Teacher Guide

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Welcome to Data Explorers!

Time: 5-10 minutes per standalone section, around 45 minutes to complete fully
Skills: Harnessing Data, Informational Skills, Climate Sciences
Values: Valuing Sustainability, Supporting Fairness + Justice, Connection to Nature
Recommended age: 11-14

Learning Objectives

Students will

- Understand what data is and how it can be collected and verified
- See how data is applied to real world problems and career paths, to create positive change
- Be introduced to a range of social environmental issues linked to different ecosystems

- **Think**: I understand what data is and how it can be used to protect the planet
- **Feel**: Confident using data, and motivated to learn more, to have a positive impact
- **Do**: Recognise data in the real world, learn more about data, consider sustainable careers that involve data

Summary

Dive into an inter-dimensional, data-driven adventure to protect Planet Earth!

Students will take on the role of a data scientist, who also happens to have magical powers... Their mission is to rescue five leading environmental experts who have been kidnapped from Earth by an inter-dimensional dragon.

They will travel through portals to five different ecosystems: rainforest, grassland, caves, glaciers and desert. In each portal they will meet locals who explain environmental problems they are facing. Together with the locals and the kidnapped expert, they will solve these problems using data. In doing so they will develop crucial skills of data recognition, verification and application.

The grand finale? Your students open the final portal to take on the dragon, with a twist in the tale...

Background

About Minecraft Education

Minecraft Education Edition prepares students for the future, building future-ready skills like creativity, problem solving, and systems thinking, and nurturing a passion for play. Minecraft Education is a unique, safe space for young people to learn about data and environmental sustainability. It's an engaging and immersive way to introduce concepts and build understanding.

Learn more about Minecraft Education.

About NetApp and Data Explorers

NetApp is a global, cloud-led, data-centric software company that empowers organisations to lead with data in the age of accelerated digital transformation. NetApp Data Explorers is a global social impact program with a mission to empower teens to discover and develop critical data science skills, preparing them to thrive and take action in a data-driven world. Learn more about Data Explorers.

About World's Largest Lesson

The World's Largest Lesson is committed to introducing children and young people everywhere to the UN Global Goals (or SDGs). It is delivered in partnership with UNICEF and UNESCO. It has reached millions of teachers and students worldwide to build sustainability skills, including a focus on harnessing data for social and environmental problem solving. Learn more about the World's Largest Lesson.

How to Get Started on Minecraft Education

If you already have Minecraft Education downloaded, follow these steps:

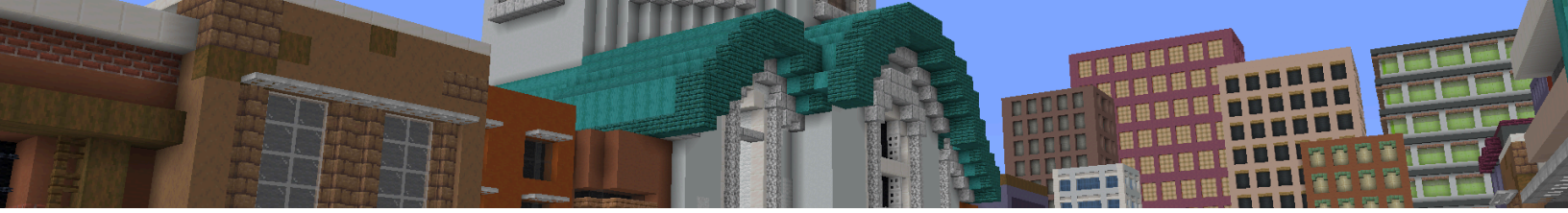
1. Download the Data Explorers world and resources
2. Open Minecraft Education and log in with your school email address
3. Upload the Data Explorers world into Minecraft to use in your lesson
4. Open the Data Explorers world, grab your lesson plan and play

If you do not have Minecraft Education downloaded, here's how to get setup:

1. If you think your school has a valid 0365 EDU account, check here and follow the instructions.
2. If not, you can still download and play for free on Windows, Mac or iPad.
3. If you need any support, the Minecraft team can help.

