

Lesson 4: Life Cycles of Aluminum & Paper

Grade Level:
6-8

Concepts Taught:

Sequencing, recycling, life cycles, creative writing

Activity Time(s):

30 minutes (lesson), 2-4 class periods (follow-up)

Essential Questions:

- How is a soda can made into a new one?
- How long does it take for a can to reach the grocery store shelf?

N.C. CORE/Essential Standards:

Grade 6: ELA Standard for Informational Text 1,3,4,7,9,10; Writing Standards 1,2,7,8,9; Technology Standards 6.TT.1, 6.RP.1, 6.SE.1; Soc Studies 6.G.1.2, 6.E.1, 6.E.1.2

Grade 7: ELA Standard for Informational Text 1,4,7,9; Writing Standards 2,3,4,6,7,8,9; Soc Studies 7.G.1

Grade 8: ELA Standard for Informational Text 1,3,4,9; Writing Standards 2,3,4,6,7,8,9; Soc Studies 8.G.1.1

Materials:

Information about aluminum life cycles (use NEED books "Talking Trash" and "Museum of Solid Waste & Energy") see [NEED pgs 15](#) and [page 31 of Museum of Solid Waste Book](#).
Creative aluminum story (included)
Grading rubric (included)

Objectives:

- Students will learn the processes involved in production and recycling of aluminum cans.
- Using an sample model story , students will write a creative story describing the life cycle of a piece of paper.

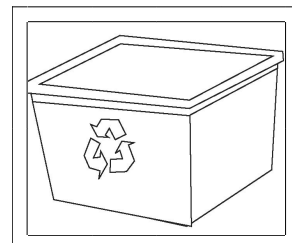
Procedure:

1. Review the three-arrow symbol and three-step process with students (*see background section*). Remind them that they will follow a certain procedure to recycle paper, plastic, and aluminum at their school.

Additional background material can be found from the National Energy Education Development (NEED) Project [The Museum of Solid Waste and Energy](#) book.

2. **Ask students what life cycles they have studied in school** (butterfly, humans, etc.). **Ask what a cycle means** (that the process continues over and over). Explain that the objects that we will recycle at school each have their own life cycle. Using the information from the NEED book, go through the life cycle of an aluminum can:

- *We start at the ore where aluminum is mined. The aluminum is still mixed with other elements, so it is sent to a plant.*
- *At the plant, the aluminum is dissolved into a liquid salt.*
- *Then an electric current separates the aluminum from other elements. The aluminum sinks to the bottom. The electric current requires an enormous amount of energy*
- *Next the aluminum is likely to be sent to another factory where it is melted and formed into cans.*
- *The cans are sent to another factory where they are filled with liquid.*
- *The can is now shipped to a store to be sold. Once the can is sold, someone uses the liquid inside. (The amount of time from beginning to end-user is approximately 60 days).*
- *Assuming the consumer is a responsible recycler, the can is placed in a recycling bin. After the*



Feed the Bin

materials in the bin are collected, a truck picks up the material and takes it to a MRF (Materials Recovery Facility) to be sorted.

◦ *The cans are sorted and taken to a recycling plant. The aluminum is then shredded and melted and formed into a mold called an ingot (information taken from [NEED book, page 27](#)).*

◦ *The aluminum is then perhaps re-formed into a can and the cycle begins again. Note that the cycle does not include mining the ore & separating the aluminum from other elements. This only has to be completed once.*

3. Explain to students that this life cycle can be used to write a creative story about a can. Read aloud the included aluminum story or another you have created. Ask students to pay attention to how each part of the life cycle is used in the story. This will serve as a model of the story they will write independently.

4. Students will use the information provided from the [NEED book, pages 30-33](#) (suggest that students use other pages from the NEED book for background information) to write a creative life story of a piece of paper, starting from a tree.

5. Have students complete a draft form for comments and then a final version. Their creative writing can be graded using the rubric. Use the aluminum can story as a model.

6. Students can create their own recycling character to go along with the life cycle story using recycled materials. "Paper Guys" can be displayed alongside the stories.

Extensions/Modifications:

Integrate technology use by having students create a recycling info fact card (similar to a baseball card) using this interactive website:

http://www.readwritethink.org/files/resources/interactives/trading_cards/

Feed the Bin

My Story: Alum, the Aluminum Can

Hi, my name is Alum. I am an aluminum can and have had a long and exciting life. It all started so long ago, I cannot even remember the exact date. I just remember being pressed tighter and tighter inside of this rock. I was happy to be there, it was safe & cozy and I had my whole family near by.

One day, there was a huge explosion. I was cracked apart. Then, these men came with hammers and ripped me out of my cozy home. They took me away to a plant. Once I was at the plant they put me into a big pot. They made it very hot and dissolved me into a liquid.

