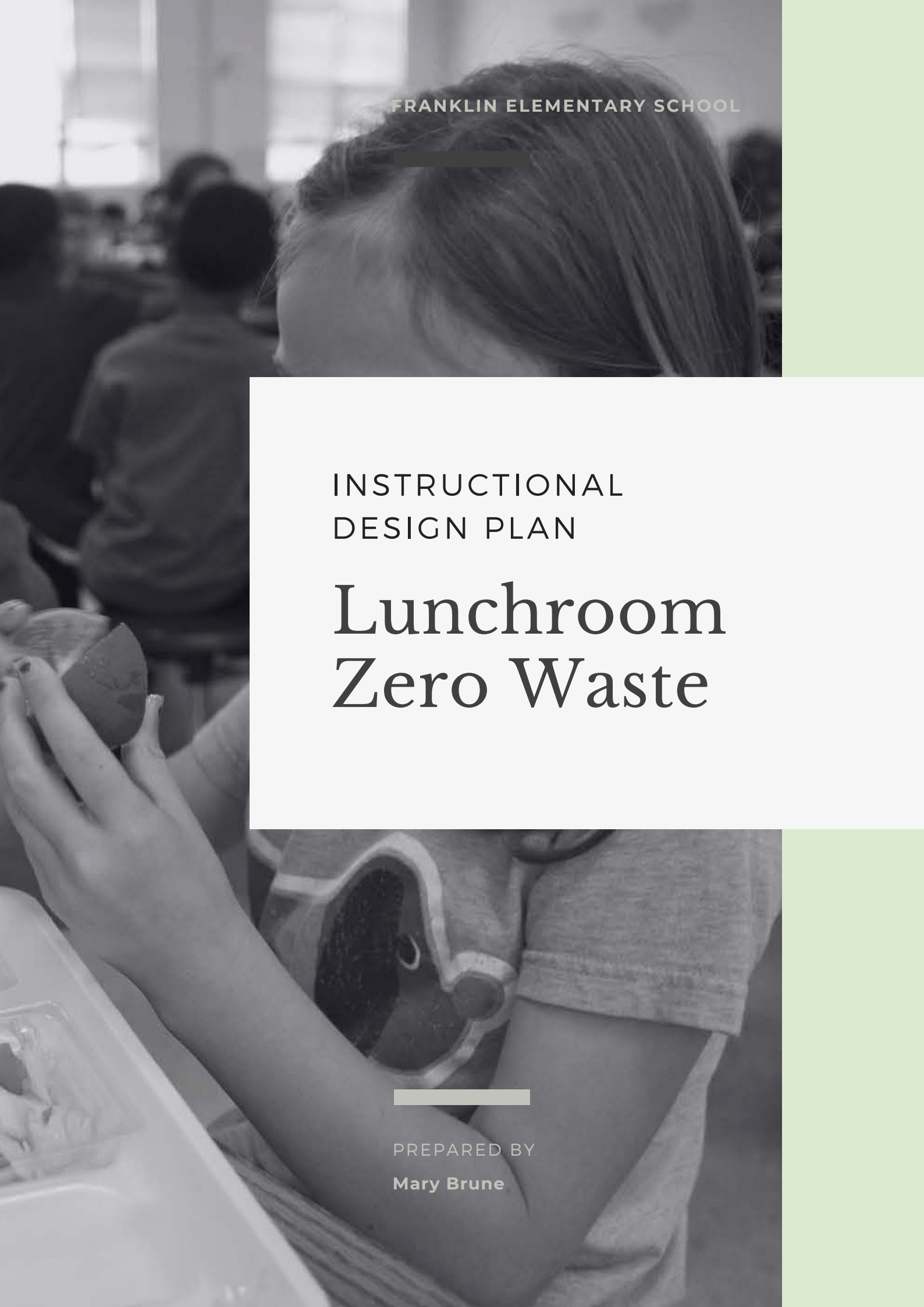




FRANKLIN ELEMENTARY SCHOOL

INSTRUCTIONAL
DESIGN PLAN

Lunchroom Zero Waste

PREPARED BY
Mary Brune



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INTRODUCTION

Project Background

According to *StopWaste.Org*, \$70 million worth of recyclable and compostable items are being dumped into the garbage in Alameda County each year (Oakley, 2015).

Food scraps and food-contaminated paper make up the largest portion of Alameda County's waste stream and emit more methane gas than any other landfill material. Methane is a "greenhouse" gas and contributes more to global warming than carbon dioxide. Placing these items into the green "organic waste" bins not only reduces the methane released from landfills, but also helps to reduce the amount of fertilizers and pesticides used in agriculture, by providing soil-enriching compost to local farms, ("Food Scrap Recycling").

Recycling plastic, glass, and aluminum containers reduces the need to mine the earth for resources to make new containers, and limits the production of new plastic goods that end up as toxic debris in our waterways. Recycling benefits the economy by saving money otherwise spent on resource extraction and chemical production, and benefits the environment by minimizing the affect those processes have on the health of the planet and its inhabitants.



Performance Analysis

In a perfect world, all students at Franklin Elementary would understand the benefits of composting and recycling, know how to differentiate between compostable materials, recyclables, and garbage, and with adult supervision and support, consistently place these items into the correctly labeled lunchroom bins.

Currently, students either bring their lunches from home in zero-waste containers (where only the uneaten food is a waste item), bring lunches from home that contain a mixture of reusable items, such as a water bottle or main lunch container, and recyclable, compostable, and landfill items. In addition to properly disposing of any uneaten food in the compost bin, these students must differentiate between what is compostable, what is recyclable, and what can neither be composted nor recycled and should therefore go into the landfill bin.

Another percentage of students purchase the school lunch, and therefore dispose of all lunch contents at the end of the period in one or more of the three bins provided: compost, recycling, and landfill. Regardless of whether students bring or buy their lunches, use eco-friendly containers or not,

The current state is that students do not *properly* and *consistently* dispose of what's left over when the bell rings. Lunchroom waste is sorted haphazardly, inconsistently, and often incorrectly. Recyclable plastics are frequently put into the landfill bin, rather than into the recycling bin. Leftover liquids (e.g., milk or juice) in containers are not disposed of prior to recycling or composting, causing inefficiencies with the downstream process (Alameda County Industries, 2010). Waste items of a mixed nature (recyclable milk carton with non-recyclable straw, for example) are not currently separated and disposed of individually, but rather tossed into whichever bin the student selects. Food waste that should be placed in the compost bin is being put into the landfill or recycling bins, or packed home where it can remain—odorously incubating—in the lunchbox over a long weekend.



