

**Chico Unified School District  
UES Program  
Campus Needs Assessment  
4<sup>th</sup> Grade**

**Standards-based Connections Set and Learning Objectives  
For the Campus Needs Assessment**

**ENGLISH/LANGUAGE ARTS:** 4th grade

**Writing** – *organization and focus* 1.1, 1.2 a – e: Create multiple paragraph compositions on waste reduction

*Research and Technology* 1.7 Use various reference materials in writing compositions

**Speaking Applications** 2.2 – Make informational presentations

L.O. Students will show their understanding of the recycling process by writing a multiple paragraph composition on the process of recycling. Information will come from *Closing the Loop* lessons, Waste Management field trip, RARE Exhibit field trip, guest speakers, resource books and CIWMB literature and the Internet.

L.O. Individually, students will make informational presentations including facts and details and will incorporate more than one source of information.

**MATH** Number Sense 1.0 – 1.5 – 1.7 and 3.0 3.1-3.4 Students will weigh and total each of the various types of waste collected from waste audit giving totals for an average day, week and month using addition, subtraction, multiplication and division of whole numbers as well as decimals and equivalent fractions.

L.O. Students will calculate weight of each category of waste and give an average for a day, week and month. (5 days per week – 4 weeks).

L.O. In calculating weight of each category of waste, students will calculate weights by writing numbers to the tenth and hundredth decimal and show ability to convert to fraction equivalents for halves and fourths.

**SCIENCE:**

**Investigation and Experimentation** - Students will ask meaningful questions relating to waste management reduction and conduct careful investigations.

L.O. Students will distinguish between observations and interpretation of observations.

L.O. Students will estimate and weigh waste from waste audit. They'll also measure volume.

L.O. Students will make and justify predictions based on cause-and-effect relationships.

L.O. Students will test their predictions and draw conclusions about the relationship between predictions and results.

L.O. Students will demonstrate an understanding of their weighing and measuring of waste material through visual graphs.

**Life Sciences** 2.c – Students will identify decomposers including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

L.O. Students will set up a vermicomposting bin in the classroom and keep a class journal of everything that gets put into the bin.

L.O. Students will classify items that can and cannot be decomposed by red worms.

L.O. Students will graph charts using categories of items the can be composted by red worms.

## **HISTORY- SOCIAL SCIENCE CONTENT STANDARDS:**

### **California: A Changing State**

4.1 (5) – Students will demonstrate an understanding of the physical and human geographic features that define places and regions in California.

(Closing the Loop)

- L. O. In using maps, charts and pictures to describe California's land usages, students will identify population density of Butte County and its affect on our local landfill.
- L. O. Students will construct models of landfills in plastic bottles to learn how landfills are constructed to protect the environment.
- L. O. From observing models over time, students will learn which waste items can be reduced, reused or recycled and can discuss alternatives to putting certain waste products in the landfill.
- L.O. Students will identify the need of our state and local community to carefully plan landfills and preserve our natural resources.

4.5 (4) Students will discuss and demonstrate an understanding of the structures, functions, and powers of the local, state, and federal governments as described in the U.S. Constitution.

- L. O. In studying the roles and responsibilities of our state's elected officials, students will read, discuss and show an understanding of the various senate and assembly bills that have had an impact on our state and local resource and waste management procedures.
- L.O. Students will write responses to local assemblymen and senators stating their opinions on the bills. Bills to investigate: AB 939 (city and county) AB 75 – (state initiative) and SB 373 – (public schools k-12).(Internet site to utilize: Californians Against Waste –[www.cawrecycles.org](http://www.cawrecycles.org), California Integrated Waste Management Board – [www.ciwmb.ca.gov](http://www.ciwmb.ca.gov))

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## **4<sup>TH</sup> Grade**

### **ENGLISH/LANGUAGE ARTS:**

#### **Reading**

Reading Comprehension: *Structural features of Informational Materials*

2.1 – Read and demonstrate understanding of grade-level-appropriate informational material through written responses to questions.

#### **Writing**

*Writing Strategies:* 1.0 1.1 & 1.2 – Create multiple paragraph narrative compositions from 1<sup>st</sup> person point of view - utilizing evaluation and revision –

*Organization and Focus:* 2.1 Students will write and perform waste reduction puppet shows

*Write responses to literature* 2.2 – Demonstrate an understanding of literary work through verbal group discussion and written responses.

**Literary Response and Analysis:** 3.1 Students will describe the structural variations of poetry and then write poems using an ABAB CDCD rhythm pattern focus with content focusing on waste reduction.

**Written and oral language convention:** 1.0 1.1-1.7 Students write with a command of Standard English conventions appropriate to this grade level.

- L.O. Students will demonstrate their understanding of grade-level appropriate non-fiction information by writing explanations of the four “R”s found on the EPA website and how they will apply them to their own personal lives.
- L.O. Students will show their understanding of the recycling process by writing multiple paragraph narrative compositions based on information attained from EPA website, local field trips to waste management, RARE Exhibit field trip, and resource books in class.
- L.O. Students will write and perform Waste Reduction Puppet shows utilizing student made props from recyclable materials.
- L.O. In small groups students will read and discuss teacher developed questions pertaining to Just a Dream by Chris Van Allsburg.
- L.O. In response to poems read in class, students will write poems with a waste reduction theme that follow an ABAB CDCD rhythm pattern.
- L.O. Students will write survey questions to gather information about the knowledge and behaviors of students, teachers and staff in regards to waste reduction in their personal lives and on campus.

## **MATH**

*Number Sense 1.2:* Students compute numbers from waste audit collections demonstrating an understanding of percentages and relating decimals to percentages.

*Algebra and Functions 1.2* Students write simple story problems that include a letter to represent an unknown number; an algebraic expression. Students will evaluate and solve problems.

*Statistics, Data Analysis and Probability 1.2* Students analyze and graph data from waste audit using appropriate graphs that clearly represent totals found tallied.

- L.O. Students weigh waste collected from wet and dry waste receptacles. With totals, students demonstrate knowledge and application of percentages when stating what percentage of waste collected is recyclable, non-recyclable, reusable, etc. (categories as shown on audit measuring tool). Students will also show understanding of relating decimals and percents.
- L.O. Students will demonstrate their knowledge of algebraic expressions by writing a story problem pertaining to the data gathered from waste reduction collected in a day, week or month that includes one unknown variable. Students will evaluate and solve problems.
- L.O. Students will calculate daily, weekly and monthly averages of recyclable waste and present visually in appropriate graphs with numerical data presented in fractions and percentages to help compare various data sets.

## **SOCIAL STUDIES:**

*California, A Changing State 4.5,4:* Explain the structures and functions of state governments, including the roles and responsibilities of their elected officials as it relates to SB373.

- L.O. Students will investigate State Senator Torlakson’s website to research SB 373 Chapter 926 and answer comprehension questions relating to the bill. Website is user friendly and appropriate for elementary aged students to read.

## **SCIENCE:**

Investigation and Experimentation – Students will conduct a simple investigation based on student developed questions pertaining to waste reduction on campus. From their investigation, students will write a report that includes question, data or evidence and drawing conclusions.

- L.O. Students will develop a testable question.
- L.O. Students will plan their investigation including needed tools and resources and timeline. Students will identify dependent and controlled variables in the investigation.
- L.O. Students will conduct investigation based on student-developed question.
- L.O. Students will identify a single independent variable explaining how this variable can be used to collect information to answer a question about the results of the experiment.
- L.O. Students will make quantitative observations and record data by using charts, graphs and diagrams.
- L.O. Students will make inferences and draw conclusions from evidence.
- L.O. Students will write a summary report that will include the question stated, tests conducted and data gathered and conclusions drawn.

### **Lesson Planning for the Campus Needs Assessment**

**Pre-assessment strategy:** Teachers will work together to write questions for a brief pre-assessment of their students to be given at the beginning of the year. The pre-assessment will include questions that test their knowledge of terms such as recycling, reuse, and reduce, and their awareness of waste reduction on their campus as well as their individual recycling/waste reduction habits.

Students will also create a map of the school, before any mapping instructions have been taught, to identify the various systems on campus, location of buildings, and waste reduction facilities. Students will walk through their campus, draw and label the various systems they observe, buildings, playground, parking lot, etc.

## **LANGUAGE ARTS**

### **Lesson 1**

Standards-based Learning objective: Reading and comprehending non-fiction material from the Internet.

#### **Context-based Learning Objective(s):**

Using the EPA website, students will read the explanations and examples of the four “R”s, write the definitions in their own words and how they will integrate them into their lives presently.

#### **Adopted Instructional Materials and Other Resources:**

[www.epa.gov/epaoswer/non-hw/reduce/catbook/index.htm](http://www.epa.gov/epaoswer/non-hw/reduce/catbook/index.htm)

#### **Summary Description:**

Students will learn to speak “pirate”, the four “R”s. In small groups or in a lab for the entire class if available, students will log on to the EPA website and read the

explanations of the four “R”s. Afterwards, they’ll write their own explanations and how they will integrate each of them into their own lives.

**Responsible Individuals:** All teachers on the team.

**Timeline:** One morning

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## **Lesson 2**

### **Standards-based Learning objective:**

Multiple paragraph compositions – narrative involving evaluation and revision.

### **Context-based Learning Objective(s):**

Students will write a narrative composition describing the life of a soda bottle from being tossed out of a moving car to the stage of being recycled. Narratives will include a plot, description of setting and characters, and a clear ending. The importance of the four “R”s needs to be included in the narrative.

### **Adopted Instructional Materials and Other Resources:**

Houghton Mifflin Reading Text – Theme 3 *Narrative compositions*, Field trip to Nor Cal Waste Management Recycling Center, WTC Recycling center, RARE Exhibit (CSUC), *Kids Talking Trash* video, and *I Want to Be an Environmentalist*.

### **Summary Description:**

After tours of our local recycling centers and lessons of the four “R”s, students will write first person point of view narrative compositions on the life of a soda bottle from being thrown out of a car window to being recycled. In the narratives, students must touch on the importance of the four “R”s. Narratives will be published, shared and displayed in the classroom and on campus. They will be accompanied by illustrations.

**Responsible Individual(s):** All teachers on team

**Timeline:** 1 week

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## **Lesson 3**

### **Standards Based Learning Objective(s):**

Writing and performing plays that have a plot, point of view, setting and conflict.

### **Context Based Learning Objective(s):**

Students will transfer knowledge of the four “R”s into written plays and perform them to an audience.

