

PAPER GROWS TREES

Dear Educator,

Research tells us that reading printed books is still the best way to build reading skills, concentration, and the ability to retain information. But many people mistakenly believe that computers and mobile devices are better for the environment.

The truth is that electronics have a much larger carbon footprint than many of us realize, and that paper is surprisingly eco-friendly. Supporting the environment and economy for the future requires that current consumers, and the next generation, are savvy enough to sift through the myths about paper products, and make paper recycling a regular habit.

To engage your class in learning about the importance of reducing our waste and making more sustainable choices, Boise Paper brings you this program on paper products and the environment. The standards-based materials enclosed include lessons in critical thinking, research, and math to help students learn to make better choices for the future.

Please share this program with other teachers in your school science, math, and library departments. Although the materials are protected by copyright, you may make as many copies as you need for educational purposes.

Sincerely,
Your Friends at Boise Paper

Target Audience

Elementary and middle-level students in grades 4-6 and their families

Objectives

- To teach students about renewable resources and their life cycles
- To illustrate how well-managed forests help protect ecosystems and support rural communities
- To show families how the paper industry works to be sustainable
- To encourage families to support the Earth by recycling and reducing waste

Program Components

- This one-page teacher's guide
- Three reproducible student activity sheets
- A reproducible letter for parents/caregivers

How To Use This Program

Distribute copies of the activity sheets to students to complete in the classroom. Have them take the Activity 3 sheet and copies of the downloaded parent letter home as well, so parents can help them compile their recycling statistics.

Activity 1

Sustainability Smarts

Begin the program with this quiz designed to help build critical thinking and research skills as it tests students' existing knowledge about paper and highlights some of the ways that the paper industry protects the environment. Answers to the quiz and references are printed on the bottom of the page, so that students can continue their research. They will need access to the Internet, either in the classroom or at home, to complete this part of the activity. Once students have had time to complete their research, review the additional facts they've gathered as a class.

Activity 2

Complete the Circle

Life cycles of matter are an important topic for middle-level science, and this activity will align that standard with the product life cycle of paper and cardboard. First lead your students in an extended discussion of renewable and non-renewable resources, and ask them to consider why renewable resources are a better environmental choice. Before they begin Part B, prompt students to think about their recycling habits. For example, where does their family keep the recycling bin? In the kitchen, the garage? Ask them to think about the products they use in other rooms – would they be more likely to recycle a cosmetic box if there were a dedicated bin in the bathroom? **Answers:** A-4, B-3, C-6, D-1, E-7, F-2, G-5, H-8

Activity 3

Recycling By the Numbers

Students will use math and graphing skills to gain a visual understanding of their family's recycling and waste practices. This may need to be completed as a class, depending on the grade level. Once classes have completed Part A, divide them into groups to complete the bar

and pie graphs. Follow up with a discussion about the results, including whether anything surprised them. Then, as a class, talk about reasons why people might neglect to recycle and have students compile some data points and create slogans to help persuade them to participate. Then, assign them to complete the Spread the Word project at home.

Follow-up Activities

- **STEAM Challenge!** Challenge your students' creativity and engineering skills by having them design and build a tool, Halloween costume, or another object using only (or primarily) recycled paper and cardboard. Use these ideas to get started:
 - https://www.educationworld.com/a_lesson/03/lp308-01.shtml
 - <https://recyclenation.com/2015/05/surprising-innovative-items-made-from-recycled-paper/>
- **Ecology of Managed Forests:** Lead students in understanding what is meant by "properly managed forests" by having them watch videos like this one: <https://www.youtube.com/watch?v=GbVK02P9xCo>. Lead a discussion about what makes a forest healthy and/or what it's like to work as a forester, as well as the benefits of managed forests in protecting watersheds and providing animal habitats. Helpful web sites include <https://www.fs.fed.us/managing-land/natural-resources> and <https://www.forestfoundation.org/providing-clean-water>.

