Build THE Change

Think Outside the Bus

School Buses in the Circular Economy

Educator Guide

In partnership with Electric School Bus INITIATIVE and WORLD RESOURCES INSTITUTE

Introduction

Dear Teachers and Students,

Welcome to our Build the Change lesson! We are delighted you are here.

In ***Think Outside the Bus: School Buses in the Circular Economy,*** you'll learn about electric school buses and help us answer an important question: as more school districts across the United States switch to clean, electric school buses, what should they do with their retiring diesel buses? This is a real question that school districts, policymakers and others are facing, and we are eager to hear your ideas.

As you journey through the lesson, you may want to browse additional resources to learn more about:

- Why the transition to electric school buses is so important for air quality, health and climate.
- Why and how to center equity in the transition to clean technologies like electric school buses.
- The school bus fleet in *your* state or school district – plus other data.
- How students can get involved in school bus electrification efforts in their own communities.

Teachers, the links within this Educator Guide provide you with:

- **The lesson slide deck.**
- **Accompanying speaker notes.**

We hope you enjoy rolling up your sleeves and building *your* ideas for school buses in the circular economy. Don't forget to upload photos of your designs!

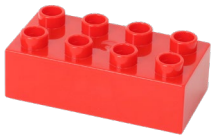
Have fun,

The LEGO Group's Build the Change team & WRI's Electric School Bus Initiative

P.S. If you're in the US and your students get inspired to bring electric school buses to their district, send us a note at ESBinfo@wri.org. We're happy to support them with free resources.

Table of Contents – Think Outside the Bus

What is in the Lesson Pack?



Think Outside the Bus

Electric School Buses in the Circular Economy

A lesson that not only introduces children to the concept of circular economy in a fun, engaging way, but also puts them in the "bus driver" seat to teach them about electric school buses and the work of the World Resources Institute. Plus, they get the opportunity to share their own ideas on how to repurpose diesel buses – with some fun hands-on, minds-on activities throughout.

Link to Lesson Presentation PDF

http://www.lego.com/cdn/cs/sustainability/assets/blt42468870bb4e7f66/Think-Outside_The_Bus_Lesson.pdf

Link to Printable Speaker's Notes for the presentation

http://www.lego.com/cdn/cs/sustainability/assets/bltc316b1f43e5722b4/Think-Outside-The-Bus_SpeakerNotes.pdf

SECTION	CONTENT	MATERIALS	TIMING (~60+ min)
Opening	A welcome to this Build the Change course, part of the LEGO Group's program for children all around the world to create and share their ideas for the future. In this lesson learners will use creativity to think up ideas to repurpose the diesel school buses being replaced by electric buses across the US.	**Session presentation PDF** (used throughout the session)	1 min
Video: Build the Change	Short video introducing students to the concept of Build the Change, with Leo and Linda.	**Online video** (link on slide in presentation)	3 min
Group Poll	A "show of hands" group poll with 2 questions about the class's feelings and sense of agency around sustainability – online poll lets the class see how their result compares with other classrooms around the world and reflect on any similarities/differences.	**Online poll** (link on slide in presentation)	3 min
Think Outside the Bus	A very brief introduction to the lesson's core theme, circular economy, and then a longer introduction to school bus electrification.		5 min
Awesome Words	A breakdown of vocabulary words that will be used in the session.		5 min
Video: A Future Without Waste	4-minute explainer video introducing the problems caused by our current Take-Make-Waste way of making and using products and resources, and how designing things according to the principles of the circular economy – eliminating waste and pollution, keeping products and resources in use for longer, and regenerating nature — could help solve them.	**Online video** (link on slide in presentation)	4 min
Discussion	A chance for the class to discuss and reflect on a couple questions.		2 min
Case Studies	Optional case studies to bring more context to the repurposing approach: one on DeClique with a video and one on a bus that has been repurposed into a café in Knox County, US.	**Online video** (link on slide in presentation)	5 min
Time to Create	Children are given the main challenge: As school districts switch to electric school buses, how can they reuse old diesel school buses (i.e., the product) or their components for a new purpose?	**Creative materials**	20 min
Time to Share	A chance for the class to share their thoughts, ideas and creations.		5 min
Time to Quiz	A few quiz questions to check understanding of the session's content.	**Quiz within slides**	3 min
Sum up & next steps	A quick wrap up on the core topics covered in the session and some pointers to potential next steps that the class can take.		2 min

