School Recycling Club SHIP

(Supporting Home Instruction Program)

Lesson Plan 9

Grade Level:	7-8
Lesson:	III.A.1.—How Can We Reduce Waste? Changing Habits and Designs—Packaging Design
Source:	*3 R's of the Common Core*
Activity/Craft:	8 DIY Ideas to Use Old Calendars (https://www.youtube.com/watch?v=_pbTpHds3q8)
Video Link:	Eco-Friendly Packaging (https://www.youtube.com/watch?v=FQNe-wjHSJw)
Video Link 2:	10 Eco-Friendly Packaging Ideas (https://www.youtube.com/watch?v=Dy4aTT4Bnnk)

Lesson Matrix Grades 7-8
3R's of the Common Core

Lesson	Leading Question	Objective	Common Core Alignments		Skills
7-8 **Throwing It All Away** **I.A.1**	What do you know about the solid waste we produce?	• Understand the sources, content and magnitude of the solid waste problem	**Grade 7** CCRI.7.1 CC.W.7.7 CC.SL.7.1 CC.7.RP.3	**Grade 8** CC.RI.8.1 CC.W.8.7 CC.SL.8.1	• Communicating • Comparing multiple solutions • Sharing research and writing • Applying mathematical concepts
7-8 **School Trash Analysis** **I.A.2**	What are all the things we throw away?	• Analyze waste producing habits in order to begin changing them	**Grade 7** CC.SL.7.4 CC.W.7.4 CC.7.SP.1	**Grade 8** CC.SL.8.4 CC.W.8.4 CC.8.SP.1	• Analyzing • Applying mathematical concepts • Investigating
7-8 **Potato Cakes** **I.A.3**	Could we save energy and other natural resources by choosing one product or packaging over another?	• Examine the complexities of food processing and packaging	**Grade 7** CC.RI.7.4 CC.SL.7.4 CC.W.7.4 CC.7.EE.3 CC.7.RP.1	**Grade 8** CC.RI.8.4 CC.SL.8.4 CC.W.8.4	• Applying ideas to solve problems • Collaborating • Researching • Using mathematical and computational thinking
7-8 **Resource Protection Game** **I.B.1**	How do our activities impact on our environment?	• Identify the ecological impacts of some of the solid waste management practices on natural resources	**Grade 7** CC.RI.7.4 CC.SL.7.1 CC.W.7.7	**Grade 8** CC.RI.8.4 CC.SL.8.1 CC.W.8.7	• Collaborating • Gathering information • Problem solving
7-8 **Trash Timeline** **I.C.1**	What can the waste we produce tell us about ourselves?	• Examine and classify various forms of evidence in the study of current trash and that of a past culture	**Grade 7** CC.RI.7.8 CC.SL.7.4 CC.W.7.6	**Grade 8** CC.RI.8.8 CC.SL.8.4 CC.W.8.6	• Analyzing • Collaborating • Sharing research and writing
7-8 **Art Reflecting the Environment** **I.C.2**	Why do people create art? What is the difference between "art" and "waste"?	• Understand the visual artist as a recorder of history and ideas • Identify society's impact on artistic expression • Identify potential ways artistic expression can impact society	**Grade 7** CC.RI.7.1 CC.SL.7.5 CC.W.7.6	**Grade 8** CC.RI.8.1 CC.SL.8.5 CC.W.8.6	• Analyzing • Applying ideas to solve problems • Questioning • Sharing research and writing
7-8 **Waste Walk** **II.A.1**	What is litter?	• Document and categorize litter in their neighborhood • Explore ways to get people to stop littering	**Grade 7** CC.RI.7.4 CC.W.7.2 CC.7.SP.1	**Grade 8** CC.RI.8.4 CC.W.8.2 CC.8.SP.1	• Applying mathematical concepts • Collecting data • Interviewing • Problem solving