The Gap

The gap between the desired state and the current state of lunchroom waste composting and recycling at Franklin Elementary is summarized below.

Supervision and assistance are limited; students are rushed. Kids barely have enough time (twenty minutes) to eat their lunch let alone take the time needed to properly sort what's left behind.

Students either don't know how to—or don't consistently—sort lunch waste into the proper bins. It could be challenging for students to know how to tell whether or not a type of plastic is recyclable. Likewise, when an item is of a mixed nature, students don't appear to know that they have to separate items before placing them into the proper bins (e.g., remove a straw from milk carton, remove aluminum foil from a sandwich, etc.), nor does there appear to be an incentive to motivate students to do it successfully.

During lunch, staff is preoccupied with keeping noise to a minimum, helping students open containers, moderating disputes, etc. Once the lunch period is over a new group of students moves in, leaving very little time at the end of the period for oversight of the waste disposal process.

To begin, this project will focus on training kindergarten students to properly sort lunchroom waste and provide "refreshers" in subsequent years as the students progress from one grade level to the next. The hope is that within six years, this approach will yield a population of K-5 students deeply committed to and skilled at proper composting and recycling of lunchroom waste.

Needs Assessment

To fully understand why this gap exists, it is necessary to find out what students currently know about composting and recycling, whether they have experience doing these tasks outside of the school environment, and if they understand why we are asking them to do it in school. We also need to understand whether the lunchroom currently supports success in composting and recycling of lunchroom waste and, if not, determine what changes may be required to support student success.

Additionally, we must also determine whether the items kids are either bringing from home or encountering as part of their school lunch are represented visually on the bin signage.

Getting a better understanding of the constraints that the lunchroom staff is under when the sorting is underway will provide insight as to whether the recruitment of parent volunteers may be necessary to assist students with the sorting process. It's also likely that students need aids to guide them when composting and recycling independently.

Sifting through the contents of the waste bins following the kindergarten lunch period can expose the students' current sorting and recycling performance.

Performing spot checks for learner understanding by asking students which bins certain items should be placed into will provide insight into their current knowledge and skills. As few students of this age group can read the bin signage, the project must include checks to determine whether an inability to read the signs posted on the bins is a hindrance to sorting items successfully. Interviewing lunchtime supervisors about their knowledge of zero waste practices and inquiring about training they received will establish their ability to assist students with the process.

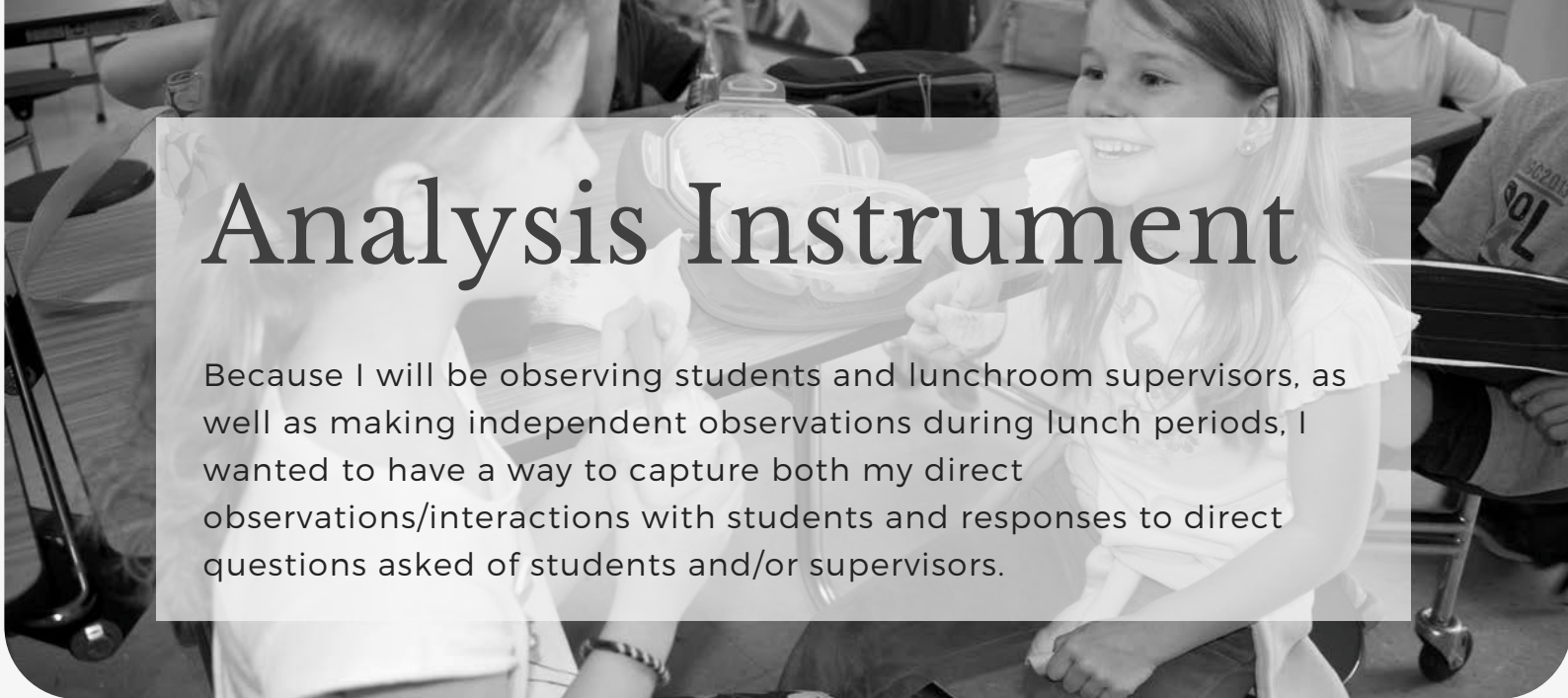


Goal Statement



After instruction in the **why** and **how** of composting and recycling that includes hands-on activities, reading, and playing a waste-sorting game, all Franklin Elementary School Kindergarten students will be able to differentiate recyclable, compostable, and landfill components from one another and place them into the corresponding bins in the lunchroom.

