Home ReSource
A Building Materials Reuse Center

# Zero Waste Ambassadors Program

ZWAP!

# 2022 Full Report

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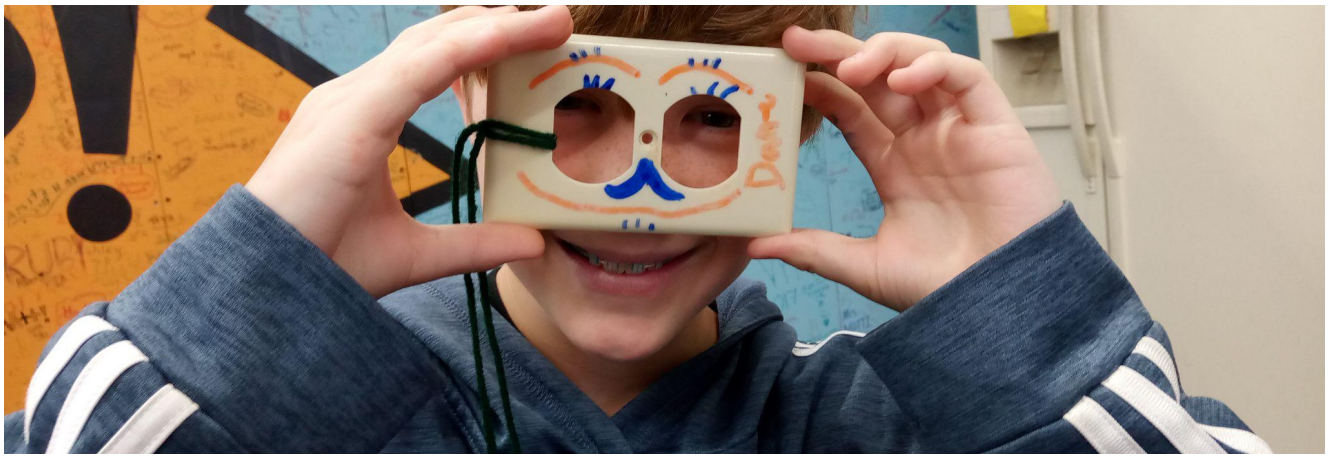


## About Home ReSource

Home ReSource, a 501c3 corporation, was founded in 2003 by two University of Montana graduates who conceived of a retail operation that reduces construction and demolition waste while contributing to a local, green economy. Today, Home ReSource keeps 900 tons of material out of the landfill each year, provides materials and services to over half of Missoula households, and has strong community partnerships, efficient operations, and a growing suite of community programs. Through waste reduction efforts, education, and the channeling of materials and services to those in need, Home ReSource works to build and inspire a more vibrant, just, and sustainable local economy.

At Home ReSource, our end goal is to help create a culture of sustainability. We believe that in order to do so we need to think differently about materials and how to reduce waste. Through **ZWAP!** and our related Zero Waste work with MCPS, we hope to imbue youth with the skills and knowledge to be Zero Waste Ambassadors in their homes, classrooms, and our community so that they can choose to join the effort to knockout waste in Missoula!

## About this Report

This report is a summary of our 2021-2022 iteration of ZWAP! and a distillation of the lessons learned in a set of recommendations to continue refining and improving ZWAP!. We are committed to making ZWAP! as fun and effective as it can be. We see continual program evaluation as a critical tool to get us there.

## About ZWAP!

ZWAP!, our Zero Waste Ambassadors Program, is an award-winning, inquiry-based education program for fifth graders. ZWAP! is designed to motivate young Missoulians to think more critically about materials–where they come from and where they go. Our objective is to empower youth with the knowledge that the choices they make and the actions they take can help create a more sustainable future.

Home ReSource educators provide a total of 3 hours of engagement for each fifth-grade class through an in-school lesson and a field trip to Home ReSource using our interactive, STEM-aligned curriculum that supports three key messages:

- **We have a CHOICE.** Materials aren't waste until they're wasted.
- **There are a lot of ACTIONS we can take to reduce waste.** Reduce, Reuse, Recycle, Request, Compost
- **We can make a DIFFERENCE by choosing to reduce waste every day.** Choice + Action = Difference

Through ZWAP!, we aim to help students become **ENGAGED** in problem solving around waste, **EMPOWERED** with the skills and knowledge to be Zero Waste Ambassadors, and **INSPIRED** to knock out waste in Missoula. At the conclusion of ZWAP!, our hope is that students have an increased understanding of waste and how to reduce it and feel more confident in their ability to evaluate real-world problems and identify sustainable solutions.

ZWAP! is supported in part by the Dennis and Phyllis Washington Foundation, the High Stakes Foundation, the Louis L. Borick Foundation, the ALPS Corporation, and private donors in our community. At this time, this program is offered at no cost to teachers, schools, or students.

## Zero Waste & MCPS

Home ReSource has worked in partnership with Missoula County Public Schools (MCPS) since 2015. Our collaboration encompasses the development of the MCPS Zero Waste Plan, Zero Waste planning and implementation, presentations and meetings with District leadership (including the Board of Trustees), and working to establish environmentally preferable purchasing practices. MCPS continues to update their purchasing and printing habits, opting for reusable and/or compostable products, recycled content paper, centralized printing, and other sustainability measures.

In 2018-2019, Home ReSource launched the Zero Waste Pilot School Program with Jeannette Rankin Elementary (JRE). This spring, we worked closely with Jeremy Drake at Strategy Zero Waste Solutions to support the addition of four more schools to the Zero Waste Pilot Program. These schools included Russell Elementary, Chief Charlo Elementary, Lewis and Clark Elementary, and Paxson Elementary. ZWAP! was delivered to every 5th grade classroom at all of those schools, and a K-5 sorting lesson was developed by Home ReSource educators to help with the implementation of zero waste lunch sorting. Home ReSource has helped recruit community volunteers to oversee the lunch time sorting of compost, recycling, trash, and reusable packaged foods. We are excited to continue supporting MCPS and Strategy Zero Waste Solutions with education and volunteer training in the coming years.

