Unit description

The *Sustainability in the Cloud* unit introduces students to how cloud computing is driving global sustainability efforts, while highlighting AWS sustainability initiatives. Students investigate key cloud concepts, and have the opportunity to build a “green” data center in a gamified environment, benchmarking their work against sustainability indicators.

This 90-minute unit is broken into two 45-minute modules of presentations, guided demo simulations, vocabulary practice, and gamified simulation activities to help students understand why the cloud is considered a more sustainable computing model, as well as the role large corporations play in spearheading corporate environmental responsibility.

Intended audience

This unit is intended for students and educators:

**Students:**
- At least 13 years or older
- Enrolled in participating AWS Spark secondary school STEM and/or CTE classes

**Educators:**
- Teach STEM and/or CTE classes to eligible secondary school students at a participating AWS Spark school
- Interested in supplemental curricular content designed to highlight the ways in which cloud computing technology is used in the subjects they teach

Recommended delivery method

This unit is designed to be facilitated by an educator in a classroom setting. If necessary, the unit may be delivered in a virtual or “flipped classroom” manner with minimal educator instruction. The unit is accompanied by a detailed Instructor Guide to assist educators with unit delivery.

Prerequisites

We recommend the following prerequisites for students and educators:

**Students:**
- A basic understanding of components of the internet
- Completed *Introduction to the AWS Cloud and Sustainability* unit

**Educators:**

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AWS Spark | *Sustainability in the Cloud* unit

- Completed *Introduction to the AWS Cloud for K-12 Educators* training
- Reviewed the Instructor guide for *Sustainability in the Cloud* unit
- A basic understanding of components of the internet
- A basic understanding of general sustainability concepts

**Technical requirements**

Educators must have:

- Access to a laptop or desktop computer running Windows, Mac or Linux, or a Chromebook
- Access to an internet connection

**Unit and module objectives**

In this unit, students will:

- Recognize the important role in which cloud computing plays in creating a sustainable environment
- Explore key tenets/metrics of global sustainability and corporate social responsibility
- Build an energy-efficient data center via simulation against benchmark indicators
- Apply AWS cloud computing concepts to addressing environmental threats

This unit features two modules, where students should learn and recognize:

**Module 1: Overview of Cloud Computing Model and Sustainable Data Centers**

**Objectives**

- Understand major environmental challenges that may affect cloud computing and data centers
- Describe the basics of cloud computing and AWS technology
- Compare cloud computing with on-premises computing in terms of energy efficiency
- Evaluate the design of a sustainable data center via simulation

**Module 2: Overview of Sustainability Initiatives at Amazon**

**Objectives**

- Articulate key sustainability initiatives at Amazon
- Identify Amazon/AWS technology used in improving the global environment
Course outline

Module 1: Overview of Cloud Computing Model and Sustainable Data Centers (45 minutes)
- **Engage via Simulation:** Major Global Environmental Challenges – Trouble in Paradise
- **Teach:** Sustainable Data Centers
- Overview of traditional data centers vs. the AWS cloud model
- Overview of decarbonizing data centers
- Overview of reducing e-waste
- **Case Study:** Amazon Second Chance
- **Simulation:** Build and Maintain a Data Center
- Check for Understanding

Module 2: Overview of Sustainability Initiatives at Amazon (45 minutes)
- **Engage:** Amazon's Sustainability Framework
- **Teach:** Amazon sustainability case studies – Climate Pledge Arena, Rainforests, and Decarbonization
- **Interactive Activity Challenges:** Rainforest, Decarbonization, and Earthquakes
- Interactive Unit Review
- Check for Understanding