This goal is in the learning domain of Intellectual skills because students are required to make discriminations between whether the waste is compostable or recyclable. They also have to discriminate among plastics to know whether or not a type of plastic is recyclable. Students also will encounter the learning concepts subset of Intellectual Skills as they will learn the concept of recycling and composting, and apply the rules about what types of waste can and cannot be placed into which bins.

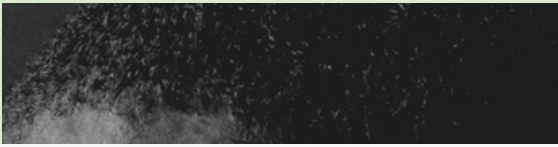
A black and white photograph of two young girls sitting at a table in a school lunchroom. They are both smiling and looking towards the camera. There are food containers and a water bottle on the table. Other students are visible in the background.

Analysis Instrument

Because I will be observing students and lunchroom supervisors, as well as making independent observations during lunch periods, I wanted to have a way to capture both my direct observations/interactions with students and responses to direct questions asked of students and/or supervisors.

QUESTIONS	OBSERVATIONS
Student: Why do we recycle?	Are the bins in a visible and accessible location?
Student: Why do we compost?	What kinds of items are students bringing from home? Are they in reusable containers or not?
Student: Can you read this sign to me?	Are items being brought to school/purchased for lunch depicted on the bin signage? If not, what's missing?
Staff: Do you know which items go into which bins?	What strategies do students appear to be using to decide what waste item goes in which bin?
Admin: Have students and/or lunchroom supervisors received training on composting and recycling? If offered, what is the format and content of the training?	How much time do students have to sort the waste before the bell?

Responses to direct questions and summaries of observations will be recorded on a clipboard for follow-up or further analysis.



Task Analysis

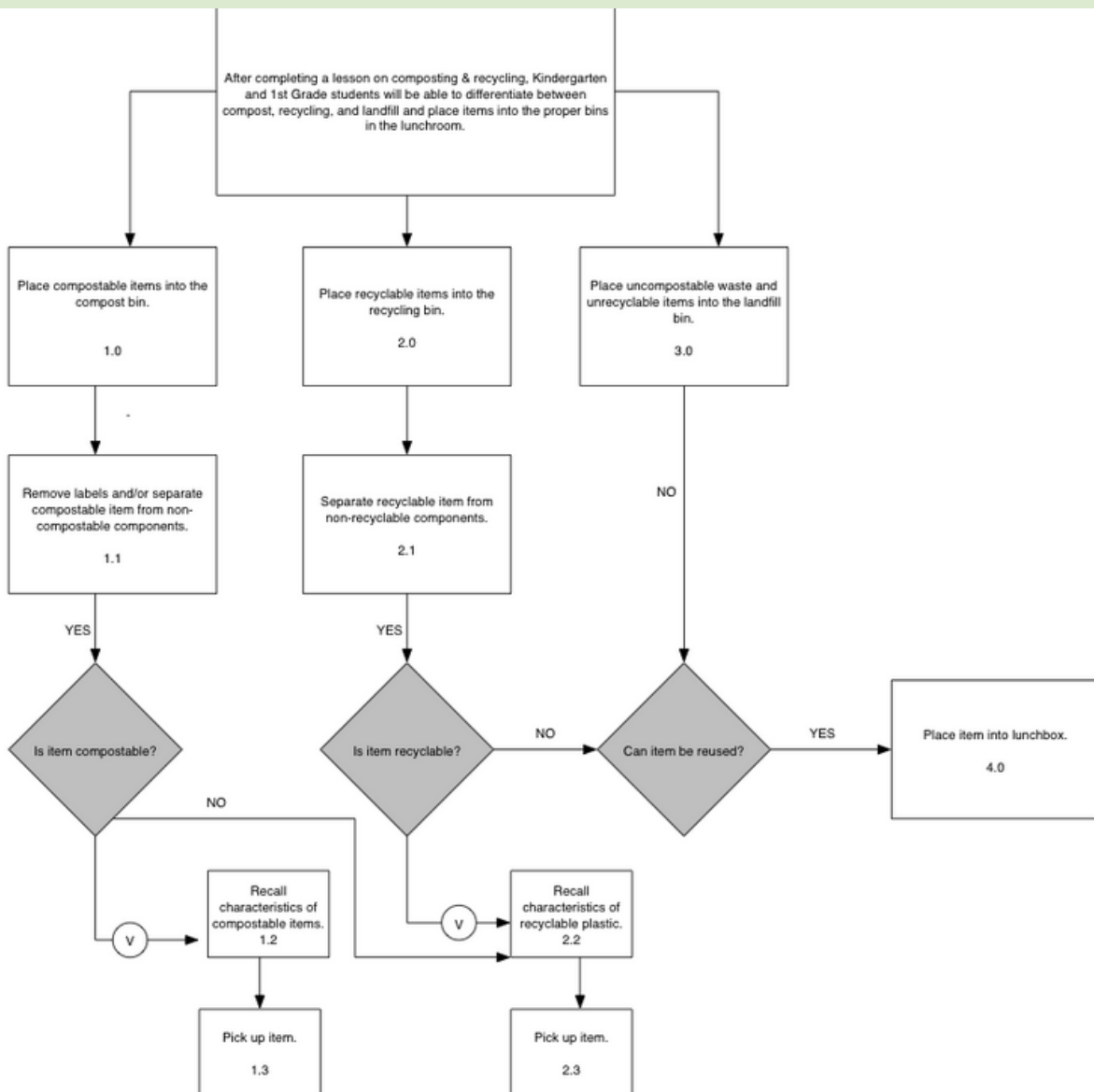
In order for kindergarten and first grade students to be able to consistently place lunch waste items into the correct bins, they must become familiar with the range of items that they may encounter during lunch, learn the characteristics of each item (e.g., Is it something you can eat?

Is it made of metal or plastic?), and determine the correct next action based on those characteristics. Students also will need to know what to do when presented with an item that comprises compostable, recyclable, and garbage components.



Because the goal is in Intellectual Skills domain, I have used the hierarchical type of analysis. Since some of the skills require the recall of information (for example, learners will need to recall the characteristic of a recyclable plastic to discriminate between an item that should be placed in the landfill bin from one that should be placed in the recycle bin). This verbal information is reflected on the diagram on the following page.