Home ReSource has continued working with the MCPS curriculum team to develop a multi-lesson science and sustainability unit for 6th graders to revisit and explore in more depth the concepts introduced in the 5th grade program. This unit was introduced to MCPS teachers this spring of 2022 and will be piloted as a stand alone teacher lead ZWAP! unit next fall in MCPS 6th grade classrooms.

Finally, Home ReSource is working to create a High School level workshop in partnership with Families for a Livable Climate where ZWAP! principles will be taught and discussed in relation to climate change and community action and resiliency.

## ZWAP! on the Go!

Zero waste educators partnered with Missoula Parks and Recreation after school programs at Lowell Grade School to provide a shortened ZWAP! lesson for students. We call this program “ZWAP on the go!”. This is a way for us to access multiple age groups of students who are mostly lower income. We were able to visit the Lowell After School Program twice. We discussed ZWAP!, the materials economy, and ended with a fun and empowering building project.

Zero waste educators also partnered with The Flagship Program to work with after school students at Meadow Hill Middle School to provide a ZWAP! on the Go. We are looking forward to expanding our after school program engagement with Missoula Parks and recreation and The Flagship Program next fall.

## ZWAP! Camp

For the fourth year, Home ReSource is partnering with the Zootown Arts Community Center to host a ZWAP! summer camp during the summer of 2022. ZWAP! From Zero Waste-inspired experiments, to building with reused materials and beyond, this week-long, half-day camp is perfect for kiddos who care about creating a sustainable future and who love to be creative. This summer, the campers will be creating a project they can submit to the Creative Reuse Division at the Western Montana Fair. The campers will also take field trips to Soil Cycle, Free Cycle, Missoula Urban Demonstration, and Recycling Works where they will continue their community engagement with the importance of reducing, reusing, and recycling in Missoula. This camp takes place July 25-29th.

For the second year, Home ReSource will be partnering with Missoula Parks and Recreation for their Deconstruct-Construct camp. Campers will deconstruct items donated to Home ReSource and reconstruct them in a creative reuse building project. This camp will happen twice during the weeks of June 20th and June 27th.


For the first time, Home ReSource will be partnering with the Montana Natural History Center for their Wild Wonders and Citizen Scientists camps. The Wild Wonders camp will be focused on pollinators like birds, bats, and bugs in Montana. We will be making bat houses, bird houses, and bug hotels to provide safe spaces for pollinators in the Nature Adventure Garden at the Montana Natural History Center. This connection shows campers that zero waste not only contributes to sustainable communities for people, but also for the animals we know and love. The Citizen Scientists camp will involve a world wide citizen science project called "Nurdle Patrol". We will be using the scientific method to look for Nurdles, a tiny plastic pellet that is the raw material for making plastic products, in the Clark Fork River. We will collect and submit data about the presence of Nurdles in our waterways and do a creative reuse project with single use plastics instead of sending them to the landfill. This camp will be focused on building knowledge about the materials economy and actionable steps for a zero waste economy that we address in our ZWAP! presentations. These camps will take place on June 28th, July 12th, August 2nd, and August 9th.

Lastly, Home ReSource will be partnering with the YWCA for GUTS! camps. GUTS is a program for girls and gender diverse youth with a focus on community-based leadership and empowerment. Home ReSource will participate in three sessions with GUTS! where campers visit Home ReSource and learn how to use hand tools to create or repair structures for our community. Projects include building and painting of a compost corral, stools for the food bank, and a free library for the MUD/Home ReSource complex. These camps will take place on June 20th, July 25th, and August 8th.

Many of our ZWAP! students express interest in creative reuse or building projects with Home ReSource (they love the woodshop and want to try out the tools), as well as ask about more actions they could take as a zero waste ambassador. We are excited to build capacity through our summer camp partnerships and provide further opportunity for engagement with Home ReSource and empowerment for our Zero Waste Ambassadors we meet during the school year.

## Summary of ZWAP! 2022

**Changes to the Program**

With each iteration of ZWAP!, we watch for what is working and what is not, make mid-course corrections, and devise and deploy new ways to guide students to a place where they think differently about materials and understand how to reduce waste. We were able to transition back from delivering virtual ZWAP! lessons to in person lessons for fall 2021 and 2022. With a sense that those aspects of the program are well-honed, our focus shifted to providing more context, bringing deeper awareness to our delivery, and determining ways to best support future Zero Waste educators.

**We returned to in-person classroom visits and field trips for the 2021-2022 school year!** **We will continue to improve and maintain the ZWAP! website as needed and use the website to provide a digital option for schools within and beyond Missoula.* **In the Classroom:** CDC and Missoula County guidelines were closely followed and it was great to see our students in person again. We modified the powerpoint presentation to be more streamlined and to maintain student engagement. **Field Trips:** We took all of the teacher and chaperone feedback from previous years, and shortened our field trip from 4 hours to 2. The students no longer ate lunch at Home ReSource for COVID safety. We introduced a hands-on project where students make name tags out of chopped up fan blades and light switch covers. The students participated in a tour, a scavenger hunt with a built-in math component, ZWAP! the game, and a reiteration of the four zero waste ambassadors actions before signing the ZWAP! wall.

**We continued to modify our language for inclusivity & empowerment.** We strive to be vigilant in identifying and remedying any language that could alienate or make assumptions about the lives of ZWAP! students. This includes using gender inclusive language and asking students to put their pronouns on their nametags, saying caregivers instead of parents, saying "where you live" instead of at home. We also mention the availability of our gender neutral bathroom when students visit Home ReSource for their field trip. We address how at present all recycling and composting programs in Missoula cost money to participate in. We discuss how being zero waste in Missoula is not attainable for everyone and how systemic inequalities have led to this and need to be addressed in order for these programs to be accessible for everyone.

**How we measure knowledge retention.** During previous years students took a quiz at the beginning of the classroom lesson and at the end of the field trip. Students used paper and electronic clickers during previous years to record results. The quiz was used as a tool to measure knowledge of waste reduction facts and concepts prior to and after ZWAP!. The quiz was not administered regularly during the 2022 school year as we did not feel that the questions adequately reflected short and long term retention rates of ZWAP! information. While we asked the same questions as previous years before the

classroom presentation and during the field trip, we did not record their answers - rather, we relied on their visioning activities (seen later in the report) to tell us about comprehension of the content.