Lesson	Leading Question	Objective	Common Core Alignments		Skills
7-8 **Recovering Recyclables** **II.A.2**	How can mixed trash be separated for recycling?	• Devise materials recovery systems for recovering recyclables from the waste stream	**Grade 7** CC.RI.7.1 CC.SL.7.4 CC.W.7.4	**Grade 8** CC.RI.8.1 CC.SL.8.4 CC.W.8.4	• Applying ideas to solve problems • Comparing multiple solutions • Developing models
7-8 **Trash Haulers** **II.A.3**	How much does waste disposal cost?	• Investigate the efficiency and costs of solid waste collection • Assess advantages/disadvantages of operating a recycling business and/or a curbside recycling program	**Grade 7** CC.SL.7.1 CC.W.7.4 CC.7.NS.3	**Grade 8** CC.SL.8.1 CC.W.8.4 CC.8.SP.1	• Gathering information • Interviewing • Sharing research and writing • Using mathematical and computational thinking
7-8 **Mini-Landfills** **II.B.1**	What are some of the possible hazards that might result from an improperly designed landfill?	• Learn how a sanitary landfill is made and operates • Understand some of the associated pollution problems	**Grade 7** CC.RST.6-8.3 CC.SL.7.4 CC.WHST.6-8.7 CC.7.G.6	**Grade 8** CC.RST.6-8.3 CC.SL.8.4 CC.WHST.6-8.7 CC.8.G.9	• Applying mathematical concepts • Developing models • Observing • Providing evidence
7-8 **Landfill Soil** **II.B.2**	Why is it important to test the soils of a potential landfill site?	• Determine the importance of soil studies prior to the siting of landfills	**Grade 7** CC.SL.7.1 CC.W.7.4 CC.W.7.7 CC.7.RP.3	**Grade 8** CC.SL.8.1 CC.W.8.4 CC.W.8.7 CC.8.F.5	• Carrying out investigations • Developing models • Observing • Sharing research and writing • Using mathematical and computational thinking
7-8 **Burning Waste: Then and Now** **II.B.3**	Why do we burn trash?	• Research the historical perspective of burning solid waste • Examine the reasons for these changes over the decades	**Grade 7** CC.RI.7.1 CC.SL.7.4 CC.W.7.4	**Grade 8** CC.RI.8.7 CC.SL.8.1 CC.W.8.6	• Sharing research and writing • Analyzing • Comparing multiple solutions • Collaborating
7-8 **Packaging Design** **III.A.1**	How could packaging be designed to waste less?	• Explore parameters of packaging design • Use guidelines in their own design project	**Grade 7** CC.RST.6-8.8 CC.SL.7.4 CC.WHST.6-8.7 CC.7.G.6	**Grade 8** CC.RST.6-8.8 CC.SL.8.5 CC.WHST.6-8.6 CC.8.G.9	• Applying ideas to solve problems • Designing • Researching • Using mathematics

Lesson Matrix Grade 7-8

3R's of the Common Core

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Lesson	Leading Question	Objective	Common Core Alignments		Skills
7-8 Source Separating III.B.1	What is the best way to sort and store our recyclables?	• Investigate current containers and make proposals • Design containers for the easy and efficient source separation of recyclables, as needed	**Grade 7** CC.RST.6-8.2 CC.SL.7.4 CC.WHST.6-8.4 CC.7.G.6	**Grade 8** CC.RST.6-8.2 CC.SL.8.4 CC.WHST.6-8.4 CC.8.G.9	• Applying mathematical concepts • Collaborating • Developing models • Problem solving
7-8 Graphing Recyclables III.B.2	Do recycling businesses pay us for the materials we collect?	• Examine how fluctuating markets and different offered prices affect the fate of recycling	**Grade 7** CC.SL.7.1 CC.WHST.6-8.4 CC.WHST.6-8.7 CC.7.SP.7	**Grade 8** CC.SL.8.1 CC.WHST.6-8.6 CC.WHST.6-8.7 CC.8.SP.4	• Communicating • Evaluating • Graphing data • Investigating
7-8 Destination Recycle III.B.3	When you recycle where does it all go? What does it become?	• Identify the destination and fate of their states recyclables	**Grade 7** CC.RST.6-8.2 CC.SL.7.1 CC.WHST.6-8.4	**Grade 8** CC.RST.6-8.2 CC.SL.8.4 CC.WHST.6-8.7	• Gathering information • Interviewing • Problem solving • Sharing research and writing
7-8 Making Good Compost III.C.1	What are the essential ingredients for a successful compost?	• Conduct experiments testing the effects of too little water, nutrients, air, and imbalance of material on producing successful compost • Learn the basic principles necessary to construct a good compost pile	**Grade 7** CC.RST.6-8.3 CC.SL.7.4 CC.WHST.6-8.4	**Grade 8** CC.RST.6-8.3 CC.SL.8.5 CC.WHST.6-8.6	• Collaborating • Collecting data • Communicating information • Synthesizing

