IGNITE MY FUTURE

LANGUAGE ARTS, MATH, SCIENCE, SOCIAL STUDIES

CURRICULUM CONNECTOR

Computational thinking teaches students to apply strategies that computers use to solve real-world problems.

The seven computational thinking strategies equip students with valuable problem-solving skills such as analyzing data in order to make inferences and breaking a problem down into manageable pieces. These engaging and fun standards-aligned resources give you the tools to integrate computational thinking into your classroom.

Computational thinking strategies:

Collecting data

https://www.globe.gov/globe-data

The Global Learning and Observations to Benefit the Environment (GLOBE) Program is a worldwide effort to collect, visualize, and share data between educational institutions and public participants. The resource page above contains links to data entry, visualizing data, and retrieving data. At the Data Entry page, participants can enter environmental data using forms, email, or a downloadable app. The Visualize Data link takes participants to an interactive data map of the world to create charts of data participants have collected. The Retrieve Data link allows participants to pick locations, timeframes, and types of data collected, and then download the data in a spreadsheet.

Lead your students through a project in their geographic area to collect and submit environmental data over time. Students will be able to see the data they reported at www.globe.gov and collect additional data. Have students practice their reading and writing skills by creating and uploading a student research report based on their data at. Use math to find the differences between data points from different locations. Students can include their calculations in their reports.

Connect to: The number system; expressions and equations; weather and climate; integration of knowledge and ideas; science, technology, and society

Analyze data

https://www.cdc.gov/500cities/

The Centers for Disease Control and Prevention (CDC) hosts the 500 Cities Project, which contains data about health and risk factors related to chronic disease to help local areas plan health interventions. Students can view data on a map of the United States and filter it by health conditions and other factors like health outcomes, prevention, and health-related behaviors. Students can find data in their area and analyze the factors that contribute to local health problems. Have students run the City Comparison Report to see how their city compares to other cities in the United States. Students can also download, read, and create a written or oral report on a selected city using the Download Maps for All Measure by City tool.

Use the 500 Cities Data Portal to view specific data reports on a wide variety of factors including social, mental, geographic, and health. Have students visit the Programs and Interventions link and read about ways to improve specific problems reported in their own city. Students can work individually or in groups to create a presentation, such as a public awareness campaign, about a local health issue. Students should explain why their campaign would be effective using evidence from their research.

Connect to: Statistics and probability; human impacts; making connections; human impacts; identifying patterns in data; key ideas and details; science, technology, and society

Find more easy-to-implement resources to integrate computational thinking practices into your classroom by visiting **ignitemyfutureinschool.org**

TATA CONSULTANCY SERVICES | Discovery EDUCATION

Decompose

https://www.nsa.gov/news-features/puzzles-activities/

The National Security Agency (NSA) relies on individuals who can break down and solve problems efficiently. Try your hand at this collection from the NSA's Puzzle Periodical. A variety of NSA mathematicians, engineers, analysts, and managers submit the puzzles. Students will read to break down information and use critical thinking to solve the problems. Keep students on their toes and thinking sharply to solve problems efficiently. The answers are also included near the bottom of each puzzle.

For example, in the March 2017 puzzle, students need to use math skills to figure out the probability of rolling a specific number. Another problem requires students to make connections about related objects or people. Typical word problems such as the May 2017 puzzle require students to break down text information to find the answer. Students can collaborate in small groups to decompose and solve the problems.

After engaging students in decomposing the puzzles, allow them to explore the additional aspects of NSA careers. Students can explore the Science of Security and also read about the NSA Day of Cyber. Students can do additional research into a career that interests them and create a report or presentation. Additionally, have students read kid-friendly biographies under the Krypto Kids section of resources for everyone.

