BOYS & GIRLS CLUBS OF AMERICA

Building Blocks
Engineering Our Community

STEM TOOL KIT

Professional Development Webinar

Presented By SAMSUNG

BOYS & GIRLS CLUBS OF AMERICA

Building Blocks Engineering Our Community

www.scholastic.com/STEMtoolkit

Welcome to the Building Blocks professional development webinar!

During this 60-minute presentation you'll discover the resources provided along with the Samsung **Galaxy Tab 4** tablets you received at your Club site.

Speakers

- Danielle Johnson, Boys & Girls Clubs of America
- Kiini Salaam, Scholastic Inc.

Overview

The STEM Tool Kit and tablet resources that we will discuss today were developed by Boys & Girls Clubs of America in partnership with Scholastic.

The goal of these resources is to provide Club members with fun and educational ways to engage with the Samsung **Galaxy Tab 4** tablets.

The resources support educational use of the tablets in three ways:

- **STEM Engagement:** Building Blocks Program
- **Reading Materials:** Digital Books
- **Reading Incentives:** Reading Explorer App

Before You Begin

Have you set up your tablets using the *Samsung Galaxy Tab 4 Club Setup Guide*?

The *Samsung Galaxy Tab 4 Club Setup Guide* walks you through setting up the **Samsung Galaxy Tab 4** tablets for Club use.

You can access the *Samsung Galaxy Tab 4 Club Setup Guide* by clicking the link on the right of this screen.

Does anyone have any questions about the setup document? We will collect your information and send your questions to tech support.

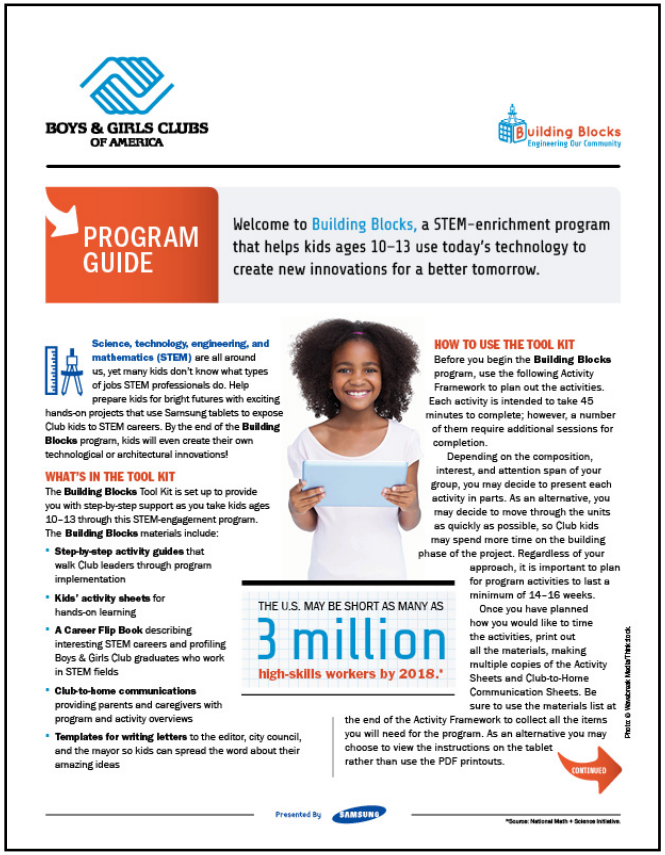
STEM Tool Kit Website

You can find the tablet resources at: **www.scholastic.com/STEMtoolkit**

Program Guide

The Program Guide provides an overview of the topics covered in the activities as well as the structure of the activities.

The Program Guide also provides a materials list so that you can prepare for program implementation.



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Building Blocks Engineering Our Community

PROGRAM GUIDE

Welcome to Building Blocks, a STEM-enrichment program that helps kids ages 10–13 use today's technology to create new innovations for a better tomorrow.

Science, technology, engineering, and mathematics (STEM) are all around us, yet many kids don't know what types of jobs STEM professionals do. Help prepare kids for bright futures with exciting hands-on projects that use Samsung tablets to expose Club kids to STEM careers. By the end of the **Building Blocks** program, kids will even create their own technological or architectural innovations!

WHAT'S IN THE TOOL KIT

The **Building Blocks** Tool Kit is set up to provide you with step-by-step support as you take kids ages 10–13 through this STEM-engagement program. The **Building Blocks** materials include:

- **Step-by-step activity guides** that walk Club leaders through program implementation
- **Kids' activity sheets** for hands-on learning
- **A Career Flip Book** describing interesting STEM careers and profiling Boys & Girls Club graduates who work in STEM fields
- **Club-to-home communications** providing parents and caregivers with program and activity overviews
- **Templates for writing letters** to the editor, city council, and the mayor so kids can spread the word about their amazing ideas

THE U.S. MAY BE SHORT AS MANY AS

3 million

high-skills workers by 2018.*

HOW TO USE THE TOOL KIT

Before you begin the **Building Blocks** program, use the following Activity Framework to plan out the activities. Each activity is intended to take 45 minutes to complete; however, a number of them require additional sessions for completion.

Depending on the composition, interest, and attention span of your group, you may decide to present each activity in parts. As an alternative, you may decide to move through the units as quickly as possible, so Club kids may spend more time on the building phase of the project. Regardless of your approach, it is important to plan for program activities to last a minimum of 14–16 weeks.

Once you have planned how you would like to time the activities, print out all the materials, making multiple copies of the Activity Sheets and Club-to-Home Communication Sheets. Be sure to use the materials list at the end of the Activity Framework to collect all the items you will need for the program. As an alternative you may choose to view the instructions on the tablet rather than use the PDF printouts.

CONTINUED

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*Source: National Math + Science Initiative.