How Can We Redesign Things to Waste Less?

Concept
Packaging is useful and necessary for many reasons, but also contributes significantly to our society's solid waste problems.

Objective
Students will explore parameters of packaging design and will use these guidelines in their own design project.

Method
Students will design environmentally sound packaging.

Materials
Magazines, drawing materials, computer access

Subjects
Art, Social Studies, Home, Economics, Industrial Arts

Skills
Applying ideas to solve problems, designing, researching, using mathematics

Time
Two or more class periods

Vocabulary
Design, parameters, packaging, prototypes

Resources
Packaging World; Packaging Digest

3R's of the Common Core
Parallel Activities
K-3, Too Much Packaging
K-3, Egg Cartons
4-6, The Story of …
4-6, Pondering Packaging
9-12, Packaging Preferences
9-12, Cart Before the Horse
Information
Packaging; Public Planning and Policy; Redesign and Reuse
Resources
Environmental Justice, Advocacy and Policy
Solid Waste and Recycling
Waste Management Agencies by State

Background

Functions and Benefits of Packaging:
- Preservation and protection of contents
- Sanitation and safety, protection of public health
- Identification of product
- Prevention of theft
- Providing instruction as to product use
- Compliance with regulatory standards
- Manufacturing of packaging provides employment
- Increase sales and profits by making the product attractive
- May decrease cost of product to consumer

Drawbacks of Packaging:
- Contributes significantly to solid waste
- Without reuse or recycling, wastes the energy and natural resources that go into packaging
- Contributes significantly to litter
- May create false impressions about the amount or quality of products
- May increase the cost of a product to the consumer

Leading Question
How could packaging be designed to waste less?

Procedure
1. Have students look through magazines for about ten minutes and cut out pictures of packaged products.
2. Have students choose one of the products for which they would like to design an alternative packaging. After selecting the item they want to design alternative packaging for; the student can go to the products site to obtain any information on the product and its packaging. Students should also research information on alternative packaging that may help them with their own designs.
3. Ask the students to look at their product and decide what the designer was trying to accomplish. Discuss the functions and drawbacks of packaging. Are any of the products designed to protect the environment? Using the notes they have taken on the product, packaging and alternatives and the discussion questions students will assess their product.

Common Core Alignments

GRADE 7

CC.RST.6-8.8
Reading in Science & Technical Subjects:
Integration of Knowledge & Ideas

CC.SL.7.4
Speaking & Listening:
Presentation of Knowledge & Ideas

CC.WHST.6-8.7
Writing in History/Social Studies,
Science & Technical Subjects:
Research to Build & Present Knowledge

CC.7.G.6
Mathematics:
Geometry

GRADE 8

CC.RST.6-8.8
Reading in Science & Technical Subjects:
Integration of Knowledge & Ideas

CC.SL.8.5
Speaking & Listening:
Presentation of Knowledge & Ideas

CC.WHST.6-8.6
Writing in History/Social Studies,
Science & Technical Subjects:
Production & Distribution of Writing

CC.8.G.9
Mathematics:
Geometry

4. Have the students design a new environmentally-sound alternative to their packaging. The designs should include considerations of waste reduction, reuse and recycling as well as public safety, product protection, shipping weight, cost of packaging material, advertising and public demand. New design parameters should include some or all of the following: minimum resource extraction, minimum use of energy in processing, minimum transportation, selection of reusable or recyclable resources, design for reusability and recyclability, use of non-hazardous materials, etc. How do these new parameters conflict with or limit old ones?
5. Students will share their written report on their design with the class. The report should explain how design decisions were made and show research to help support their new design. The report will include drawings of prototypes and/or a sample to view.