### **Adopted Instructional Materials and other Resources:**

Houghton Mifflin Reading – Theme 3 & 4 *Process writing*

### **Summary Descriptions:**

Students are placed into groups and given the Waste Reduction Puppet Show assignment. Plays are to be entertaining and informative. Written and performed plays must contain a plot, setting, conflict, accurate explanations of the four “R”s, correct spelling, punctuation and grammar. Props made of recyclable material, and an all-inclusive cast – everyone has a speaking part. Plays will be performed for other classes and must each be no longer than 5 minutes each.

**Responsible Individuals:** All teachers on the team

**Timeline:** Two weeks

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**Lesson 4**

**Standards Based Learning Objective(s):**

Students read and respond to the literature book Just a Dream, by identifying main conflict, character development, theme, effects of literary devices, and conflict resolution.

**Context Based Learning Objective(s):**

In reading and responding to Chris Van Allsburg's Just a Dream, students will analyze the main character's motivations and actions in his decisions to contribute to waste reduction in his life.

**Adopted Instructional Materials and other Resources:**

Houghton Mifflin Reading Series 5<sup>th</sup> Grade – Theme 1 – *Comprehending Literature*

**Summary Descriptions:**

After reading the story silently, (teacher read aloud if not enough copies or it's teacher preference) students will discuss the questions in a small group and then answer them individually. Afterwards, students and teacher will discuss responses. (Questions were written by Pete Pembroke)

**Responsible Individuals:** All teachers on team.

**Timeline:** 1 hour

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**Lesson 5**

**Standards-based Learning objective(s):**

Writing poems using ABAB CDCD rhythm pattern

**Context-based Learning objective:**

Students will write poems using an ABAB CDCD pattern with a focus on waste reduction after hearing poems read aloud by teacher who emphasizes the pattern orally.

**Adopted Instructional Materials and Other Resources:**

Teacher poems, poetry examples from 4<sup>th</sup> grade Houghton Mifflin Reader - Theme 4  
*Poetry*

**Summary Description:**

Students listen to various poems with ABAB CDCD pattern (see poems above) and then brainstorm words related to waste reduction. They connect the rhyming words and then write their own poems and recite them aloud to the class.

**Responsible individual(s):** All teachers on team.

**Timeline:** one to two days

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## Lesson 6

### Standards-based Learning objective(s):

Writing surveys with a command of Standard English conventions appropriate to grade four.

### Context-based Learning objective:

Students will formulate waste reduction related survey questions, write and conduct a fall and a spring school wide survey. Survey question suggestions come from San Mateo waste audit sample. (See end of lesson.)

### Adopted Instructional Materials and Other Resources:

San Mateo County waste audit, CIWMB waste audit questionnaire.

### Summary Description:

Students will write and conduct a school wide survey on waste reduction behaviors of people on the school site. Those surveyed will include students (upper grades), teachers and staff. Results of the survey will be published in the school newsletter. Survey will be conducted again in March after waste audit and waste reduction lessons and activities have taken place. Students will compile the results of the surveys and share findings with the school. A display board of recyclable materials and photos from the waste audit will accompany the compilation of information gathered from the survey for public viewing. Students will include sample written survey answers on the display. Survey results will also be posted in the school newsletter, presented to the school PTO/PTA and to the School Site Council.

**Responsible individual(s):** Teachers and students

**Timeline:** One – two weeks in the fall. One week in the spring

Survey sample questions... **San Mateo Waste Audit.**

- Are you familiar with the four “Rs”, Reduce, Reuse, Recycle and buying Recycled materials?
- Would you place an aluminum can in a recycling bin if it was located 5 – 10 feet away, or would you put it in the trash can, located just 1 –2 feet away?
- If you are not recycling, why not?
- If you do recycle, what items do you recycle?
- How often do you recycle them?
- Do you see double-sided copies on your campus often or not?
- Do you make your own lunch? If you do make your own lunch, do you put your lunch in reusable containers?  
If not, what do you use to wrap your lunch items?  
Do you know what a compost bin is?
- Do you have a compost bin at home?
- What is the best way to change peoples’ behavior so that they recycle, reuse, reduce waste and buy recycled materials?

## MATH

### Lesson 7

**Standards-based Learning objective(s):**

Compute numbers demonstrating percentages and decimal equivalents.

**Context-based Learning objective(s):**

Using numbers from waste audit collections, students will interpret percents as part of a hundred and find decimal equivalents to the percentages.

**Adopted Instructional Materials and Other Resources:**

Math texts (Harcourt Math, Chapter 18 *Relate Decimals and Percents* pg. 318)

**Summary Description:**

After performing the school waste audit, students will weight waste collected, dividing dry waste and wet waste, and will record amounts in pounds, decimal and percentage form.

**Responsible individuals(s):**

All teachers on team and Julie. Julie will purchase scales.

**Timeline:** 1 – 2 days

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### Lesson 8

**Standards Based Learning Objective(s):**

Students will use a letter to represent an unknown number, write and evaluate simple algebraic expression with one variable and a function table.

**Context Based Learning Objective(s):**

Based on their findings from the audit materials, students will write an algebraic equation (story problem) that includes one variable.

**Adopted Instructional Materials and other Resources:**

Harcourt Math Text (Grade 4) Chapter 24.3 *Use and Equations* -

**Summary Descriptions:**

Students will complete waste audit and tally measurements from the audit. Based on models from written equations from math text (Harcourt), the teacher and class will write equations together using waste audit totals as the context for the equations. Students will then write their own equations for other students to solve. (Teacher's choice whether students write them in pairs or individually).

**Responsible Individuals:** All teachers

**Timeline:** One day

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### Lesson 9

**Standards Based Learning Objective(s):**

Organize and display totals from waste audit data in using appropriate graphs – double bar graphs.

**Context Based Learning Objective(s):**

Students display, analyze, compare and interpret different data sets from results of the school wide waste audit for public viewing at school site.

**Adopted Instructional Materials and other Resources:**

Harcourt Math (grade 4) Analyze Data and Graphs (chapter 7)  
*Make a Graph & Analyze Graphs*

**Summary Descriptions:**

Students will collect and weigh waste from Waste Audit B. After totaling the various categories of waste, students will graph their findings using a double bar graph and write a brief explanation to accompany their charts that will be displayed at school.

**Responsible Individuals:** All teachers.

**Timeline:** 2 - 3 days

**SOCIAL STUDIES**

**Lesson 10**

**Standards Based Learning Objective(s):**

Understand the structures and functions of state governments that include the roles and responsibilities of elected officials.

**Context Based Learning Objective(s):**

In reading, studying and discussing SB 373, students will learn about the bills written by officials promoting positive changes for the community they represent.

**Adopted Instructional Materials and other Resources:**

Website: <http://democrats.sen.ca.gov/senator/torlakson/>  
Site contains information on SB373 chapter 926.

**Summary Descriptions:**

Either in small groups or whole class (if computer lab suffices) students will log on to State Senator Torlakson’s website to read about SB 373 chapter 926 which he authored. After reading the summary of the bill, students will individually answer comprehension questions, discuss the bill as a whole class, and write the senator. Students are encouraged to inform the senator of the waste reduction activities taking place on campus as well as the waste audit, ask questions, and inform the senator of our school’s UES status.

**Responsible Individuals:** All teachers on team

**Timeline:** One – two days

**SCIENCE**

**Standards Based Learning Objective(s):**

Students will conduct a simple investigation based on a student developed question pertaining to waste reduction on campus.

**Context Based Learning Objective(s):**

Based on information and results from the school waste audit, students will come up with a question – pertaining to waste reduction - that will be the basis of their investigation.

**Adopted Instructional Materials and other Resources:**

Houghton Mifflin, Discovery Works – 4<sup>th</sup> grade *Investigative Process*

**Summary Descriptions:**

After school waste audit, students will brainstorm various questions about the results of their audit. In small groups (3 – 4) students will choose a question to investigate, designate needed tools to perform the investigation, identify variable(s), make observations, inferences and write a summary report of their findings. Students will be given deadlines for each of the steps, depending on length of time needed, and will present their findings at the February district Science Fair.

**Responsible Individuals:** All teachers on team

**Timeline:** varies depending on investigation

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**Assessment Strategies for Campus Needs Assessment:**

- Pre and post assessments – based on classroom curriculum
- Surveys – habits of personnel, students, families (student written and administered)
- Teacher assessments, rubrics, students work, portfolios

**Collaborative Instructional Teams:**

Educators and school staff:

Kristin Fairfield – Parkview School 4<sup>th</sup>/5<sup>th</sup> grade and Principal Joanne Parsley, Pete Pembroke – Chico Country Day School 5<sup>th</sup> grade teacher, Julie A-Nilsson – Parkview School Grant Manager/Service Learning Coordinator, Chico Unified Purchasing Department Scott Jones and Melinda Edgecomb, buyer, School custodians and cafeteria managers at each site, Food Services Supervisor – Joel Adema, principals at each site: Parkview – Joanne Parsley, Chico Country Day – Jeff Plotnick

**Coach:** Teachers and Julie A-Nilsson

**Community Partners:** North Valley Waste Management, WTC, City of Chico, Chico Unified School District, CSUChico, PTO/PTA, parents on site, CSUC recycling and composting sites.

**Additional support mechanisms:** Principals, CIWMB, SEER,

**Teaming considerations:** Timing and scheduling, grade span, departmentalizing, expectations

**Timeline for Developing the Campus Needs Assessment:**

**Planning:** July 2003 – October 31<sup>st</sup>, 2003

**Development:** SEER and CIWMB consultation, teacher lessons, gathering of sources

**Evaluation:** on-going, team reflection in January prior to finalizing for re-application

**Celebration:** Post waste-audit and spring 2004

**Team Leader(s):** Teachers and Julie A-Nilsson

**Leadership Team:** See attached list

**School and district administrative support that the teams should engage:**

Superintendent and Assistant Superintendents, School Board and continual outreach to parents in the community.

