

# Integrating Coding Instruction Across the Content Areas with Young Learners

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*Hempfield School District and  
Harrisburg Area Community College*

*@ IU13 Elementary Technology Conference  
Wiki: [goo.gl/dZfrbE](https://goo.gl/dZfrbE)*

# What's In It For Me (WIIFM)

Young learners become familiar with computer science by participating in integrated, unplugged coding activities.

Young learners can learn to code through hands-on activities that are unplugged from technology. Further, the foundational ideas of coding can be integrated across the content areas.

At the end of the session, K-3 teachers will have a toolbox of coding activities to use with their students.



# **AGENDA**

- **Introduction**
- **Overview of Coding**
- **Coding Activities Across Content Areas**
- **Wrap-Up Discussion**

# Padlet

How do you use coding in your  
classroom?



Password: IU13

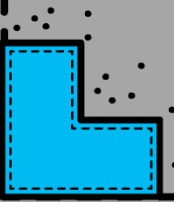
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# What is Coding?

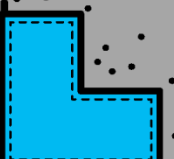
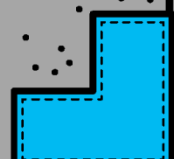
Coding is telling computers what to do. Computers follow list of instructions (code) written by a coder or programmer. The instructions have to be written using rules so the computer understands (DK Let's Find Out, 2017).

Coding allows you to become fluent with technologies to express yourself and express your ideas (Resnick, 2017).





# What are the benefits of coding?

- Coding teaches problem-solving, creativity, and communication skills (Pinola, 2013).
  - Teaching students to code helps the students thrive in the ever changing world (Pinola, 2013).
  - It teaches students how to troubleshoot (Tahnk, 2015).
- 
- 

# iGeneration

- We are teaching the iGeneration (Ross, 2017).
- iGeneration include children and teens born in the new millennium who are defined by technology and media use. They love electronic communication and they multitask (Ross, 2017).
- The I represents individualized technology devices (Ross, 2017).
- How do iGens use their technology:  
We need to move away from just passive (browsing, gaming, and texting).
- Familiar using technology, but not express themselves.
- “They can read, but can’t write with technology” (Resnick, 2017).

# Great Resource



Curriculum Guide  
and  
Unplugged Lesson Plans

## Computer Science Fundamentals Courses A-F



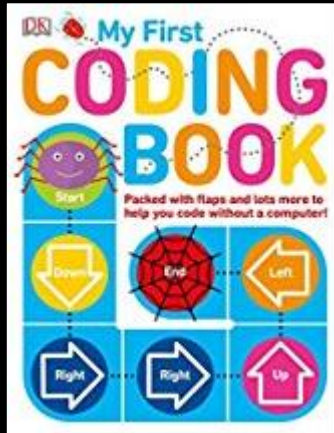
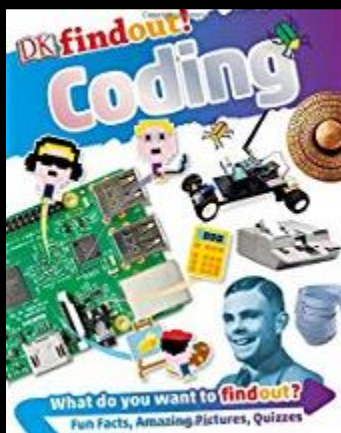
Course A	Course B	Course C	Course D	Course E	Course F
Designed for Kindergarten	Designed for 1st Grade	Designed for 2nd Grade	Designed for 3rd Grade	Designed for 4th Grade	Designed for 5th Grade



# Go Beyond Hour of Code!

## How do we start?

- Introduce and Post Vocabulary
- Read Coding Books/Passage
- Activities to Develop Background



Dear American Generation,

Your generation is marked with an "i" indicating that you have access to individualized technology devices. You are a part of a group of children and teens born in a new millennium. You use technology and media to multitask and communicate. Most of you would consider yourself savvy and comfortable with using technology. You use your device to browse, game, and text.

However, if you are tech savvy, then you can use technology to create and express yourself. Your generation will need to move away from being consumers to producers. Computer Science involves using the power of computers to solve problems. Every day the world of technology is evolving and changing. Many great discoveries are being made. You're connected to the world and you have the potential to solve many problems (big and small). You have an opportunity to make a huge difference! There are many other kids in other countries who code in school every day. In America, we offer many free programs you can use to teach yourself to code. Many of you were able to experience an Hour of Code in school if your teacher participated in the event. Regardless of your opportunities, you can do it!