## What We Accomplished

### Program Reach

### Number of Schools: 17

Alberton School, Chief Charlo Elementary School*, DeSmet Elementary School, Franklin Elementary School*, Frenchtown Intermediate School, Hawthorne Elementary School*, Jeannette Rankin Elementary School*, Lewis and Clark Elementary School*, Lowell Elementary School*, Missoula International School, Missoula Online Academy*, Paxson Elementary School*, Rattlesnake Elementary School*, Russell Elementary School*, St. Joseph School, Sussex School, Target Range School

**Missoula County Public Schools*

### Participating Classes: 38

### Number of Students:

- Classroom visits: 742
- Field trips: 611

## What We Heard

We invited teachers and chaperones to provide feedback on the ZWAP! experience using a Google form. The 31 respondents included 19 teachers, 9 parents, one grandparent, and one person who was both a teacher and parent.Feedback was overwhelmingly positive. Students felt the content was fun and engaging. Highlights from the surveys are included below.

### Overall impressions of ZWAP!:

- *"The best part is exposing our students to the problem of waste and ways we can combat it!"*
- *"It was a fantastic experience. The home resource's staff was welcoming. I liked the way they taught us about the purpose of your organization."*
- *"The activities were easy to understand and developed in a fun way."*
- *"The hands-on activities were great and kept students engaged!"*

### Response highlights: "What did you like best about the ZWAP! experience?"

- *"Getting out of the classroom and showing students solutions to real-world problems."*
- *"It was such an engaging, well thought out, hands-on experience for the kids. They have really absorbed the information and have tried to put it into effect in our school and at their home!"*
- *"I love that the field trip was interactive, educational, and practical. It really showed the kids how much they could save from the landfills by reusing!"*
- *"I liked that the kids got to work with the idea that all material goods come from the Earth and that the systems we currently have in place aren't as sustainable as we need them to be. I like that the message was realistic but also optimistic."*

### Response highlights: "Was the content delivered effectively?"

100% of chaperones answered yes to the question, "Was the content delivered effectively?" Below are explanations on why chaperones answered yes:

- *"The kids LOVED the scavenger hunt. The instructor did great revisiting what the class had learned during her in-classroom visit and the board game made it fun to test the kids' knowledge and participate."*
- *"Information was just right for the students' learning abilities. They definitely came away with new knowledge."*
- *"Our leader was incredible. She made purposeful connections with the kids and delivered just enough information."*
- *"The zero waste topic is really quite big - but it is presented in a doable, understandable fashion and the kids learn pieces of it at both the classroom and field trip portions."*

## Response highlights: "What are the ways you think we could improve ZWAP!?"

There were some suggestions for specific actions teachers and parents would like to see incorporated into ZWAP!:

- *"Maybe there could be some kind of message/letter they take home to their families in which they convey what they learned. Parents most likely didn't read much of the permission slip material, but they'd be more apt to read something from their kid. That could solidify their ambassador commitment a little more."*
- *"This is a great program and I wouldn't really change anything. The improvements made over the past 5 years have been amazing, practical, and better for the students."*
- *"Maybe a follow up classroom session. During this session the students could brainstorm ideas on how to make the school a "Zero Waste" facility! Or even ideas for at home."*

## What We Learned & Recommendations for ZWAP!

Each year, the Zero Waste Ambassadors Program improves, and changes become minimal. Few internal program or content challenges were found this year; the main challenges was school and student engagement during such a hectic year. Our other main challenge was administering the post quizzes that are usually taken during the field trip.

## Challenges and Changes

**Hard to Wrangle Educators**
We had increased teacher participation from the 2020-2021 school year and part of that was due to our lessons and field trips being in person. Teachers were still difficult to get a hold of but the teachers who did engage with us were really glad they participated in the ZWAP! program and were excited for next year. We're confident in having even more teacher participation next year as the difficulties around classroom visits and field trips associated with the pandemic get resolved.

**Field Trips to the Landfill**
The landfill was closed to public tours during the 2021-22 school year due to Covid-19. We are hoping to bring back landfill field trips for the 2022-23 school year. Touring the landfill gives our students a powerful visual of how much waste Missoulians create and inspires positive action. The landfill field trips will once again be a great addition to our ZWAP! curriculum.

**Relevance of the "What do you know about Waste?" Quiz**
We will be reworking our pre and post quiz to more accurately reflect the change in knowledge and behaviors of our students before and after the ZWAP! lessons and field trips. The way metric data is collected at this time is not effective and does not provide useful information for improving our curriculum to address the needs of our students. Next year we plan to start the classroom presentations with Zero Waste Guessing Game to engage the students with real-life facts and relevant, local waste data. This will help them get their "sustainability brains" engaged for the presentation. We then plan to send the students home with a waste reduction infographic with resources and ways to stay engaged before they come see us for a field trip. We plan to gauge short and long term retention rates by giving an open ended journal prompt during the field trip where the students tell us what, how and why being Zero Waste can help people and the planet.

**Group dynamics**
Going on a field trip and getting out of the classroom is an exciting event for students and sometimes that comes with unruly behavior. The students arrive at Home ReSource and sit down in our classroom without a seating chart which leads to interesting group dynamics. This spring, some teachers arrived at Home ReSource with premade groups and had the students sit and do the scavenger hunt in those groups. This led to better listening by the students and lessened the chance of horseplay during the scavenger hunt compared to when the ZWAP! educators randomly make groups. Next year, we will be asking teachers in their pre field trip email to pre make five groups of students and arrive with the students ready to sit and work in those groups.

