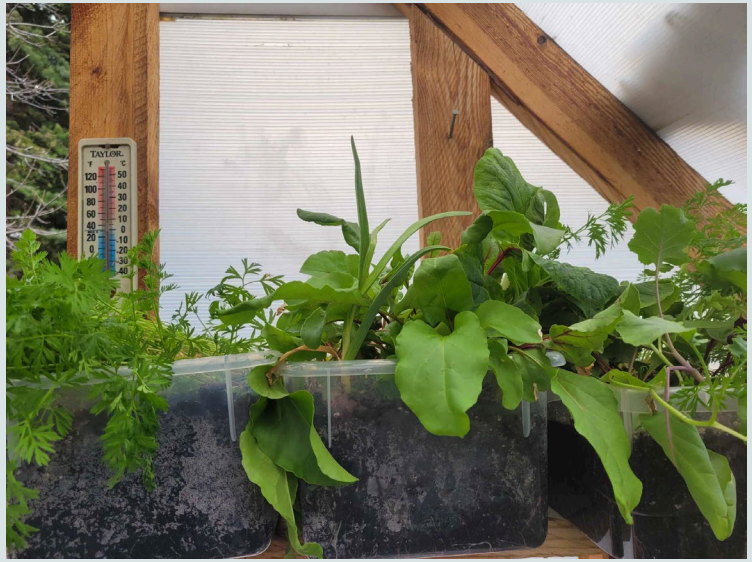
The Nuthatch classroom was able to raise their own butterflies and release them in the garden to promote healthy pollinators for our plants

Things to come...

What is left to do for our garden:

- Finish setting up our irrigation lines.
- Get the plants into the ground in the beginning of March.
- From there on its basic maintenance, weeding, trimming and keeping eyes out for plant diseases. Then harvesting of the fruits and vegetables we will have.

The garden is a very important part of our school, we are so happy to have had the opportunity to share it with you.



Thank you

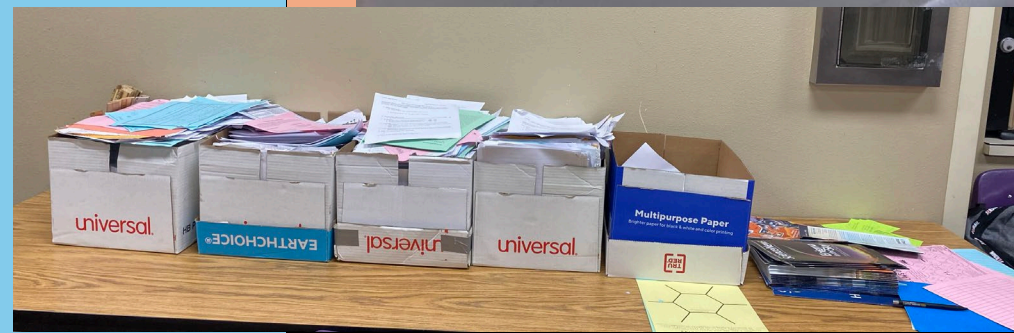
We appreciate your time in looking at our community!