**Community partners and stakeholders that the teams should engage:**

Parents, other waste management organizations, conservation groups

| <b>TASK</b>   | <b>Responsible Person(s)</b> | <b>Due Date</b> |
|---|------------------------------|-----------------|
| Complete design of CNA  | Teachers and Julie           | 10/30           |
| Implement CNA   | Teachers and Julie           | Aug. – Dec.     |
| Team reviews results of CAN   | “ “ “                        | 12/3/03         |
| and begins implementation planning  |                              | 1/28/04         |
| Submit 1 <sup>st</sup> draft of year 2 Implementation Plan to SEER for review | UES Grantees                 | 3/1/04          |
| Review and comment on Implementation Plan                                     | SEER                         | 3/21/04         |
| Final Year 2 Implementation Plan completed                                    | UES Grantees                 | 3/31/04         |
| Submit 2 year Implementation Plan for CIWMB approval                          | UES Grantees                 | 3/31/04         |
| CIWMB staff review Year 2 Implementation Plan                                 | CIWMB                        | 4/04            |
| CIWMB considers Phase Two funding   | CIWMB                        | 5/04            |
| Phase Two agreements sent to Grantees and returned to CIWMB                   | CIWMB staff & grantees       | 5/04            |

## **Performing a School Waste Audit**

The objective of our school waste audit is to introduce the idea to our students and staff that garbage doesn't just disappear once it is collected in your garbage can. You can't just *throw it away*. It can be compacted, buried, or changed to ash and vapor but the garbage must all go somewhere.

The audit below, based on a model from San Mateo County, will show students the procedures to determine the quantity of waste at their school site and introduce the categories in which waste can be classified such as waste that can be reduced, reused, recycled, composted, thrown away, donated, etc. Prior to this process, and from this process, students will engage in a variety of learning experiences across the curriculum.

**Prior to the Audit** Before the audit, teachers will define waste reduction to students, introducing them to the terminology related to waste reduction such as the four "R"s. Teachers will discuss with the students the various systems on campus and particularly systems for waste reduction. Teachers will also explain, in terms of grade level appropriateness, \*SB 373 and how public schools were not a part of that mandate but are now being asked to reduce waste by 2005. Through field trips to the local waste management facility, various guest speakers available for the classroom as well as informative literature and topic related books from school libraries and the Service Learning books on campus, students will gain an awareness and understanding of the systems involved in waste management on their school site and in their community.

Each of the school sites from our Leadership Team has its own Campus Needs Assessment due to the different grade levels involved with the grant. The three sites and grade levels involved are: Hooker Oak school with 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> grades represented, Parkview School has 4<sup>th</sup> and 5<sup>th</sup> grades, and Chico Country Day has 5<sup>th</sup> grade only. Each campus has its separate systems, campus specific needs, and goals.

Each site collaborative team will meet to discuss the details, dates, and duties of all involved in the audit. Teachers in charge, with the help of collaborative partners, will gather the items needed: goggles, scale, tarps, containers, and will group students into working teams for the audits. The collaborative team will communicate information to the student body and staff giving a brief explanation of the audit and the need for everyone to cooperate in depositing items into the correct containers the day of Audit A and to help out with waste collecting for Audit B. All classes are encouraged to observe the audit and learn from their peers about the process of auditing their school waste stream. Permissions slips are sent home and returned.

Students involved in the waste audit will also compile questions for a survey to be given to students, teachers and staff on campus prior to the audit and a post survey in March. (Suggestions for questions are in lesson 4 ). Students will tally answers to questions and work with the teacher on organizing the answers to the written questions. Students will write up their findings and report survey responses to the school and parents via the school newsletter and display boards in the hallway.

- (SB373) mandates that all California cities and counties must divert at least 50% of their solid waste from landfill disposal by the end of the year 2005).

## **Methods**

**Audit A.** Students conduct a one-day audit of food service waste for one lunch period for the entire school

**Audit B.** Students collect waste from all classrooms and work spaces on campus for an entire day.

**Audit C** Students conduct a visual waste audit of the contents of the school dumpster.

\*Each American throws out about three to four pounds of waste per day. Each student produces about half a pound of waste per school day. All of this adds up to a problem because America's old landfills are filling up quickly... and new safer landfills are very costly to construct (Source CIWMB, *Closing the Loop* A-46).

**Material needed:**

**Waste audit A:**

- Labeled garbage cans or containers for each classroom or area. These will be used to sort two types of waste (wet waste and dry waste see table below)
- Plastic garbage bags for each of the containers
- Two washable plastic tarps
- Plastic gloves for each student
- Pens for labeling bags, containers
- Change of clothes and washable shoes to wear for the activity
- Parent/guardian permission slip
- Scale for weighing waste
- Camera – school camera or teacher's

**Procedure for waste audits A:**

Teacher will describe duties of designated groups. Groups are:

1. **(Lunch Ambassadors)** students designated to direct correct depositing of waste in the appropriate container – wet/dry – during the lunch hour and are in charge of writing and posting lists in the cafeteria of wet/dry items (see below),
2. **The Weighers** - students to weigh waste and assist in communicating exact amounts.
3. **Tarp Distributors** - students to spread out dry waste on tarp afterward to check for correct categorization and observation and students to record
4. **Publicity** – Students will photograph during the audit – photos will be used for displays and science fair reports

Wet waste matter will not be spread out on tarps, just weighed and all students will complete the written audit and all will be involved in clean up. These groups, or a modification of these groups, will pertain to audits B and C as well. Below are the container codes to use to help sort dry/wet waste. Waste that can be stored for visual display later will be stored in the classroom and wet waste will be deposited in the dumpster after weighing.

**Wet Waste**

Leftover lunch items, sandwiches, fruits, yogurt, cheese, chips, breads, soups, milk, contaminated paper trays or pizza boxes, used paper towels and tissues.

**Dry Waste**

Candy wrapper, empty potato chip bag, bakery containers, all types of wrappers (i.e. candy, cookies), empty soda cans or water bottles, any type of paper, plastic Wrap or packaging, catalogs, magazines, cardboard, and paperboard

## **Container Codes**

|         |   |
|---------|---|
| WW      | Wet waste sorting area                  |
| MP      | Mixed paper                             |
| NP      | Newspaper                               |
| OW      | Other waste not classified              |
| PB      | Plastic Bottles # 1 & # 2               |
| PW      | Plastic wrap and misc plastic # 3 - # 7 |
| AL / SC | Aluminum can, steel cans                |
| OCC     | Cardboard                               |

After the raw data is compiled, you can determine:

- How much waste is generated per year at your school
- The waste composition (what's in the waste stream)
- How much material is diverted through 3Rs approaches
- How and why the waste is generated
- How much more could be diverted through 3Rs approaches

Materials needed for **Waste audit B:**

- Labeled garbage cans for wet/dry waste
- Plastic garbage bags for each of the containers
- A scale for weighing the materials in pounds.
- Two washable plastic tarps for laying out waste
- Plastic gloves for each student
- Change of clothes and washable shoes for students (if requested)
- Parent/guardian permission slip

### **Procedures for Waste audit B**

At the end of designated day, students will gather all waste from classrooms and office work areas on campus and distribute into appropriately labeled containers. After all waste is distributed into labeled containers, bags will be weighed and recorded on audit sheet – each student has an audit sheet for audit B. Students will display dry waste on tarp for photos and observation. Wet waste matter will not be spread out on tarps, just weighed. Students will refer to Butte County Recycling Directory from Butte

County for clarification of recyclable and non-recyclable materials as needed, as well as any other reliable sources they have acquired.

**Materials needed for Waste Audit C:**

- Gloves for students
- Litter pick-up stick (Your school district maintenance staff may have this item)
- Parent/guardian permission slip

**Procedures for waste audit C:**

If sorting is not allowed at your site then conduct a visual waste audit of the materials found in the dumpster. Use the litter pick-up tool to break apart the bags and inspect what you find and fill out the table below. Decipher what is recyclable by site and what is not. Below are some helpful conversions:

**Estimating Weights**

| One Cubic yard                    | Est. wt. (in lbs.) |
|-----------------------------------|--------------------|
| Whole bottles                     | 500-700            |
| Aluminum cans                     | 50-70              |
| Aluminum cans (crushed by hand)   | 250-430            |
| Steel cans                        | 150                |
| Steel cans flattened              | 850                |
| PET (soda bottles)                | 30 - 40            |
| Newspaper (not compacted)         | 360-505            |
| Mixed paper (flat- not compacted) | 380                |

**After the Audit**

After the waste audits are completed, students will gather, organize, and compute data, which will involve applying grade level standards from various areas of the curriculum. (Lessons explain) Students will report findings on the results of the audit to the school within two weeks. Results of the waste audits will be presented in an organized, visual fashion utilizing graphs and written explanations appropriately. Students will also work through the investigative process of a scientific study based on a hypothesis or question formed prior to the audit – appropriate to grade level science standards. During the two to three months following the audit, students will complete their investigation and demonstrate their findings at the annual school science fair in February. In addition to integrating math and science standards, students will write letters, compositions, poetry and persuasive compositions on the subject of waste reduction and other related topics. Students will follow up with a spring (March) post survey to learn about what changes in

knowledge of waste management and behavior in waste reduction took place from students, staff and teachers on campus. From these survey results, students will again compile data and present their findings to the school.

### **Waste audit Permission Slip**

Dear Parent(s),

On (date/s) \_\_\_\_\_ our class will be participating in a study of waste generated by the school. This will involve the handling of school garbage from the classroom, the cafeteria and the school dumpster. Students will be provided with gloves and goggles, we will coach them in safety procedures, and every precaution will be taken to ensure you child's safety. A faculty member will be present. Students will be sorting, weighing and analyzing our school's waste stream to gather baseline information for a school wide project. We need your permission for your child to participate in this activity. If this meets your approval, please sign the statement below.

If you have any questions please contact \_\_\_\_\_ at school.

My child, \_\_\_\_\_ has my permission to

participate in the school waste audit to be conducted at school.

Parent signature: \_\_\_\_\_ Date: \_\_\_\_\_

## 5<sup>TH</sup> Grade

### ENGLISH/LANGUAGE ARTS

#### Reading

Reading Comprehension: *Structural features of Informational Materials*

**2.1** – Read and demonstrate understanding of grade-level-appropriate informational material through written responses to questions.

#### Writing

*Organization and focus: 1.0* 1.1 – 1.3 – Create multiple paragraph narrative compositions from 1<sup>st</sup> person point of view – exhibiting awareness of audience and purpose.

*Organization and Focus: 2.1* Students will write and perform waste reduction puppet shows with a developed plot, setting and point of view.

Writing Applications:

*Write responses to literature 2.2* – Demonstrate an understanding of literary work through verbal group discussion and written responses.

*Writing applications: 2.5* Students will write persuasive letters or compositions.

**Literary Response and Analysis:** 3.4 Students will analyze the structural features of poetry and then write poems using an ABAB CDCD rhythm pattern focus with content focusing on waste reduction.

**Written and oral language convention: 1.0** 1.1-1.7 Students write with a command of Standard English conventions appropriate to this grade level.