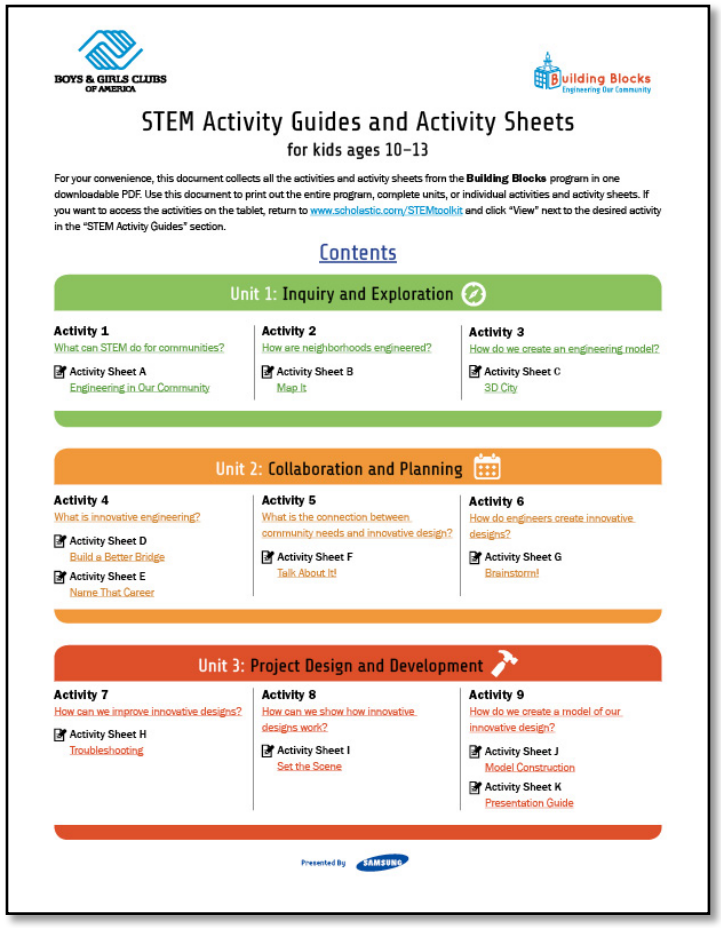
Activity Guides and Activity Sheets

The STEM Activity Guides and Activity Sheets PDF compiles all the activity instructions and activity sheets into one document.

This document is a good resource if you want to read or print out the entire program at once.

Each individual activity guide and activity sheet is available for individual download on the site, and we will have a more in-depth discussion about the activities later in the presentation.

Note: We will also address the STEM Career Flip Book later in the presentation.



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Building Blocks Engineering Our Community

STEM Activity Guides and Activity Sheets

for kids ages 10–13

For your convenience, this document collects all the activities and activity sheets from the **Building Blocks** program in one downloadable PDF. Use this document to print out the entire program, complete units, or individual activities and activity sheets. If you want to access the activities on the tablet, return to www.scholastic.com/STEMtoolkit and click "View" next to the desired activity in the "STEM Activity Guides" section.

Contents

Unit 1: Inquiry and Exploration

Activity 1
What can STEM do for communities?
Activity Sheet A
Engineering in Our Community

Activity 2
How are neighborhoods engineered?
Activity Sheet B
Map It

Activity 3
How do we create an engineering model?
Activity Sheet C
3D City

Unit 2: Collaboration and Planning

Activity 4
What is innovative engineering?
Activity Sheet D
Build a Better Bridge
Activity Sheet E
Name That Career

Activity 5
What is the connection between community needs and innovative design?
Activity Sheet F
Talk About It!

Activity 6
How do engineers create innovative designs?
Activity Sheet G
Brainstorm!

Unit 3: Project Design and Development

Activity 7
How can we improve innovative designs?
Activity Sheet H
Troubleshooting

Activity 8
How can we show how innovative designs work?
Activity Sheet I
Set the Scene

Activity 9
How do we create a model of our innovative design?
Activity Sheet J
Model Construction
Activity Sheet K
Presentation Guide

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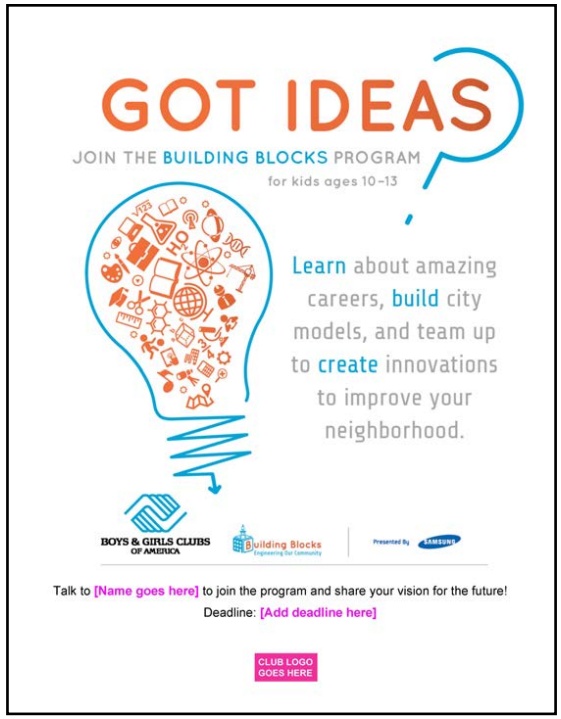
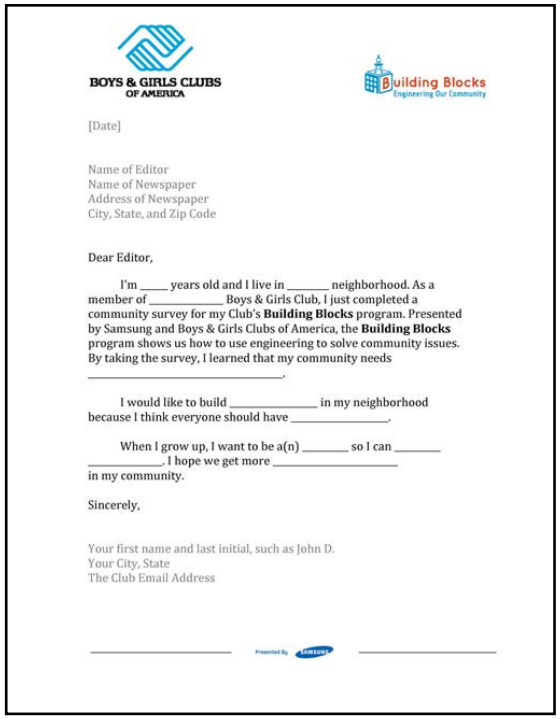
Program Communications

The Program Communications are customizable files that allow Club leaders to communicate with parents, local Club members, and the community.