Completely new to Minecraft Education? Take a look at this resource hub.

NetApp WORLD'S LARGEST LESSON



Activities

Introduction

- Tutorial: The player is introduced to the controls
- The player is part data-scientist and part wizard, with a tiny robot familiar called Dana to help them on their mission.
- The player learns that an evil dragon is wreaking havoc on Earth and five people have gone missing. Their objective is to stop the dragon and rescue the people.

Exploring the 5 portals

This is a 'choose your adventure' style learning experience. Players will choose to explore the world in different ways. Some players may complete all the activities, while others don't get as far. Whatever path they choose, players will learn from the characters and tasks they encounter along the way. Afterwards, they can discuss their different experiences and what they learned.

The player will visit 5 different magical worlds modelled on real-world ecosystems. In each of those habitats they will encounter an environmental problem experienced by the local community. They will solve that problem using data, with the help of an expert in their field. Each problem and expert will connect to a different STEAM theme.

Reflection

Recap what you've done today:
· Explored different social and environmental issues
· Used data to solve problems
· Learned about different environmental careers

Encourage students to discuss their experiences in the game and what they learned. For example:

- What characters did you meet in the game? Describe them.
- What was a problem you tackled? How did it connect to the environment? How did you solve it?
- Where did data appear in the game? Name as many examples as you can. How would you describe 'data'?
- Do you think it's important to protect the planet? Would you like to do a job like this in the future? Why?

Then provide students with their certificate of completion!

Key Learning Concepts

This is a 'choose your adventure' style learning experience. Players will choose to explore the world and the portals in different ways. Some players may complete all the activities, while others don't get that far. Whatever path they choose, players will learn from the characters and tasks they encounter along the way. Afterwards, they can discuss their different experiences and what they learned.

Harnessing Data

The World's Largest Lesson report 'Ready, Willing and Able?' reviewed key literature and 154 existing education programs worldwide to ask: What skills and capacities do young people need to address sustainability
issues? It identifies 17 Sustainability Competencies including:

- Harnessing Data: To identify and collect data. To clean, store, analyse and visualize large data sets for project monitoring, evaluation and decision making.

Key data literacy competencies and concepts included in this learning experience include:

- What is data? Data is all around us. It gives us information about the world.
- How is it used? Data helps us understand what is happening and make informed decisions.
- Data in careers: Data skills are valuable in many (if not all) careers. For example: Scientist; Engineer; Tech developer; Healthcare; Policy-maker; Journalist - and many, many, more!
- Data for good: Data can be used in a wider range of sustainable careers and actions to make positive change. It helps us identify problems, try to solve them, and evaluate the impact.

The gameplay will use examples to explore the following questions:

- How can you collect data yourself?
- Where can you access data that already exists
- How do you know if it is quality/reliable vs mis/disinformation
- How can you handle it?
- How can you visualize it?

Education for Sustainability

The World's Largest Lesson 'Ready, Willing and Able?' report proposes five "family" groups of competencies. These groups connect and intersect, blending knowledge (able to) with mindset and attitude (willing to). The groups are:

- Embodying sustainability values
- Acting for sustainability
- Applying sustainability sciences
- Envisioning sustainable futures
- Embracing complexity in sustainability

This Minecraft learning experience aims to build competencies across all five of these groups, through a narrative-led process of exploration, discussion and problem solving:

- The player will visit 5 different magical habitats modelled on real-world ecosystems.
- In each of those habitats they will encounter an environmental problem experienced by the local inhabitants
- They will solve that problem with the help of an expert representing a real-world environmental career
- Each problem and expert will connect to a different STEAM theme

This Minecraft learning experience helps learners understand the inter-connection of the Global Goals through contextualized learning. Students will explore the effects of different issues on the local community and the environment, in a wide range of contexts.

