Greener Gadgets

Dear Educator,

Today's kids are savvier than ever when it comes to tech products — the latest smartphone, streaming video, the newest apps. They also need to be savvy when it comes to understanding that tech devices can be refurbished, reused, and recycled — and packaging can be recycled too. Being savvy also means knowing which tech products consume the most energy, and choosing tech products that use energy-saving technology. That's why the Consumer Technology Association (CTA)™, the technology trade association representing the consumer technology industry, has partnered with Young Minds Inspired (YMI) to create this free educational program based on CTA's consumer initiative, GreenerGadgets.org. This lesson will help students and their families learn how to lessen the environmental impact of their technology choices.

Designed to support both National Science and Next Generation Science Standards, the program includes classroom activities encouraging students to better understand their responsibility as consumers in our increasingly technology-driven world. Using a favorite subject — technology — students will learn how to make smarter choices that promote a more sustainable future for the Earth.

Although the materials in this program are copyrighted, you may make as many copies as you need for your students and other educators in your school. Please share your thoughts about the program by returning the enclosed reply card or commenting online at www.ymiclassroom.com/feedback-cta. We depend on your feedback to continue providing free educational programs that make a real difference in students' lives.

Sincerely,
Dr. Dominic Kinsley
Editor in Chief, Young Minds Inspired

YMI is the only company developing free, creative and innovative classroom materials that is owned and directed by award-winning former teachers. View our website at www.ymiclassroom.com to send feedback and download more free programs. For questions, contact us toll-free at 1-800-859-8005 or by email at feedback@ymiclassroom.com.

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Target Audience

This science program is designed for students ages 9-12 in grades 4-6.

Program Objectives

- Teach students to differentiate between renewable and non-renewable resources.
- Engage students in assessing the impact of recycling tech product waste and packaging on the environment.
- Help students analyze data and compare solutions for reducing waste through ecycling.
- Empower students and their families to discover how they can choose and use tech devices and other products that consume less energy.

Program Components

- One-page teacher's guide in English and Spanish.
- Three reproducible student activity sheets.
- A colorful wall poster for your classroom.
- An additional "Be a Good eNeighbor" activity and parent letter available at ymiclassroom.com/cta.
- All activity sheets and the parent letter are available in Spanish at ymiclassroom.com/cta.
- A reply card for your feedback, or comment at ymiclassroom.com/feedback-cta.

How to Use This Program

Photocopy the teacher's guide and activity sheets before displaying the poster. Send copies of the parent letter home with your students when you begin the program. Visit ymiclassroom.com/cta to review this program's alignment with National Science and Next Generation Science Standards.

How to Use the Wall Poster

Display the poster to introduce the program and refer to it as students complete activities. Guide them to understand that the ecycling process featured on the poster relies on them: *Students and parents* visit GreenerGadgets.org to find a *Local Recycling Drop-off Location*, where recyclables are sent to a responsible *Third-Party Certified Recycler*, who separates them to send to *Companies That Process Parts* to be recycled into new materials, which *Manufacturers* then use to create products purchased from *Retailers*.

Activity 1

Completing the Circle

Part 1. Distribute the activity sheets. After students complete Part 1, review the answers together: 1–cell phone; 2–glass bottle; 3–cardboard box; 4–soda can; 5–printer cartridges; 6–video game console; 7–banana; 8–plastic carton; 9–computer. Renewable resources–3, 7; non-renewable resources–1, 2, 4, 5, 6, 8, 9.

Part 2. Lead a class discussion on ways students can complete the recycling circle, pointing out that your students can help solve the e-waste problem. For example, a computer (made from mostly non-renewable resources) could be treated as follows:

- **Reduce:** Use the computer as long as possible and maintain it through careful handling, software upgrades, and replacement parts.
- **Reuse:** Donate a still-usable computer to a family member, friend, school, or other organization when no longer needed.
- **Recycle:** Take the computer to a responsible e-waste recycler to reuse parts when possible and recover non-renewable resources like metal. Recycle the computer's packaging when buying a new computer.

Activity 2

Recycling By the Numbers

Distribute the activity sheets. Have students complete Part 1 in class (***Answers:*** 1-a; 2-d; 3-b; 4-c; 5-e; for green design, all but 2 and 9 are green characteristics) and Part 2 at home. Have students return their papers to class to share family recycling goals and to characterize their lists by graphing renewable vs. non-renewable materials by recycling categories (e.g., paper, plastic, metal, tech product components, etc.), and then determining class percentages for each.

Activity 3

Become an Energy Detective!