**Creating a ZWAP! StoryMap**
A ZWAP! "StoryMap" was created to track the progress of ZWAP! over the years. A StoryMap is an interactive web map with information, pictures, and maps to make a standalone resource. The mapping software, ArcGIS, was used to show the growth in student numbers and school participation since ZWAP! started in 2015. The StoryMap was added to our ZWAP! website and Home ReSource website as well as being used as an advertising tool for future ZWAP! participants. The StoryMap was also included in

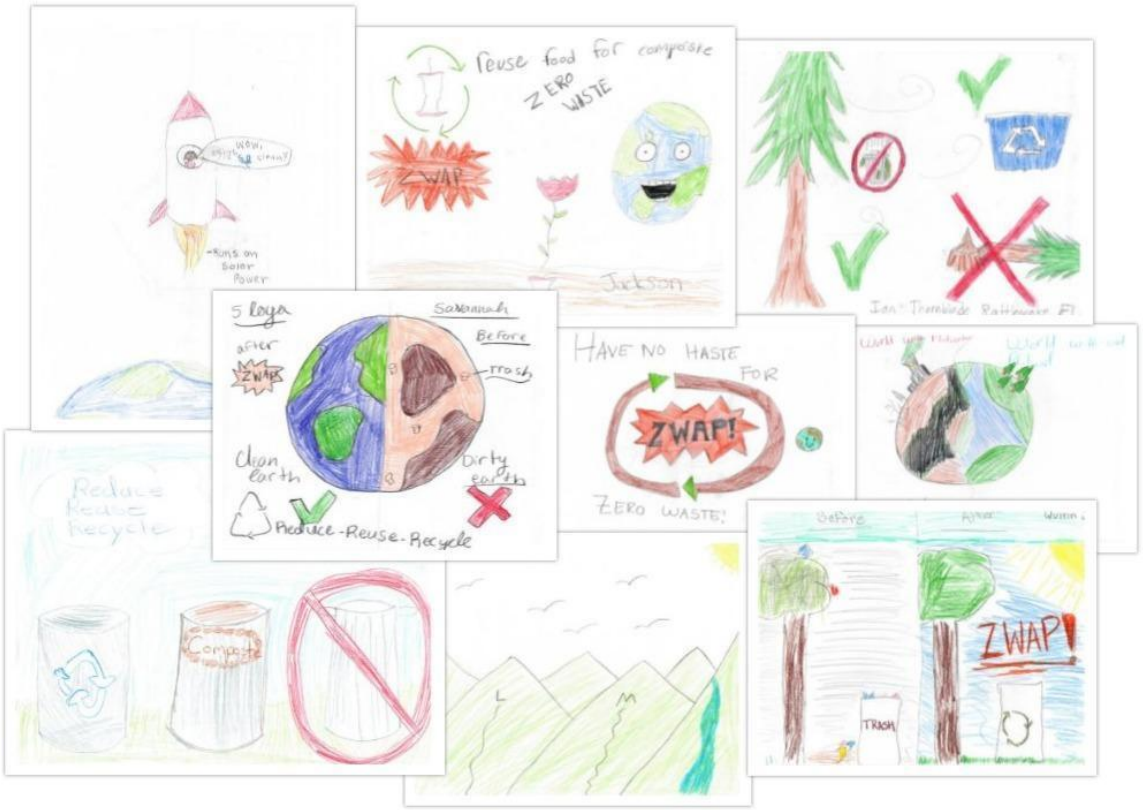
our end of the year thank you to all of our teachers to give them information about how far reaching ZWAP! is in Missoula and how important their participation is. The ZWAP! StoryMap can be found here.

**Visioning Activity**

The visioning activity is the student's response to the question "What would Zero Waste look like for your school, home, community, or planet?" through pictures or stories. This activity was done at the end of our classroom presentations this year, but there was not usually time to do this activity. There were a handful of field trips with extra time at the end so we did the visioning activity as the very last thing after all of our other ZWAP! activities. This proved to be a very effective way to do the activity as the drawings the students did were a culmination of all the ZWAP! knowledge they had been absorbing. The students also got to hang up their drawings around our ZWAP! classroom for future students and visitors to see. Next year, we will be doing the visioning activity at the end of all of our field trips.

## Conclusion

For the 7th year in a row, ZWAP! has remained an integral part of the Missoula 5th grade experience. Despite the unique circumstances and challenges faced by students, schools, and educators during the past couple school years, ZWAP! remains as essential and relevant as ever, and is still a priority in many classrooms and schools. We continue to hear that ZWAP!'s real-world application is of the utmost importance to teachers and students. We are hopeful that program engagement will only continue to increase as the schools and teachers process the relevance of these topics.



# Appendix A: Program Timeline and Logistics

**ZWAP! Plan 2022**

| | |
|---|---|
| **January** | • Continue scheduling ZWAP! class visits and field trips<br>• Organize Calendly calendar<br>• Prepare ZWAP! program materials (Update powerpoints, print quizzes, organize field trip materials)<br>• BSWC member starts term of service<br>• Make new year/ second email outreach<br>• Renew/check subscriptions (calendly, websites, quizizz)<br>• Expand on our camps, take to ZW pilot schools, and other groups like GUTS |
| **February** | • Teach ZWAP! Classes<br>• Send third email outreach to teachers who have not responded<br>• Make bus reservations for field trips |
| **March**<br>**April**<br>**May** | • Host field trips at Home ReSource<br>• Begin recording data and calculating metrics<br>• Begin compiling survey responses from teachers and chaperones<br>• 6th grade curriculum pilot (APRIL)<br><br>Last day of MCPS in 2022 was June 10th |
| **June**<br>**July**<br>**August** | • Complete program metrics<br>• Thank you to teachers<br>• Create StoryMap<br>• Compile and synthesize survey responses - use them for Curriculum revamp<br>• Produce the ZWAP! annual report (JUNE)<br>• ZWAPO - update<br>• Make recommendations for continued curriculum development<br>• Begin updating program resources for the upcoming year<br>  ○ Update with current waste information<br>• Renew/check subscriptions (calendly, websites, quizizz) |
| **September** | • Start outreach to teachers with an initial email invite. |
| **November** | • Prepare spreadsheets for teacher communication records and program metrics. Teacher contact info and class records<br>• Make sure information for 5th grade teachers in MCPS and other nearby districts are current.<br>• Send a second outreach email to teachers who did not respond to the first invitation. |

**Classroom Visit**

- Email teacher one week before classroom visit
    - Confirm lesson time, class size, classroom number
    - Let teacher know you will need access to a projector and space on the whiteboard
    - Let them know you will bring waivers for a field trip that need to be filled out in advance
    - Send them supplementary class activities to precede the field trip
- Prepare materials
    - Prepare sample HR items to bring to the class (~10 -15 items)
    - Prepare note cards for each piece with landfill decomposition times
    - Bring wireless clicker and USB for teacher laptop
- Classroom setup
    - Lay out opened suitcase containing HR items on a table
    - Set up powerpoint presentation
- After the classroom visit
    - Touch base with teachers- field trip date/time, bus transportation, chaperones, etc.