The first step you need to take is to recognize that you're a digital citizen. A digital citizen is someone who acts safely, responsibly, and respectfully online. You are creating a digital footprint by the leaving information about yourself on the internet. You have to be aware of what you have done and what you will do because you are making a mark. We have to be aware that how we act creates our self-image and sometimes creates a reputation. Also, we have to think about how we treat others online. As digital citizens, we are a part of a digital community. We have to understand that not everyone conducts himself or herself respectfully on the internet. We have to make smart choices, not think before we act. Everything with the internet happens quickly. It's a blur to stop, and think before we post or respond to others.

You are always learning new things. As with anything, you have to start by understanding the vocabulary. You can start whenever you want, without becoming a coder or programmer. Programmers write code (a list of instructions) to tell computers what to do. If you want to give commands to a computer, then you need to follow written rules so the computer will understand. Over time, you will become more skilled at creating algorithms (a list of steps used to finish a task). Sometimes you will have a bug, also known as, an error in your program that prevents it from running as expected. When you are dealing with a bug then you will need to start debugging (finding and fixing errors in programs).

The most important thing to remember is that learning is not always easy and it is not always instant. You have to accept that learning is a process. If something doesn't work be patient and try something else. Troubleshooting is your new motto! You need to move from one place to the next and so on.

I see a great deal of potential in you, and I want to help you be successful not only in this class, but in every grade... college... and beyond. Let's get far or let's create something together!

Fondly,  
Your Teacher

Read and Respond

Vocabulary- Write a definition for each word

\_\_\_\_\_

iGeneration

Computer Science

Digital Citizen







Digital Footprint

Coder or Programmer

Algorithm

Bug






Debugging

Mizzle the Mouse	
<b>Name:</b> Mizzle	<b>Where you live:</b> Mouse hole
	
<b>Pet's name:</b> Frank the Flea	<b>Favorite hobby:</b> Ice skating
	
<b>Favorite food:</b> Cheese	<b>My favorite photo:</b>
	

### Directions

Follow the trails of Mizzle the Mouse and Electra the Elephant. Fill in the chart below. Then answer the questions.

	Mizzle the Mouse	Electra the Elephant
1. Whose full name do you know?		
2. Whose house could you find?		
3. Whose birth date do you know?		
4. Whose username and password do you know?		
5. Who let out a secret on the Internet?		
6. Which animal can you describe better from his or her photo?		

Electra the Elephant	
<b>Name:</b> My full name is: Electra Ella Elephant	<b>Where you live:</b> 123 Water Hole Lane, Peanuts, Ohio
	
<b>Birth date:</b> February 21, 2010	<b>User name:</b> gray_toes <b>Password:</b> bamboo
	
<b>Secret:</b> My brother and I fight all the time	<b>My favorite photo:</b>
	

Code.org Lesson plan  
Unit 2 (Pages 138-  
148)

Herm Edwards Don't Press SEND



Reading

# Reading- Retell

Help students translate an algorithm into code. Student practice encoding algorithms.  
Help Flurb get to the fruit.

5

Happy Map XL 5

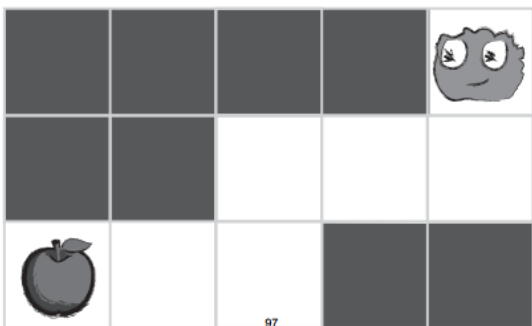
C O  
D E



6

Happy Map XL 6

C O  
D E



97



From Code.org Programming Unplugged Course A Lesson 5

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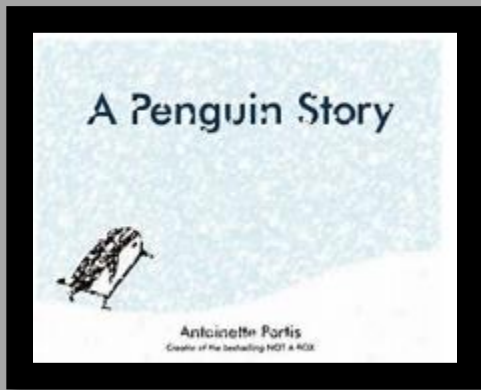
Date: \_\_\_\_\_

Happy Maps Game Pieces

X

# Reading- Retell

Help students translate an algorithm into code. Student practice encoding algorithms.  
Adapt Flurb get to the fruit to match book!