Recycling paper, and why it's so important

Butte High School

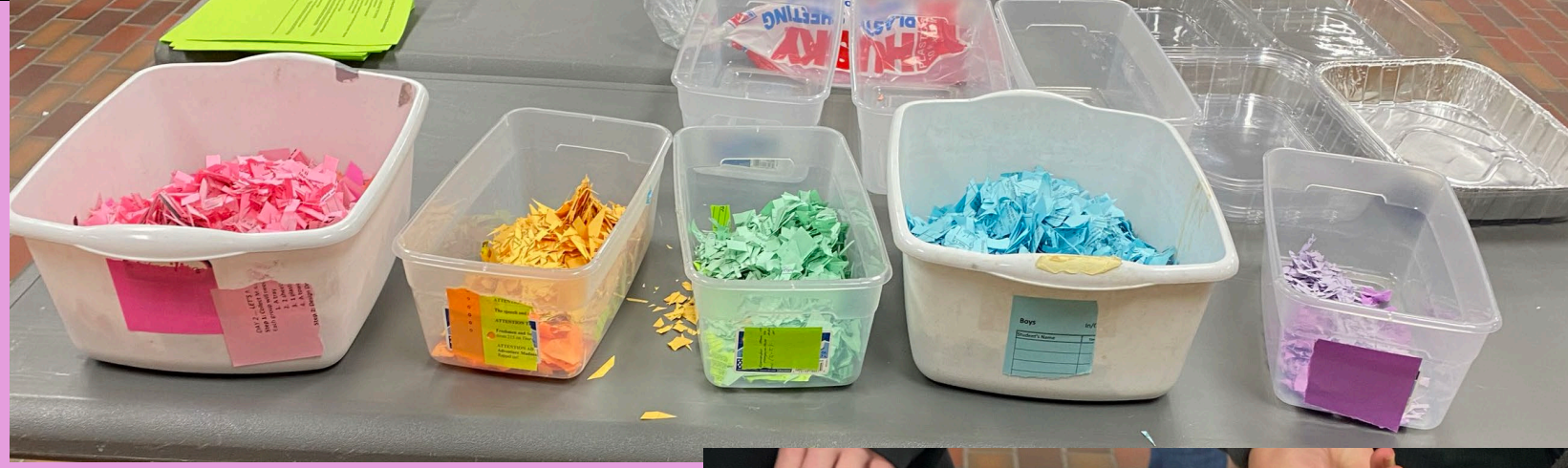
Materials Needed

- ❑ Used paper (any kind)
- ❑ A pan
- ❑ Plastic sheets
- ❑ Plastic net/mesh
- ❑ Blender
- ❑ Water
- ❑ Roller (optional)
- ❑ Scissors (optional)



Step 1

- ❑ Gather the paper you want to use and start tearing it into small pieces and get those in your pan.



Tip: For more fun later separate by color

Hint: tearing is faster, but scissors help with getting small pieces

Step 2

- Soak your paper anywhere from four hours to overnight

Tip: The longer you soak the easier it blends.

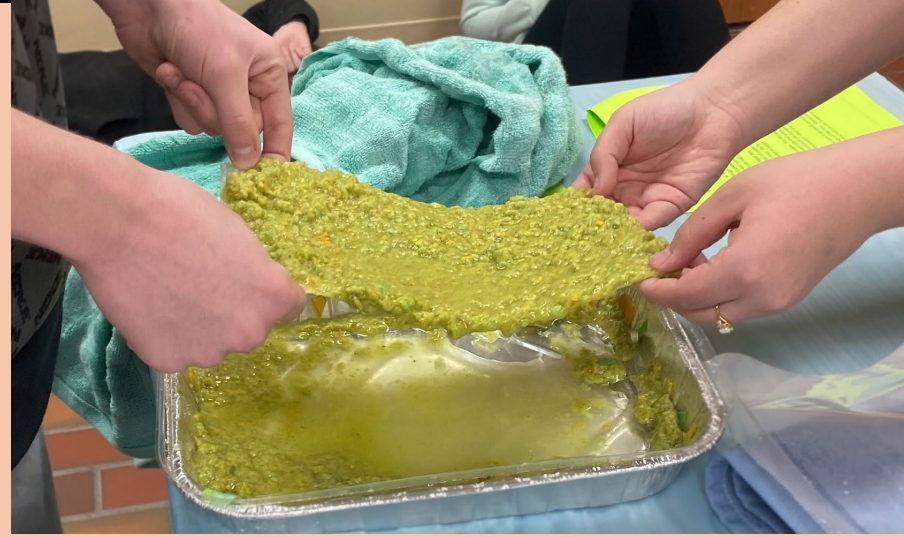
Step 3

- ❑ Take about three scoops of paper and place it in your tray, then blend.

Tip: Have at least an inch of water above your paper in the blender.

Step 4

- Slide your plastic net under your mixture and lift it straight out.



Hint: works best with multiple people.

Step 5

- Let it drip briefly then turn it, net up, on to a plastic sheet.
- Then use a towel to absorb as much moisture as possible.

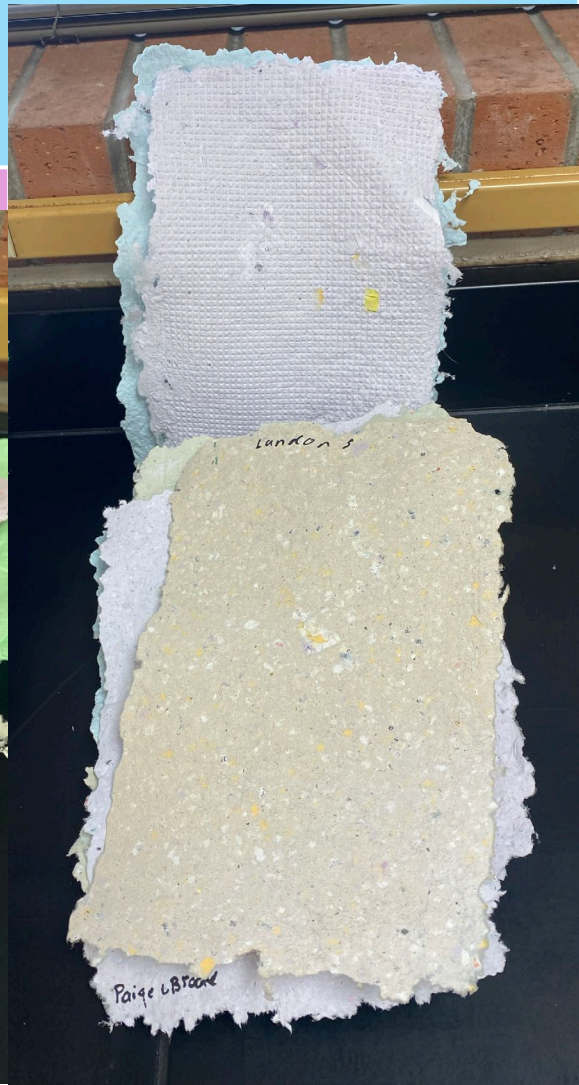
Hint: placing the plastic on the mixture and then flipping is less messy