- L.O. Students will demonstrate their understanding of grade-level appropriate non-fiction information by writing explanations of the four “R”s found on the EPA website and how they will apply them to their own personal lives.
- L.O. Students will show their understanding of the recycling process by writing multiple paragraph narrative compositions based on a first person point of view of the life of a soda bottle beginning with being tossed from a car to the stage of being recycled.
- L.O. Students will write and perform Waste Reduction Puppet shows utilizing student made props from recyclable materials.
- L.O. In small groups students will read and discuss teacher developed questions pertaining to Just a Dream by Chris Van Allsburg.
- L.O. Individually, students will write persuasive letters stating a clear position on the importance of recycling. An audience is identified prior to writing.
- L.O. In response to poems read in class, students will write poems with a waste reduction theme that follow an ABAB CDCD rhythm pattern.
- L.O. Students will write survey questions to gather information about the knowledge and behaviors of students, teachers and staff in regards to waste reduction in their personal lives and on campus.

### MATH

*Number Sense 1.2:* Students compute numbers from waste audit collections demonstrating decimal and percent equivalents.

*Measurement and Geometry 1.3 & 1.4* Students understand and compute the volume and area of simple objects.

*Algebra and Functions 1.2* Students write simple story problems that include a letter to represent an unknown number; an algebraic expression. Students will evaluate and solve problems.

*Statistics, Data Analysis and Probability 1.2* Students display, analyze, compare and interpret different data sets of waste audit results for school site and the public in general.

- L.O. Students weigh waste collected from wet and dry waste receptacles demonstrating knowledge and application of interpreting percents as a part of a hundred and finding decimal and percentage equivalents when stating what percentage of waste collected is recyclable.
- L.O. Students will apply their understanding of the concept of volume when computing the volume of the school dumpster using the common measuring system and will differentiate between appropriate uses of measuring for two- and three-dimensional objects (area and volume) by also computing the area of the dumpster.
- L.O. Students will demonstrate their knowledge of algebraic expressions by writing a story problem pertaining to the data gathered from waste reduction collected in a day, week or month that includes one unknown variable. Students will evaluate and solve problems.
- L.O. Students will calculate daily, weekly and monthly averages of recyclable waste and present visually in appropriate graphs with numerical data presented in fractions and percentages to help compare various data sets and include numerical representation of mean and median.

### **SOCIAL STUDIES:**

*Chronological and Spatial Thinking 1 & 2.* Students explain how major events are related to one another in time and construct time lines of key events, people, and period of history related to unit of study.

- L.O. Students will read “Garbage Through the Ages” and construct time lines relating stages waste management throughout time prehistoric times to present day.

**SCIENCE:** Investigation and Experimentation – Students will conduct a simple investigation based on student developed questions pertaining to waste reduction on campus. From their investigation, students will write a report that includes question, data or evidence and drawing conclusions.

- L.O. Students will develop a testable question.
- L.O. Students will plan their investigation including needed tools and resources and timeline. Students will identify dependent and controlled variables in the investigation.
- L.O. Students will conduct investigation based on student-developed question.
- L.O. Students will identify a single independent variable explaining how this variable can be used to collect information to answer a question about the results of the experiment.
- L.O. Students will make quantitative observations and record data by using charts, graphs and diagrams.
- L.O. Students will make inferences and draw conclusions from evidence.
- L.O. Students will write a summary report that will include the question stated, tests

conducted and data gathered and conclusions drawn.

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### **Lesson Planning for the Campus Needs Assessment**

**Pre-assessment strategy:** Teachers will work together to write questions for a brief pre-assessment of their students to be given at the beginning of the year. The pre-assessment will include questions that test their knowledge of terms such as recycling, reuse, and reduce, and their awareness of waste reduction on their campus as well as their individual recycling/waste reduction habits.

Students will also create a map of the school, before any mapping instructions have been taught, to identify the various systems on campus, location of buildings, and waste reduction facilities. Students will walk through their campus, draw and label the various systems they observe, buildings, playground, parking lot, etc.

### **LANGUAGE ARTS**

#### **Lesson 1**

Standards-based Learning objective: Reading and comprehending non-fiction material from the Internet.

#### **Context-based Learning Objective(s):**

Using the EPA website, students will read the explanations and examples of the four “R”s, write the definitions in their own words and how they will integrate them into their lives presently.

#### **Adopted Instructional Materials and Other Resources:**

What CSUSD Adopted Instructional Materials?

([www.epa.gov/epaoswer/non-hw/reduce/catbook/index.htm](http://www.epa.gov/epaoswer/non-hw/reduce/catbook/index.htm))

#### **Summary Description:**

Students will learn to speak “pirate”, the four “R”s. In small groups, or in a lab for the entire class if available, students will log on to the EPA website and read the explanations of the four “R”s. Afterwards, they’ll write their own explanations and how they will integrate each of them into their own lives.

**Responsible Individuals:** All teachers on the team.

**Timeline:** One morning

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#### **Lesson 2**

#### **Standards-based Learning objective:**

Multiple paragraph compositions – narrative involving evaluation and revision.

#### **Context-based Learning Objective(s):**

Using knowledge gained from various sources such as tours of our local waste management recycling centers and research of the four “Rs”, students will write a narrative composition describing the life of a soda bottle from the point of being tossed out of a moving car to the stage of being recycled.

**Adopted Instructional Materials and Other Resources:**

Houghton Mifflin Reading Text – Theme 2 *Clarification Composition*, Field trip to Nor Cal Waste Management Recycling Center, WTC Recycling center, RARE Exhibit (CSUC), *Kids Talking Trash* video, and *I Want to Be an Environmentalist*.

**Summary Description:**

From information gained from various sources, the field trips to waste management sites and research on the four “R”s, students will write a first person point of view narrative composition of the life of a soda bottle from the point of being thrown out of a moving car, to being recycled. Narratives will be published and shared and displayed in the classroom and on campus and will be accompanied by illustrations.

**Responsible Individual(s):** All teachers on team

**Timeline:** 1 week

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**Lesson 3**

**Standards Based Learning Objective(s):**

Writing and performing plays that have a plot, point of view, setting and conflict.

**Context Based Learning Objective(s):**

Students will transfer knowledge of the four “R”s into written plays and perform them to an audience.

**Adopted Instructional Materials and other Resources:**

Houghton Mifflin Reading – Theme 3 & 4 *Process writing*

**Summary Descriptions:**

Students are placed into groups and given the Waste Reduction Puppet Show assignment. Plays are to be entertaining and informative. Written and performed plays must contain a plot, setting, conflict, accurate explanations of the four “R”s, correct spelling, punctuation and grammar. Props made of recyclable material, and an all-inclusive cast – everyone has a speaking part. Plays will be performed for other classes and must each be no longer than 5 minutes each.

**Responsible Individuals:** All teachers on the team

**Timeline:** Two weeks

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**Lesson 4**

**Standards Based Learning Objective(s):** Students read and respond to the Literature book *Just a Dream*, by identifying main conflict, character development, theme, effects of literary devices, and conflict resolution.

**Context Based Learning Objective(s):**

In reading and responding to Chris Van Allsburg’s *Just a Dream*, students will analyze the main character’s motivations and actions in his decisions to contribute to waste reduction in his life.

**Adopted Instructional Materials and other Resources:**

Houghton Mifflin Reading Series 5<sup>th</sup> Grade – Theme 1 – *Comprehending Literature*

**Summary Descriptions:**

After reading the story silently, (teacher read aloud if not enough copies or it's teacher preference) students will discuss the questions in a small group and then answer them individually. Afterwards, students and teacher will discuss responses. (Questions were written by Pete Pembroke)

**Responsible Individuals:** All teachers on team.

**Timeline:** 1 hour

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**Lesson 5**

**Standards-based Learning objective(s):**

Students will write persuasive letters.

**Adopted Instructional Materials and Other Resources:**

Houghton Mifflin Reading Text Grade 6 - Theme 6 –*Persuasive Writing*, teacher samples and modeling.

**Summary Description:**

Students will choose a site based issue related to waste management and research two to three facts to include in the persuasive letter. Students will select their audiences, state a clear position on the issue in their letter or composition and send letters if appropriate.

**Responsible Individual(s):** All teachers on team

**Timeline:** 1-2 weeks

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**Lesson 6**

**Standards-based Learning objective(s):**

Writing poems using ABAB CDCD rhythm pattern

**Context-based Learning objective:**

Students will write poems using an ABAB CDCD pattern with a focus on waste reduction after hearing poems read aloud by teacher who emphasizes the pattern orally.

**Adopted Instructional Materials and Other Resources:**

Teacher poems, poetry examples from 6<sup>th</sup> grade Houghton Mifflin Reader - Theme Poetry, *What is Poetry* – pg. 119, *Child Rest* – pg. 132

**Summary Description:**

Students listen to various poems with ABAB CDCD pattern (see poems above) and then brainstorm words related to waste reduction. They connect the rhyming words and then write their own poems and recite them aloud to the class.

**Responsible individual(s):** All teachers on team.

**Timeline:** one to two days

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## **Lesson 7**

### **Standards-based Learning objective(s):**

Writing surveys with a command of Standard English conventions appropriate to grade five.

### **Context-based Learning objective:**

Students will formulate survey questions pertaining to waste reduction content, write and conduct a fall and a spring school wide survey. Survey question suggestions come from San Mateo waste audit sample. (See end of lesson)

### **Adopted Instructional Materials and Other Resources:**

San Mateo County waste audit, CIWMB waste audit questionnaire.

### **Summary Description:**

Students will write and conduct a school wide survey on waste reduction behaviors of people on the school site. Those surveyed will include students (upper grades), teachers and staff. Results of the survey will be published in the school newsletter. Survey will be conducted again in March after waste audit and waste reduction lessons and activities have taken place. Students will compile the results of the surveys and share findings with the school. A display board of recyclable materials and photos from the waste audit will accompany the compilation of information gathered from the survey for public viewing. Students will include sample written survey answers on the display. Survey results will also be posted in the school newsletter, presented to the school PTO/PTA and to the School Site Council.

**Responsible individual(s):** Teachers and students

**Timeline:** One week.

Survey sample question (San Mateo Waste Audit).

- Are you familiar with the four “Rs”, Reduce, Reuse, Recycle and Recycled materials?
- Would you place an aluminum can in a recycling bin if it was located 5 – 10 feet away, or would you put it in the trash can, located just 1 –2 feet away?
- If you are not recycling, why not?
- If you do recycle, what items do you recycle?
- How often do you recycle them?
- Do you see double-sided copies on your campus often or not?
- Do you make your own lunch? If you do make your own lunch, do you put your lunch in reusable containers?
- If not, what do you use to wrap your lunch items?

