STEM@CGI AT HOME

STEM-based activities for kids that can be done at home

Staying active. Learning together. #STEMatHome

"STEM@CGI at Home" offers weekly STEM-based activity packets for children, including practical STEM activities and competitions. Get your family involved, share pictures, learn and have fun!

Smart Cities are a new concept for a lot of us! Before we start exploring Smart Cities, let's define a few terms around the concept:

Smart City – a city or community that uses technology to improve quality of life. Being a "Smart City" can also improve the way that the government works for the people who live inside of it. In Smart Cities, data and technology can help answer questions like, "Where is the best place to build a building for energy efficiency?" What are the best places for the city bus to stop?" and "When should street lights turn on?"

Data - are pieces of information. When we organize data to help us better understand things, we call that **Data Analysis**. When we show data in picture form, we call that **Data Visualization**.

Internet of Things (IoT) - interconnected technologies that often use devices to exchange the collected data from one network to another. Most of our everyday devices are designed and used to collect data all the time.

Examples of IoT devices include – your in-home thermostat from your smart phone, or a fitness device designed to track your heart rate throughout the day.

Examples of Smart City IoT devices – many Smart City IoT devices are sensors. Sensors to tell us about air quality, traffic patterns, open parking spaces and more.

Prototype – a first model of something. Sometimes prototypes are working models and sometimes they are just to show the concept. Prototypes are generally 3D but often much smaller than the actual design. Some prototypes are "**working prototypes**" meaning they are able to actually demonstrate the technology and some are "**non-working prototypes**" meaning they show what the device would look like but not demonstrate the technology.

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Smart Cities and Equity

Simply put equity is fairness. When we think about creating new technology, it is important to think about who that technology is including and whom it may accidently be excluding. For example, think about how this technology will be accessible by and will impact:

- People without internet at home
- People without a smart phone
- People without a computer
- People who are deaf
- People who are blind
- People in a wheelchair
- People without a car
- People who speak a different language

When thinking about a particular Smart City technology think about how to make it equitable.

Activity 1 – Create a prototype of an IoT Smart City device

All ages

Step 1 – think of a problem in your community

Step 2 – think of how technology using data could help solve this problem

Step 3 – write out what this device would do

Step 4 – draw up your idea of what this device might look like

Step 5 – create a non-working prototype of the device

Step 6 – ask yourself how accessible and how equitable your design is. Are there changes you can make that will make the device more accessible and equitable?

Step 7 – Make them!

Activity 2 – Create a Smart City and Silly City

All ages

A tale of two cities

A Smart City makes the best use of its resources to serve its people. A Silly City does not take into account how its resources will serve its people.

Watch this video of CGI Director, Josh Sonnier, giving an example of how Smart Cities use resources to help you think about your city.

Note: remember how we talked earlier about equity and accessibility? We applied that idea when creating this lesson. We know some of you may have a printer and some may not. Because of that, the lesson design allows for completion with or without a printer. It took a little more time and work to create this alternative activity, but it is totally worth it to allow more people to learn from and have fun with this great lesson!

You can participate in this lesson in two ways – physical and digital.

Physical

Step 1 – print out the full sheets provided

Step 2 – color them in as you like

Step 3 – cut out and arrange on a page to create your cities

Step 4 – is there anything you want to include in your city that is missing? If so, draw it in

Step 6 – glue down and voila!

Digital

Step 1 – download the digital images provided

Step 2 – upload to a trusted editing software – we suggest Scratch

Step 3 – digitally edit each image to your liking

Step 4 – save the images

Step 5 – arrange the images as you see fit for your city

Activity 3 – Smart City in Action | LEaRN Air-Quality Sensors

It's time to LEaRN about LEaRN.

This is a great example of a Smart City project in action! Listen to Miss Anne and Josh talk about this great project. Plus, learn how to use the data collected by the LEaRN project.

Parents –

Check out LEaRN on Facebook and Twitter too!

Bonus activities

These activities are aimed at students aged 8 to 14 but everyone can get involved!

Block House

Learn how to make a simple house from a block with Blender.

Blender

This is a first building block to making a digital city.

Citizen Scientist Video

Become a Citizen Scientist and learn how individuals sharing information can improve data.

Video Sensing

Sensors are often used in Smart Cities. Have fun with video sensors in this Scratch project!

Watch for more STEM@CGI at Home ideas next week.
Stay healthy and safe!

For more information or additional support with STEM activities when working remotely, please contact us **here**.

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