**Field Trip Preparation: Materials**

- Visioning activity
    - Check supplies of colored pencils, erasers, and drawing paper
    - Sharpen pencils
    - Rip pieces of old printer paper
- Name Tag preparation
    - Cut up fan blades and drill holes, cut pieces of yarn to length and attach to blades
- ZWAP! The Game
    - Check game boards
    - Check arrows, reinforce Velcro if necessary
    - Repair team envelopes for each round, reinforce Velcro if necessary
    - Check game instructions for each group
- Reuse Scavenger Hunt
    - Check laminated shopping lists
    - Put shopping lists on clipboards, attach Vis-a-Vis marker to each clipboard

**Field Trip Preparation: Logistics**

- Bus reservations - fax Beach Bus
- Email teacher one week prior to field trip
    - Confirm times for departure from/ return to school
    - Remind them bring students' completed field trip waivers
    - Encourage them to bring 3+ chaperones
    - Provide a list of what students should bring: water, a snack, warm clothes, walking shoes
- Room preparation
    - Organize stored ZWAP! field trip materials
    - Tables (4) and chairs (6-8 at each table)

- Create materials economy boxes on white board to prepare students

**Day of Field Trip**

- Place orange traffic cones on Wyoming St. side of Home ReSource to mark the bus loading zone
- Ensure room setup is complete (tables, chairs, and drawing supplies)
- Write "Welcome [School]" on the whiteboard
- Prepare field trip materials
    - Educator: timeline, script, instructions, dry erase markers, materials economy pictures
    - Visioning: drawing paper, erasers, colored pencils, regular pencils
    - ZWAP! The Game: team instructions, envelopes, arrows, and game boards
    - Reuse scavenger hunt: clipboards with markers and project sheets, two tape measures, and sample 2 x 4 wood in baskets for each group
- After the field trip
    - Clean up and organize materials
    - Save data from Turning Point. Add data to metrics spreadsheet
    - Empty zero waste station bins and wipe down tables
    - Email ZWAP! survey and the follow-up Redesign activity to teachers and chaperones
    - *Weekly or bi-weekly:* Sweep the ZWAP! room, sanitize clickers, and sharpen colored pencils

**After all ZWAP!s**

- Compile all metrics
- Compile survey responses
- Write ZWAP! annual report
- Suggest continued curriculum adjustments as needed
- Ensure program materials are organized and easy to find/ use for next year
- Prepare spreadsheets and materials for new ZWAP! educator

# Appendix B: In-Class Lesson Plan Scripts

***We use this as a foundation, but modify and personalize to ensure effective delivery**

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1. My name is ____. I work at Home ReSource. [Can ask about classroom conventions for behavior, etc.]
2. [Set expectations for class participation.] I am going to be asking you all some questions. Just so you know, I will only call on students who raise a hand first.
3. **Raise your hand if you've been to Home ReSource before.** Hands down.
4. **Raise your hand again if you want to describe Home ReSource.** [start with 1; ask if anyone wants to add anything – choose no more than 3-4 students total]. Hands down.
5. **Raise your hand if you've been to a thrift store like Goodwill before.** Hands down
6. **Raise your hand if you've been to a hardware store like Home Depot before.** We're thrift store + hardware store.
7. Welcome to the Zero Waste Ambassadors Program or ZWAP! for short. **Can everyone say ZWAP!?** Good. That's the sound of knocking out waste in Missoula. I am here today to talk to you about where our stuff comes from and where it goes. We'll talk about how we can work together to knock out waste or, in other words, to reduce the amount of stuff we throw away. Let's start out with a quick quiz to see how much we know about waste.
    - I won't know who has what clicker. Just do your best to guess if you don't know the answer. We'll go over the correct answer after each question. As we go through the quiz, please keep your answers to yourself!
    - In a moment, when I say "go," I want you to – quickly and quietly – come get a clicker and return to your seat
    - [Explain clickers: Green light, can click more than once to make sure your answer goes in; the last button you click is your answer]
    - [If students aren't clicking, you can say, "Moving on in 3, 2, 1…"]

8. When I say "go" again, I want you to – in a very quiet, orderly, and prompt way – return your clicker, grab an object off the table, and return to your seat. [Can ask teacher to help pass out items to speed students along]
9. **What is this stuff?** Describe it; name it if you can.
10. **What is it made out of?** [Write materials named in a column to the left of the drawing of Earth—List: plastic/rubber, wood, metal, glass, textiles, ceramics {minerals, sand, clay}]
11. **Where does this stuff come from —In the landscape?** [Write different resources: oil, trees, ore, sand, plants, and animals] **—On the globe?** [Put dots on the globe; add any big ones that aren't. e.g. China, Bangladesh, Vietnam, etc.]
12. **Where do these raw materials go next after we find them and harvest or extract them?** Let's use the plastic hose nozzle as an example. [Draw the rest of the diagram up to the house.] Extraction (planet)

    Production (factory)  Distribution (box store + laptop computer)  Consumption (house + school)

13. It's an entire system!
14. **Who knows what a SYSTEM is?** [A set of connected things, parts, and processes that form a complex whole]. People have created lots of systems! **Who can name a human-made system?** This system is called the MATERIALS ECONOMY.
15. **Does anyone know of a system in nature?** (e.g. respiratory, circulatory, solar, ecosystem, hydrologic cycle, carbon cycle). There's a difference between these natural systems and the one we have on the board!
16. **What shape do systems of nature make?** They make circles; they're what we call "cyclical". These natural systems work together to keep out planet livable. **What shape is the system of the Materials Economy?** It's

like a line or "linear," with a beginning and an end, unlike natural systems. Remember this—we'll come back to it a little bit later!