Classroom Activities

A. Make models of new package.

B. Have students write to and send their designs and/or prototypes to packaging manufacturers as suggestions for improvement in packaging design.

C. Analyze a variety of products, measuring the actual amount of the product compared to the size and shape of the product's package.

D. Invite representatives from the grocery business and the packaging industry to class to discuss packaging. Invite an industrial designer to class to discuss packaging design.

E. Research the regulatory standards packagers and retail outlets are required to meet. Who sets these standards? What is required? Why is safety a concern today?

F. Discuss the pros and cons of new types of packaging, such as brick packs and plastic cans. Divide students into small groups which will build cylinders and rectangular prisms containing exactly one pint. If filling a cardboard carton for shipping, which solid would fit more compactly?

G. Have students complete the attached How Do You Stack Up worksheet.

How Do You Stack Up?

The things you do or don't do every day can make a difference in the amount of garbage you produce! Here's your chance to stop and consider just what your contribution is. Take a few minutes to complete this checklist.

Then find your total by adding the numbers you circled in each column.
The back of this sheet will tell you how you stack up.

Do You...	**Never**	**Sometimes**	**Often**
Take advantage of opportunity to recycle in your area?	3	2	1
Shop at garage sales and second-hand stores?	3	2	1
Try not to use disposable products when longer-lasting alternatives are available?	3	2	1
Use sponges and dishcloths rather than items that can be used only once?	3	2	1
Compost yard debris, kitchen waste and other organic matter?	3	2	1
Think about what happens to a product or package when you're finished with it?	3	2	1
Try to reuse things instead of disposing and buying new ones?	3	2	1
Consider whether you really need something before you buy It?	3	2	1
Consider whether pollution/wastes were caused by manufacturing the item you buy?	3	2	1
Avoid products with built-in obsolescence?	3	2	1
Express concern about the need to produce less wasteful products by writing product manufacturers or your legislator?	3	2	1
Ask that the least amount of paper and plastic wrapping be used for your order in fast-food restaurants?	3	2	1
Talk to store managers about stocking products in bulk or avoiding unnecessary packaging?	3	2	1
Make a habit of reading labels and consumer information articles to learn about the quality and durability of products you buy?	3	2	1
TOTALS			
GRAND TOTAL *(Add 3 Columns)*			

How Do You Stack Up?

SCORE SHEET

Your GRAND TOTAL ☐

If Your Score Was ...

40 or more

You're contributing a great deal of trash to our rapidly filling landfills, including thousands of tons of reusable, recoverable materials which are thrown away each year!

What you can do!

- Become more aware of the amount of trash you throw out every day. What could be reused, recycled or avoided completely?
- Next time you go to the store, see if products you usually buy in non-recyclable containers are also available in returnable, refillable or recyclable containers.
- Call your local government, garbage collector or recycler for information on how, when and where to recycle.

Between 21 & 39

Pretty good! It's obvious you're doing some reusing, recycling and reducing of the amount of trash you throw out. These habits need to be practiced consistently by all if we're to reduce the increasing quantity of waste produced in the United States.

What you can do!

- Look at various types of packaging and the available alternatives. Does it cost you more or less to buy reusable or recyclable packages?
- Reuse plastic sacks; bring your own grocery bags to the supermarket.
- Look around your home for more items to recycle and phone your local government, garbage collector or recycler for information.

20 or less

Congratulations! It's clear you've done some serious thinking about the need for waste reduction and recycling. You're helping ensure that future generations enjoy natural resources, pristine beauty and better quality of life. You're also providing jobs for the many people working in industries that use recycled materials to make new products.

What you can do!

- Encourage one other person to recycle. You set a good example!
- Write letters, attend meetings. Get involved in solid waste management in your community.
- Give yourself a pat on the back and keep up the good work!

Less is better when it comes to garbage and energy consumption.