Task Analysis Diagram



Entry Skills

Distinguish between plastic, metal, and glass

Use a computer mouse.

Learner Tasks:

STEP 1: PLACE COMPOSTABLE ITEM IN COMPOST BIN.

This step has three subordinate steps:

- (1.1) Pick up item
- (1.2) Remove labels and/or separate compostable item from non-compostable components
- (1.3) Recall characteristics of compostable items (v)

STEP 2: PLACE RECYCLABLE ITEM IN RECYCLE BIN.

This step has three subordinate steps:

- (1.1) Pick up item
- (1.2) Identify the recycling symbol and code
- (1.3) Recall characteristics of recyclable plastic (v)

STEP 3: PUT REMAINING INORGANIC AND NON-RECYCLABLE ITEMS IN LANDFILL BIN.

This step has three subordinate steps:

- (1.1) Pick up item
- (1.2) Remove labels and/or separate compostable item from non-compostable components
- (1.3) Recall characteristics of compostable items (v)

STEP 4: PUT ITEM IN LUNCHBOX.

If everything has been composted, recycled, or tossed into the landfill bin and only the learner's reusable personal items remain, it's time to pack up and head out to recess!





Learner Analysis

The learners are Kindergarten and First grade students. Kindergarten students are new to the school environment and may not initially possess the confidence and experience with independent decision-making that is necessary for them to dispose of lunch waste items on their own.

Entry Skills: Students should be able to distinguish between something edible (and therefore compostable), and something made from glass, plastic, or metal. Students also will need to use a mouse to access the instructional context.

Prior Knowledge of Topic Area: Even if Kindergarten students perform this task on their own at home, doing it in the school context may challenge them. Although First graders have had, theoretically, another year of practice dealing with lunch waste at school than the Kindergartners have had, they do not exhibit superior performance in handling lunch waste.

Attitudes Toward Training & Delivery Methods:

Students in this age group most likely have had some experience with composting and recycling, especially given the geographic region we're in and its commitment to green living and sustainability (Kay, 2009). As for the potential delivery systems, one component of the planned instruction will be a computer-based learning module and a composting game. Based on anecdotal evidence and observation, any type of instruction that at least looks like "fun" will be embraced by learners in this age group. Design of companion pieces such as lunchroom signage, stickers, flyers, will use colors, fonts, and language that appeals to the targeted age group.

**Academic Motivation:**

There is no inherent academic motivation for students to master this instruction. I have considered whether the school (or PTA) could incentivize increased performance with composting and recycling by running a contest around Earth Day and providing prizes. Whether this will be possible is still to be determined.

Educational & Ability Levels:

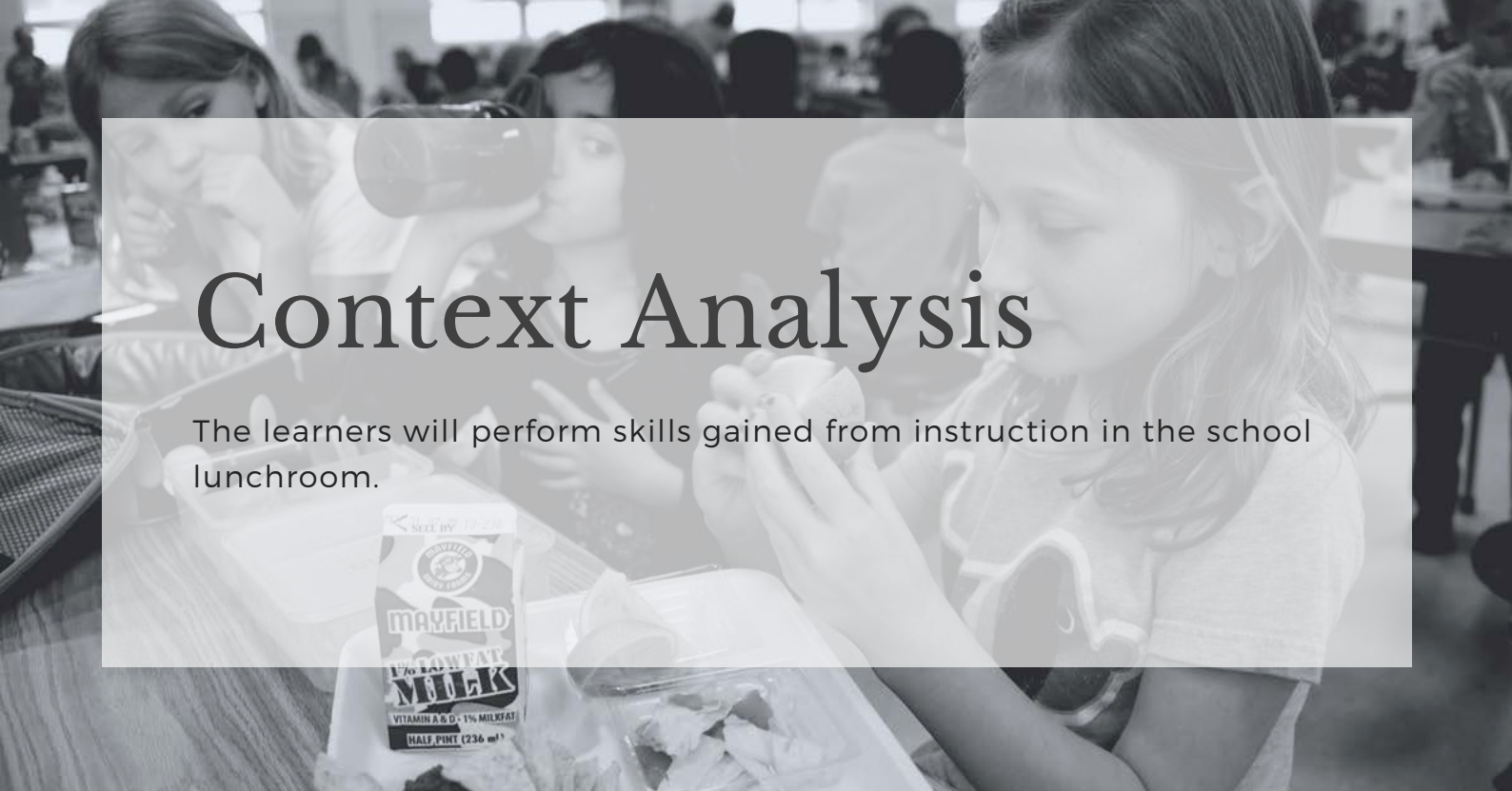
Students in kindergarten have limited ability to read and use a computer. Any computer-based instruction will need to employ voiceover instructions in addition to text on the screen.