Next they ran a huge electric current through me. Wow – it used so much energy! I sunk to the bottom of the liquid, and the oxygen & other elements that had been with me went to the top.

They took me and sent me to another factory. I had to say goodbye to the other elements, because they did not come with me. They got me hot again, melted me, and made me into a flat sheet. Then they made me into something that is called a “can”. This is something that humans used to store liquid.

I then was sent to another factory – this one was called Pepsi. They painted me with neat colors and then filled me up with a sweet and fizzy liquid. Then someone put me in a truck where I rode for a while.

Remember how they made me so hot before? Well, now they made me very cold. I was put in a refrigerator in something called a vending machine. Next thing I knew, I was being bumped all around and came out of a slot. A kid’s hand reached out and grabbed me.

He opened me up, turned me upside down, and emptied me out inside of him! The kid seemed really happy to see me. But then I got scared. I thought, “What if this is the end? Maybe this will be all I ever do.”

Boy, was I wrong! This kid threw me in a special bin that only had other aluminum cans & plastic bottles in it. I even ran into my cousin, Inum, in there! He told me that everything would be okay. Next, someone lifted us out of the bin. I was glad that I could see out since the bag we were in was made of clear plastic. They took us outside.

That afternoon, a truck came. Someone emptied us into the back of the truck with a bunch of other aluminum cans and plastic bottles. The truck drove for about 30 minutes and then brought us to something they called a MRF. The plastic bottle next to me, Dottie Bottle, told me that MRF stood for “Materials Recovery Facility.” I didn’t get to see Dottie again because we were separated – all of the cans were put into one pile.

Then they took all of us aluminum cans to another factory. We were shredded up (Don’t worry, it didn’t hurt me. I don’t have any nerve endings.) and melted. They poured us into these molds, almost like you pour batter into a cake pan. We got hard. Then they melted us again and made us into aluminum sheets by flattening us.

Now here is the wildest part. Guess what they made me into next? Another can! This time I went to something called a grocery store. Someone drank the liquid inside of me, put me in a recycling bin, and then the whole process of being made into a can started over again.

I love being made into a can over and over again. I have gotten to see so many different parts of the world this way. Some cans tell me that I am lucky. There are ghost stories about cans who get put into something called the trash. They don’t get made into a can again. Instead they get buried in the ground with a bunch of other things. I just hope this never happens to me. I love being used over and over and meeting new people!

Well, that is my life story. You now know all about Alum, the aluminum can. Who knows, maybe I’ll meet you the next time you buy something in an aluminum can. Please, just make sure to remember to recycle me so I can keep going!

Creative Writing: Life Cycle of Paper

CATEGORY	4	3	2	1
Writing Process	Student devotes a lot of time and effort to the writing process (prewriting, drafting, reviewing, and editing).	Student devotes sufficient time and effort to the writing process (prewriting, drafting, reviewing, and editing)..	Student devotes some time and effort to the writing process but was not very thorough.	Student devotes little time and effort to the writing process.
Neatness	The final draft of the story is readable, clean, neat and attractive. It is free of erasures and crossed-out words.	The final draft of the story is readable, neat and attractive. It may have one or two erasures, but they are not distracting.	The final draft of the story is readable and some of the pages are attractive.	The final draft is not neat or attractive.
Organization	The story is very well organized. One idea or scene follows another in a logical sequence with clear transitions.	The story is pretty well organized. One idea or scene may seem out of place. Clear transitions are used.	The story is a little hard to follow. The transitions are sometimes not clear.	Ideas and scenes seem to be randomly arranged.
Spelling and Punctuation	There are no spelling or punctuation errors in the final draft. Character and place names that the author invented are spelled consistently throughout.	There is one spelling or punctuation error in the final draft.	There are 2-3 spelling and punctuation errors in the final draft.	The final draft has more than 3 spelling and punctuation errors.
Accuracy of Facts	All facts presented in the story are accurate.	Almost all facts presented in the story are accurate.	Most facts presented in the story are accurate (at least 70%).	There are several factual errors in the story.
Creativity	The story contains many creative details and/or descriptions that contribute to the reader's enjoyment. The author has really used his imagination.	The story contains a few creative details and/or descriptions that contribute to the reader's enjoyment. The author has used his imagination.	The story contains a few creative details and/or descriptions, but they distract from the story. The author has tried to use his imagination.	There is little evidence of creativity in the story. The author does not seem to have used much imagination.
Requirements	All of the written requirements (# of pages, # of graphics, type of graphics, etc.) were met.	Almost all (about 90%) of the written requirements were met.	Most (about 75%) of the written requirements were met, but several were not.	Many requirements were not met.