5

Happy Map XL 5

C O  
D E

6

Happy Map XL 6

C O  
D E

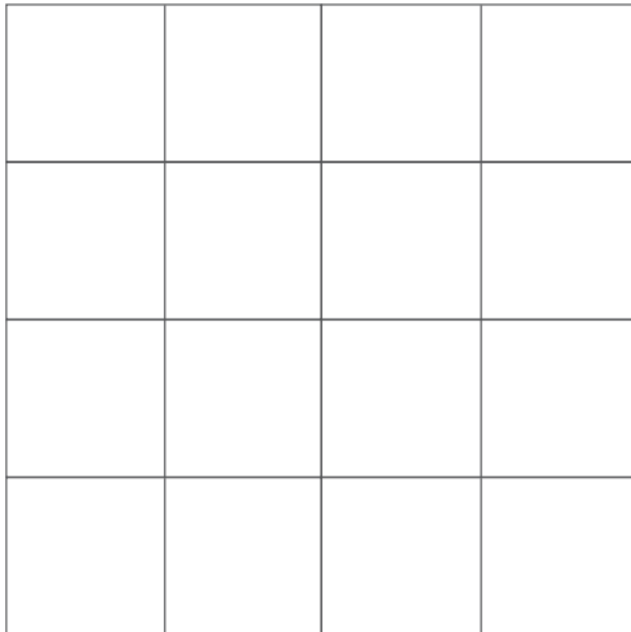
97

From Code.org Programming Unplugged Course A Lesson 5

# Reading- Retell

Help students translate an algorithm into code. Student practice encoding algorithms.  
Adapt Flurb get to the fruit to match book!

## Happy Map XL Blank (right)



99

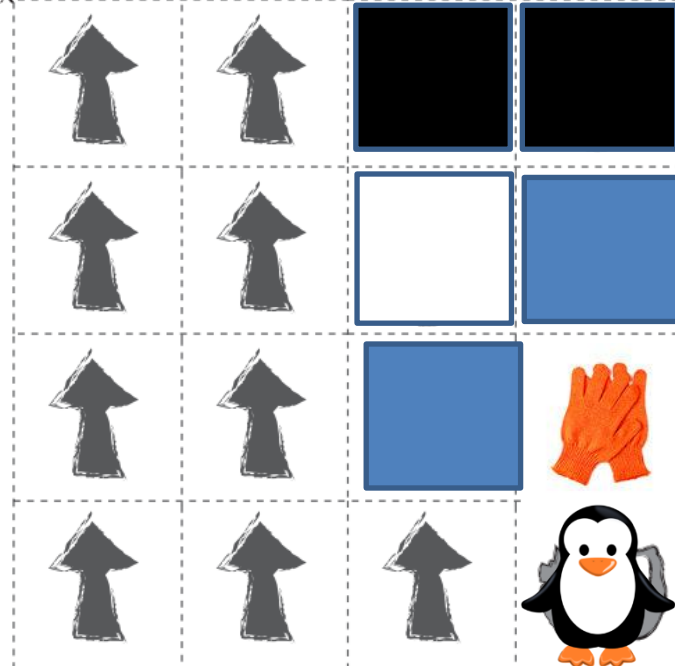
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Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Happy Maps Game Pieces