Presentation **Group discussion** **Hands-on** **Poll (Online)** **Quiz** **Video (Online)**

UPLOADING THE IDEAS

Don't forget to upload your kids' creations to our Think Outside the Bus gallery on LEGO.com!

Just scan the QR code below with a phone camera to get started or use this URL:

https://www.lego.com/sustainability/buildthechange/challenges/bus/upload

Once they're moderated, the ideas will appear here:

https://www.lego.com/sustainability/buildthechange/challenges/bus/gallery

Scanning the "Uploader" QR code with your phone camera will bring up a webpage where you can photograph your children's builds, add a short description and upload them to our galleries on LEGO.com.

Idea Uploader

Think Outside the Bus:
Electric Buses in the Circular Economy

NOTE: You'll need to create and/or sign in with a LEGO ID Account so we can contact you with any queries about your submission.

While we can't wait to see what your learners come up with, please be aware that images may be rejected by our moderation system, especially if they contain personally identifying information, e.g.

- Faces and/or people in the image
- Information about the creator beyond first name and age – e.g. last names, names of schools or geographic areas, etc.
- Email addresses, phone numbers, etc.

Images may also be rejected if they are rotated, very blurry, or contain inappropriate content.

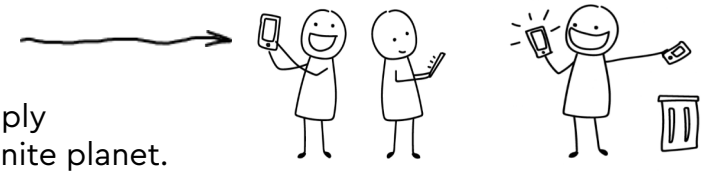
← Back to table of contents

Background for educators: Getting to grips with the circular economy

This resource is a collection of helpful content for educators who wish to begin teaching the circular economy. It is designed to give a quick and accessible overview of the circular economy concept and its core principles. Having established this base-line knowledge, educators should feel equipped to use other circular economy resources from the Ellen MacArthur Foundation and beyond.

Where are we now?
To understand what the circular economy is, it's helpful to start with where we are now. In our current economy, we **take** resources from the Earth to **make** products, which we use for a short time before we throw them away and they become **waste**.

Take-make-waste



We call this a linear economy. It simply cannot work in the long-term on a finite planet.

Where are we heading?
Nature never does things in straight lines. It has arrived at a far more efficient and effective way of doing things — it works in cycles. Things grow, they die, and then nutrients return to the Earth so that new life can grow. Again and again. The energy needed to make all of this happen comes from the sun.

The aim of the circular economy is to mimic nature's cycles as much as possible in our economy. So instead of working in straight lines, we work in cycles; and instead of losing valuable materials and nutrients to landfill or incineration (leading to high levels of waste and pollution), it keeps them in the economy for as long as possible. This can help us tackle pressing concerns like climate change and biodiversity loss.

The three principles of the circular economy are:

1- Eliminate waste and pollution
2- Keep products and materials (resources) in use
3- Regenerate nature

What separates this from other sustainability initiatives like recycling? The answer is **Design.** The circular economy addresses the root causes of problems like waste and pollution instead of the symptoms. By fundamentally redesigning the things around us we can stop them from ever becoming waste in the first place.

For example, we might design things to be more durable, to be shared or reused in various ways, to be repaired, or to be easily taken apart at end of life so that materials can be recovered and used again. What if we viewed waste as a design flaw? After all, there is no waste in nature.