Attitudes Toward Training Organization:

The learners may feel intimidated by the newness of the training organization, but also have a high level of trust for it.

Group Characteristics: Kids of this age have difficulty ignoring the lure of silliness that surrounds them long enough to eat their lunch, let alone dispose of its remnants properly. The targeted learners also have a strong desire to follow rules and please authority figures.

Learner Analysis Process: I plan to conduct unstructured interviews with students, teachers, school administrators, and lunchroom supervisors. I will informally interview the students about the items they dispose of during lunch to gain a better understanding of the gaps in their understanding; teachers to discuss the plan for instruction and ensure I have their approval for the final project; and administrators to plan for integrating the instruction into any planned back-to-school curriculum.



Context Analysis

The learners will perform skills gained from instruction in the school lunchroom.

Managerial or Supervisor Support:

Learners will have support in the lunchroom in the form of signage on the bins to help them figure out what kind of waste goes into which bin. Depending on recruitment success, there also may be dedicated parent volunteers to help students with sorting during lunchtime. properly sort what's left behind.

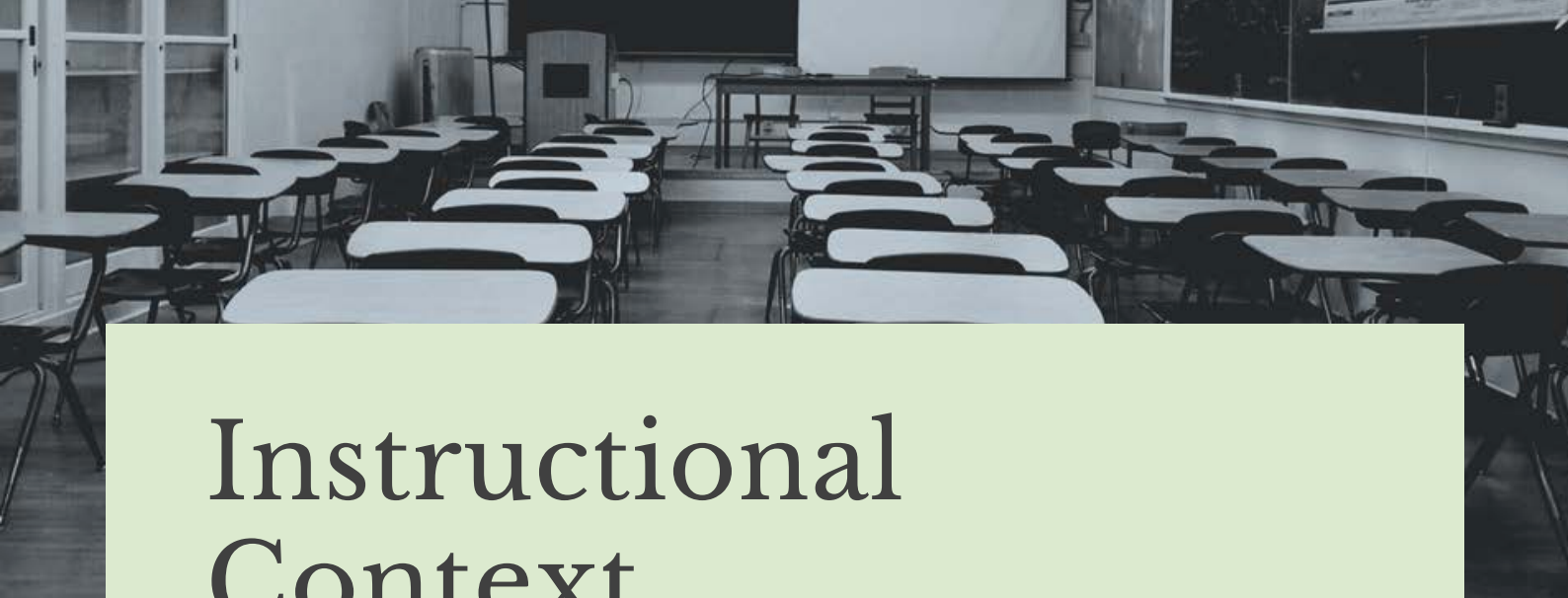
Physical Aspects of the Site: The lunchroom at Franklin Elementary is small. There are usually two classes having lunch at one time. There are bins for each type of waste, which are labeled as Compost, Recycling, and Landfill.

Social Aspects of the Site:

Learners will be pressed for time when performing these skills. They will be anxious to get the sorting done so that they can get out onto the blacktop for recess. While they are encouraged to work independently, there will be a couple of adult supervisors to help them.

Relevance of Skills to

Performance Context: The skills that the learners are going to be putting to use in the performance context are the exact skills they will be expected to use for real in that environment every day.



Instructional Context

The learners will learn skills in the classroom that they will perform in the school lunchroom.

Compatibility of Site with

Instructional Requirements: The instruction will be delivered either in the classrooms of the Kindergarten and 1st grades, or in the Media Center. The classrooms and Media Center have Chromebooks and some desktop computers.

Adaptability of the Site to

Simulate Workplace: The site can very closely mirror the workplace in the simulation, however, it won't be an identical digital replica, given the limited resources for this project, however, the sorting game will give learners an opportunity to "test out" their new knowledge before having to attempt it in the lunchroom.

Adaptability for Delivery

Approaches: The instruction will contain four 10 minute mini-lessons covering the concepts of composting, recycling, how these practices are beneficial to the environment:

- An introductory video that provides details about composting and recycling and how they benefit the Earth.
- A 10-minute hands-on workshop where kids can pick up and feel and learn to identify different kinds of compostable and recycling items.
- A reading and response activity where students will listen to two books and answer questions.
- Playing a lunchroom waste sorting game called Sort It Out.

Learning Site Constraints Affecting Design & Delivery: In the classroom students would need to be rotated among different groups in order to allow all the students to have a chance to engage in each activity. The space will need to be large enough to allow for setting up multiple stations and separated enough so that learners at one station do not become distracted by surrounding stations. An outdoor setting for the sorting activity would be ideal, as it would separate the messy activity from the reading and sorting game activities. This would require a weather protected outdoor space in proximity to the classroom.