17. **How do we move things around this system, the M.E.?** [Draw modes of transportation below first arrow.]
18. **How far does stuff travel to get to Missoula?** [>5,000 miles on average] That would be like driving from Missoula to Billings and back over 7 times! [Draw a line from planet to house & 5,000 miles]
19. **How do all those vehicles and machines get the power to extract and transport this stuff?** [Fuel] We'd use a lot of gas driving 5,000 miles, wouldn't we?
20. **What comes out of the trucks, trains, planes, and boats when they burn fuel?**
21. Greenhouse gases, including carbon dioxide ($CO_2$). **What do you know about greenhouse gases like $CO_2$?** [Write GHGs near Earth]
    a. **Does anyone know what the atmosphere is?** [layers of gases that surround Earth]
    b. **Have you ever gotten into a car in the summer and it's way hotter in the car than it is outside?** That's kind of how greenhouse gases like $CO_2$ work in the atmosphere; they trap heat.
    c. $CO_2$ is natural and essential to life on Earth: we breathe it out, trees breathe it in. Greenhouse gases like $CO_2$ help keep our planet warm and livable, but **what happens when we add more $CO_2$ to the atmosphere?**
    d. The molecules trap even more heat, contributing to global climate change.
    e. **Who remembers the bad fire season we had in 2017? And how about last winter - Normal? Weird?** We can connect our strange seasons at home with climate change and the Materials Economy. Our stuff affects our climate!
22. **Now that we see how greenhouse gases and climate change are connected to the Materials Economy, let's talk about what happens next in this system. What do we usually do with our stuff when we're done with it?**
23. We throw it "away." Then, someone drives it to the landfill. [Draw last part of the system: the landfill]
24. **Who remembers how many pounds of stuff the average Montanan throws away every day?** 7 lbs
25. **Who remembers if that is more, the same, or less then what the average American throws away?** More
26. **What kind of stuff do we throw away?** [Get a few responses; be sure to include toxics]
27. **What are some of the consequences of throwing this stuff away?** [Write impacts on board]
    a. [If no reply, follow up with: **What are some ways throwing things in the dump harms us or our planet?**]
28. Let me tell you a story. When people began to live in big cities, trash and human waste were often thrown into the streets or outside the city gates. Imagine if you were to throw all of your garbage out of your bedroom window! **What would Missoula look like?** As cities kept growing larger, people began to link trash and sewage with disease. The concept of a common garbage "dump" or landfill was seen as a solution to these public health concerns. And then the landfill was born; waste materials were collected and put into one area outside of town. Then and now, landfills have kept garbage out of the streets and protected public health.
29. Unfortunately, now we have different problems:
    a. We're throwing away a lot of stuff!
    b. A lot of it is isn't "garbage," it is reusable, repairable, recyclable, etc.
    c. A lot of it becomes harmful to us and the planet when dumped in a landfill
    d. ***Is this a good way to go?*** [No!]
30. **Do we have choices other than the landfill for the stuff that we no longer want?** [Yes!]
31. We have a CHOICE! Materials don't become waste until they're wasted.
32. Who decides when a bottle or a can or a piece of paper becomes waste or garbage? [We do!]
33. It happens right here with us at home & at school. [Point to the home/school picture]

34. The good news is that there's a simple equation that each of us can use to keep stuff out of the dump & become a Zero Waste Ambassador. When we CHOOSE to reduce waste and take ACTION, we can make a big DIFFERENCE. [Write as CHOICE + ACTION = DIFFERENCE].
35. **Who remembers the first "R"?** [1 (circled); REDUCE] **Who remembers what it means?** [USE LESS STUFF] Who wants to guess why I'm putting REDUCE by Earth? **When we choose to use less stuff, do we need oil, trees, ore, etc.?** [No!] **Do we then need to log, drill, or mine?** [No!] If we leave forests, mountains, and open spaces alone, nature's systems can continue to cycle and support life. Choosing to reduce is one of the best things we can do for the health of our planet. When we put the first "R" into action, we can make the biggest difference!
36. **Now, what shape is a natural system again?** [Circle]. **What shape is the Materials Economy?** [Line]. **Do you think we can change this line into a circle?** [Yes!]
37. **Who knows the second "R" of waste reduction?** [2 (circled); REUSE] This is something we do a lot of at Home ReSource. It means USE IT AGAIN. [Draw and label reuse arrow. Make sure all of the arrows originate from one point below the home. Write definitions near R words]. This arrow starts with us! At our homes and schools, do we choose to send something to the landfill, or do we choose to reuse?
    a. Small arrow: Examples of reuse behaviors, things that we can reuse at home/school
    b. Mid-sized arrow: Examples of reuse businesses in Missoula [Include Free Cycles, library, thrift stores]
38. **Who knows the third "R"?** [3 (circled); RECYCLE] It means MAKE IT AGAIN. – Big arrow: Examples of materials that can be recycled
    a. Raise your hand if you remember how much energy recycling one aluminum can saves [enough to power a TV for three hours - draw on the side]
    b. **Raise your hand if you want to guess how many times we can recycle an aluminum can.** [An infinite number!] [draw symbol]
39. **What good things happen when we reduce waste and close the system?** [Write on board: good for the environment + planet, good for the economy, good for public health] Remember this: We can use our equation for becoming a Zero Waste Ambassador to make these things happen! When we make the CHOICE to reduce waste and put the 3 Rs into ACTION, we can make a big DIFFERENCE. [refer to equation already written on the board]
40. Now, we've talked about different ways we can take action. **Are there any items and/or materials that don't fit into our ZW system?** [Yes- Styrofoam, wrappers, packaging, etc.]. We make waste because a lot of things we use in our lives are DESIGNED FOR THE DUMP. [give an example of something that's DFTD, e.g. Chips Ahoy bag]
41. The good news is that it doesn't have to be this way! Things can be made to fit into the ZW system instead of being DFTD.
42. **Raise your hand if you remember the "R" from the quiz that we can practice to persuade the people who make the stuff we buy & use to change the way they make stuff so that it can fit into this Zero Waste picture?** [REQUEST]
43. Let's talk about that Chips Ahoy bag again. **How could I practice the Request "R" word?** I could write a letter – describe what the letter would say.
44. **So if we put all the R's into ACTION, and the people who make stuff made it so that it could fit into this system do you think we could live in a world that creates Zero Waste?** That would mean that instead of a Materials Economy, we'd create an economy that produces ZERO WASTE! [Cross out "MATERIALS," replace with "ZERO WASTE"]
45. Zero Waste is a system that supports people and the planet by using the 3 Rs. It requires us to play an active role and to make the CHOICE to put those Rs into ACTION. In a Zero Waste world, all the things in the Zero Waste Economy are made to last longer, and to be repairable, reusable, recyclable, and compostable. [point to or circle the factory – where stuff is made]. The entire system needs to change. And it already is changing!