Habitat	Environmental Problem	Real- world career	STEAM theme
Rainforest	Loss of undiscovered species due to deforestation	Researcher discovering new species of plants for medicines	Science
Grassland	Reduced soil quality caused by over-farming.	Environmental engineer, expert in rewinding and regenerative agriculture	Engineering
Desert	Smog caused by fossil fuel use	Solar energy technician in charge of vast array of solar panels	Technology
Caves	Pollution caused by extraction of minerals	Filmmaker and campaigner raising awareness using statistics	Arts
Glaciers	Dwindling fish stocks due to overfishing	Oceanographer, monitoring fish stocks through statistical analysis	Math

The United Nations Global Goals

This learning experience is grounded in the framework of the UN Global Goals, also known as the Sustainable Development Goals or SDGs:

- 17 ambitious goals to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.
- Agreed in 2015 by all 193 member states of the United Nations.
- Deadline 2030!

All of these Global Goals are connected. They connect us all, around the world, through our shared needs and values.

The 'Wedding Cake Model' helps students see the Goals in three groups that all connect with each other: Economy, Society and Biosphere.

This inter-connection means we cannot achieve any of the Global Goals on their own. They all rely on each other. Sustainable development means balancing all our social, economic and environmental needs together, in a way that we can maintain in the future.

Extension Activities

This is a gamified learning experience that aims to introduce key topics in a playful way. It is recommended that teachers follow-up on this learning experience with more in-depth data education. Here are some from NetApp and World's Largest Lesson.

- **Be A Fact-ivist!**

Introduce data on the Global Goals, visualise it, and share it with the world!
https://be-a-fact-ivist.worldslargestlesson.globalgoals.org/en

- **Dive Into Data on SDG 4**

A data project to explore, handle and visualise global data on school closures at the height of the COVID-19 pandemic
https://worldslargestlesson.globalgoals.org/resource/dive-into-data-on-sdg-4/

- **NetApp Data Explorers**

Preparing teens to thrive and take action in a data-driven world
https://www.netapp.com/esg/social-impact/data-science-education/

- **World's Largest Lesson**

A wide range of resources inspired by the UN Global Goals, to empower students with the knowledge and skills to take action
https://worldslargestlesson.globalgoals.org

NetApp WORLD'S LARGEST LESSON

Educational Standards and Curriculum Links

UNESCO Greening Curriculum Guidance

Alignment with UNESCO Greening Curriculum Guidance (UGCG)
This learning experience offers an interactive way to learn about environmental science, tying directly into the holistic education model advocated by UNESCO. Although it uses imaginary worlds as the setting, the social and environmental problems being solved, and the careers being modelled, mirror those in the real-world.

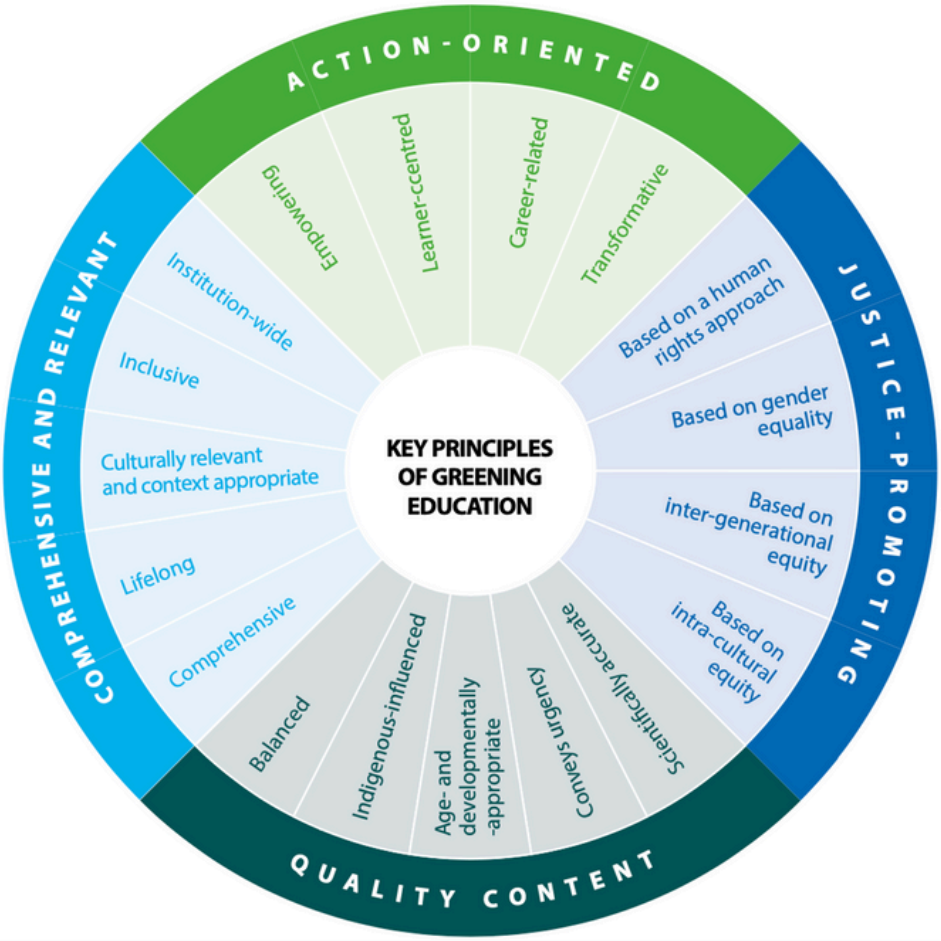
- **Empathy and Environmental Awareness:** By reflecting real-world scenarios the experience encourages a deeper understanding of the interaction between humans and the earth's natural systems, and an emotional connection with these issues.