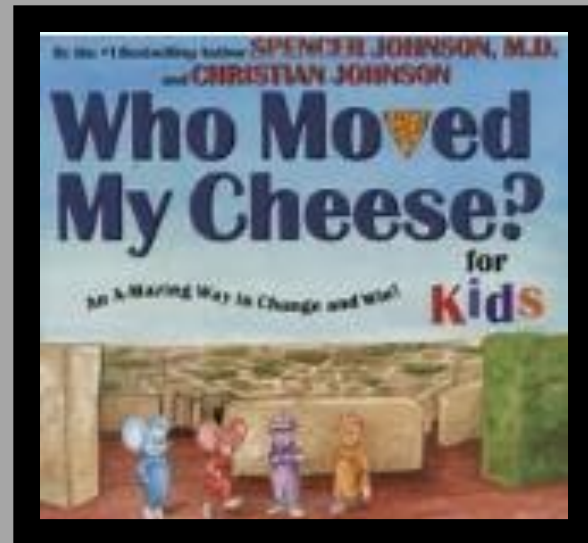
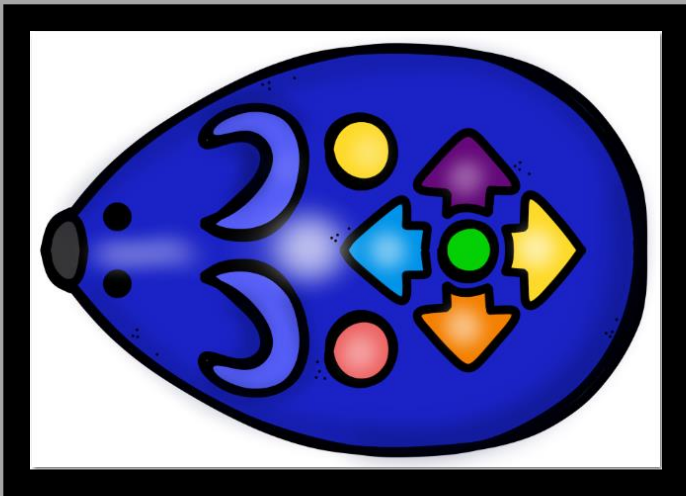
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# Reading- Retell

Help students translate an algorithm into code. Student practice encoding algorithms.

## Code and Go Robot Mouse!





# Reading- Retell

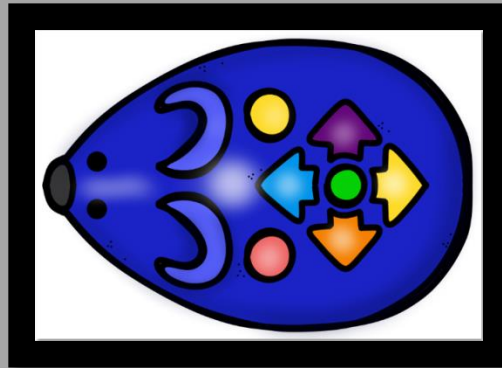
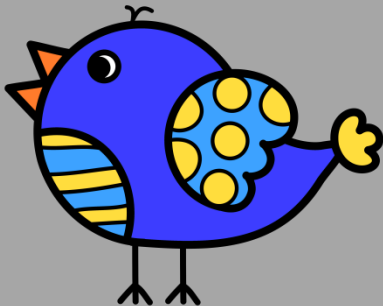
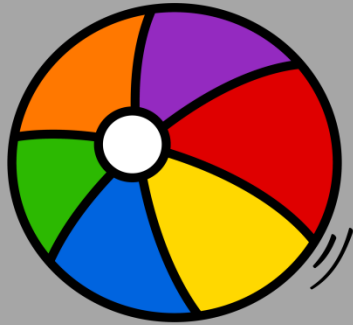
Help students translate an algorithm into code. Student practice encoding algorithms.

## Code-a-pillar and The Very Hungry Caterpillar



# Phonics with Code and Go Robot Mouse

Code to Find words that start with the  
/b/ sound!




# Reading- Retell with Ozobot

## OZOBOT Codes

 SNAiL doSe

 NiTRO BOOSt

 SLOW


 U-tuRN (Line end)


 CRuiSe

 Red  
MARKER =  
Red LiGHt

 Blue  
MARKER =  
Blue LiGHt

 fAST

 green  
MARKER =  
green  
LiGHt

 BLACK  
MARKER =  
ReguLAR  
Line

 tURBO

\*Codes MuSt COME BEFORE AND  
AFTER A STRAiGHt BLACK LiNe

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# Reading- Retell with Ozobot

## OLD LADY Sequencing CARDS



**FIRST**  
DRAW A LINE FROM THE  
OLD LADY TO THE FIRST  
THING THAT SHE  
SWALLOWED. MAKE THE  
OZOBOT GO SLOW.

**SECOND**  
DRAW A LINE FROM THE  
FIRST THING TO THE  
SECOND THING THAT SHE  
SWALLOWED. MAKE THE  
OZOBOT TURN RED.

**THIRD**  
DRAW A LINE FROM THE  
SECOND THING TO THE  
THIRD THING THAT SHE  
SWALLOWED. GIVE THE  
OZOBOT A NITRO BOOST.