- Do you know what a compost bin is?
- Do you have a compost bin at home?
- What is the best way to change peoples' behavior so that they recycle, reuse, reduce waste and buy recycled materials?

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## Math

### Lesson 8

#### **Standards-based Learning objective(s):**

Compute numbers demonstrating decimal and percent equivalents.

#### **Context-based Learning objective(s):**

Using numbers from waste audit collections, students will interpret percents as part of a hundred and find decimal equivalents to the percentages.

#### **Adopted Instructional Materials and Other Resources:**

Math texts (Harcourt Math, Chapter 18 *Relate Decimals and Percents pg. 318*)

#### **Summary Description:**

After performing the school waste audit, students will weight waste collected, dividing dry waste and wet waste, and will record amounts in pounds, decimal and percentage form

**Responsible individuals(s):** All teachers on team and Julie. Julie will purchase scales.

**Timeline:** 1 day

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### Lesson 9

#### **Standards-based Learning objective(s):**

Understand and compute the volume and area of simple objects.

#### **Context-based Learning objective(s):**

Students will measure the volume of the school dumpster by applying the common measuring system for volume. (Harcourt Math – chapter 28 Hands On: Relate Perimeter and Area.

#### **Adopted Instructional Materials and Other Resources:**

Harcourt Math – 6<sup>th</sup> grade – *Surface Area and Volume – pg. 552*

#### **Summary Description:**

When completing the third phase of the waste audit, students will measure the volume of the school dumpster by applying the common measuring system. They will report the estimated volume of waste in the dumpster they observe for the week and then compute the month's total waste volume.

**Responsible individuals(s):** All teachers – consult with site custodian and principal.

**Timeline:** one day

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**Lesson 10****Standards Based Learning Objective(s):**

Students will use a letter to represent an unknown number, write and evaluate simple algebraic expressions in one variable by substitution.

**Context Based Learning Objective(s):**

Based on their findings from the audit materials, students will write an algebraic expression (story problem) with one variable.

**Adopted Instructional Materials and other Resources:**

Harcourt Math Text (Grade 5) Chapter 6 - *Write and Evaluate Expressions*

**Summary Descriptions:**

Students will complete waste audit and tally measurement totals from the audit. Based on models from written expressions from math text (Harcourt), the teacher and class will write expressions together using waste audit totals as the context for the expressions. Students will then write their own expressions for other students to operate and evaluate. Teacher's choice whether students write them in pairs or individually,

**Responsible Individuals:** All teachers

**Timeline:** One day

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**Lesson 11****Standards Based Learning Objective(s):**

Organize and display single-variable data in appropriate graphs and representations (histograms, circle graphs) and explain which types of graphs are appropriate for various data sets.

**Context Based Learning Objective(s):**

Students display, analyze, compare and interpret different data sets from results of the school wide waste audit for public viewing at school site.

**Adopted Instructional Materials and other Resources:**

Harcourt Math (grade 5) Analyze Data and Graphs (chapter 7)  
*Make a Graph & Analyze Graphs*

**Summary Descriptions:**

Students will collect and gather data from the waste audit and analyze various types of graphs to best communicate their findings, i.e., bar graphs, line graphs, pictographs, histograms, circle graphs. Upon deciding, students will create graphs to publicize their findings to the school.

**Responsible Individuals:** All teachers.

**Timeline:** 4 - 5 days

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## SOCIAL STUDIES

### Lesson 12

#### **Standards Based Learning Objective(s):**

Students explain how major events are related to one another in time – *Chronological and Spatial Thinking*.

#### **Context Based Learning Objective(s):**

After reading “Garbage Through the Ages” (*Project Learning Tree, Exploring Environmental Issues: Municipal Solid Waste*) students will explain the evolution of waste management from one period of time, and place, to the next time and place.

#### **Adopted Instructional Materials and other Resources:**

“Garbage Through the Ages” (*Project Learning Tree, Exploring Environmental Issues: Municipal Solid Waste*)

#### **Summary Descriptions:**

As a whole class students will read “Garbage Through the Ages” silently and then aloud with a partner. In groups of 2 – 4 students will paraphrase the history of waste management for their assigned time period (there are 6 periods). Illustrations of key events, people and places in the world will accompany the paraphrased histories. In chronological order, each group will present their paraphrased histories and illustrations. Props, skits, 3-D visuals are encouraged.

**Responsible Individuals:** All teachers on team

**Timeline:** One - two afternoons

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### Lesson 13

#### **Standards Based Learning Objective(s):**

Students will develop a hypothesis based on findings from the school wide waste audit and work through the steps of the Investigation and Experimentation outlined in the 6<sup>th</sup> grade content standards with a few a few modifications:

- a. Develop a hypothesis.
- b. Select and use appropriate tools and technology
- c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.
- d. Communicate the steps and results from an investigation in written reports and oral presentations.
- e. Recognize whether evidence is consistent with a proposed explanation.
- f. Evaluate and summarize the conclusion of your observations and state whether or not your hypothesis was correct.

**Responsible Individuals:** All teachers on the team

**Timeline:** varies – depending on hypothesis

### **Assessment Strategies for Campus Needs Assessment:**

- Pre and post assessments – based on classroom curriculum
- Surveys – habits of personnel, students, families (student written and administered)
- Teacher assessments, rubrics, students work, portfolios

### **Collaborative Instructional Teams:**

Educators and school staff:

Kristin Fairfield – Parkview School 4<sup>th</sup>/5<sup>th</sup> grade and principal Joanne Parsley,  
Pete Pembroke – Chico Country Day School 5<sup>th</sup> grade teacher,  
Julie A-Nilsson – Parkview School Grant Manager/Service Learning Coordinator,  
Chico Unified Purchasing Department Scott Jones and Melinda Edgecomb, buyer  
School custodians and cafeteria managers at each site, Food Services Supervisor – Joel Adema, principals at each site: Parkview – Joanne Parsley, Chico Country Day – Jeff Plotnick

**Coach:** Teachers and Julie

**Community Partners:** North Valley Waste Management, WTC, City of Chico, Chico Unified School District, CSU Chico, PTO/PTA, parents on site, CSUC recycling and composting sites.

**Additional support mechanisms:** Principals, CIWMB, SEER,

**Teaming considerations:** Timing and scheduling, grade span, departmentalizing, expectations

## **5<sup>TH</sup> Grade**

### **ENGLISH/LANGUAGE ARTS**

#### **Writing**

*Writing Strategies* 1.0 –1.6, – Create multiple paragraph compositions- narrative and expository - utilizing research and technology and evaluation and revision.

*Writing Applications:* 2.4 Students will write persuasive letters or compositions.

2.2 Students will write poems using an ABAB CDCD rhythm pattern focus with content focusing on waste reduction.

#### **Listening and Speaking:**

*Speaking Applications* 2.2: Deliver informative presentations about waste reduction.

Reading: *Literary Response and Analysis* 3.1. Identify and analyze the characteristics of poetry.

*Written and Oral Language Conventions* 1.1, 1.2, 1.4, 1.5. Students will write and speak with a command of Standard English conventions appropriate to the grade level.

L.O. Students will show their understanding of the recycling process by writing multiple paragraph narrative and expository compositions based on information from Closing the Loop, CIWMB literature, Waste Management field trip, RARE Exhibit field trip, guest speakers, resource books and the internet.

- L. O. Individually, students will write persuasive letters stating a clear position on the importance of recycling. An audience is identified prior to writing.
- L. O. In response to poems read in class, students will write poems with a waste reduction theme that follow an ABAB CDCD rhythm pattern.
- L. O. In small groups, the students will give informative presentations to students in their class as well as other classes on waste reduction solutions to waste problems on campus.
- L. O. After listening to poetry read aloud, students will apply correct usage of verbs, modifiers and pronouns, capitalization and spelling when writing their own ABAB CDCD poems focusing on recycling/waste reduction
- L.O. Students will listen to poetry with an ABAB CDCD pattern (with a waste reduction focus), and analyze and discuss the reasons why authors chose that particular form.

## MATH

*Number Sense 1.2:* Students compute numbers from waste audit collections demonstrating decimal and percent equivalents.

*Measurement and Geometry 1.3 & 1.4* Students understand and compute the volume and area of simple objects.

*Algebra and Functions 1.2* Students write simple story problems that include a letter to represent an unknown number; an algebraic expression. Students will evaluate and solve problems.

*Mathematical Reasoning 1.0* In examining information gathered from analyzing waste audit results, students will determine how to approach the issue of waste reduction on campus by identifying relationships, distinguishing relevant from irrelevant information, sequencing and prioritizing information and observing patterns.

*Statistics, Data Analysis and Probability 1.2 – 1.3* Students display, analyze, compare and interpret different data sets of waste audit results for school site and the public in general.

- L.O. Students weigh waste collected from wet and dry waste receptacles demonstrating knowledge and application of interpreting percents as a part of a hundred and finding decimal and percentage equivalents when stating what percentage of waste collected is recyclable.
- L.O. Students will apply their understanding of the concept of volume when computing the volume of the school dumpster using the common measuring system and will differentiate between appropriate uses of measuring for two-and three-dimensional objects (area and volume) by also computing the area of the dumpster.
- L.O. Students will demonstrate their knowledge of algebraic expressions by writing a story problem pertaining to the data gathered from waste reduction collected in a day, week or month that includes one unknown variable. Students will evaluate and solve problems.
- L.O. Based on analysis of information from waste audits, students will calculate potential savings for school site based on the amount of waste reduction that

could be diverted, recycled or composted and will present solutions using mathematical notation and explicit verbal language.

- L.O. Students will calculate daily, weekly and monthly averages of recyclable waste and present visually in appropriate graphs with numerical data presented in fractions and percentages to help compare various data sets and include numerical representation of mean and median.

### **SCIENCE:**

Investigation and Experimentation – Students will conduct a simple investigation based on student developed questions pertaining to waste reduction on campus. From their investigation, students will write reports that include a question, data or evidence and drawing conclusions.

- L.O. Students will develop a testable question.
- L.O. Students will plan their investigation including needed tools and resources and timeline. Students will identify dependent and controlled variables in the investigation.
- L.O. Students will conduct investigation based on student-developed question.
- L.O. Students will identify a single independent variable explaining how this variable can be used to collect information to answer a question about the results of the experiment.
- L.O. Students will make quantitative observations and record data by using charts, graphs and diagrams.
- L.O. Students will make inferences and draw conclusions from evidence.
- L.O. Students will write a summary report that will include the question stated, tests conducted and data gathered and conclusions drawn.