Advances in technology have greatly reduced the amount of energy it takes to run many of the tech devices students use every day. This activity will engage students as energy detectives to find out what design changes have helped improve energy efficiency. First ask students to share which tech devices/appliances in their homes they think use the most energy. Then distribute the activity sheet and read through the directions together before grouping students into teams. What surprised students most about what they learned? (***Answers:*** **Part 1.** video game consoles and laptops; $5.49 and $2.22; around $12.16; 11 percent; helps the environment/saves water and electricity, reduces pollution. **Part 2.** lighter/thinner flat-screen TVs, multifunctional devices, reduced sizes, backlight dimming, automatic lighting control, technology producer agreements to reduce energy use, etc.)

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Activity 1 Reproducible Master

Completing the Circle

Hey kids! It's me, Earth! I'm all about recycling the planet's waste through decomposition and other natural processes, but I need your help to recycle the waste that people create.

You may have noticed that not everything you consider trash has this mark. In that case, what are people supposed to do? It starts with understanding the difference between renewable and non-renewable resources.

Part 1.

Renewable resources are things that are renewed within a relatively short period of time or may never run out, such as plants, animals, sun, wind, air, water, etc.

Non-renewable resources are things that are renewed over extremely long periods of time, from hundreds to millions of years, or that are available in fixed amounts, such as minerals and fossil fuels.

Some products you might use are listed below. Unscramble their names and then write an "R" if they come from renewable resources or an "NR" if they come from non-renewable resources.

	Product		R or NR?
1.	llec nohpe	c __ __ l __ h __ __ __	____
2.	lsasg lttboe	__ __ a __ __ b __ __ t __ __	____
3.	bdarcdrao xbo	__ __ r __ b __ __ r d __ o __	____
4.	dosa nac	__ o __ __ __ a __	____
5.	rniptre tdgrarcise	__ r __ __ t __ __ __ __ r __ r __ __ __ e __	____
6.	dveio mgea	__ i __ __ o __ a __ e	
	lsonceo	__ __ n __ __ __ e	____
7.	nanbaa	__ __ __ a __ __	____
8.	ticlpsa tonarc	__ l __ s __ __ __ c __ __ t __ __	____
9.	pucomert	__ __ __ p __ __ __ __	____

Good News! What's lighter, smaller, and better? Consumer tech devices, that's what! Thanks to innovation in product design and manufacturing, the amount of non-renewable resources in consumer tech devices has actually *decreased*. Not only are we doing a better job of completing the circle, but we're also making that circle smaller!

Part 2.

Listed at right are ideas to help lessen the impact of waste on the environment. Add an idea of your own for each. Now choose one product from each resource category ("R" and "NR") from Part 1. Follow your teacher's directions to determine a "future" for each one.

Reduce *by finding ways to create less waste:*

1. Only print final versions of documents to save paper, ink, and electricity.

Idea 2. _____

_____

_____

_____

_____

Reuse *by finding new uses for old items:*

1. Donate your old but still-working computer to a charity.

Idea 2. _____

_____

_____

_____

_____

Recycle *old products into new ones:*

1. Separate recyclables from your other trash.

Idea 2. _____

_____

_____

_____

_____

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Recycling By the Numbers

Part 1. How much do you know about the amount of trash people create? Match the following figures with the facts shown below.

Figures	Facts
1. 4.48 lbs.	_____
2. 39.8%	_____
3. 1.23 million tons	_____
4. 91.2 million tons	_____
5. 52.5%	_____

Facts*

a. Amount of trash generated by one person per day in the U.S.

b. Weight of total consumer tech devices recycled in 2015.

c. Amount of common waste, including yard waste, glass, plastic, paper, metals, and tech devices, recycled and composted in the U.S. in 2015.

d. Percentage of discarded consumer tech devices that were recycled in 2015.

e. Percentage of U.S. trash that was buried in landfills in 2015.

Tech Manufacturers Lead the Way!

Improvements in technology now require less materials and prevent more e-waste from entering the waste stream than previously. Mark the boxes below that you think identify green design characteristics.

- ☐ **1.** Use less hazardous materials to manufacture
- ☐ **2.** Are painted green
- ☐ **3.** Designed for longer life
- ☐ **4.** Comes in recyclable packaging
- ☐ **5.** Smaller, lighter, and more functional
- ☐ **6.** Can be repaired and reused multiple times during the life of the product
- ☐ **7.** Are easy to disassemble
- ☐ **8.** Require less extraction of natural resources
- ☐ **9.** Made of magic dust
- ☐ **10.** Designed to use less energy when in use

Part 2. How do your family's recycling numbers add up? Take this sheet home to list 5 products you or another family member plan to throw away. Products might include items from your trash or an old item you no longer use. At least three of the five should be tech products, such as a television, cell phone, etc. You can visit GreenerGadgets.org for ideas. Record the recycling action you might take for that item below.