## Cold Lady Sequencing

NAME \_\_\_\_\_

WRITE THE ITEMS THAT THE OLD LADY ATE IN THE CORRECT ORDER.  
COLOR THE CODE THAT YOU USED.

FIRST

--	--	--

COLOR  
THE  
CODE

SECOND

--	--	--

COLOR  
THE  
CODE

THIRD

--	--	--

COLOR  
THE  
CODE

FOURTH

--	--	--

COLOR  
THE  
CODE

FIFTH

--	--	--

COLOR  
THE  
CODE

SIXTH

--	--	--

COLOR  
THE  
CODE

LAST

--	--	--

COLOR  
THE  
CODE

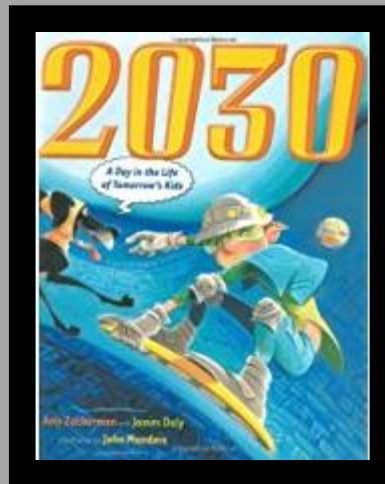
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**Writing**

# Writing Prompts!

- How-To Code Writing (Including Step-By-Step Directions)
- Personal Narrative: Describe a time that you had a bug in your code and explain how you were able to overcome it.
- Nonfiction Writing: All About Coding!
  - Fiction writing about the Future!



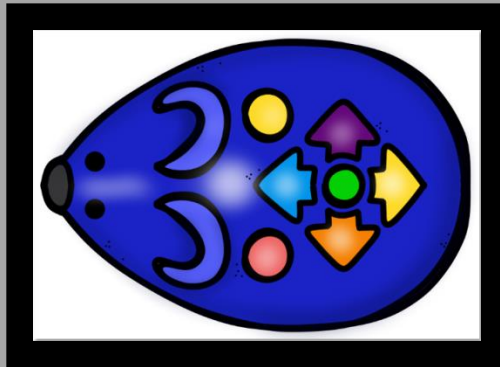


**Math**

Math

Code and Go Robot Mouse  
Code to Find ways to make 8!

$$3+5$$





A worksheet template for science. It features a light gray background with a dashed black border. In the center, the word "Science" is written in a large, bold, black font. The corners are decorated with blue L-shaped corner pieces, each with a dashed outline and a cluster of small black dots. The overall design is clean and educational.

# Science

# Science

U

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Unplugged



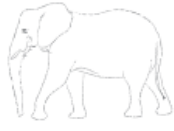






**Real-Life Algorithms**

Plant a Seed Worksheet

C O  
D E

You can use algorithms to help describe things that people do every day. In this activity, we will create an algorithm to help each other plant a seed.

Cut out the steps of planting a seed below, then work together to glue the six the correct steps, in order, onto a separate piece of paper. Trade your finished algorithm with another person or group and let them use it to plant their seed!

 PUT POT IN SUNLIGHT	 PUT SEED IN HOLE	 HUG AN ELEPHANT
 PUT GLUE ON SEED	 FILL POT WITH SOIL	 POKE HOLE IN SOIL
 WATER POT	 COVER SEED WITH SOIL	 POUR SODA POP IN POT

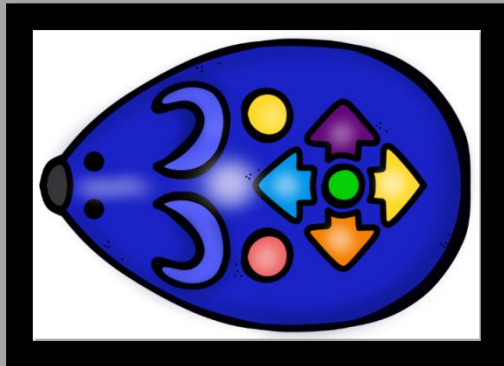
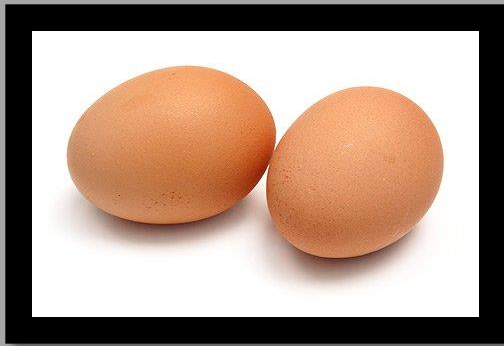
72