## **Standards-based Connections Set and Learning Objectives** **For the Campus Needs Assessment**

### **6<sup>TH</sup> Grade**

#### **ENGLISH/LANGUAGE ARTS**

**Writing Applications (Genres and Their Characteristics)** 2.1, 2.2 , 2.5 – Create multiple paragraph compositions: narrative, expository, persuasive.

**Listening and Speaking** *Speaking Applications:* 2.2, 2.5. Deliver narrative informational presentations and persuasive presentations on problems and solutions.

- L.O. Students will show their understanding of the recycling process by writing a multiple paragraph narrative based on information from Closing the Loop, CIWMB literature, Waste Management field trip, RARE Exhibit field trip, guest speakers, resource books and the internet.
- L.O. Individually, students will write persuasive compositions stating a clear position on the importance of implementing waste reduction.
- L.O. In small groups, the students will deliver informational presentations and persuasive presentations to other classes on waste reduction solutions to waste problems.

## MATH

**Number Sense** – 1.3 Students will use proportions to solve problems, e.g., determine the value of  $N$  if  $\frac{4}{7} = \frac{N}{21}$

### **Algebra and Functions** –

1.0 – Students will write story problems as algebraic expressions and equations using up to three variables.

2.0 Students will analyze waste collected from waste audit and use tables, graphs and grids to solve problems involving rates and proportions:

### **Measurement and Geometry-**

1.0 – Students will deepen their understanding of the measurement of plane and solid shapes by using the formulas for measuring the volume of trash in a cylinder shaped trashcan.

L.O. Students will determine the value of  $N$  when solving the proportion problem of the amount of waste a school site accumulates in a week, day, month of a specific item such as Styrofoam trays, milk cartons, etc..

L.O. Students will demonstrate their knowledge of algebraic expressions by writing a story problem that includes an algebraic expression using up to three variables.

L.O. Students will convert standard volume measurements to metric volume measurements after weighing waste audit materials demonstrating an understanding that rate is a measure of one quantity per unit value of another quantity (standard – metric).

L.O. Students will measure the amount of trash collected in a cylinder garbage can by using the formula (area of base x height).

## SCIENCE

**Investigation and Experimentation** – Students will conduct a simple investigation based on student developed hypothesis and investigation.

L.O. Students will select necessary tools and technology, perform tests and collect and display data.

L.O. Students will develop qualitative statements about the relationships between variables.

L.O. Students will write steps and results of investigation in written reports and state whether evidence is consistent with a proposed explanation.

L.O. Students will present their findings and summaries orally.

## HISTORY/SOCIAL STUDIES

### **Historical Interpretation:**

Students read “The History of Trash” and in small groups (each group presenting a time period) give an oral presentation of the issues people faced regarding garbage in periods from prehistoric times to present day.

L.O. Working in small groups, students will identify the cause and effect of waste in me period and report their findings to the class.

L.O. Students will identify in writing how the combination of new ideas, technologies and events bring about new patterns of waste reduction.

L.O. Students will make a visual time line of the problems throughout time, people and countries involved and solutions created.

## 6<sup>TH</sup> Grade

### ENGLISH/LANGUAGE ARTS:

#### Reading

Reading Comprehension: *Structural features of Informational Materials*

**2.1** – Read and demonstrate understanding of grade-level-appropriate informational material through written responses to questions.

#### Writing

*Organization and focus:* 1.0 1.1 – 1.3 – Create multiple paragraph narrative compositions from 1<sup>st</sup> person point of view – exhibiting awareness of audience and purpose.

*Organization and Focus:* 2.1 Students will write and perform waste reduction puppet shows with a developed plot, setting and point of view.

Writing Applications:

*Write responses to literature* 2.2 – Demonstrate an understanding of literary work through verbal group discussion and written responses.

*Writing applications:* 2.5 Students will write persuasive letters or compositions.

**Literary Response and Analysis:** 3.4 Students will analyze the structural features of poetry and then write poems using an ABAB CDCD rhythm pattern focus with content focusing on waste reduction.

**Written and oral language convention:** 1.0 1.1-1.7 Students write with a command of standard English conventions appropriate to this grade level.

- L.O. Students will demonstrate their understanding of grade-level appropriate non-fiction information by writing explanations of the four “R”s found on the EPA website and how they will apply them to their own personal lives.
- L.O. Students will show their understanding of the recycling process by writing multiple paragraph narrative compositions based on a first person point of view of the life of a soda bottle beginning with being tossed from a car to the stage of being recycled.
- L.O. Students will write and perform Waste Reduction Puppet shows utilizing Student-made props from recyclable materials.
- L.O. In small groups students will read and discuss teacher developed questions pertaining to Just a Dream by Chris Van Allsburg.
- L.O. Individually, students will write persuasive letters stating a clear position on the importance of recycling. An audience is identified prior to writing
- L.O. In response to poems read in class, students will write poems with a waste reduction theme that follow an ABAB CDCD rhythm pattern.
- L.O. Students will write survey questions to gather information about the knowledge and behaviors of students, teachers and staff in regards to waste reduction in their personal lives and on campus.

### MATH

*Number Sense 1.2:* Students compute numbers from waste audit collections demonstrating decimal and percent equivalents.

*Measurement and Geometry 1.3 & 1.4* Students understand and compute the volume and area of simple objects.

*Algebra and Functions 1.2* Students write simple story problems that include a letter to represent an unknown number; an algebraic expression. Students will evaluate and solve problems.

*Statistics, Data Analysis and Probability 1.2* Students display, analyze, compare and interpret different data sets of waste audit results for school site and the public in general.

- L.O. Students weigh waste collected from wet and dry waste receptacles demonstrating knowledge and application of interpreting percents as a part of a hundred and finding decimal and percentage equivalents when stating what percentage of waste collected is recyclable.
- L.O. Students will apply their understanding of the concept of volume when computing the volume of the school dumpster using the common measuring system and will differentiate between appropriate uses of measuring for two- and three-dimensional objects (area and volume) by also computing the area of the dumpster.
- L.O. Students will demonstrate their knowledge of algebraic expressions by writing a story problem pertaining to the data gathered from waste reduction collected in a day, week or month that includes one unknown variable. Students will evaluate and solve problems.
- L.O. Students will calculate daily, weekly and monthly averages of recyclable waste and present visually in appropriate graphs with numerical data presented in fractions and percentages to help compare various data sets and include numerical representation of mean and median.

### **SOCIAL STUDIES:**

*Chronological and Spatial Thinking 1 & 2.* Students explain how major events are related to one another in time and construct time lines of key events, people, and period of history related to unit of study.

- L.O. Students will read “Garbage Through the Ages” and construct time lines relating stages waste management throughout time prehistoric times to present day.

**SCIENCE:** Investigation and Experimentation – Students will conduct a simple investigation based on student developed questions pertaining to waste reduction on campus. From their investigation, students will write a report that includes question, data or evidence and drawing conclusions.

- L.O. Students will develop a testable question.
- L.O. Students will plan their investigation including needed tools and resources and

timeline. Students will identify dependent and controlled variables in the investigation.

- L.O. Students will conduct investigation based on student-developed question.
- L.O. Students will identify a single independent variable explaining how this variable can be used to collect information to answer a question about the results of the experiment.
- L.O. Students will make quantitative observations and record data by using charts, graphs and diagrams.
- L.O. Students will make inferences and draw conclusions from evidence.
- L.O. Students will write a summary report that will include the question stated, tests conducted and data gathered and conclusions drawn.

### **Lesson Planning for the Campus Needs Assessment**

**Pre-assessment strategy:** Teachers will work together to write questions for a brief pre-assessment of their students to be given at the beginning of the year. The pre-assessment will include questions that test their knowledge of terms such as recycling, reuse, and reduce, and their awareness of waste reduction on their campus as well as their individual recycling/waste reduction habits.

Students will also create a map of the school, before any mapping instructions have been taught, to identify the various systems on campus, location of buildings, and waste reduction facilities. Students will walk through their campus, draw and label the various systems they observe, buildings, playground, parking lot, etc.

## **LANGUAGE ARTS**

### **Lesson 1**

Standards-based Learning objective: Reading and comprehending non-fiction material from the Internet.

#### **Context-based Learning Objective(s):**

Using the EPA website, students will read the explanations and examples of the four “R”s, write the definitions in their own words and how they will integrate them into their lives presently.

#### **Adopted Instructional Materials and Other Resources:**

[www.epa.gov/epaoswer/non-hw/reduce/catbook/index.htm](http://www.epa.gov/epaoswer/non-hw/reduce/catbook/index.htm)

#### **Summary Description:**

Students will learn to speak “pirate”, the four “R”s. In small groups, or in a lab for the entire class if available, students will log on to the EPA website and read the explanations of the four “R”s. Afterwards, they’ll write their own explanations and how they will integrate each of them into their own lives.

**Responsible Individuals:** All teachers on the team.

**Timeline:** One morning

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### **Lesson 2**

#### **Standards-based Learning objective:**

Multiple paragraph compositions – narrative involving evaluation and revision.

**Context-based Learning Objective(s):**

Using knowledge gained from various sources such as tours of our local waste management recycling centers and research of the four “Rs”, students will write a narrative composition describing the life of a soda bottle from the point of being tossed out of a moving car to the stage of being recycled.

**Adopted Instructional Materials and Other Resources:**

Houghton Mifflin Reading Text – Theme 2 *Clarification Composition*, Field trip to Nor Cal Waste Management Recycling Center, WTC Recycling center, RARE Exhibit (CSUC), *Kids Talking Trash* video, and *I Want to Be an Environmentalist*.

**Summary Description:**

From information gained from various sources, the field trips to waste management sites and research on the four “R”s, students will write a first person point of view narrative composition of the life of a soda bottle from the point of being thrown out of a moving car, to being recycled. Narratives will be published and shared and displayed in the classroom and on campus and will be accompanied by illustrations.

**Responsible Individual(s):** All teachers on team

**Timeline:** 1 week

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**Lesson 3**

**Standards Based Learning Objective(s):**

Writing and performing plays that have a plot, point of view, setting and conflict.

**Context Based Learning Objective(s):**

Students will transfer knowledge of the four “R”s into written plays and perform them to an audience.

