



# Curriculum Development Guide

**Developed by the Fall 2023  
Curriculum Interns**



# TABLE OF CONTENTS

Overview.....	1
Components.....	2
Best Practices.....	3
Lesson Planning Tips & Tricks.....	6
Templates and Resources.....	7
Girls Code the World Example Lessons.....	9
Producing Your Lesson.....	10



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# OVERVIEW

We invite all employees, partners, and volunteers to consider their own passions in STEM and mobilize that into lesson plans that we can implement in our programs.

Don't have experience designing curriculum? Don't worry! We have resources and step-by-step guides for you so you will be successful no matter what your current knowledge is.



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# COMPONENTS

1. Choose a topic
2. Develop a clear objective: what will students will accomplish or understand at the end of the lesson?
3. Prep/Materials: what is needed for the lesson to move smoothly?
4. Warm-up/Intro to Lesson: what background information is important
5. Activity/Procedures: what are the steps that you will take to successfully take students through the lesson?
6. Wrap-up/Conclusion: How will you end the lesson? How will you evaluate that the students understood your objective?



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# BEST PRACTICES

## **Always research the science behind the activity, but think about ways to express it in kid-friendly terms**

The main objective of these lessons are supporting young girls to develop positive attitudes toward science. However, research the science concepts behind the activity in case students pose questions about it and use kid friendly terms.

## **Consider potential modifications**

Consider pre-requisite knowledge & skill(s) to engage in the activity. Do not assume any familiarity with the material. You should always think about the target grade level.

In case you run out of time, think ahead about a meaningful place to wrap up the activity. Consider extra challenges for early finishers.

Think about how to give extra support to strugglers and think about how to challenge the early finishers. Consider where is the meaningful place to stop if the activity takes more time than expected.



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## **Connect the activities with the bigger picture**

Relate activities to students' lives or everyday life. Always connect activities with the bigger picture. For example, for 3D printing, talk about how 3D printing tech can be helpful in everyday life.

Relate the activities to bigger ideas about doing science. Connect activities to bigger ideas about doing science.

For example, in the Scratch lesson plan students are remixing pre-existing codes. This could be a nice time to address how doing science is a social enterprise that scientists do not work in isolation they rather work in close collaboration. For example, it is a common practice in computer science to make changes on a pre-existing code prepared by another computer scientist.

## **Think about ways to increase student interaction**

Always encourage student collaboration. Do not save argumentation to the last, let students share their hypotheses & ask them questions throughout the activity.

Encourage students to show their works to others and reflect on them at the end of the class. Scientists work in collaboration not in isolation! Let students collaborate and share their results.



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Discussion and reflection part can be improved. In some of the lesson plans, students complete reflections in their workbooks at the end. However, always see benefits in a verbal reflection so that other students can learn from each other's experiences.

Let students share their work with each other at the end.

### **Seek for the coherence**

Make sure to revisit the ideas you started with There are coherence issues from time to time. To solve this issue, what is addressed at the beginning of the class can be revisited at the end of the class.

For example, in “Introduction to Engineering” lesson, students learn about the engineering design process. Later at the end of the activity, it would be better if students revisit the steps of the engineering design process and reflect on how they used these steps in their design.





# LESSON PLANNING TIPS AND TRICKS

## DO'S

Include a lesson objective (clear goal), procedures to achieve the lesson objective, materials that will be needed, and an assessment task to check for understanding.

Maintain a similar lesson approach each day. Students appreciate routine and structure, and tend to respond well when they know what procedures to expect.

Put your own style and personality into each lesson. You are the facilitator of student learning-they will love to learn what you are introducing to them!

## DONT'S

Be afraid to change a part of your original plan as needed! Sometimes a lesson will take a turn in a different direction- sometimes it's helpful to just go with it!

Speak too quickly or feel the need to rush through a lesson or activity. Be sure to pause for questions and allow time for students to interact with you and each other.







# TEMPLATES AND RESOURCES

## Template

Make a copy of this template to be able to make a lesson plan.

[Lesson Plan Template Here →](#)

## Resources

Here are some Best Practices for Designing and Implementing Lessons. Here is a database with website sources to help get inspiration for lessons.

## Lesson Style Inspiration

For tons of lessons: Teach Engineering

For great video sources: PBS Learning Media

For simulations: PhET

For using household materials: Science Snacks | Exploratorium and Toys from Trash

## Lesson Topic Inspiration

Coding: Scratch, Code.org, Pencil Code

Computer Science: PaTTAN Computer Science

Engineering and Science: Engineering Classroom

Resources | NSF, For Educators - NASA, WorldWide Telescope



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## **Curriculum Sets and Ideas**

### Topics – TechGirlz

These are lesson plans that have a variety of focuses on technology and STEM. Make sure to cite your sources and convert into our template.

### Science in Action - CuriOdyssey

This is a collection of science-at-home activities students can work on. Make a lesson plan that includes these videos and the recommended materials.

### STEM2D.org

This site originates from a free Johnson and Johnson resource center; they have given us a grant and let us know that all of their lessons are free to use and include.

### Educator Guide: STEM Activities for Families |

#### NASA/JPL Edu

Pre-made, easy, and fun lesson plans that just need to be transformed into our templates

### Lesson Plans | NSTA

Includes pre-made lesson plans!

### Teachers Pay Teachers

You can use these free pre-made lesson plans made by teachers to ensure cohesive curriculum across the week by adapting a few lesson plans instead of just one!



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# GIRLS CODE THE WORLD EXAMPLE LESSONS

## **Clean Water Science Filtration Experiment**

[Lesson linked here](#) →

## **Bristlebot Building**

[Lesson linked here](#) →

## **Science Behind Slime: Virtual Format**

[Lesson linked here](#) →

## **Girls Code the World Video Tutorials**

We have made some of our own video tutorials to line up with our lesson plans. Check out our [video tutorials](#).





# PRODUCING YOUR LESSON

## Where to send lessons for approval

Reach out to our Director of Curriculum, Kristen Aballa, at [curriculum@girlscodetheworld.org](mailto:curriculum@girlscodetheworld.org) to get it reviewed.

kristen will offer feedback and additional resources. She aims to have lessons reviewed within a week of you sending them to her.

## Who to ask for help

Reach out to our Co-President and Founder, Sydney Gibbard, at [sydney@girlscodetheworld.org](mailto:sydney@girlscodetheworld.org). Reach out to our Director of Curriculum, Kristen Aballa, at [curriculum@girlscodetheworld.org](mailto:curriculum@girlscodetheworld.org).

Both are willing to provide support and additional resources.



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