Resources

- Boise Paper: BoisePaper.com
- Paper and Packaging Board: www.howlifeunfolds.com
- American Forest and Paper Association: afandpa.org/sustainability and paperrecycles.org
- Two Sides North America: www.twosidesna.org
- North American Forest Partnership: [https://forestproud.org](http://forestproud.org)



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Paper & Packaging

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SUSTAINABILITY SMARTS

Did you know that paper is one of the most recycled materials in the world? And that using paper actually helps to support wildlife habitats and watersheds? If you're like many people, you may have been told to "save a tree" by not printing out digital content. But printing on paper or shipping in a cardboard box is often the *more* eco-friendly choice for forests.

Test your sustainability smarts by answering True (T) or False (F) for each of the following questions. **But first, fold back the bottom of the page so you can't see the answers.**

- ___ 1. Paper production has a large carbon footprint.
- ___ 2. Most of the paper consumed in the U.S. is recycled.
- ___ 3. There are very few uses for recycled paper products.
- ___ 4. Reading e-books, doing homework on a computer and sending emails has no environmental impact.
- ___ 5. The paper industry has contributed to the growth of our nation's forests.
- ___ 6. The paper industry is important for the economy.
- ___ 7. Recycling uses less energy than making new paper.
- ___ 8. We could make all the paper we need using recycled fibers.
- ___ 9. Water used by the paper industry is returned to streams cleaner than it was before.
- ___ 10. There are 37% more trees in the U.S. today than there were on the first Earth Day celebration in 1970.

Now read the answers below to learn more about each of the quiz questions. Then, choose one topic and research it further using the listed online resources. Write down two facts you discover to share with your class:

1. _____
2. _____

Paper and cardboard are sustainable!
Learn more at www.twosidesna.org

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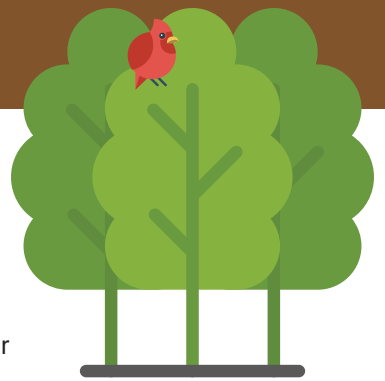
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Pop Quiz Answers:

1. **False.** With only 1% of the world's greenhouse gas emissions, the paper industry is one of the lowest industrial emitters. And paper industry members reduced their footprint by 23.2% from 2005-2018, while also reducing water waste.¹
2. **True.** In 2018, the U.S. recycled 68.1% of paper products used. The industry goal is to recover 70% annually by 2020. By contrast, 91% of plastic is not recycled.²
3. **False.** More than 5,000 products can be made from recycled paper.³
4. **False.** Emails alone generate about 107 million metric tons of CO₂ each year – about the same amount as 23 million cars – and that doesn't even include the power used to charge your computers, tablets, and/or mobile devices.⁴
5. **True.** The number of trees in the U.S. has increased by 20% since 1970, and U.S. forests grow more wood each year than is harvested. The income landowners receive for trees grown on their land encourages them to maintain, sustainably manage, and renew this valuable resource.⁵
6. **True.** Companies in the U.S. paper industry employ approximately 950,000 people. In 45 states, they are among the top 10 providers of manufacturing jobs.⁶
7. **True.** Using old paper and cardboard to make new products uses 40% less energy and creates 35% less water pollution.⁷
8. **False.** Recovered paper accounts for about 40% of fiber used to make new products, but we'd run out in about 6 months if we didn't also use new wood.⁸
9. **True.** Water is reused and recycled at least 10 times throughout the paper manufacturing process.⁹
10. **True.** Additionally, total forest area grew by 13 million acres from 2007 to 2017.¹⁰

¹ https://guidehouse.com/-/media/www/site/downloads/energy/2019/asn_navigant_emissionsflowchart.pdf and <https://sustainability.afandpa.org/3-pillars/environmental/>
² <https://paperrecycles.org/media/news/2019/05/08/u.s.-paper-recovery-for-recycling-rate-reaches-record-68.1-percent-in-2018> and <https://news.nationalgeographic.com/2017/07/plastic-produced-recycling-waste-ocean-trash-debris-environment/>
³ <https://archive.epa.gov/wastes/conserve/materials/paper/web/html/faqs.html>
⁴ <https://twosidesna.org/e-media-also-has-environmental-impacts/>