Instructional Objectives

The instructional goal is for kindergarten students at Franklin Elementary to be able to accurately and consistently sort lunchroom waste into the proper bins. This instructional goal has been converted into the following terminal objective:

After completing a Lunchroom Zero Waste lesson consisting of classroom presentation, educational game, hands-on sorting, and reading comprehension activities, kindergarten students at Franklin Elementary will be able to identify compostable items, distinguish non-recyclable plastics from recyclable plastics, and separate and sort mixed-waste items correctly. Observations of sorting performance, correctness of verbal responses to questions, and outcome of sorting game will be used to assess whether this objective was achieved.

To achieve this objective, the following major step (number 5 below) and subordinate skills (1-4) were identified:

1. Pick up item.
2. Recall characteristics of compostable items and recyclable plastics.
3. Separate non-compostable components from compostable components (e.g. remove label from fruit).
4. Separate recyclable item from non-recyclable components (e.g., pour milk out of carton).
5. Place item into the appropriate bin (Compost, Recycling, or Landfill).

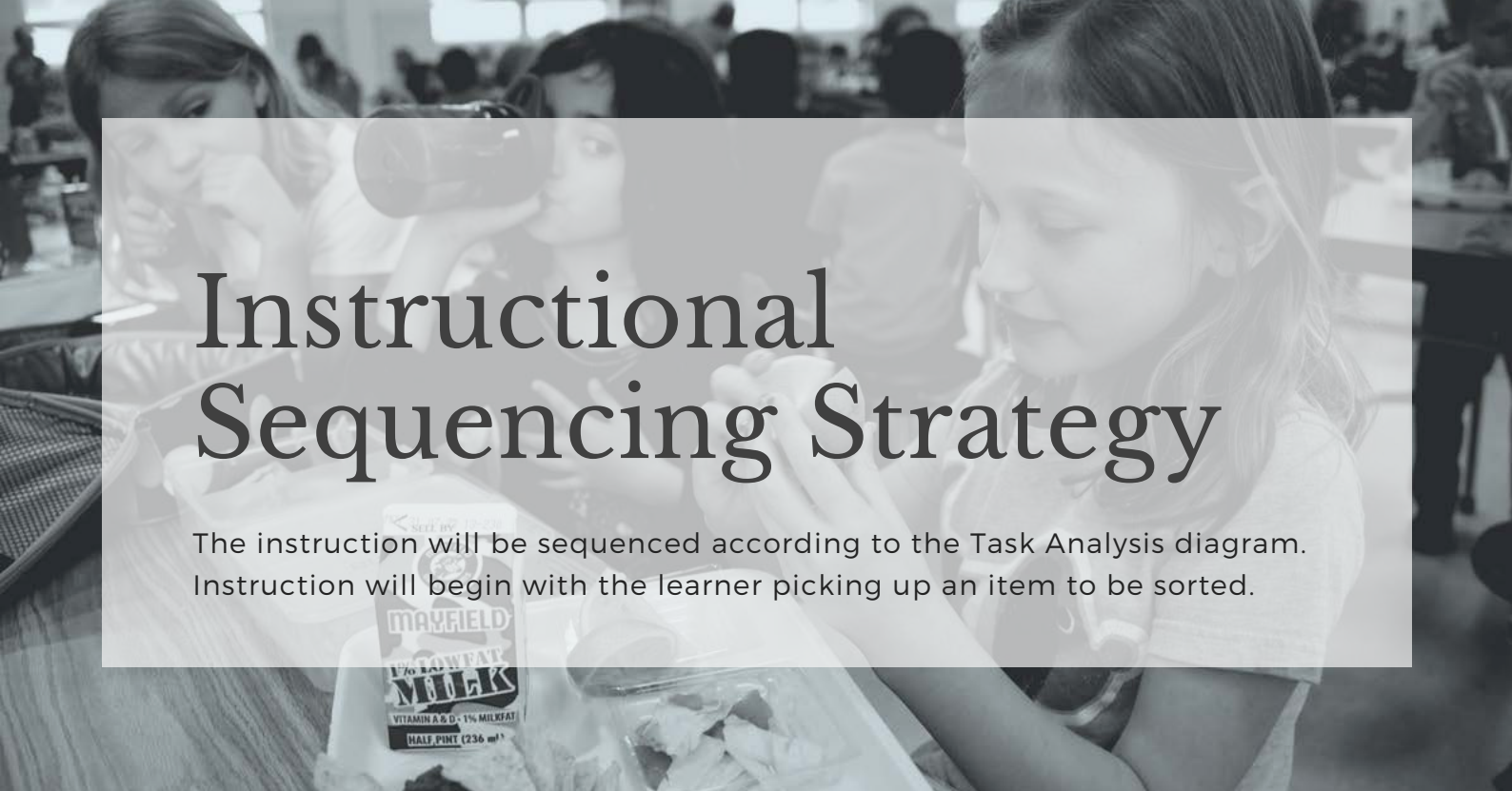
The table on the following page illustrates the performance objectives for tasks described in steps 2, 3, and 4 above.





Performance Objective

STEP	OBJECTIVE
Recall Characteristics of compostable and recyclable items.	When presented with a variety of waste items learners will be able to consistently and correctly identify compostable and recyclable waste items. Learners will place food items into the compost bin and recyclable plastic and paper items into the recycle bin.
Separate non-compostable components from compostable components in mixed-wasted items.	When presented with landfill or recycling items that are attached to compostable items, learners will be able to consistently and correctly separate items into their individual waste components.
Separate non-recyclable components from recyclable components in mixed-waste items.	When presented with landfill or compostable items that are attached to recyclable items, learners will be able to consistently and correctly separate items into their individual waste components.
Place non-compostable and non-recycling items in landfill or in lunchbox.	When left with items that can neither be composted nor recycled, students can place items into either the landfill bin or their lunchboxes.



Instructional Sequencing Strategy

The instruction will be sequenced according to the Task Analysis diagram. Instruction will begin with the learner picking up an item to be sorted.

Content Sequencing: I will begin the instruction with an introduction to the concepts of composting and recycling to help learners understand why doing these things is important, why these practices are good for the planet and our health, and why NOT doing them can be harmful to same. I will begin by showing a brief video to the entire group that will cover this information. Following the video, I will divide the learners into 4 groups of six students each. The teacher will lead one group activity, I will lead one group activity, and the remaining two groups will be lead by parent helpers. Parent volunteers will be given an instruction sheet for the groups they are leading that explains the lesson and instructions. Students will participate in the activity assigned to their group for roughly 10 minutes, then switch activities.