Revision 140710.1a



From Code.Org (pages 70-74)

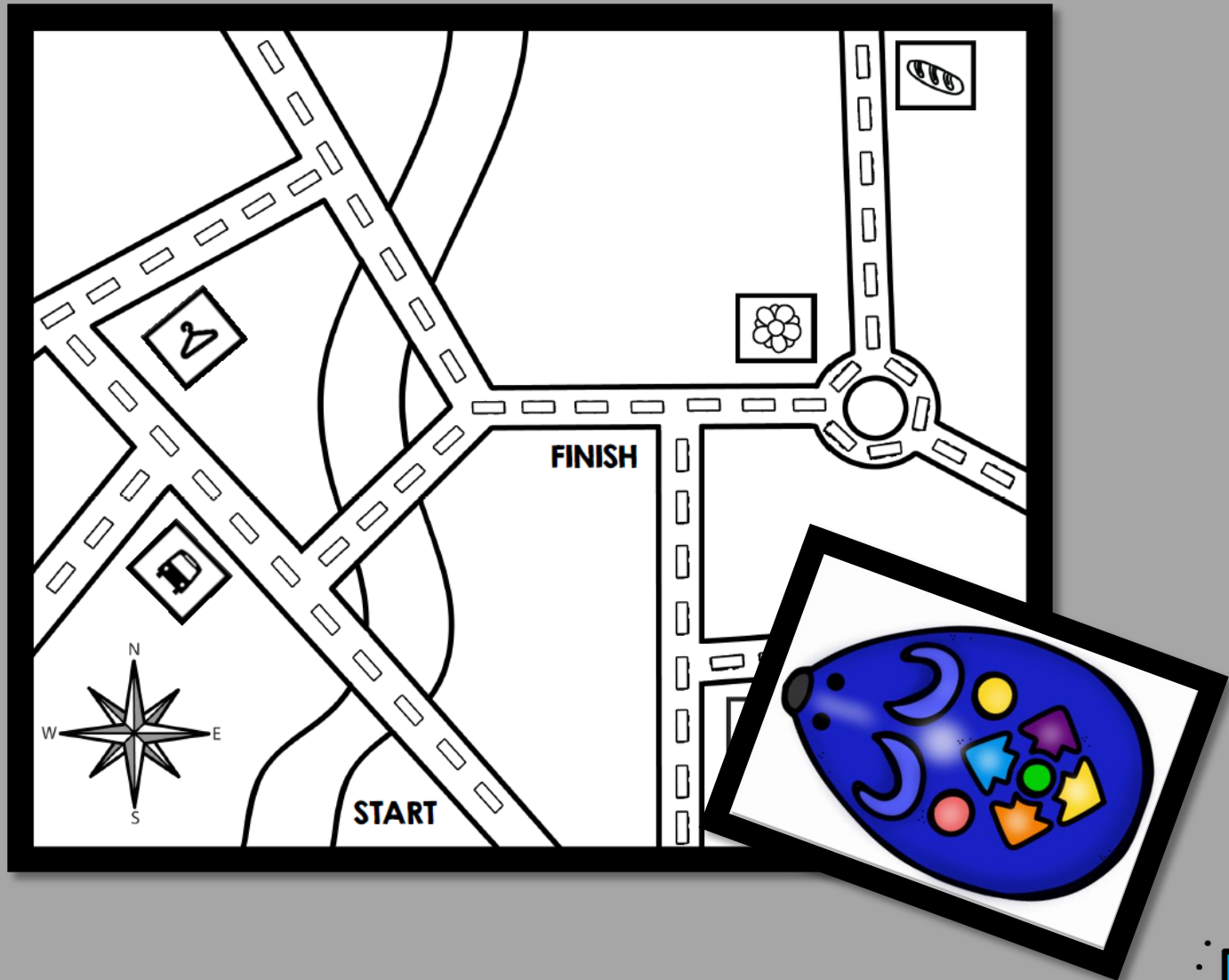
# Science Life Cycle Sequence!