⁵ https://www.fs.fed.us/research/publications/gtr/gtr_wo97.pdf
⁶ <https://afandpa.org/our-industry/fun-facts>
⁷ <https://www.mpcprinting.com/post/2015/05/11/paper-recycling-an-environmental-success-story>
⁸ <https://twosidesna.org/recycled-fiber-and-wood-fiber-from-well-managed-forests-are-both-essential-to-sustain-the-paper-life-cycle/>
⁹ https://afandpa.org/docs/default-source/sust-toolkit/af-amp-pa-2016-sustainability-report_final.pdf?sfvrsn=2
¹⁰ https://www.fs.fed.us/research/publications/gtr/gtr_wo97.pdf

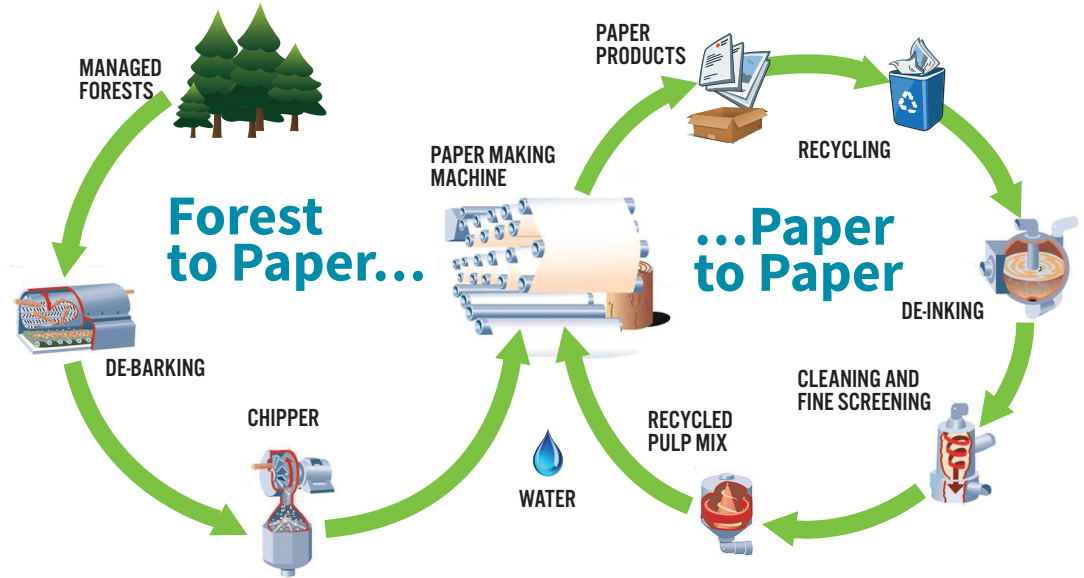


COMPLETE THE CIRCLE

Part A. The Life Cycle of Paper

Some of the resources we use every day are renewable, meaning that they are naturally restored or replenished. Some are non-renewable; once they are taken from the Earth, they won't be replaced for millions of years.

Paper is both renewable *and* recyclable. In fact, a piece of paper or cardboard can be recycled about seven times before the fiber is too small to use it again! That means paper's life cycle doesn't end in the trash can. Look at the diagram. It shows how paper and cardboard products are first made from trees, then recycled to become clean, new paper and cardboard products. The steps in this process are described in the chart below. Number the statements to put them in the right order.



- | | |
|---|---|
| <p>___ A. The pulp is squeezed flat and rolled into sheets of paper or cardboard.</p> <p>___ B. The trees are chopped into wood chips and ground up to become pulp, which is like a watery stew of wood fibers.</p> <p>___ C. At the paper plant, special machines remove any ink or glue from the recycled paper products.</p> <p>___ D. Trees from managed forests are cut down and taken to the paper plant.</p> | <p>___ E. The recycled paper products are shredded and turned into pulp.</p> <p>___ F. The bark is removed from the trees to become mulch.</p> <p>___ G. People put their used paper and cardboard into a recycling bin.</p> <p>___ H. The recycled pulp is squeezed flat and rolled into sheets of paper or cardboard.</p> |
|---|---|

Part B. Recycling Race

The increasing popularity of online shopping can mean that cartons are delivered to your home almost every day. What happens to those cartons after you've opened them? And what happens to the cardboard packaging inside the cartons, and the boxes that come with products you bring home from a store? On the back of this sheet, make a week-long diary of all the cartons and boxes your family receives, and note how many of them you put in the recycling

bin versus the household trash. Don't forget small boxes that are easy to "toss" – waffle boxes, cosmetic boxes, etc. Make it a class competition and compare results among your peers. Who won the cardboard recycling race with the largest number of cartons and boxes?