Customizable Program Flyer

The Customizable Program Flyer can be posted at your local Club site to advertise the program to Club members. It is a Word doc, with space (highlighted in pink) to add a staff name, an application deadline, and a Club logo.

Club-to-Home Communication Sheets

The Club-to-Home Communication Sheets provide valuable information about the program for parents and caregivers. There are four sheets: one general sheet about the program, and three sheets aligned with the three units. The program overview should be sent home as soon as you've identified a Club member to participate in the program. The remaining Communication Sheets should go home when you begin each unit.

In addition to outlining what children will learn in each Unit, the sheet profiles BGCA alumni who are currently STEM professionals or are studying to become STEM professionals. The sheets also provide conversation starters to support parents in helping their child gain a deeper understanding of program concepts.

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Building Blocks Engineering Our Community

Club-to-Home Communication:
PROGRAM OVERVIEW

Get ready to discover the engineer in your child!

Dear Parents and Caregivers,

We're delighted to welcome your child into an exciting new Boys & Girls Clubs program about career skills, technology, and communities. Presented by Samsung, the **Building Blocks** program gives your child a chance to participate in hands-on projects, showcase his or her ideas, and prepare for a brighter future.

We know activities that involve problem solving and critical thinking better prepare kids for academic and social success.

We can't wait to work with your child to identify community challenges and help him or her brainstorm creative solutions.

Sincerely,

[Insert Club Name]

CLUB LOGO GOES HERE

About the Program

The goal of the **Building Blocks** program is to spark your child's imagination! The program will expose your child to:

- science, technology, engineering, and math careers—also known as STEM careers
- innovative technology and engineering that improve daily life
- graduates of Boys & Girls Clubs who are STEM professionals or in college

How You Can Get Involved

Ask your child about the learning activities in the **Building Blocks** program. Talk about the things that could be improved in your community and help your child brainstorm solutions. Each conversation you have with your child about new thoughts and possibilities will help to:

- build confidence in his or her ideas
- strengthen critical thinking
- support healthy self-esteem

Meet a Boys & Girls Club Alum Scientist!

Martha Olang, Forensic Scientist in Training

Science-related career: Major in forensic science at Chaminade University of Honolulu, with a focus on fingerprint analysis and crime scene investigation

On overcoming challenges: School was difficult for me. My mother only spoke Spanish, so it was hard for her to help with my homework. When I joined the Boys & Girls Club, I was able to get help. Also, I've had to overcome stereotypes because Hispanic women are underrepresented in STEM fields. I am determined to change that.

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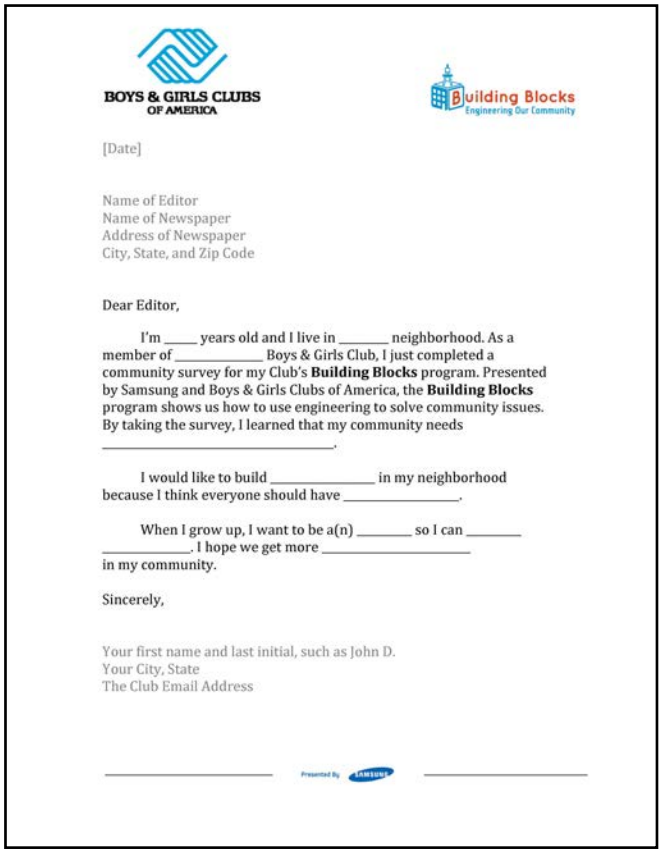
Outreach Letter Templates

Each unit provides Club members with the opportunity to share what they have been learning. There are templates for letters that Club members can write to newspapers, city council representatives, and mayors.

This optional letter-writing extension offers members a chance to use real-world communication skills and possibly drum up some support for their STEM projects.



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Building Blocks Engineering Our Community

[Date]

Name of Editor
Name of Newspaper
Address of Newspaper
City, State, and Zip Code

Dear Editor,

I'm _____ years old and I live in _____ neighborhood. As a member of _____ Boys & Girls Club, I just completed a community survey for my Club's **Building Blocks** program. Presented by Samsung and Boys & Girls Clubs of America, the **Building Blocks** program shows us how to use engineering to solve community issues. By taking the survey, I learned that my community needs _____.

I would like to build _____ in my neighborhood because I think everyone should have _____.