Product	Reuse/Recycling Action To Be Taken
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

Dear Parents,

Your child is participating in a free educational program from the Consumer Technology Association (CTA)™ and curriculum specialists Young Minds Inspired (YMI) on keeping the environment healthy through consumer tech recycling. Help your child complete this part of the activity at home, then ask him or her to return the activity sheet to school.

*source: epa.gov

Take action! Set a family goal to recycle as many of the products and their packaging listed above as possible! Visit CTA's GreenerGadgets.org, where you can quickly and easily locate a responsible tech device recycling collector near you.

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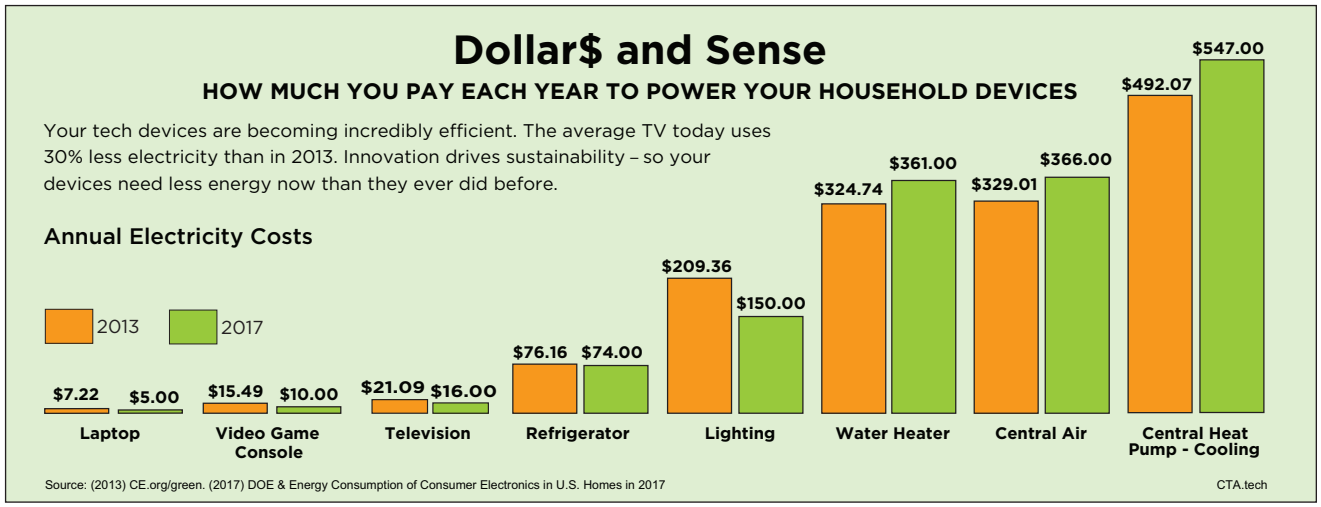
Become an Energy Detective!

Advances in innovation – supported by programs such as ENERGY STAR® that help you identify more energy-efficient products – have drastically cut the amount of energy consumed by household tech devices and appliances in recent years. In fact, consumer technology has led the way!

You can help take charge of your energy future by becoming an energy detective. Let's see first where things stand now:

Part 1. Review these charts from 2013 and 2017 to find which tech devices and other home appliances have become more, and less, energy efficient. Then answer the questions below.



- Which two household devices had the highest percentage decrease in energy use? _____

_____

- What was the difference in annual electricity cost to run those tech devices between 2013 and 2017?

_____

- If television costs decrease the same percentage in four years, how much will they cost?

_____

- Now look at the costs of household devices that increased since 2013. What percentage did they all roughly increase by? _____
- Energy-efficient devices offer more benefits than just saving money. What are some of them?

_____

Part 2. Recent design improvements in tech devices have made important contributions to energy efficiency. In fact, home energy consumption by consumer tech has decreased 25% since 2010. Now, put on your detective hat and research what kinds of advancements have helped televisions, for example, become 63% more energy efficient since 2003. With your team, head over to http://www.cta.tech/green and see if you can discover why televisions and other tech products consume much less energy today than they did 15 years ago. Then, use the statistics you find to create a report you can share with other classmates.

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The more energy you save, the more you will help the environment – *and* your future!

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Live Green
Buy Green
Recycle Responsibly

Energy efficiency through improved design!

Earth's natural renewable and non-renewable resources are needed to create the products we use every day.

We help protect the Earth's systems when we recycle these products

In today's digital age, being green means:

- **Live Green!** Be efficient with your energy use and unplug chargers and devices when they are not in use.
- **Buy Green!** Buy refurbished products and ENERGY STAR® products. The ENERGY STAR label means the product is designed for efficiency.
- **Recycle Responsibly!** Visit GreenerGadgets.org to find a responsible e-waste recycling center near you. Recycle packaging at curbside or at a local recycling center.