WATCH: Humans Changed the Face of the Earth, Now we Rethink our Future

← Back to table of contents

Circular economy background (continued)

Now let's take a closer look at how materials can cycle in a circular economy. Here, Ellen MacArthur explains how the different 'loops' of the circular economy work to create a system that is regenerative by design: The Butterfly Diagram with Ellen MacArthur

How we talk about the circular economy

Since the Ellen MacArthur Foundation was founded in 2010, we have described the circular economy as an economic opportunity with multiple environmental and societal benefits. This is where the concept distinguishes itself from most sustainability narratives and paradigms, which often leave out the role of the economy when it comes to considering environmental concerns.

Increasing pressures from things like climate change, resource scarcity, supply chain disruptions, increasing consumer demands, and policy changes, mean that businesses will need to transition to more circular ways of operating in order to increase efficiencies, lower costs, minimise negative externalities such as waste, and generally future-proof their operations. Our reports have helped highlight the benefits of a circular transition and there are now companies, cities, governments and educational institutions the world over, reaping the rewards of going circular (for people, profit, and planet).
View our case study library to explore some of the most innovative examples.

The circular economy in education

The transition from a linear to a circular economy is a huge undertaking that will require new skills, knowledge, and mindsets. There is a role for artists, designers, architects, engineers, educators, entrepreneurs, policy-makers, scientists, farmers and just about everyone in between. By its very nature, it is an interdisciplinary topic, excellent for project-based and problem-based learning approaches with an emphasis on creativity, collaboration, critical thinking and systems thinking.

We believe that the circular economy should be at the heart of the education system, helping to empower students with a positive vision for the future based on solutions to real-world problems.

← Back to table of contents

Additional Online Resources

PACE: https://pacecircular.org/

Electric School Bus Initiative: https://electricschoolbusinitiative.org/

Article on battery second use: How Electric School Bus Fleet Owners Can Ensure That Their Used Vehicle Batteries Avoid the Landfill – and Reap Economic and Environmental Benefits

Data dashboard: Electric School Bus Data Dashboard | Electric School Bus Initiative

Equity videos: Students Need Access to a Clean Ride to School | Electric School Bus Initiative

How to engage: Engage | Electric School Bus Initiative

← Back to table of contents

What Next Steps Can You Take Towards Green School Transportation?

There are *lots* of ways you can help your school and community be greener. If you don't know where to start, we have a few ideas for you!

Keep learning about school bus electrification, other green ways to get to school, and the circular economy.

1. Understand why the transition to electric school buses is so important for air quality, health and climate: https://electricschoolbusinitiative.org/why-we-need-transition-electric-school-buses
2. Learn why and how to prioritize people when switching to clean technologies like electric school buses: https://electricschoolbusinitiative.org/transition-electric-school-buses-must-center-equity-heres-why & https://electricschoolbusinitiative.org/engage
3. Think about other green ways to get to school, like walking and biking! https://electricschoolbusinitiative.org/we-need-electric-school-buses-and-we-need-more-students-walking-and-biking-school
4. Dig deeper into the circular economy: LEGO Build the Change - A Future Without Waste Course Pack - https://www.lego.com/sustainability/buildthechange/courses
5. See how electric bus batteries can be part of a circular economy: https://electricschoolbusinitiative.org/how-ensure-sustainable-future-electric-school-bus-batteries

Connect with your school's environmental club – or start your own! – to take action on green school initiatives, like sustainable transportation.

1. Check out other environmental clubs and see how students are driving change: https://gogreeninitiative.org/programs/local-leaders/
2. Talk to your classmates about The Great School Electrification Challenge: https://youth.citizensclimatelobby.org/school-electrification/
3. Visit WRI's student engagement page to find more ways to connect: https://electricschoolbusinitiative.org/how-students-can-take-action-electric-school-buses

Ask your school about their school bus electrification plans.