- **Active and Participatory Learning:** The interactive design embodies UNESCO's focus on participatory learning methods. These methods are crucial for inspiring students to act for sustainability, providing them with the knowledge and skills to make informed decisions and engage in their communities.

- **Data Skills:** The experience develops key data skills identified throughout the UGCG
  - Understanding data: Analysing local and global trends
  - Sourcing data: knowing where to find it and thinking critically about its origin
  - Collecting data: knowing how to gather and handle data, work with local communities, the value of citizen science
  - Communicating data: visualising data, using data to tell a story or send a message

- **Agency and Careers:** All of these skills, knowledge and mindsets are developed through a range of environmental scenarios, so that learners can see how they are applied in real-life situations and careers.

Figure 1: Key principles of greening education



Action-oriented

▶ Empowering: It supports learners' empowerment, self-efficacy and agency by improving their analytical, communication, and other skills, and by supporting the acquisition of relevant knowledge and values for sustainable development and addressing climate change.

▶ Career-related: It incorporates practices or ideas that can be applied to career choices and workplace practices.

Justice-promoting

▶ Based on intra-cultural equity: It develops a vision of environmental, economic, and social justice and fairness across communities and cultures within the current generation.

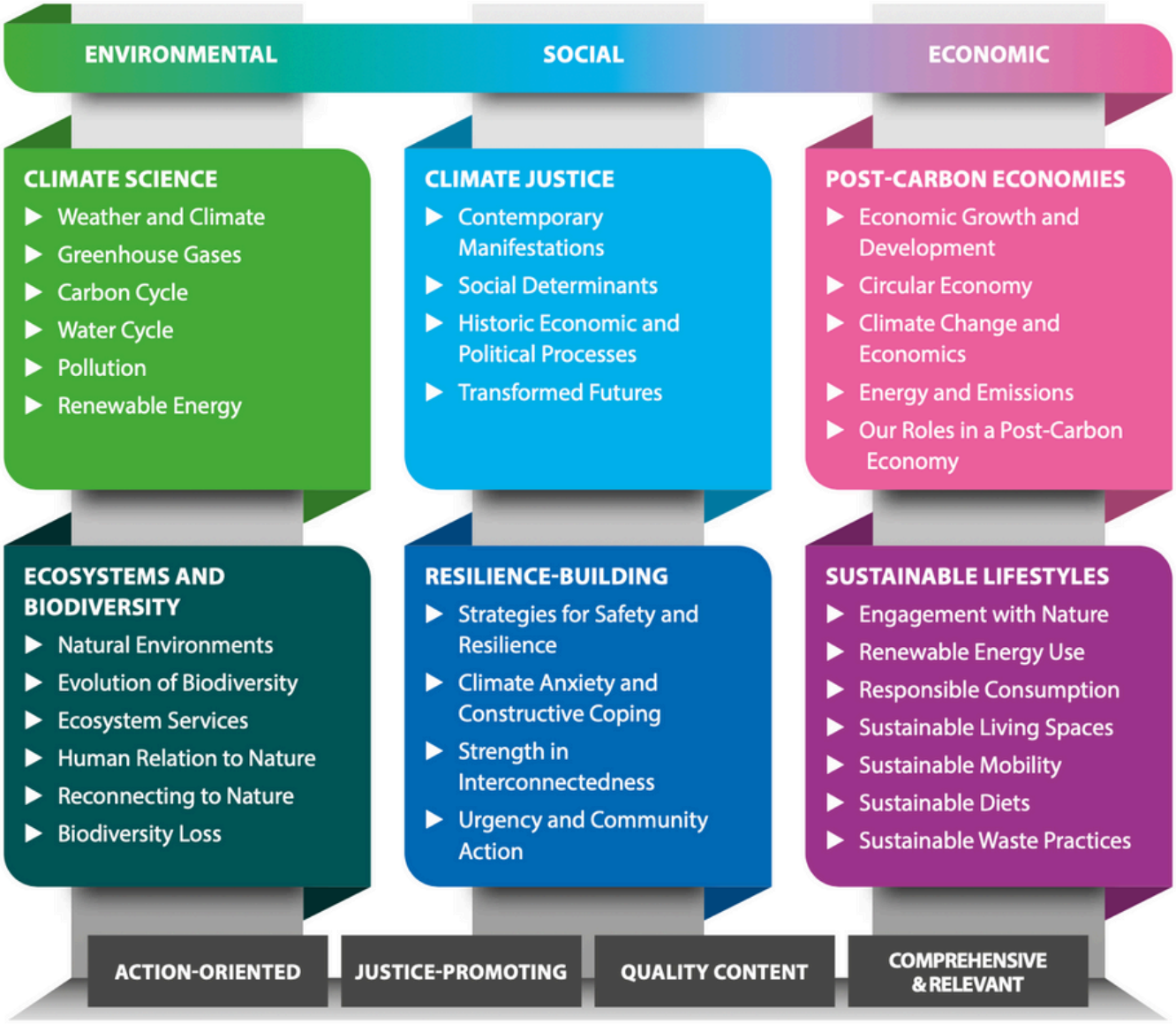
Quality content

▶ Scientifically accurate: The content is based on evidence related to climate change and sustainable development.

▶ Age- and developmentally-appropriate: The content is responsive to the evolving capabilities of the child and young person as they grow.

Comprehensive and relevant

▶ Culturally relevant and context appropriate: It fosters learning outcomes that are relevant to local climate change challenges and solutions, and cultural structures and norms that affect people's choices in addressing sustainable development and climate change.



This learning experience aligns most closely with the Environmental Pillar, especially:

Climate Science
- Greenhouse gases
- Pollution
- Renewable Energy

Ecosystems and Biodiversity
- Natural environments
- Human relation to nature
- Biodiversity loss

However, these problems encountered and solved in each world are contextual, and so have connections across the Social and Economic pillars too.

Next Generation Science Standards

The Next Generation Science Standards (NGSS) provide a framework for teaching science that emphasizes the use of real-world data to explore and address critical issues, including sustainability.

The curriculum links below vary in depth. This Minecraft Learning experience covers the elementary school learning objectives comprehensively, whereas it provides more of an introduction to the middle school objectives.