At the conclusion of the instruction, every learner will have participated in all four of the activities.

Clustering Instruction:

The whole lesson will be about 50 minutes long but it will be broken into four mini-lessons of 10 minutes each with about 5 minutes for the pre-instructional activities and video and 5 minutes for wrapping up. I have clustered this instruction in a hierarchical method because the instructional goal is in the Intellectual Skills domain (Dick, Carey, 2015).

Student Groupings: Because we're dealing with kindergartners with a short attention span, I am grouping students into four groups of six students (Gullo, Heroman, Copple, 2014, pp. 66-68). Each group will cover a different aspect of the instruction and then rotate through all lessons until completed.



Group 1: Reading about

Composting - This group will read the book *Garbage Helps Our Garden Grow: A Compost Story*. After reading the story, the parent volunteer will ask the kids 1-2 questions to assess their understanding of the concepts. Those questions are still TBD. This activity should take about 10 minutes.

Group 2: Hands-on Sorting of

Waste Items -This group will sort items that were put into the garbage and determine if they are supposed to go into the garbage, compost, or recycling. Kids will put on gloves and empty a small garbage container onto a covered table. Learners will go through the items and then sort into the correct bins.

Group 3: Reading about Recycling

- This group will read the book *The Adventures of a Plastic Bottle: A Story About Recycling*. After reading the story, the parent volunteer will ask the kids 1-2 questions to assess their understanding of the concepts. Those questions are still TBD. This activity should take about 10 minutes.

Group 4: Computer-based Sorting

Game – This group will play a computer- based game I designed called Sort it Out that includes some reinforcement from the opening video regarding the reasons for composting and recycling as well as a game on that allows learners to test out their sorting knowledge. The game will be timed and allow students a certain amount of time to get it right. If they get do not successfully complete the sorting before the time runs out, they will be able to view more tips and try again.



Instructional Strategy & Activities

This section describes the pre-instructional activities that are planned prior to classroom instruction.

Motivating Learners - To motivate the learners, I will gain their attention by coming into the classroom wearing something crazy either on my head or a jumpsuit with food and garbage stuck to it. The idea is just to make them laugh and be comfortable with the subject we're going to cover. I will ask learners whether they know what it means to throw something "away". Where is "away" to them?

Relevance – I will point out to them that everyone has come into contact with the materials we're going to cover. Everyone's put something in the garbage before, right? I will ask them if they always know which bin something should go in to. I will ask them if they have ever been confused about what to do with an apple core, plastic baggie, or a carton of milk?

I will explain the ways that composting and recycling correctly benefit the planet, and in turn, their own health.

Confidence – I want the learners to feel confident that they will be able to learn the difference between what goes into the compost, recycling, and landfill because they will have hands-on experience sorting the waste in the classroom during the lesson and they will have multiple opportunities to test out their skills. If there are kids who already know all about this and how to do it correctly, I could ask them to point out items that could either be repaired or reused instead of thrown away.

Satisfaction – For the hands-on sorting, I could say if they sort three items correctly, they earn a "green citizen" sticker.



Content Presentation & Learning Guidance

The format for my instruction will be both deductive and inductive, in that there will be a component that is instructor-led, guiding the learners through information and there also will be learning through discovery when learners participate in hands-on activities (Dick et. al, 2015, pp. 179).

I will use several different objects and media types in this instruction, including:

- A video overview of the reasons why composting and recycling are good to do
- A computer-based sorting game
- Garbage cans filled with waste items to be sorted

Examples and non-examples of recyclable plastic objects

- Two books *Garbage Helps Our Garden Grow: A Compost Story* and *The Adventures of a Plastic Bottle: A Story About Recycling*.
- Visuals to use in the discussion to reinforce the characteristics of items that go into the various lunchroom bins.

Follow-through activities -

Students will receive a memory aid they can attach to their backpacks or lunchboxes that would have reminders about what goes where that should help them with their sorting skills in the performance context. They will also receive a coloring page that reinforces the learning.

Learner Participation

Learners will actively participate in the majority of the instruction. They will answer questions about objects presented during the pre-instructional activities, they will (one hopes) listen attentively during the story time and answer questions related to the story. Students will pick up and feel different kinds of plastic items, turning them over, looking for the recycling triangle and number, assessing their characteristics (is this hard or soft? Is it clear or solid?) in order to differentiate non-recyclable plastics from recyclable ones.

Similarly, in the computer-based simulation, the learner will test his or her knowledge of the types of items that go into the compost, recycling, and landfill bins.

The rationale for using this strategy is that kids are most likely to be engaged when they get to participate actively in something rather than just passively listen to instruction (Roschelle et al, 2000, pp. 79). The rationale for presenting instruction in the form of a hands-on sorting activity and sorting simulation is that this mirrors the real-world actions required of the learners in the performance context. Learners will receive feedback throughout the instruction in different ways based on the activity.

If an item is placed in the wrong bin, I may ask them “why did you choose that bin?” to help them think through their own thought processes.

Assessment - One type of assessment I plan to conduct will be a pretest of sorts by going through the compost, recycling, and garbage bins in the lunchroom and tracking how frequently the items were placed into the wrong bins. Any item routinely placed in the wrong bin can be highlighted during instruction.

A practice test in the form of a hands-on sorting activity will assess the student’s understanding of what type of item goes into which bin. During the reading activity, the parent helper will ask two questions from each book to assess the learner’s understanding of the stories they had just read, regarding composting and recycling. The results of the sorting game (whether the items were sorted correctly within the appropriate timeframe) will assess the learner’s understanding of the information.

A follow-up observation in the lunchroom two weeks after instruction will also provide data as to the effectiveness of instruction.



Formative Evaluation

Subject Matter Expert & Learning Specialists

- For this component of the formative evaluation, I will share my instructional roadmap and supporting materials as they are developed with two experts in the field of composting and recycling. Deborah Moore is the Executive Director of The Green Schools Initiative in Berkeley, which helps schools introduce environmental education and practices into their curriculum. Ms. Moore can lend advice and insight into whether the instruction contains the right level of content for learners at this age. I also will consult with a representative from StopWaste.org in Alameda County to evaluate the accuracy of the content included in the instructional materials. I also will consult with kindergarten teachers at Franklin Elementary, as to the appropriateness of the content for the age of the learners.