46. Once we make the CHOICE to practice the Rs & stuff is made to fit into a Zero Waste Economy then can we truly get to Zero Waste.
47. **Did you know that Missoula has a Zero Waste goal & a plan to get there?** Missoula is planning to reduce the amount of stuff it sends to the landfill by 90% by 2050. The Missoula County Public School district is on board too! **How old will you all be in 2050? What would it be like to be able to reduce the amount trash you throw away by 90%?**
48. We need your help! If you can reduce waste every day and encourage your friends and family to do the same, imagine how much of a difference we can make! That's why we need each of you to become Zero Waste AMBASSADORS [Write "AMBASSADORS" next to "ZERO WASTE" and circle]. When you come to Home ReSource for your field trip, we'll talk more about what that means.
49. In the meantime, I'd like you all to quietly think of some ideas for what a Zero Waste Missoula might look like. Think of Zero Waste in your homes, yours school, and anywhere else. I will ask to hear your ideas when you visit Home ReSource for your field trip!
50. Thanks! I look forward to seeing you at Home ReSource!

# Appendix C: Field Trip Timeline and Activities

| Timeline | Activity |
|---|---|
| 9:00 AM | Arrive |
| 9:00 - 9:15 | Intro/ZWAP! Recap |
| 9:15 – 9:25 | Reuse Name Tags |
| 9:25 - 9:35 | Home ReSource Tour |
| 9:35 - 10:00 | Scavenger Hunt + Discussion |
| 10:00 - 10:30 | ZWAP! the Game |
| 10:30 - 10:40 | Ambassador Actions |
| 10:40 - 11:00 | Visioning Activity + Writing Prompt |
| 11:00 | Wall Signing + End |
| | **Total: 2hrs** |

## ZWAP! Recap/Refresher and Reuse Name Tag Creation

### Overview

Remind students about why they are visiting Home ReSource.
Review and recreate materials economy - Interactive popcorn style on white board.
Talk about CO2 emissions and then make name tags out of reused materials.

## Visioning Activity

### Overview

Many students completed a visioning activity at the end of their field trips. The activity aims to get students active in thinking about Zero Waste and topics covered in the classroom lesson. Students draw pictures and write responses to the question "What would Zero Waste look like for your school, home, community, or planet?" To conclude the activity, students volunteered to share their drawings and ideas with the entire class.

## ZWAP! The Game Overview

Objectives:

1. To review the Materials Economy classroom lesson
2. To teach students about "R words," how to use them, and to reinforce the key takeaways of ZWAP! (Choice + Action = Difference)

Learning Outcomes:

Students will understand:

1. Where stuff comes from and where it goes
2. How they can apply "R" words to reduce waste
3. That their individual choices can and do make a difference

Materials:

1. Laminated game pieces located on Google Drive: *ZWAP! > 2020 > Field Trip Resources > ZWAP! The Game > Graphics*
2. Game materials are located on the white shelf and in the window above it in the Home ReSource community room. Game boards have a pocket on the back which contain the arrow pieces; pieces for other rounds can be found in the brown game envelopes.

Activity Description:

1. The class will divide into groups of three or four. Each group will receive a game board with three arrows, a brown envelope with three sets of game pieces, and instructions for the game.
2. In Round 1, the students will put the Materials Economy in order on their boards.
3. In Round 2, students will put arrows on their boards to change the system of the Materials Economy to keep all of our stuff from ending up in the landfill.
4. In Round 3, students will add labels to their game boards, with emphasis on "Reduce", "Reuse", and "Recycle".
5. In Round 4, students will put the "R" words into action by placing common objects in either the landfill, one of the three arrows, or under "Reduce". A class discussion will wrap up the game.

## Instructions

### Round 1: Recreating the System

1. Starting at START, velcro each piece in order along the straight black line.
2. Once you are finished, Call out "DONE!" and raise your hands.
   HINT: Do you remember the MATERIALS ECONOMY, the SYSTEM where things come from and where they go?

### Round 2: Turning the Line into a Circle

1. Velcro the three orange arrow pieces under the Materials Economy.
   HINT: All of the arrows start with us! WHERE do you spend most of your time?
2. Once you are finished, Call out "DONE!" and raise your hands.
   HINT: Remember the choices we can make to change the Materials Economy into a Zero Waste Economy which is more like Earth's natural systems?

### Round 3: Naming our Choices

1. Velcro the red and green pieces where they belong under the Materials Economy on the board or on the orange arrows.
   - The pieces: REDUCE, REUSE, RECYCLE, and LANDFILL need to be matched with the correct 3-word definition pieces:

   Remember: There are two REUSE pieces because there are two ways to Reuse in the Zero Waste Economy.
2. Place the black circle numbers next to the "R" words to show the correct order.
   HINT: The 3 "Rs" are always in the same order, do you remember which one goes first?
3. Once you are finished, Call out "DONE!" and raise your hands.