**Adopted Instructional Materials and other Resources:**

Houghton Mifflin Reading – Theme 3 & 4 *Process writing*

**Summary Descriptions:**

Students are placed into groups and given the Waste Reduction Puppet Show assignment. Plays are to be entertaining and informative. Written and performed plays must contain a plot, setting, conflict, accurate explanations of the four “R”s, correct spelling, punctuation and grammar. Props made of recyclable material, and an all-inclusive cast – everyone has a speaking part. Plays will be performed for other classes and must each be no longer than 5 minutes each.

**Responsible Individuals:** All teachers on the team

**Timeline:** Two weeks

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**Lesson 4**

**Standards Based Learning Objective(s):**

Students read and respond to the literature book Just a Dream, by identifying main conflict, character development, theme, effects of literary devices, and conflict resolution.

**Context Based Learning Objective(s):**

In reading and responding to Chris Van Allsburg's Just a Dream, students will analyze the main character's motivations and actions in his decisions to contribute to waste reduction in his life.

**Adopted Instructional Materials and other Resources:**

Houghton Mifflin Reading Series 5<sup>th</sup> Grade – Theme 1 – *Comprehending Literature*

**Summary Descriptions:**

After reading the story silently, (teacher read aloud if not enough copies or it's teacher preference) students will discuss the questions in a small group and then answer them individually. Afterwards, students and teacher will discuss responses. (questions were written by Pete Pembroke)

**Responsible Individuals:** All teachers on team.

**Timeline:** 1 hour

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**Lesson 5**

**Standards-based Learning objective(s):**

Students will write persuasive letters.

**Adopted Instructional Materials and Other Resources:**

Houghton Mifflin Reading Text Grade 6 - Theme 6 –*Persuasive Writing*, teacher samples and modeling.

**Summary Description:**

Students will choose a site based issue related to waste management and research two to three facts to include in the persuasive letter. Students will select their audiences; state a clear position on the issue in their letter or composition and send letters if appropriate.

**Responsible Individual(s):** All teachers on team

**Timeline:** 1-2 weeks

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**Lesson 6**

**Standards-based Learning objective(s):**

Writing poems using ABAB CDCD rhythm pattern

**Context-based Learning objective:**

Students will write poems using an ABAB CDCD pattern with a focus on waste reduction after hearing poems read aloud by teacher who emphasizes the pattern orally.

**Adopted Instructional Materials and Other Resources:**

Teacher poems, poetry examples from 6<sup>th</sup> grade Houghton Mifflin Reader - Theme *Poetry, What is Poetry* – pg. 119, *Child Rest* – pg. 132

**Summary Description:**

Students listen to various poems with ABAB CDCD pattern (see poems above) and then brainstorm words related to waste reduction. They connect the rhyming words and then write their own poems and recite them aloud to the class.

**Responsible individual(s):** All teachers on team.

**Timeline:** one to two days

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**Lesson 7**

**Standards-based Learning objective(s):**

Writing surveys with a command of Standard English conventions appropriate to grade five.

**Context-based Learning objective:**

Students will formulate survey questions pertaining to waste reduction content, write and conduct a fall and a spring school wide survey. Survey question suggestions come from San Mateo waste audit sample. (See end of lesson)

**Adopted Instructional Materials and Other Resources:**

San Mateo County waste audit, CIWMB waste audit questionnaire.

**Summary Description:**

Students will write and conduct a school wide survey on waste reduction behaviors of people on the school site. Those surveyed will include students (upper grades), teachers and staff. Results of the survey will be published in the school newsletter. Survey will be conducted again in March after waste audit and waste reduction lessons and activities have taken place. Students will compile the results of the surveys and share findings with the school. A display board of recyclable materials and photos from the waste audit will accompany the compilation of information gathered from the survey for public viewing. Students will include sample written survey answers on the display. Survey results will also be posted in the school newsletter, presented to the school PTO/PTA and to the School Site Council.

**Responsible individual(s):** Teachers and students

**Timeline:** One week.

Survey sample question (San Mateo Waste Audit).

- Are you familiar with the four “Rs”, Reduce, Reuse, Recycle and Recycled materials?

- Would you place an aluminum can in a recycling bin if it was located 5 – 10 feet away, or would you put it in the trash can, located just 1 –2 feet away?
  - If you are not recycling, why not?
  - If you do recycle, what items do you recycle?
  - How often do you recycle them?
  - Do you see double-sided copies on your campus often or not?
- 
- Do you make your own lunch? If you do make your own lunch, do you put your lunch in reusable containers?  
If not, what do you use to wrap your lunch items?
  - Do you know what a compost bin is?
  - Do you have a compost bin at home?
  - What is the best way to change peoples' behavior so that they recycle, reuse, reduce waste and buy recycled materials?

## MATH

### Lesson 8

#### **Standards-based Learning objective(s):**

Compute numbers demonstrating decimal and percent equivalents.

#### **Context-based Learning objective(s):**

Using numbers from waste audit collections, students will interpret percents as part of a hundred and find decimal equivalents to the percentages.

#### **Adopted Instructional Materials and Other Resources:**

Math texts (Harcourt Math, Chapter 18 *Relate Decimals and Percents pg. 318*)

#### **Summary Description:**

After performing the school waste audit, students will weight waste collected, dividing dry waste and wet waste, and will record amounts in pounds, decimal and percentage form

**Responsible individuals(s):** All teachers on team and Julie. Julie will purchase scales.

**Timeline:** 1 day

### Lesson 9

#### **Standards-based Learning objective(s):**

Understand and compute the volume and area of simple objects.

#### **Context-based Learning objective(s):**

Students will measure the volume of the school dumpster by applying the common measuring system for volume. (Harcourt Math – chapter 28 Hands On: Relate Perimeter and Area.

#### **Adopted Instructional Materials and Other Resources:**

Harcourt Math – 6<sup>th</sup> grade – *Surface Area and Volume – pg. 552*

**Summary Description:**

When completing the third phase of the waste audit, students will measure the volume of the school dumpster by applying the common measuring system. They will report the estimated volume of waste in the dumpster they observe for the week and then compute the month's total waste volume.

**Responsible individuals(s):** All teachers – consult with site custodian and principal.

**Timeline:** one day

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**Lesson 10****Standards Based Learning Objective(s):**

Students will use a letter to represent an unknown number, write and evaluate simple algebraic expressions in one variable by substitution.

**Context Based Learning Objective(s):**

Based on their findings from the audit materials, students will write an algebraic expression (story problem) with one variable.

**Adopted Instructional Materials and other Resources:**

Harcourt Math Text (Grade 5) Chapter 6 - *Write and Evaluate Expressions*

**Summary Descriptions:**

Students will complete waste audit and tally measurement totals from the audit. Based on models from written expressions from math text (Harcourt), the teacher and class will write expressions together using waste audit totals as the context for the expressions. Students will then write their own expressions for other students to operate and evaluate. Teacher's choice whether students write them in pairs or individually,

**Responsible Individuals:** All teachers

**Timeline:** One day

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**Lesson 11****Standards Based Learning Objective(s):**

Organize and display single-variable data in appropriate graphs and representations (histograms, circle graphs) and explain which types of graphs are appropriate for various data sets.

**Context Based Learning Objective(s):**

Students display, analyze, compare and interpret different data sets from results of the school wide waste audit for public viewing at school site.

**Adopted Instructional Materials and other Resources:**

Harcourt Math (grade 5) Analyze Data and Graphs (chapter 7)  
*Make a Graph & Analyze Graphs*

**Summary Descriptions:**

Students will collect and gather data from the waste audit and analyze various types of graphs to best communicate their findings, i.e., bar graphs, line graphs, pictographs, histograms, circle graphs. Upon deciding, students will create graphs to publicize their findings to the school.

**Responsible Individuals:** All teachers.

**Timeline:** 4 - 5 days

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**SOCIAL STUDIES**

**Lesson 12**

**Standards Based Learning Objective(s):**

Students explain how major events are related to one another in time – *Chronological and Spatial Thinking*.

**Context Based Learning Objective(s):**

After reading “Garbage Through the Ages” (*Project Learning Tree, Exploring Environmental Issues: Municipal Solid Waste*) students will explain the evolution of waste management from one period of time, and place, to the next time and place.

**Adopted Instructional Materials and other Resources:**

“Garbage Through the Ages” (*Project Learning Tree, Exploring Environmental Issues: Municipal Solid Waste*)

**Summary Descriptions:**

As a whole class students will read “Garbage Through the Ages” silently and then aloud with a partner. In groups of 2 – 4 students will paraphrase the history of waste management for their assigned time period (there are 6 periods). Illustrations of key events, people and places in the world will accompany the paraphrased histories. In chronological order, each group will present their paraphrased histories and illustrations. Props, skits, 3-D visuals are encouraged.

**Responsible Individuals:** All teachers on team

**Timeline:** One - two afternoons

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**Lesson 13**

**Standards Based Learning Objective(s):**

Students will develop a hypothesis based on findings from the school wide waste audit and work through the steps of the Investigation and Experimentation outlined in the 6<sup>th</sup> grade content standards with a few a few modifications:

- Develop a hypothesis.
- Select and use appropriate tools and technology
- Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.

- Communicate the steps and results from an investigation in written reports and oral presentations.
- Recognize whether evidence is consistent with a proposed explanation.
- Evaluate and summarize the conclusion of your observations and state whether or not your hypothesis was correct.

**Responsible Individuals:** All teachers on the team

**Timeline:** varies – depending on hypothesis

**Assessment Strategies for Campus Needs Assessment:**

- Pre and post assessments – based on classroom curriculum
- Surveys – habits of personnel, students, families (student written and administered)
- Teacher assessments, rubrics, students work, portfolios

**Collaborative Instructional Teams:**

Educators and school staff: Kristin Fairfield – Parkview School 4<sup>th</sup>/5<sup>th</sup> grade and principal Joanne Parsley, Pete Pembroke – Chico Country Day School 5<sup>th</sup> grade teacher, Julie A-Nilsson – Parkview School Grant Manager/Service Learning Coordinator, Chico Unified Purchasing Department Scott Jones and Melinda Edgecomb, buyer School custodians and cafeteria managers at each site, Food Services Supervisor – Joel Adema, principals at each site: Parkview – Joanne Parsley, Chico Country Day – Jeff Plotnick

**Coach:** Teachers and Julie

**Community Partners:** North Valley Waste Management, WTC, City of Chico, Chico Unified School District, CSU Chico, PTO/PTA, parents on site, CSUC recycling and composting sites.