I would also look to the teachers to identify any issues with regard to classroom management due to the lesson being delivered in groups and the need to rotate from one activity area to the next, as this closely mirrors the stations used on a regular basis in their classrooms

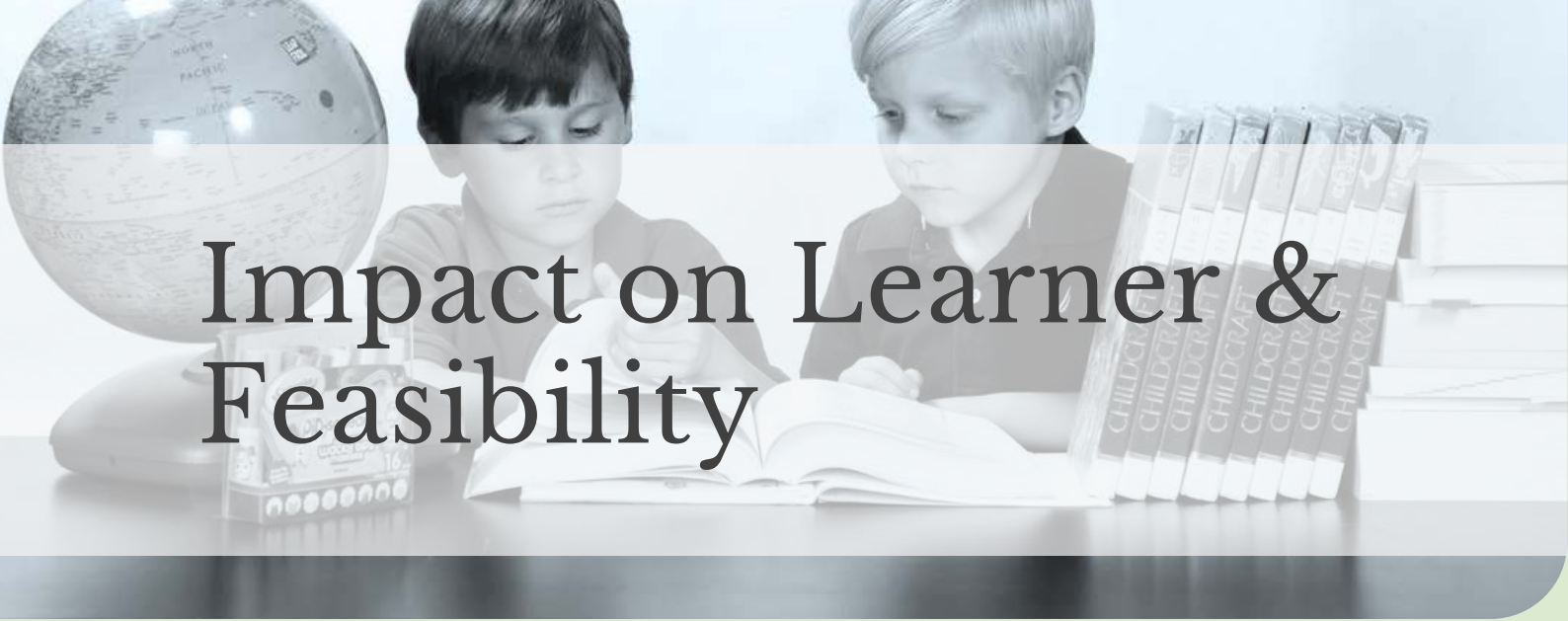
Small-Group Evaluation - Small-Group Evaluation is the best strategy. While learner input on a one-to-one basis would provide feedback on certain aspects of the instruction, since much of it is hands-on and participatory, small-group evaluation makes the most sense and will enable me to get the best feedback about the planned instruction.

Criteria and Data - During these sessions I will determine the clarity, impact, and feasibility of certain components of the planned instruction by asking questions that get at the details described in the following section.



Clarity of Instruction

ELEMENT	CHARACTERISTICS
Concepts & Message	• Did learners understand the terms and concepts used? • When asked, could they explain what it means to compost and recycle? • Could they recall one reason why putting food and recyclables into the landfill is bad for the Earth?
Links to Prior Knowledge	• Were learners familiar with items used in the sorting activity? • Did they see the connection between sorting in the lesson and sorting in the lunchroom or at home?
Procedures	• Were there too many activities? • Were learners able to transition quickly from one activity to the next without too much distraction? • Did the activities take up equal amounts of time?



Impact on Learner & Feasibility

ELEMENT IMPACT	CHARACTERISTICS
Attitudes	- Did learners appear motivated to engage in the activities? - Did learners enjoy the activities? - Did they feel more confident in sorting waste?
Achievement	- Did they understand what they were supposed to do? - Were they successful in performing the tasks?
ELEMENT FEASIBILITY	CHARACTERISTICS
Learner	- Were the concepts appropriate for the learners' age level? - Could they perform the tasks with minimal direction?
Resources	- Was there adequate time to complete the activities? - Was the room large enough to accommodate the different lessons at once? - Was it too noisy for the reading groups to hear?



Summative Evaluation

For the summative evaluation phase, I will analyze the quantitative data received from the sorting simulation activity, and the qualitative survey of the student's responses to the various activities as noted above. Immediately following the instruction, I will interview the parent helpers and classroom teacher to assess whether the sequencing of the activities worked, whether they felt the materials worked, get their input on what they felt could be improved upon. I elicit this feedback through a focus on the various levels (Reaction, Learning, Behavior, Results) of Kirkpatrick's Model of Evaluation (2006, pp. 21-26).

The following questions primarily reflect Level 1 feedback:

- Was the size of the groups too large, too small, or just right?

- Was the time allotted for the activities, too little, too much, just right?
- How would they rate the effectiveness of the materials in teaching the concepts?
- Which activity did they like the best? Least? Why?
- Any suggestions they can offer for improving the instruction?

Additionally, I will observe the learners in the performance context to assess whether the skills gained were transferred and retained. I will do this two and four weeks out from the instruction using an instrument derived from the Item-by-Objective Analysis Table (Dick, 2015, pp. 320). As it will take time to observe and record the performance of fifty learners, this process will take several lunch periods to complete. I will use the below criteria for this evaluation and revise instruction based on data collected.

Resources

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