Step 6

- ❑ Optionally you can smooth the paper with a roller to remove the texture.
- ❑ Peel off the net and leave the paper to dry overnight

How it happens

When the paper soaks the cellulose fibers remain since they don't dissolve in water. Then these fibers tangle which allows paper to form, and this can be done 5-6 times with a single paper making it much more friendly thing getting a brand-new piece of paper for everything. Much better than regular papermaking which requires 68 million trees in the US alone annually.



Why it's important

When you think of paper waste and papers that are thrown out schools ought to come to the forefront of your mind. With kids throwing away unneeded classwork and pages lots is being wasted, and with the average school using nearly 360,000 pages a year and much more if unexpected things happen. This is why saving even a fraction of this paper to be recycled and used again could significantly help with not only waste but also cost of paper for schools.

Value in the community

- We went to a local elementary school and were able to use it as a substitute for construction paper in crafts.

- It got the idea out into the community beyond just some high school classes

Classmates who had fun

References

- *How Much Do Schools Spend On Paper Per Year*. (2020, January 2). Record Nations. https://www.recordnations.com/blog/schools-spend-paper-per-year/
- Paper Production and Consumption Facts Global and U.S. Paper Production and Consumption Statistics. (2015). https://greenamerica.org/sites/default/files/inline-files/Paper%20Facts%202017.pdf
- *various cellulose fibers mdipi*. (n.d.). Bing. Retrieved March 6, 2024, from https://www.bing.com/search?pglt=171&q=various+cellulose+fibers+mdipi&cvid=b3c58460051b41778701c0d49b87a721&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIGCAEQABhAMgYIAhAAGEAyBggDEAAYQDIGCAQQABhAMgYIBRAAGEAyBwgGEEUY_FXSAQg2MTY2ajBqMagCALACAA&FORM=ANNAB1&DAF0=1&PC=U531

SMART Schools

Kalispell Middle School

Kalispell Middle School SMART Schools Team

<u>8th Grade</u>

Emma Colby
Zoey Franklin
Jacob Linden

<u>7th Grade</u>

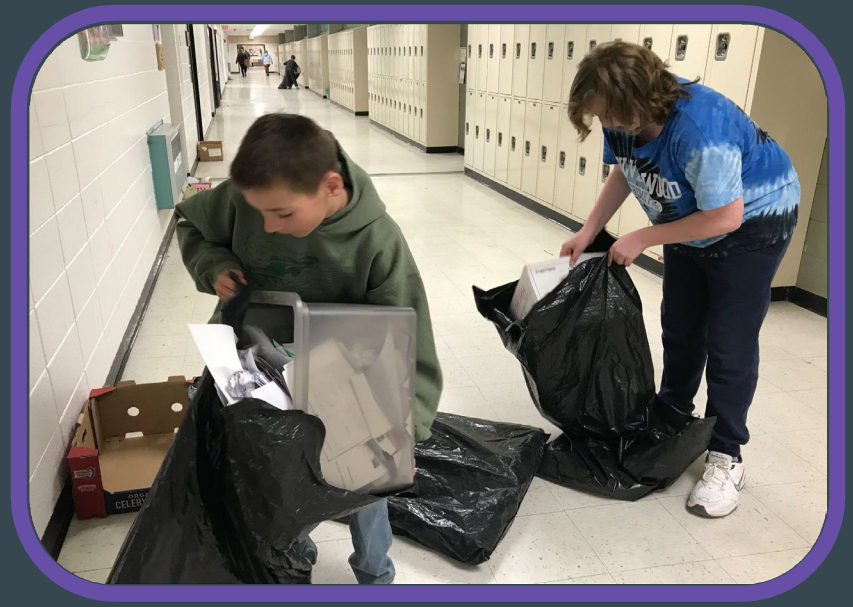
Owen Foley
Lucas Kimmet
Nick Pytell
William Smiley