When I grow up, I want to be a(n) _____ so I can _____ _____. I hope we get more _____ in my community.

Sincerely,

Your first name and last initial, such as John D.
Your City, State
The Club Email Address

Why STEM?

OF 15 MAJOR CAREER CATEGORIES,
ENGINEERING HAS THE
HIGHEST MEDIAN EARNINGS,
YET LESS THAN 20% OF STUDENTS
CHOOSE A STEM PATH.
—NATIONAL MATH + SCIENCE INITIATIVE

STEM enrichment can:

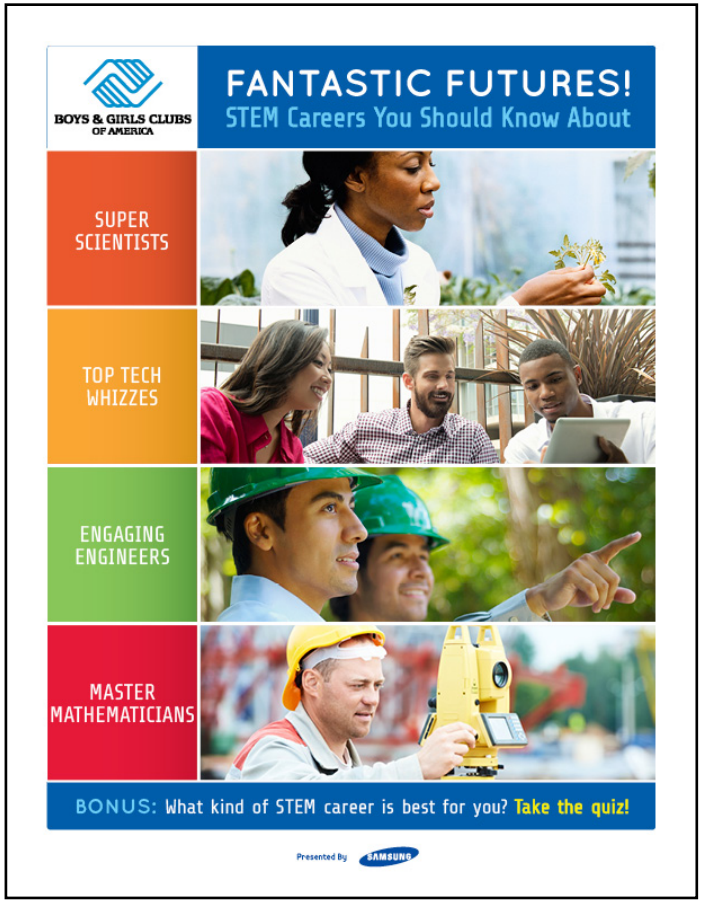
- Open the eyes of Club members to new careers.
- Support academic growth and participation.
- Awaken inventiveness, curiosity, and engagement.

STEM Career Flip Book

Careers in science, technology, engineering, and math may seem foreign to some Club members. The STEM career flip book provides a quick snapshot of a wide range of STEM careers.

Emphasize to your Club group that kids just like them grow up to be STEM professionals. Share the stories of four BGCA alumni who are succeeding in STEM fields using their profiles in the STEM Career Flip Book.

Note: You can use the "View" link to review the careers in flip book mode on screen or you can click "Download the Flip Book" to print out the overview of STEM careers.



Building Blocks Program Overview

Building Blocks is a hands-on program that provides an introduction to engineering by inspiring Club members to create a concept for innovative engineering that could improve their communities.

The program has three units: Inquiry and Exploration; Collaboration and Planning; and Project Design and Development. Within each unit are three activities that take Club members through different elements of the engineering and design process using digital apps, group discussions, and building activities.

Unit 1: Members use the tablets and mapping activities to learn about civil engineering in the world around them.

Unit 2: Members study existing examples of innovative engineering and create their own innovative engineering ideas.

Unit 3: Members learn to improve and present their ideas.

Preparing to Teach Building Blocks

Timing and Pacing

You'll need a minimum of 12 sessions to complete the Building Blocks program. Some groups may need to move at a slower pace, while other groups may move through the activities quickly, and spend more time on the building and presentation phases of the project.

45-Minute Sessions

All activities are intended to be completed in 45-minute sessions. Some activities will only take 45 minutes to complete; others will take three or four 45-minute sessions. It will be helpful to skim the entire program in advance of your start date so you can have a general sense of how the program is organized and what it will require.

Downloading and Viewing Program Materials

Based on your comfort level, you can view the materials in print or on screen.

Print: All the materials are available through a downloadable file format that can be saved and printed. Use the "Download" link if you want to print materials for your own review or if you want to print activity sheets for the Club members.