Sign up now to take the pledge to Live Green – Buy Green – Recycle Responsibly!

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Dear Parents,

Your child is currently studying a free curriculum program on ecycling provided by the Consumer Technology Association (CTA)™ and curriculum specialists Young Minds Inspired (YMI). Part of the program involves reaching out to families to help extend learning into the home. We know that children can feel especially empowered when helping their families live a greener lifestyle, and this curriculum is designed to help them discover ways to do just that.

CTA is the technology trade association representing the $377 billion U.S. consumer technology industry and more than 2,200 companies. One long-term goal of our industry for consumers is to make recycling tech devices as easy as purchasing them. That's why CTA has developed online tools for consumers to reduce their environmental footprint at GreenerGadgets.org. Here are a few of the resources you can find there:

- **Consumer Tech Energy Calculator.** This easy-to-use calculator helps you determine the impact of tech products use on your wallet by the month and year.
- **Recycling Tech Devices.** This service makes finding an environmentally-friendly tech product recycling center near you as easy as typing in your zip code. The ecycling list includes industry programs that practice strict standards and use third-party certified recyclers, providing you with assurance that your device will be safely recycled.
- **So Much More.** Lists of CTA members and industry partners with their own ecycling programs, some of which even offer you money back for your efforts...advice on what to do if your consumer tech product is still in good condition, but you no longer need it...tips on recycling packaging...as well as other helpful sites.

Recent improvements in design have helped boost the role of tech devices in saving money through reduced energy use. Always look for the ENERGY STAR® label when buying appliances. And visit GreenerGadgets.org today to find out how you can help your family save money and do something good for the planet at the same time. It's easy!

Sincerely,
Walter Alcorn
Vice President, Environmental Affairs and Industry Sustainability
Consumer Technology Association

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Apreciados padres:

Su hijo(a) está cursando actualmente un programa de estudios gratuito sobre reciclaje de electrónica ofrecido por la Asociación de Tecnología de Consumo (*Consumer Technology Association*, CTA™) y especialistas del plan de estudios de Young Minds Inspired (YMI). Como parte del programa nos ponemos en contacto con las familias para ayudar a llevar el aprendizaje a los hogares. Sabemos que los niños pueden sentirse especialmente empoderados cuando ayudan a sus familias a vivir un estilo de vida más ecológico y este programa de estudios ha sido diseñado para ayudarles a descubrir maneras de hacer precisamente esto.

La CTA es la asociación del ramo de la tecnología que representa a la industria de la tecnología de consumo de los Estados Unidos, un negocio de 377 mil millones de dólares y más de 2,200 compañías. Un objetivo a largo plazo de nuestra industria para los consumidores es que el reciclaje de los productos electrónicos sea tan fácil como el comprarlos. Es por ello que CTA ha creado herramientas en Internet para que los consumidores reduzcan su huella en el medio ambiente en GreenerGadgets.org. Estos son algunos de los recursos que puede encontrar ahí:

- **Calculadora de energía de productos electrónicos de consumo.** Esta calculadora fácil de usar le ayuda a determinar el impacto del uso de la electrónica en su cartera al mes y al año.
- **Reciclaje de electrónica.** Este servicio hace que encontrar un centro ecológico de reciclaje de desechos electrónicos cerca de usted sea tan sencillo como escribir su código postal. La lista de reciclaje de electrónica incluye programas de la industria que practican estándares estrictos y utilizan compañías de reciclaje certificadas independientes, lo cual le garantiza que su dispositivo se reciclará de forma segura.
- **Mucho más.** Listas de miembros de la CTA y socios de la industria con sus propios programas de reciclaje de electrónica, algunos de los cuales incluso le devuelven dinero por sus esfuerzos... asesoramiento sobre qué hacer si su producto electrónico de consumo sigue estando en buen estado pero ya no lo necesita... consejos sobre cómo reciclar los empaques... así como enlaces a otros sitios útiles.

Las recientes mejoras en el diseño ayudaron a impulsar el papel que cumplen los productos electrónicos en el ahorro de dinero mediante el uso reducido de la energía. Al comprar aparatos electrónicos, busquen siempre la etiqueta de ENERGY STAR®. Y visiten GreenerGadgets.org para averiguar cómo pueden ayudar a su familia a ahorrar dinero y hacer algo bueno por el planeta al mismo tiempo. Es sencillo.

Atentamente,
Walter Alcorn
Vicepresidente, Asuntos Medioambientales y Sustentabilidad de la Industria
Consumer Technology Association

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