**Additional support mechanisms:** Principals, CIWMB, SEER,

**Teaming considerations:** Timing and scheduling, grade span, departmentalizing, expectations

Timeline for Developing the Campus Needs Assessment:

**Planning:** July 2003 – October 31<sup>st</sup>, 2003

**Development:** SEER and CIWMB consultation, teacher lessons, gathering of sources

**Evaluation:** on-going, team reflection in January prior to finalizing for re-application

**Celebration:** Post waste-audit and spring 2004

**Team Leader(s):** Teachers and Julie

**Leadership Team:** See attached list

**School and district administrative support that the teams should engage:**

Superintendent and Assistant Superintendents, School Board and continual outreach to parents in the community.

**Community partners and stakeholders that the teams should engage:**

Parents, other waste management organizations, conservation groups

| <b>TASK</b>   | <b>Responsible Person(s)</b> | <b>Due Date</b> |
|---|------------------------------|-----------------|
| Complete design of CNA  | Teachers and Julie           | 10/30           |
| Implement CNA   | Teachers and Julie           | Aug. – Dec.     |
| Team reviews results of CAN   | “ “ “                        | 12/3/03         |
| and begins implementation planning  |                              | 1/28/04         |
| Submit 1 <sup>st</sup> draft of year 2 Implementation Plan to SEER for review | UES Grantees                 | 3/1/04          |
| Review and comment on Implementation Plan                                     | SEER                         | 3/21/04         |
| Final Year 2 Implementation Plan completed                                    | UES Grantees                 | 3/31/04         |
| Submit 2 year Implementation Plan for CIWMB approval                          | UES Grantees                 | 3/31/04         |
| CIWMB staff review Year 2 Implementation Plan                                 | CIWMB                        | 4/04            |
| CIWMB considers Phase Two funding   | CIWMB                        | 5/04            |
| Phase Two agreements sent to Grantees and returned to CIWMB                   | CIWMB staff & grantees       | 5/04            |

### **Performing a School Waste Audit**

The objective of our school waste audit is to introduce the idea to our students and staff that garbage doesn't just disappear once it is collected in your garbage can. You can't just *throw it away*. It can be compacted, buried, or changed to ash and vapor but the garbage must all go somewhere.

The audit below, based on a model from San Mateo County, will show students the procedures to determine the quantity of waste at their school site and introduce the categories in which waste can be classified such as waste that can be reduced, reused, recycled, composted, thrown away, donated, etc. Prior to this process, and from this process, students will engage in a variety of learning experiences across the curriculum.

**Prior to the Audit** Before the audit, teachers will define waste reduction to students, introducing them to the terminology related to waste reduction such as the four “R”s. Teachers will discuss with the students the various systems on campus and particularly systems for waste reduction. Teachers will also explain, in terms grade level appropriate, \*SB 373 and how public schools were not a part of that mandate but are now being asked to reduce waste by 2005. Through field trips to the local waste management facility, various guest speakers available for the classroom as well as informative literature and topic related books from school libraries and the Service Learning books on campus, students will gain an awareness and understanding of the systems involved in waste management on their school site and in their community.

Each of the school sites from our Leadership Team has its own Campus Needs Assessment due to the different grade levels involved with the grant. The three sites and

grade levels involved are: Hooker Oak school with 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> grades represented, Parkview School has 4<sup>th</sup> and 5<sup>th</sup> grades, and Chico Country Day has 5<sup>th</sup> grade only. Each campus has its separate systems, campus specific needs, and goals.

Each site collaborative team will meet to discuss the details, dates, and duties of all involved in the audit. Teachers in charge, with the help of collaborative partners, will gather the items needed: goggles, scale, tarps, containers, and will group students into

working teams for the audits. The collaborative team will communicate information to the student body and staff giving a brief explanation of the audit and the need for everyone to cooperate in depositing items into the correct containers the day of Audit A and to help out with waste collecting for Audit B. All classes are encouraged to observe the audit and learn from their peers about the process of auditing their school waste stream. Permissions slips are sent home and returned.

Students involved in the waste audit will also compile questions for a survey to be given to students, teachers and staff on campus prior to the audit and a post survey in March. (Suggestions for questions are in the Language Arts Lessons section). Students will tally answers to questions and work with the teacher on organizing the answers to the written questions. Students will write up their findings and report survey responses to the school and parents via the school newsletter and display boards in the hallway.

- (SB373) mandates that all California cities and counties must divert at least 50% of their solid waste from landfill disposal by the end of the year 2000).

### **Methods**

Audit A. Students conduct a one day audit of food service waste for one lunch period for the entire school

Audit B. Students collect waste from all classrooms and work spaces on campus for an entire day.

Audit C Students conduct a visual waste audit of the contents of the school dumpster.

\*Each American throws out about three to four pounds of waste per day. Each student produces about half a pound of waste per school day. All of this adds up to a problem because America's old landfills are filling up quickly and new safer landfills are very costly to construct (Source CIWMB, Closing the Loop A-46).

### **Material needed:**

#### **Waste audit A:**

- Labeled garbage cans or containers for each classroom or area. These will be used to sort two types of waste (wet waste and dry waste see table below)
- Plastic garbage bags for each of the containers
- Two washable plastic tarps
- Plastic gloves for each student
- Pens for labeling bags, containers
- Change of clothes and washable shoes to wear for the activity
- Parent/guardian permission slip
- Scale for weighing waste
- Camera – school camera or teacher's

### **Procedure for waste audits A:**

Teacher will describe duties of designated groups. Groups are:

1. **(Lunch Ambassadors)** students designated to direct correct depositing of waste in the appropriate container – wet/dry – during the lunch hour and are in charge of writing and posting lists in the cafeteria of wet/dry items (see below),
2. **The “Weighers”** - students to weigh waste and assist in communicating exact amounts.
3. **Tarp Distributors** - students to spread out dry waste on tarp afterward to check for correct categorization and observation and students to record
4. **Publicity** – Students will photograph during the audit – photos will be used for displays and science fair reports

Wet waste matter will not be spread out on tarps, just weighed and all students will complete the written audit and all will be involved in clean up. These groups, or a modification of these groups, will pertain to audits B and C as well. Below are the container codes to use to help sort dry/wet waste. Waste that can be stored for visual display later will be stored in the classroom and wet waste will be deposited in the dumpster after weighing.

### Wet Waste

Leftover lunch items, sandwiches, fruits, yogurt, cheese, chips, breads, soups, milk, contaminated paper trays or pizza boxes, used paper towels, napkins and tissues.

### Dry Waste

Candy wrappers, empty potato chip bags, bakery containers, all types of wrappers (such as candy, cookies), empty soda cans or water bottles, any type of paper, plastic (lunchable containers) wrap or packaging, catalogs, magazines, cardboard, and paperboard.

### Container Codes for all audits - A, B & C

- WW** - Wet waste sorting area
- MP** - Mixed paper
- NP** - Newspaper
- OW** - Other waste not classified
- PB** - Plastic Bottles # 1 & # 2
- PW** - Plastic wrap and misc. plastic # 3 - # 7
- AL / SC** - Aluminum can, steel cans
- OCC** - Cardboard

After the raw data is compiled, you can determine:

- How much waste is generated per year at your school
- The waste composition (what's in the waste stream)
- How much material is diverted through 3Rs approaches
- How and why the waste is generated
- How much more could be diverted through 3Rs approaches

**Materials needed for Waste audit B:**

- Labeled garbage cans for wet/dry waste
- Plastic garbage bags for each of the containers
- A scale for weighing the materials in pounds.
- Two washable plastic tarps for laying out waste
- Plastic gloves for each student
- Change of clothes and washable shoes for students (if requested)
- Parent/guardian permission slip

**Procedures for Waste audit B**

At the end of designated day, students will gather all waste from classrooms and office work areas on campus and distribute into appropriately labeled containers. After all waste is distributed into labeled containers, bags will be weighed and recorded on audit sheet – each student has an audit sheet for audit B. Students will display dry waste on tarp for photos and observation. Wet waste matter will not be spread out on tarps, just weighed. Students will refer to Butte County Recycling Directory from Butte County for clarification of recyclable and non-recyclable materials as needed, as well as any other reliable sources they have acquired.

**Materials needed for Waste Audit C:**

- Gloves for students
- Litter pick-up stick (Your school district maintenance staff may have this item)  
Parent/guardian permission slip

**Procedures for waste audit C:**

If sorting is not allowed at your site then conduct a visual waste audit of the materials found in the dumpster. Use the litter pick-up tool to break apart the bags and inspect what you find and fill out the table below. Decipher what is recyclable by site and what is not. Below are some helpful conversions:

**Estimating Weights**

| One Cubic yard                  | Est. wt. (in lbs.) |
|---------------------------------|--------------------|
| Whole bottles                   | 500-700            |
| Aluminum cans                   | 50-70              |
| Aluminum cans (crushed by hand) | 250-430            |

|                                   |         |
|-----------------------------------|---------|
| Steel cans                        | 150     |
| Steel cans flattened              | 850     |
| PET (soda bottles)                | 30 - 40 |
| Newspaper (not compacted)         | 360-505 |
| Mixed paper (flat- not compacted) | 380     |

### **After the Audit**

After the waste audits are completed, students will gather, organize, and compute data, which will involve applying grade level standards from various areas of the curriculum. (Lessons explain) Students will report findings on the results of the audit to the school within two weeks. Results of the waste audits will be presented in an organized, visual fashion utilizing graphs and written explanations appropriately. Students will also work through the investigative process of a scientific study based on a hypothesis or question formed prior to the audit – appropriate to grade level science standards. During the two to three months following the audit, students will complete their investigation and demonstrate their findings at the annual school science fair in February. In addition to integrating math and science standards, students will write letters, compositions, poetry and persuasive compositions on the subject of waste reduction and other related topics. Students will follow up with a spring (March) post survey to learn about what changes in knowledge of waste management and behavior in waste reduction took place from students, staff and teachers on campus. From these survey results, students will again compile data and present their findings to the school.

**Waste audit Permission Slip**

Dear Parent(s),

On (date/s) \_\_\_\_\_ our class will be participating in a study of waste generated by the school. This will involve the handling of school garbage from the classroom, the cafeteria and the school dumpster. Students will be provided with gloves and goggles, we will coach them in safety procedures, and every precaution will be taken to ensure you child's safety. A faculty member will be present. Students will be sorting, weighing and analyzing our school's waste stream to gather baseline information for a school wide project. We need your permission for your child to participate in this activity. If this meets your approval, please sign the statement below.

If you have any questions please contact \_\_\_\_\_ at school.

My child, \_\_\_\_\_ has my permission to participate in the school waste audit to be conducted at school.

Parent signature: \_\_\_\_\_ Date: \_\_\_\_\_