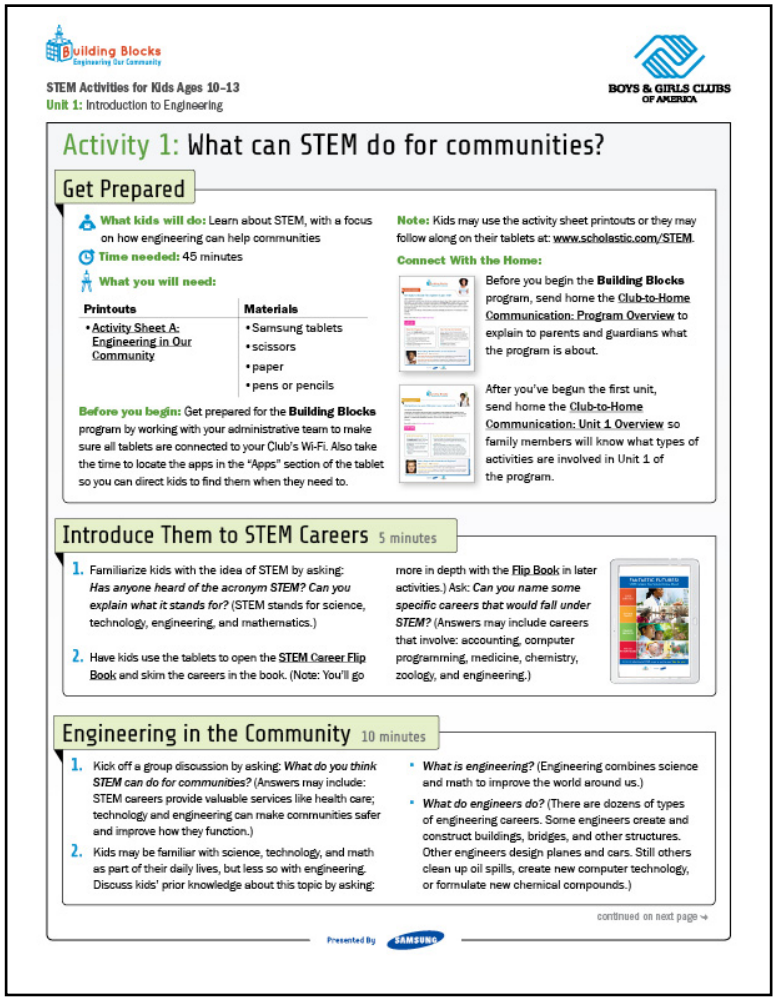
On Screen

If you want to view the materials on the tablet, use the "View" link next to the appropriate activity.

Activity Instructions

Each activity has full, step-by-step activity instructions with the following features:

- The central question appears at the top of each activity lesson page.
- Each activity is broken into sections with the amount of time each section should take.
- Activity instruction pages have links to tablet resources and other program materials.



Building Blocks Engineering Our Community

BOYS & GIRLS CLUBS OF AMERICA

STEM Activities for Kids Ages 10–13
Unit 1: Introduction to Engineering

Activity 1: What can STEM do for communities?

Get Prepared

What kids will do: Learn about STEM, with a focus on how engineering can help communities

Time needed: 45 minutes

What you will need:

Printouts	Materials
• Activity Sheet A: Engineering in Our Community	• Samsung tablets • scissors • paper • pens or pencils

Before you begin: Get prepared for the **Building Blocks** program by working with your administrative team to make sure all tablets are connected to your Club's Wi-Fi. Also take the time to locate the apps in the "Apps" section of the tablet so you can direct kids to find them when they need to.

Note: Kids may use the activity sheet printouts or they may follow along on their tablets at: www.scholastic.com/STEM.

Connect With the Home:

Before you begin the **Building Blocks** program, send home the Club-to-Home Communication: Program Overview to explain to parents and guardians what the program is about.

After you've begun the first unit, send home the Club-to-Home Communication: Unit 1 Overview so family members will know what types of activities are involved in Unit 1 of the program.

Introduce Them to STEM Careers 5 minutes

1. Familiarize kids with the idea of STEM by asking: *Has anyone heard of the acronym STEM? Can you explain what it stands for?* (STEM stands for science, technology, engineering, and mathematics.)
2. Have kids use the tablets to open the STEM Career Flip Book and skim the careers in the book. (Note: You'll go more in depth with the Flip Book in later activities.) Ask: *Can you name some specific careers that would fall under STEM?* (Answers may include careers that involve: accounting, computer programming, medicine, chemistry, zoology, and engineering.)

Engineering in the Community 10 minutes

1. Kick off a group discussion by asking: *What do you think STEM can do for communities?* (Answers may include: STEM careers provide valuable services like health care; technology and engineering can make communities safer and improve how they function.)
2. Kids may be familiar with science, technology, and math as part of their daily lives, but less so with engineering. Discuss kids' prior knowledge about this topic by asking:
   - *What is engineering?* (Engineering combines science and math to improve the world around us.)
   - *What do engineers do?* (There are dozens of types of engineering careers. Some engineers create and construct buildings, bridges, and other structures. Other engineers design planes and cars. Still others clean up oil spills, create new computer technology, or formulate new chemical compounds.)

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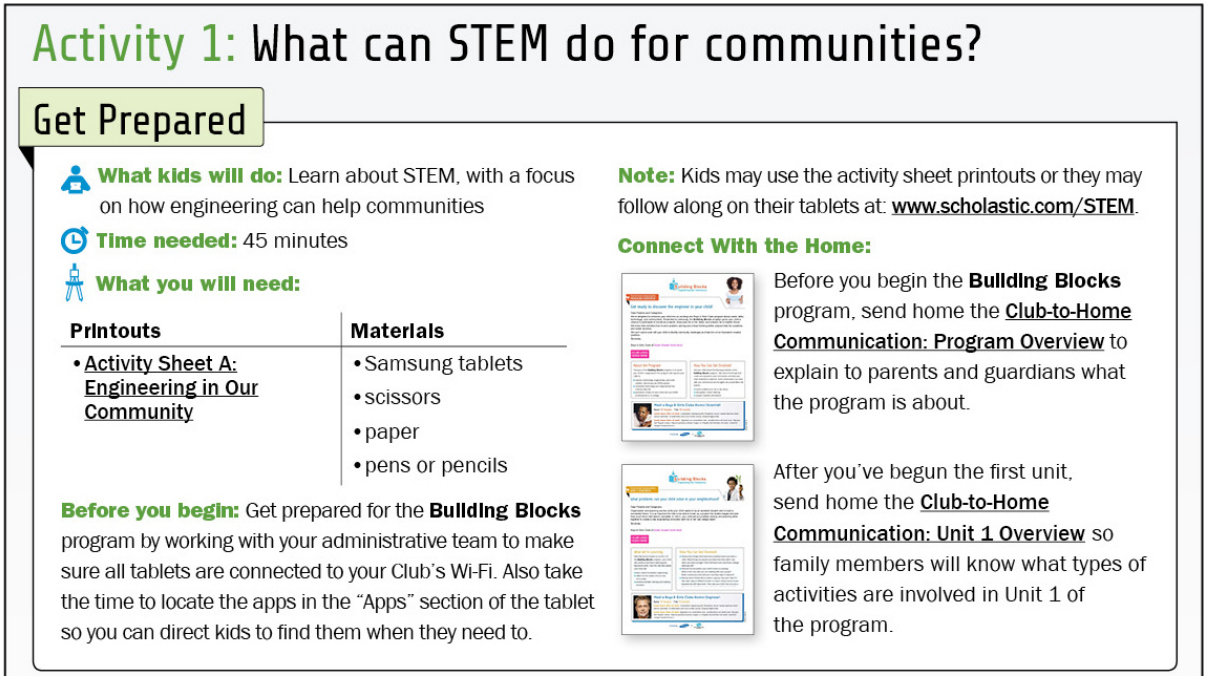
Materials Required

A complete list of materials is included in the Program Guide. Materials are also listed at the beginning of each lesson, including any related program materials such as Club-to-Home Communications.