### Round 4: Tracking our Trash

1. Take turns drawing one game piece at a time from the Round 4 envelope. As a team, choose where to put each of these items on the game board.
   - Your choices are: any of the three arrows, in the landfill, or under the Earth to REDUCE the amount you use in the first place!
2. Be prepared to explain your choices and why you made them.

3. Once you are finished, Call out "DONE!" and raise your hands.
   *HINT: The "R" words are in order for a reason!*

## Reuse Scavenger Hunt

Instructions and Outline

1. Introduce and explain the activity
    a. Number students off to create five groups, and assign a chaperone to each group
    b. Have each group get the box of materials with their group number on it, and give each group wet erase markers (keep track of them!)
    c. Explain: Each group will have 15 minutes to find and measure out the items needed for their project with their shopping list. The scavenger hunt is not a competitive race, but each group should try to find as many items as possible on their list! Remind groups to stay together during the activity.
    d. *Disclaimer:* You'll notice that some of the pictures for your projects look really fancy! These are pictures of really nice homes and other structures; you could totally make something this nice with materials from Home ReSource, and you could also do a remodel project that doesn't end up looking like a page out of a magazine!
2. Introduction to tape measure use and understanding the item lists
    a. Explain how to read the item lists for their project (highlight lingo such as 2x4 wood, square footage, 4x8 plywood, etc.)
    b. Explain how to use tape measures
    c. Have students practice using their tape measures to measure the area of their table and the dimensions of their 2x4
3. Scavenger hunt (15 min.)
    a. Set an end time for the scavenger hunt so adults/students know when to return to the ZWAP! room
    b. Groups will find as many of their items as possible. *Reminder*: Groups are checking off items on their list, not physically collecting them.
4. Reflection
    a. Have each group share the red number on their shopping lists to the class. Explain that these numbers represent estimated weights of all of the items needed for their project.
    → Project (lbs.)- bathroom (777), bedroom (743), chicken coop (553), kitchen (1,314), treehouse (1,006)
    b. Add up the total weight for these Home ReSource shopping projects (4,130 lbs.)
    c. Discussion (10 min.): Think (1 min.), Pair (3 min.), and Share (6 min.)
        i. Question: What happens when we choose to reuse at a place like Home ReSource?
            1. [Think of what happens to people, the economy, and the environment]
            2. Take notes on students' thoughts and ideas on the whiteboard next to the projects and their weights. Make connections to talking points on the HR tour
        ii. Big picture tie-in
            1. Look at how the action of choosing to reuse can make a difference!

2. How does the system of the materials economy change when we choose to reuse? [It becomes a circular system! Connect to ZWAP! The Game]

## Zero Waste Ambassador Actions

The actions below were shared with ZWAP! participants at the end of their field trips. We asked students to pledge to be a Zero Waste Ambassador by taking on at least one of these actions (or coming up with some of their own). Students wrapped up the field trip by signing the ZWAP! wall.

### You know you're a Zero Waste Ambassador when you…

Drink from a reusable water bottle every day!

Bottled water is bad for the planet. It takes a lot of energy and makes a lot of waste to bottle and transport water. Just turn on the tap! Choose to reuse water bottles, shopping bags, clothes, toys, and more.

Practice Zero Waste at mealtimes!

Together we can tackle food waste and lunchtime litter. Only take what you think you will eat! Save or share leftovers, and compost your food scraps when possible. Use reusable lunchboxes, cups, dishes, silverware, and napkins.

Shop secondhand first!

Think "thrifty" when looking for school supplies and "new-to-you" clothes or shoes. Check out local thrift stores or pawn shops before heading to a big box store. Choose stuff that can be reused, repaired, repurposed, recycled, or composted.

Help one person understand!

Knowing why waste is bad for the planet and how to reduce it is a great start. Talk to your friends and family about it. Help them understand the choices we make everyday matter.

# Appendix D: Facilitation Tips

**General Facilitation**

- Make expectations clear from the beginning
- Speak loudly, but don't shout over students
- Give clear and concise verbal instructions
- Say "When I say GO…" before giving instructions to keep students from jumping right in
- Use established classroom conventions for getting everyone's attention
- Know when to ask for students' attention, when to defer to their teachers for help, and when to just wait for them to settle down
- Use students' names as much as possible
- Ask for volunteers to help pass out materials if/when needed. Students love volunteering!
- Take pictures of completed whiteboards for future reference!

**In-class Presentation**

- Ask students to hold their questions when time is running short
- Ask students to keep the objects brought from Home ReSource as quiet as possible during the presentation
- When taking answers and there's lots of hands in the air, keep things moving by saying, "I'm going to take two more hands before moving on"
- Some questions are open to the whole class to answer out loud, others are for raising hands. Clarify by asking students to raise hands when appropriate (e.g., "I'm looking for a few hands to tell me…")
- Move around the classroom! Walking by and glancing at noisy or distracted students can help remind them to pay attention
- Don't talk to the whiteboard when drawing or writing—you can both talk to the class and draw with practice
- Use whiteboards over SMART Boards whenever possible—they're much easier to use!

**Field Trip**

- Give a few-minute warning to students before the sharing time for Visioning drawings so they can finish their work and so that they are ready for the next transition
- Talk through transitions. Say what's going to happen, how it's going to happen, and how everyone will know when we're ready for the next activity. For example, "We are going to finish our drawings and get ready for ZWAP! The Game. We need to do some transitioning first. When we're ready for the game, our art supplies will be put away, and we'll have two groups ready to go at each table, one at either end. In a minute, I will ask for student volunteers from each table to help clean up the art supplies. I will gather the art supplies, and with teacher/ chaperone help, we'll get game materials to you all. Sounds good to everyone?"
- When preparing for the tour, ask students their ideas for ground rules. They'll be much more on board with ground rules if they create and agree to them.
- If you're waiting for groups to return to the scavenger hunt, or there's extra time, have a quick game in your back pocket to engage the students and have some fun! (something like Rhythm Master or Frogger)
- At the end of the field trip, take a group picture if student media waivers allow
- Do things slightly differently each time! That way, you won't get as bored, and you'll find new ways to effectively facilitate each activity.