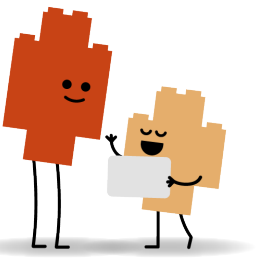
1. Ask your teacher or principal who's involved in student transportation decisions. Set up meetings to talk about their plans for school bus electrification.
2. Learn more about the current school bus fleet in your state or school district: https://electricschoolbusinitiative.org/electric-school-bus-data-dashboard
3. Explore this list of electric school bus funding opportunities, and share them with your district: https://electricschoolbusinitiative.org/clearinghouse-electric-school-bus-funding-and-financing-opportunities

Share your ideas for repurposing old school buses!

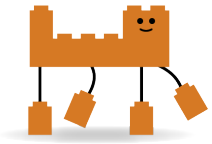
1. https://www.lego.com/sustainability/buildthechange/challenges/bus/upload

General facilitation tips and tricks

Getting the best ideas out of young learners.



GENERAL

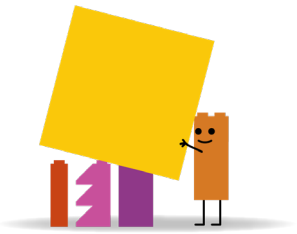


You are educators so we are super aware that you are likely to know this already, but in the spirit of sharing, here are a few workshop facilitation techniques we use in the LEGO Group:

- Keep questions open-ended whenever possible.
- Encourage reflection.
- Ensure that the tone is kept light, hopeful and fun (it is easy to go gloomy when talking about topics like climate change).
- If the question feels too big and general for them, try to bring it back to something they can relate to, something local perhaps.

We need your help in conveying the energy behind some of the statements that aim to empower and motivate children. Imagine it's the most important thing you've ever said to them. Then times it by a million.

In the immersion material, we have tried to give enough information about the topics without making it too prescriptive for the children. A novel engineering approach to some of the challenges, means that children can find their own issues to address from what we present to them. This gives them a sense of ownership and an increased motivation to come up with solutions.



CREATIVE SECTIONS

We all know what it is like to be stuck on first steps when given an open-ended creative exercise: frozen, no ideas in sight, panic starting to set in.

We also know that it is normal to feel this way but here are some tips to spark that first step into creativity overload!

- Go back over key points from earlier that session. Do any jump out to the student? Expand on those.
- Give your own wacky ideas (the sillier the better) on what you would do. This helps relax the student and reminds them that anything is possible. It's important that the students don't feel the constraints on creativity that we often do as adults.
- If there are creative materials in front of the student, tell them to let their hands do the thinking. Get them to start putting objects together randomly. Is anything appearing? Any shapes? Does it remind them of anything? This is a great way to break that idea freeze.

Once the students are creating their ideas, spend a moment with each group or individual to ensure they are giving thoughts to the following:

- Is it a new idea? If not, what can you add to make it even cooler and more unique?
- What are the causes and effects in their idea?
- Keep them on theme. Everyone loves to build a space rocket swimming pool dinosaur machine, but is it going to help the planet? Maybe... hold that thought ;)

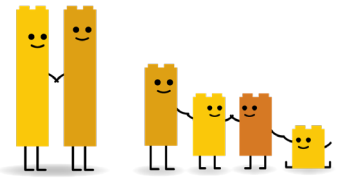
When it comes to sharing their creation encourage them to use a simple structure:

- What is their creation?
- How does it help nature, community or business? (or all three)
- Encourage students to be big picture thinkers by asking them 'connecting' questions - how does this idea connect to that? What will happen to this if we do that? How does this business help that group of people? etc. This helps them to see how changes to one part of their build can affect the whole.

← Back to table of contents

Facilitation tips and tricks

GROUP WORK



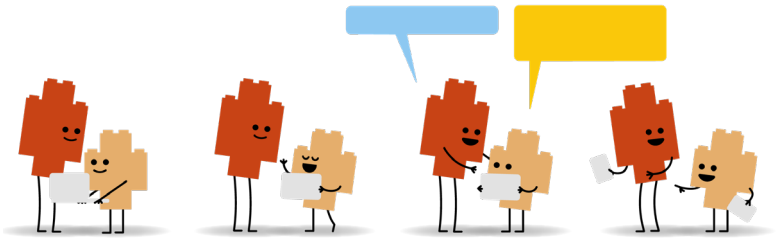
Build the Change is perfect for working in groups, but we would recommend no more than 4 children per group. This is simply to ensure everyone gets to input and play an important role.