Activity 1: What can STEM do for communities?

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Note: Kids may use the activity sheet printouts or they may follow along on their tablets at: www.scholastic.com/STEM.

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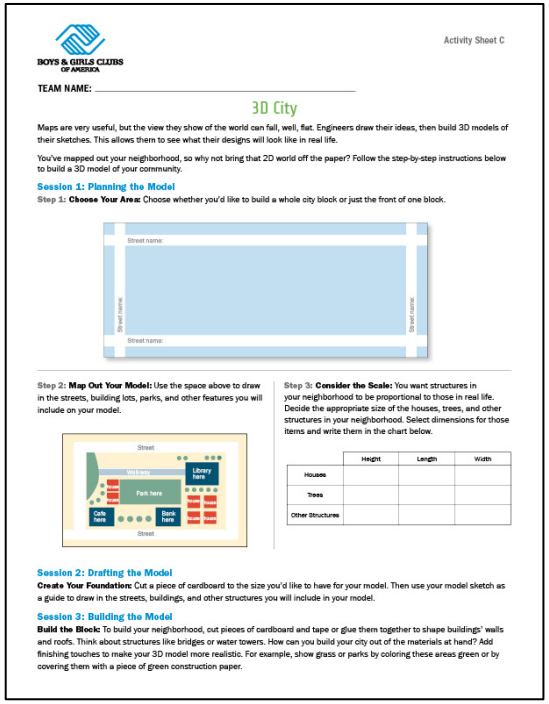
After you've begun the first unit, send home the Club-to-Home Communication: Unit 1 Overview so family members will know what types of activities are involved in Unit 1 of the program.

Activity Sheets

Each activity has a Club member activity sheet that can be downloaded and printed, or a set of instructions that Club members can follow on the tablets.

Activity Sheet



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Activity Sheet C

TEAM NAME: _____

3D City

Maps are very useful, but the view they show of the world can fall, well, flat. Engineers draw their ideas, then build 3D models of their sketches. This allows them to see what their designs will look like in real life.

You've mapped out your neighborhood, so why not bring that 2D world off the paper? Follow the step-by-step instructions below to build a 3D model of your community.

Session 1: Planning the Model

Step 1: Choose Your Area: Choose whether you'd like to build a whole city block or just the front of one block.

Street name:
Street name:
Street name:
Street name:

Step 2: Map Out Your Model: Use the space above to draw in the streets, building lots, parks, and other features you will include on your model.

Street
Vacant
Library here
Park here
Cafe here
Bank here
Street

Step 3: Consider the Scale: You want structures in your neighborhood to be proportional to those in real life. Decide the appropriate size of the houses, trees, and other structures in your neighborhood. Select dimensions for those items and write them in the chart below.

	Height	Length	Width
Houses			
Trees			
Other Structures			

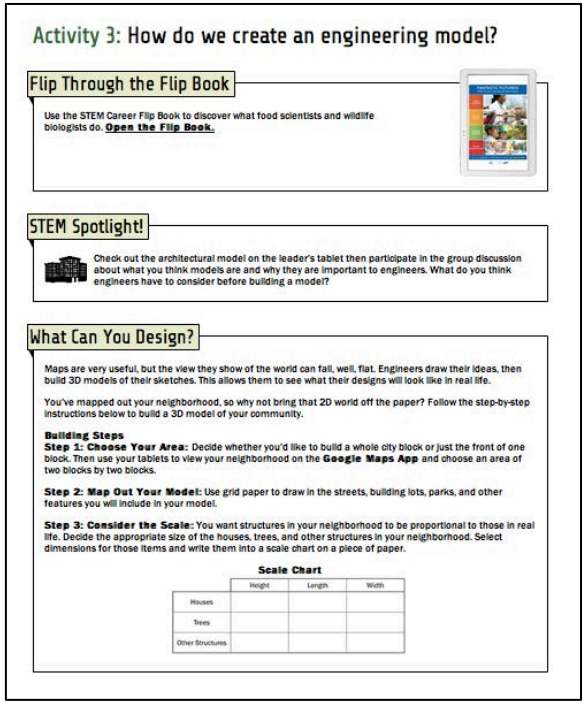
Session 2: Drafting the Model

Create Your Foundation: Cut a piece of cardboard to the size you'd like to have for your model. Then use your model sketch as a guide to draw in the streets, buildings, and other structures you will include in your model.

Session 3: Building the Model

Build the Block: To build your neighborhood, cut pieces of cardboard and tape or glue them together to shape buildings' walls and roofs. Think about structures like bridges or water towers. How can you build your city out of the materials at hand? Add finishing touches to make your 3D model more realistic. For example, show grass or parks by coloring these areas green or by covering them with a piece of green construction paper.

Activity Instructions for Tablet



Activity 3: How do we create an engineering model?

Flip Through the Flip Book

Use the STEM Career Flip Book to discover what food scientists and wildlife biologists do. **Open the Flip Book.**

STEM Spotlight!

Check out the architectural model on the leader's tablet then participate in the group discussion about what you think models are and why they are important to engineers. What do you think engineers have to consider before building a model?