Paper and cardboard are from a renewable resource – trees.
Learn more at www.howlifeunfolds.com/3645-2/



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RECYCLING BY THE NUMBERS

Did you know that the average American discards about 4.5 pounds of trash every day? For a family of three, that's more than 94.5 pounds of trash per week! How does your family match up?

Part A. Trash Tracker

Use this chart to track how many bags of trash and recyclables your family tosses during the next week. Show how many bags are trash and how many are recyclables. Use the data you collect to answer the questions below.

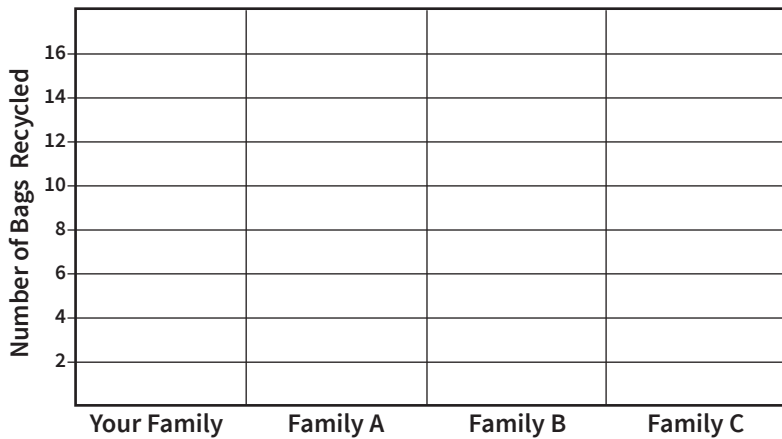
	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
Trash							
Recyclables							

- How much total trash and recyclables did your family discard in one week (number of bags)?
Trash: _____ Recyclables: _____
- Assuming that this was a typical week, how much would your family accumulate in one year?
Trash: _____ Recyclables: _____
- What was the ratio of recyclables to trash in your home? _____
- Estimate what percentage of your recyclables was:
% paper/cardboard _____ % glass _____ % metal _____ % plastic _____



Part B. See the Difference

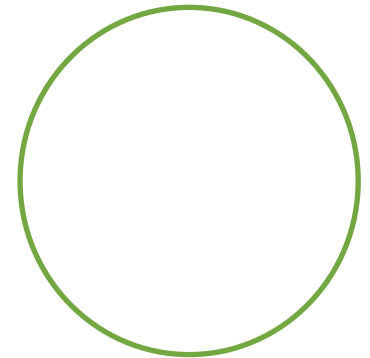
Within your group, fill in the following graphs to show how much your family recycled and how it compares to your classmates.



Family Waste Allocation

Use this circle to create a pie chart that shows the amount your family produced in:

- Trash
- Paper/cardboard recyclables
- Other recyclables



Recycling By Volume

Now compare your family's stats with those of your classmates. Who "won" the title of best recycler?

Part C. Spread the Word

Using the data you collected above, and any statistics you can find about your state or town's recycling program, create an infographic and PSA campaign aimed at increasing recycling in your community. Be creative! You can design a poster, an outline for a video, a social media campaign, a series of bumper stickers, etc. Here are some topics to help get you started, but you can come up with your own theme, too!

- Digital isn't greener.
- The average American discards about 4.5 pounds of trash every day.*
- There are recyclables in EVERY room of the house – it's not just the kitchen!
- Here's a tip – let it rip! How to tell what's recyclable and where it goes (hint: paper tears, plastic doesn't)

Paper and cardboard are recyclable!
Learn more at www.paperrecycles.org

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