# Social Studies

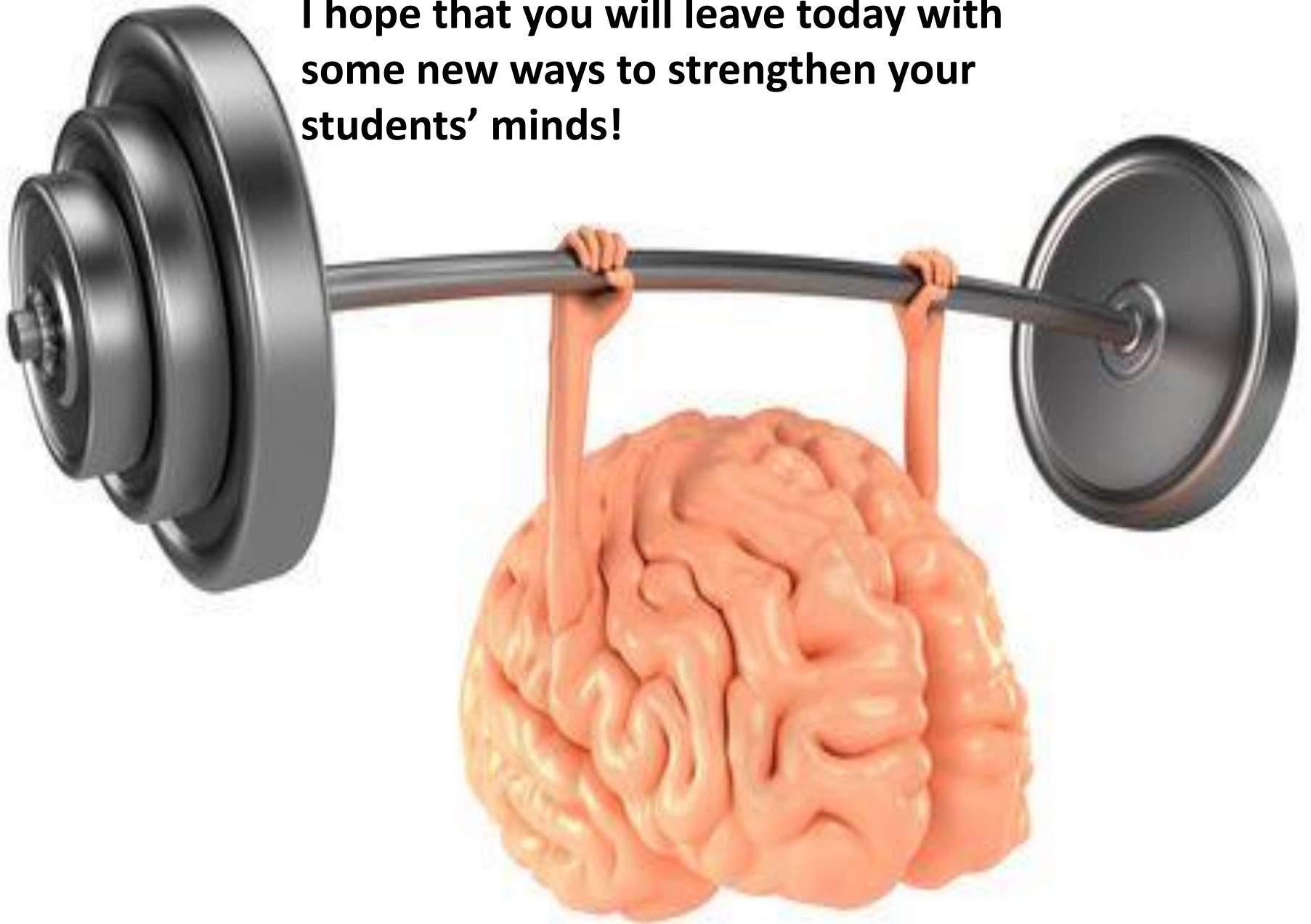
# Social Studies



# Social Studies- Timeline SmartGurlz



**I hope that you will leave today with  
some new ways to strengthen your  
students' minds!**



## References

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# Thank You!

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