What Can You Design?

Maps are very useful, but the view they show of the world can fall, well, flat. Engineers draw their ideas, then build 3D models of their sketches. This allows them to see what their designs will look like in real life.

You've mapped out your neighborhood, so why not bring that 2D world off the paper? Follow the step-by-step instructions below to build a 3D model of your community.

Building Steps

Step 1: Choose Your Area: Decide whether you'd like to build a whole city block or just the front of one block. Then use your tablets to view your neighborhood on the **Google Maps App** and choose an area of two blocks by two blocks.

Step 2: Map Out Your Model: Use grid paper to draw in the streets, building lots, parks, and other features you will include in your model.

Step 3: Consider the Scale: You want structures in your neighborhood to be proportional to those in real life. Decide the appropriate size of the houses, trees, and other structures in your neighborhood. Select dimensions for those items and write them into a scale chart on a piece of paper.

Scale Chart

	Height	Length	Width
Houses			
Trees			
Other Structures			

Club Member Activity Home Page

If you'd like to teach the materials on the tablet, groups of kids can access digital activity instructions at: www.scholastic.com/STEM. This home page provides the activity materials in a tablet-ready format.

Unit 1 Activities

Unit 1—Inquiry and Exploration

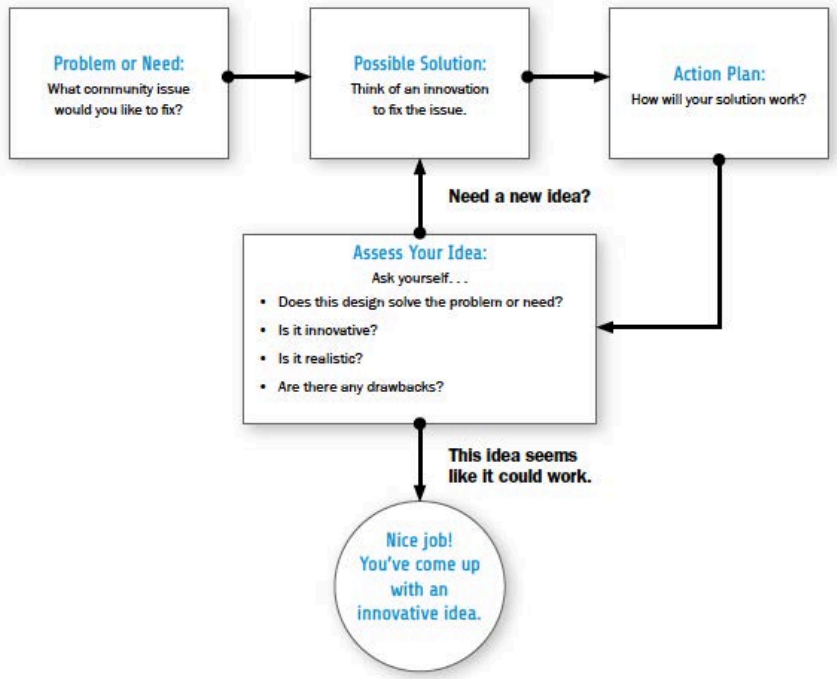
Activity 1 (45 minutes):
- Learn about STEM careers.
- Create digital cartoons about their community.
- Reflect on the needs of their community.

Activity 2 (two 45-minute sessions):
- Learn about civil engineering.
- Practice mapping their neighborhoods.

Activity 3 (three to four 45-minute sessions):
- Build 3-D models of their neighborhoods.
- Write letters to the editor about what they learned (optional).

Unit 2 Activities

Unit 2—Collaboration and Planning



Activity 4 (three 45-minute sessions):
- Learn about innovative designs worldwide.
- Practice building a strong structure.

Activity 5 (45 minutes):
- Make connections between innovative design and community needs.
- Identify community needs in their neighborhood.

Activity 6 (45 minutes):
- Create innovations to address community problems.
- Write letters to the city council outlining their ideas for improving their communities (optional).

Unit 3 Activities

Unit 3—Project Design and Development

Activity 7 (45 minutes):
- Troubleshoot their innovations and create solutions for design problems.

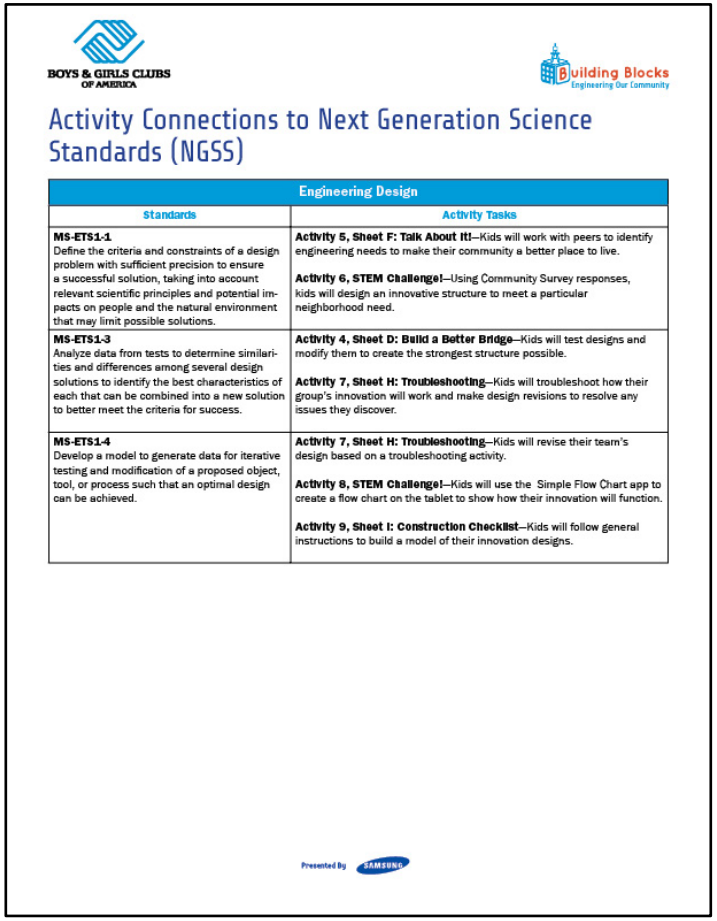
Activity 8 (one to two 45-minute sessions):
- Create flowcharts that detail how their innovations will work.
- Develop storyboards that show their innovations in action (optional).