Depending on the students, it might be worth delegating roles. For example, some of the roles that have worked in the past include:

- a project manager (to lead the group)
- a communicator
- a writer (to capture the story – almost like a journalist)
- a designer
- an architect/engineer

This list is far from exhaustive on the roles within a creative design project, so feel free to come up with completely different ones based on your students.

SPEAKING MOMENTS



At the LEGO Group, we love building microphones out of LEGO bricks and handing them to those whose turn it is to speak. It works wonders and adds a bit of fun.

← Back to table of contents

The World Resources Institute
Making Big Ideas Happen

WRI is a global research organization that works with governments, businesses, multilateral institutions and civil society groups to develop practical solutions that improve people's lives and protect nature.

Find out more at World Resources Institute | Making Big Ideas Happen (wri.org)

Established in partnership with the Bezos Earth Fund, WRI's Electric School Bus Initiative collaborates with partners and communities to build unstoppable momentum toward an equitable transition of the U.S. school bus fleet to electric by 2030, bringing health, climate, and economic benefits to children and families across the country and normalizing electric mobility for an entire generation.

Electric School Bus INITIATIVE

WORLD RESOURCES INSTITUTE

← Back to table of contents

What is the LEGO Group's Build the Change program?

We strongly feel that children need to be equipped for the future, and that future must be a sustainable one. To do this, the Build the Change team create resources, content and experiences that connect children with real-world topics and empower them to share their ideas on ways to make the planet a better place – whether environmentally or socially.

The LEGO Group are lucky to be a much-recognised brand and the Build the Change team leverage this to enhance that innate passion children have for the planet and everything on it.

It is the LEGO Group's flagship sustainability education program. Deceptively simple and effective, it has been tested with kids at events around the world for over a decade

Immerse ➡ Create ➡ Share

Learn about a real-world planet and people challenge.

Devise your own brilliant solution.

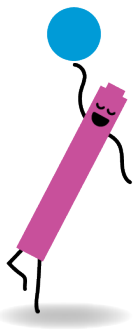
Share it with others.

KEY FACTS

- Build the Change is a social impact program driven by the LEGO Group since 2007.
- Its purpose is to engage children on real-world sustainability challenges through learning through play and to amplify their creative ideas for a better future.
- The program is funded completely by the LEGO Foundation whose mission is to redefine play and reimagine learning.
- In 2023, the program has reached more than 1.3M children around the world

← Back to table of contents

The LEGO Group on Learning through Play and Sustainability

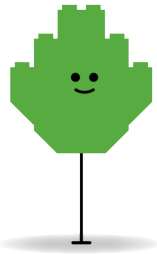


OUR COMMITMENT TO LEARNING THROUGH PLAY

The LEGO Group and the LEGO Foundation are committed to becoming a global force for learning through play. We aim to redefine play and reimagine learning with hands-on learning experiences like Build the Change, where children are actively engaged through a meaningful and enjoyable experience, testing and trying out things with others. Success for us is seeing more and more children around the world become creative, engaged, and life-long learners.

Educators can use Learning through Play to support students' depth of knowledge and understanding, with the application of this knowledge into practical skills and nurturing a lifelong motivation to learn new things.

On the LEGO Foundation website, you can find more information and access the LEGO Foundation knowledge base and in particular the white papers on What we mean by Learning through Play and Learning through Play at school.



OUR COMMITMENT TO SUSTAINABILITY

We're playing our part in building a sustainable future and creating a brighter world for our children to inherit. We're joining forces with children and parents, educators, our employees, partners, charities and experts to have a lasting impact and inspire the children of today to become the builders of tomorrow.

We are proud of the journey we are on and recognize that there is much more to do and learn. We will continue to do everything we can to achieve our ambitions.

On our sustainability website you can find more information about our initiatives, ambitions and progress.

← Back to table of contents