Curriculum Links with Data Skills in NGSS

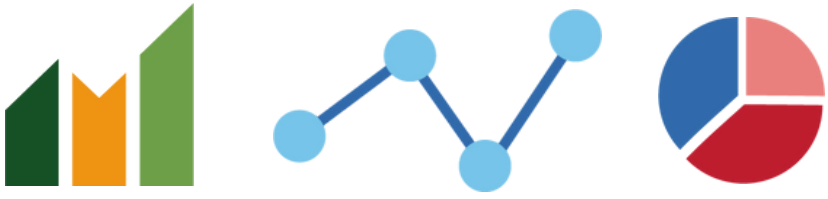
Elementary School (Grades K-5)

- Kindergarten: Students collect and organize simple data (e.g., counting objects, sorting by color), developing basic data analysis skills.
- Grades 1-2: Students continue to collect and organize data, using graphs and charts to represent their findings. They begin to interpret simple data patterns.
- Grades 3-5: Students use data to answer questions and solve problems. They learn to collect, analyze, and interpret data from various sources, including experiments, surveys, and observations.

Middle School (Grades 6-8)

- Grade 6: Students use data to investigate relationships between variables. They learn to use statistical tools, such as mean, median, and mode, to analyze data and draw conclusions.
- Grade 7: Students apply data analysis techniques to solve real-world problems. They learn to use technology to collect, analyze, and represent data.
- Grade 8: Students explore probability and statistical inference. They learn to use data to make predictions and draw conclusions about populations.

Throughout all grade levels, students are encouraged to develop strong data skills to become critical thinkers and problem-solvers. They should be able to collect, analyze, and interpret data to inform their understanding of the world and to make evidence-based decisions.



Curriculum Links with Environmental Sustainability in NGSS

Elementary School

- Kindergarten: Students observe and describe natural phenomena, such as weather and plant growth, and begin to understand the importance of natural resources.

- Grades 1-2: Students study ecosystems and the interdependence of organisms, learning about the role of humans in maintaining a healthy environment. They begin to collect and analyze simple data to understand environmental changes.

- Grades 3-5: Students explore the engineering design process to develop solutions to environmental problems, such as pollution or resource depletion. They analyze data to evaluate the effectiveness of their solutions and consider the impact on ecosystems and society.

Middle School

- Grade 6: Students investigate the structure and function of ecosystems, examining the interdependence of organisms and the flow of energy. They analyze data to identify patterns and trends in environmental systems.

- Grade 7: Students explore the Earth's systems, including the atmosphere, hydrosphere, geosphere, and biosphere. They analyze data to understand the impact of human activities on these systems and propose sustainable solutions.

- Grade 8: Students study energy transfer and conservation, exploring renewable and non renewable energy sources.They analyze data to evaluate the benefits and drawbacks of different energy options and propose strategies for sustainable energy use.

Throughout all grade levels, students are encouraged to use data to inform their understanding of environmental issues and to develop evidence-based solutions for a sustainable future.

GAISE II: Guidelines for Assessment and Instruction in Statistics Education by American Statistical Association

This report outlines guidelines for teaching statistics across all grade levels. While the focus is on statistical concepts, it emphasizes the importance of incorporating real-world data into instruction to address sustainability issues.

Curriculum Links for Elementary and Middle School (GAISE II)

Elementary School (Grades K-5)

- Data Collection and Representation: Students should learn to collect, organize, and represent data using various methods, such as charts, graphs, and tables.
- Data Analysis and Interpretation: Students should be able to describe and interpret data patterns, including identifying trends, comparing and contrasting data sets, and drawing simple conclusions.
- Problem Solving with Data: Students should use data to solve real-world problems, such as determining the most popular snack or analyzing classroom attendance.
- Sustainability Focus: Incorporate data on environmental issues, such as recycling rates, energy consumption, or water usage, to engage students in sustainability topics.

Middle School (Grades 6-8)

- Statistical Inference: Students should learn basic statistical concepts, such as mean, median, mode, and range, to analyze data and make inferences about populations.
- Probability: Students should understand the concept of probability and be able to calculate probabilities of simple events.
- Data Analysis and Modeling: Students should use data to create and interpret models, such as scatter plots and line graphs, to identify relationships between variables.
- Sustainability Focus: Explore sustainability-related data, such as climate change trends, biodiversity loss, or resource depletion, to help students understand the challenges and potential solutions.

By integrating these curriculum links into elementary and middle school instruction, students can develop strong data skills and a deeper understanding of sustainability issues.