Activity 9 (one to two 45-minute sessions):
- Build models of their innovations.
- Develop a presentation to introduce their innovations to others (optional).
- Write letters to the mayor about their projects (optional).

Academic Standards

For your reference, we've compiled a academic standards charts that provide a list of skills that the STEM Tool Kit activities support. The academic standards referenced are:

- Common Core State Standards
- Next Generation Science Standards
- Texas Essential Knowledge and Skills Standards



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Building Blocks Engineering Our Community

Activity Connections to Next Generation Science Standards (NGSS)

Engineering Design	
Standards	**Activity Tasks**
MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	**Activity 5, Sheet F: Talk About It!**—Kids will work with peers to identify engineering needs to make their community a better place to live. **Activity 6, STEM Challenge!**—Using Community Survey responses, kids will design an innovative structure to meet a particular neighborhood need.
MS-ETS1-3 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	**Activity 4, Sheet D: Build a Better Bridge**—Kids will test designs and modify them to create the strongest structure possible. **Activity 7, Sheet H: Troubleshooting**—Kids will troubleshoot how their group's innovation will work and make design revisions to resolve any issues they discover.
MS-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	**Activity 7, Sheet H: Troubleshooting**—Kids will revise their team's design based on a troubleshooting activity. **Activity 8, STEM Challenge!**—Kids will use the Simple Flow Chart app to create a flow chart on the tablet to show how their innovation will function. **Activity 9, Sheet I: Construction Checklist**—Kids will follow general instructions to build a model of their innovation designs.

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Digital eBook Library

In addition to the STEM Tool Kit engagement, members will have the opportunity to practice their literacy skills with an ebook Library of Scholastic books. The books cover a range of reading levels and interests.

You can access both the Book List and the Overview and Setup Guide on the tool kit website at **www.scholastic.com/STEMtoolkit**.

Additional Tablet Resources

eBook Library: Overview and Setup Guide . . . . . Coming Soon

eBook Library: Book List . . . . . Coming Soon

Reading Explorer App Overview . . . . . Download

Reading Explorer App

This app—created solely for Boys & Girls Clubs by Samsung and Scholastic—encourages reading with digital rewards.

How It Works

Before reading, Club members will:

- Tap the Reading Explorer app icon.
- Find their username.
- Start the timer.
- As they read, the app will track their times and provide digital rewards for reaching reading milestones.

Reading App Digital Rewards

As Club members read, the Reading Explorer will discover new STEM careers, changing his clothing and background to fit his new career.

Challenge the members in your group to discover all 10 careers.

Archaeologist

Architect

Astronaut

Automotive Engineer

Chemist

Computer Programmer

Financial Analyst

Mathematician

Surveyor

Web Designer

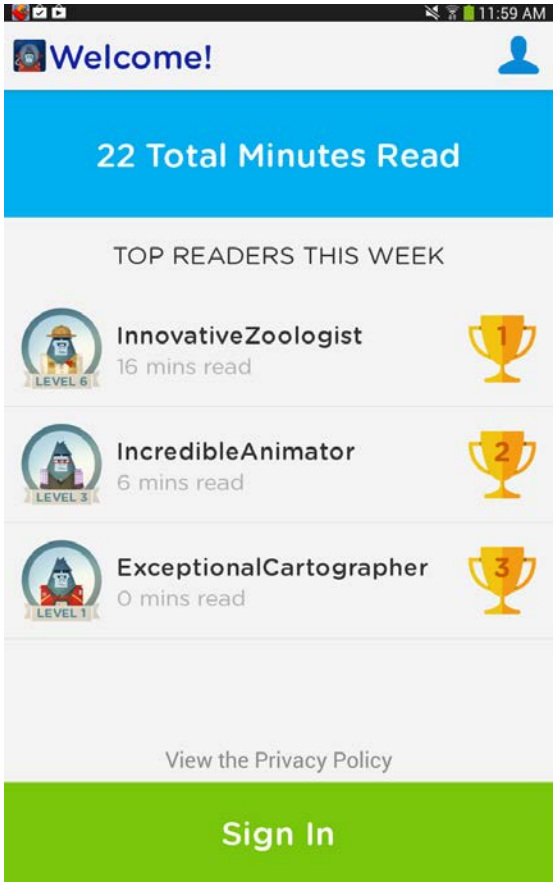
Tracking Reading

Every Club member has a unique username created by the app.

The time each member spends reading for the current week is always displayed along with their username. The three members who did the most reading for the week will appear on the Top Readers list every week.

For further tracking, tap the administrator icon in the top right corner of the app screen, and enter the preset password: **read**.

Top Readers Screen

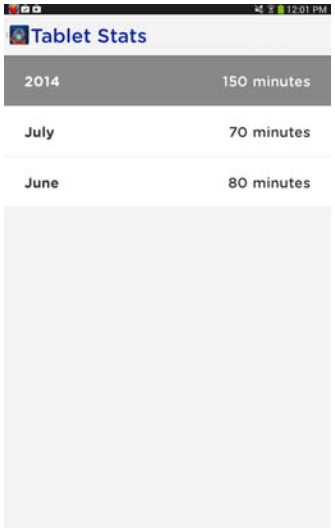


Tablet Stats

On the administrator screen, you can track the reading stats of individual readers, as well as the overall stats of all the reading that was done on the tablet.

Individual User Stats

Tablet Stats



NOTE: Please refer to the Reading Explorer App Overview on the Tool Kit homepage for more information about the Reading Explorer app.

QUESTIONS?