Connect to: Expressions and equations; comprehension and collaboration; presentation of knowledge and ideas; science, technology, and society

Find Patterns

https://health.gov/dietaryguidelines/2015/guidelines/

The Office of Disease Prevention and Health Promotion publishes dietary guidelines to help Americans maintain a healthy lifestyle and make good choices. This includes information about foods and nutrition, as well as diet plans. There is also a section on the Social-Ecological Model for Food and Physical Activity Decisions that displays graphics and data about the impacts of food habits on health.

Engage students in a discussion about their food choices after reading the Key Elements of Healthy Eating Patterns and then have a class discussion in which students collaborate to create a set of rules to improve or maintain their own habits. Find out more about the Science Behind Healthy Eating Patterns and allow students to discover which patterns they follow that scientifically impact their health. After students research the food groups, they can develop a meal plan for healthy living (for example, by planning meals and snacks for a week). Students can study the chart and describe patterns of eating habits in the United States, including percentages and numerical comparisons.

Connect to: The number system; growth, development, and reproduction of organisms; identifying patterns in data; making connections; presentation of knowledge and ideas; science, technology, and society

Abstract

http://gero.usc.edu/udcompetition/

The Morton Kesten Universal Design Competition is hosted by the University of Southern California Leonard Davis School of Gerontology. It challenges students to design a kitchen/living space or product that improves usability for all people. To be successful at the challenge, a space or product must meet the principles of Universal Design, a practice that is founded in reducing complexity and detail to make a product available for many people or applications.

Engage students with the concept of Universal Design by reviewing the most recent winning projects of the competition. View the design concept presentation to understand how the process works. Then, study the principles of Universal Design found at the link under the banner of "What is Universal Design?" and clicking on the color poster version. Challenge students to think like computers by abstracting an object or idea to work for many applications while following the Universal Design Principles. Students can work individually or in small groups to create sketches of their object or idea. Hold a competition to design or repurpose something in the classroom.

Connect to: Ratios and proportional relationships; engineering design; integration of knowledge and ideas; key ideas and details; science, technology, and society

Build models

https://eclipse2017.nasa.gov/

The 2017 Total Solar Eclipse was a monumental event in global history. NASA has developed a website dedicated to resources, events, and activities related to the eclipse. Explore the site to find information about science, safety, community events, projects, and educator resources. The Citizen Science link leads to the Citizen Continental-American Telescopic Eclipse Experiment (CATE), which involves multiple telescopes across America gathering data to be combined for enhanced imagery of the sun's corona. The Events link lists numerous events hosted by museums, libraries, national parks, and even airports.

Take your students in the Citizen CATE project to see enhanced images of the solar corona that took place during the eclipse. Read about eclipse misconceptions, or try to answer questions about strange animal behavior, and then carry out scientific experiments listed at the bottom of the page. Try a geotagging experiment and create a collection of geotags. For multiple math projects, go to the Activities link at the top and choose Citizen Explorers and measure the distance between the Earth and the moon, measure the speed of the lunar shadow, and use linear and quadratic equations to pinpoint historic eclipses crossing with the 2017 eclipse.

Connect to: Ratios and proportional relationships; expressions and equations; space systems; integration of knowledge and ideas; science, technology, and society

Develop algorithms

http://www.gps.gov/

The Global Positioning System website provides information about GPS and how the U.S. government provides it. It includes links to explain what GPS is, how GPS works, and tips to improve GPS in devices. The Applications link on the top menu leads to a wealth of information about how GPS contributes to society around the world. Topics include Agriculture, Aviation, Environment, Marine, Public Safety, Disaster Relief, Rail, Recreation, Roads & Highways, Space, Surveying & Mapping, and Timing.

Students will be able to research and report on a variety of topics by visiting any of the additional links and choosing from the left menu. To read about how algorithms apply to autonomous vehicles, go to this link, which is a PowerPoint presentation on GPS and its use for vehicle control. More information about an algorithm developer provides a glimpse of who writes algorithms for GPS. Have students study the process and information and dive in to writing their own algorithm for the process.

Connect to: Expressions and equations; engineering design; range of reading and level of text complexity; craft and structure; science, technology, and society