<u>6th Grade</u>

Ian Martin
Henry Reichenberg
Seth Smiley

Recycling

- We are in charge of recycling for our school!
- Every other week we pick up all the recycling
  - About 150 lbs of paper per week
  - = 2,850 lbs of paper for the year!
- We also attended a presentation from “Waste Not” to learn more about recycling and get more in depth information about recycling
- We present to other students about the importance of recycling and how to recycle properly



Bio Station

- We went to the Flathead Lake Bio Station which monitors Flathead Lake's water quality and different fish populations.
  - The clarity of the lake
  - Microscopic Organisms that play a big roll in the ecosystem around the area
- While there we also learned about invasive species such as Zebra mussels and how they are harmful.
  - And the recent discovery of them in the Snake River.
- We will teach this to other students at Earth Day Expo Event

FLATHEAD LAKE BIO STATION
UNIVERSITY OF MONTANA

Sustainable Cities

Making the Cities

- We made the cities using recycled parts
  - Some of these recycled materials came from around our school for example:
    - Wood - Woodworking/construction
    - Paper + Paint - Art rooms
    - Cardboard - Schools recycling
  - Other materials would then come from personal recycled materials such as:
    - Bottles + Plastic
    - Foam
    - Recycled plastics - used for 3D prints
    - Fabric
    - Pop Can tabs

Sustainable Cities

In reality

- The models that our club created represent cities that could function as a single unit without any imports or exports. This idea is possible with sustainable energy, efficient transportation, and active innovation. We incorporated each of these elements into our city in the following examples.
  - Renewable energy produced by turbines and solar panels located around the city and on houses
  - Transportation like monorails to save electricity and be an efficient way around the city
  - Plastic can be reused to make insulation and building materials when melted into different forms

Eco-Bricks

The Creation Process

- Choose a bottle and a compressing stick
- Start collecting and cleaning plastics
- Chop them into fine pieces and store them until you have enough
- Take a solid color plastic and press it to cover the entire bottom
- Take the chopped plastic and push it into the bottle until about halfway then compress it and repeat until full and dense
- Record the weight and density and write it on the bottle using paint

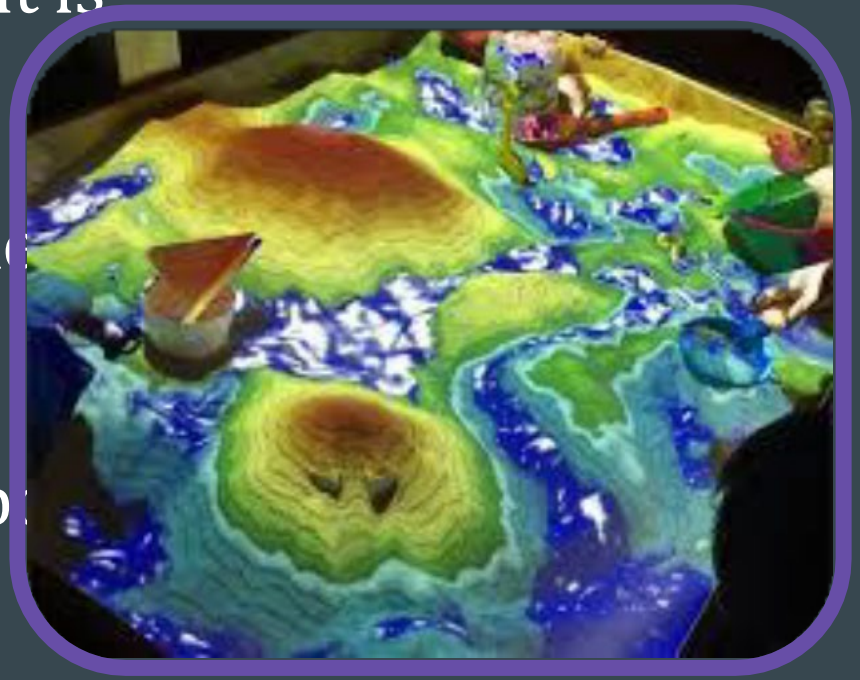
EcoBricks

Uses of the EcoBrick

- EcoBricks build sustainable buildings
  - House walls or planters
- Plastic that would be normally in a landfill is reused for sustainable building
  - The density was 0.5 g/ml to 0.37 g/ml afterwards
- Plastic Sequestration
  - They help to preserve the earth by removing waste and acting as bricks for new structures
  - Locks the carbon footprint into the EcoBrick

Earth Day

- Sustainable Growth
  - Flathead Valley is growing quickly and it is important that we build sustainably
  - Present our sustainable cities
  - Talk to our community about renewable energy
- Augmented Reality Sandbox
  - Teaching the community about the importance of protecting our watersheds



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Ian Martin
Henry Reichenberg
Seth Smiley


Alkali Metals
Alkaline Earth Metals
Transition
Other Metals
Man Made
Metaloids
Nonmetals
Noble Gases

Thank You!