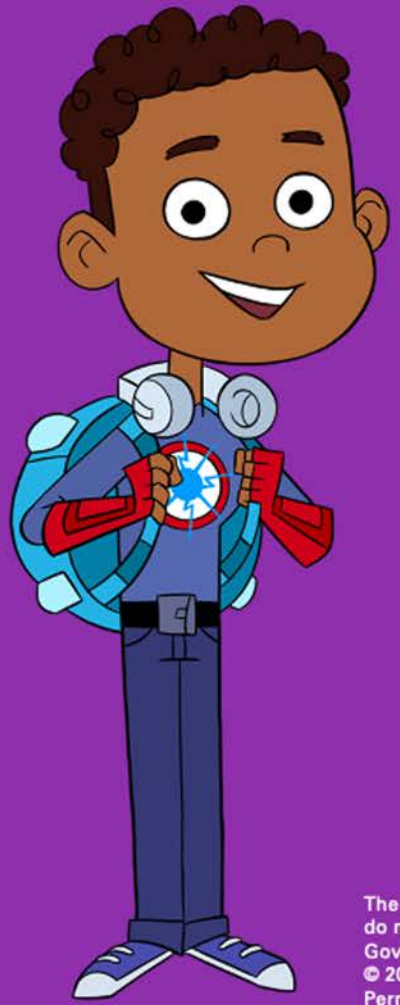
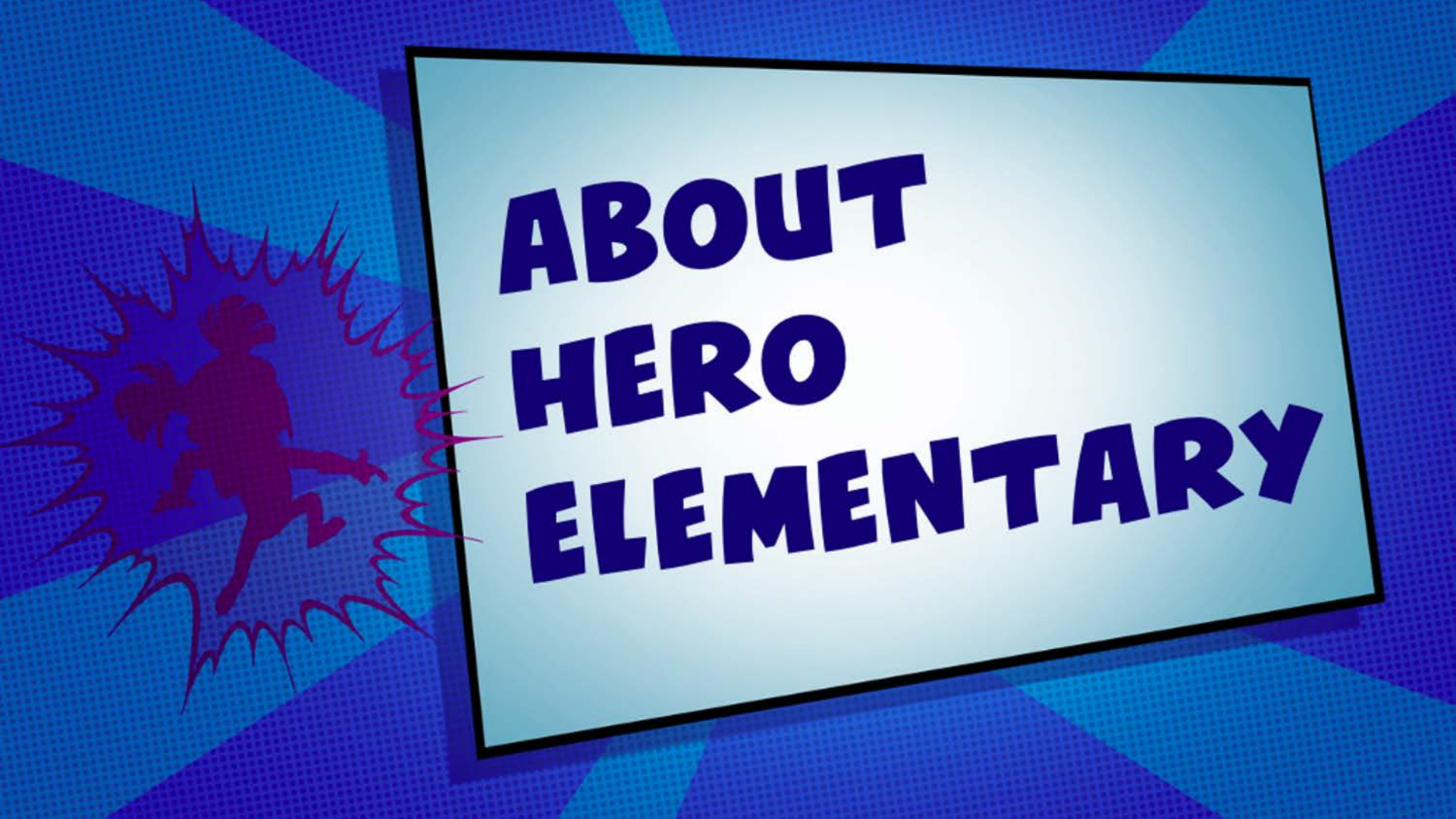


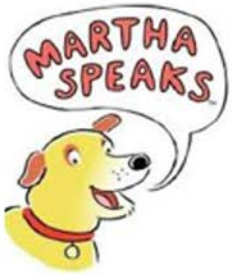
# HERO ELEMENTARY: EQUITY AND THE SUPERPOWERS OF SCIENCE

The contents of this document were developed under a grant from the U.S. Department of Education. However, those contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government. PR/Award Number U295A150012. The U.S. Department of Education is the funding agency.


ABOUT
HERO
ELEMENTARY

# READY TO LEARN



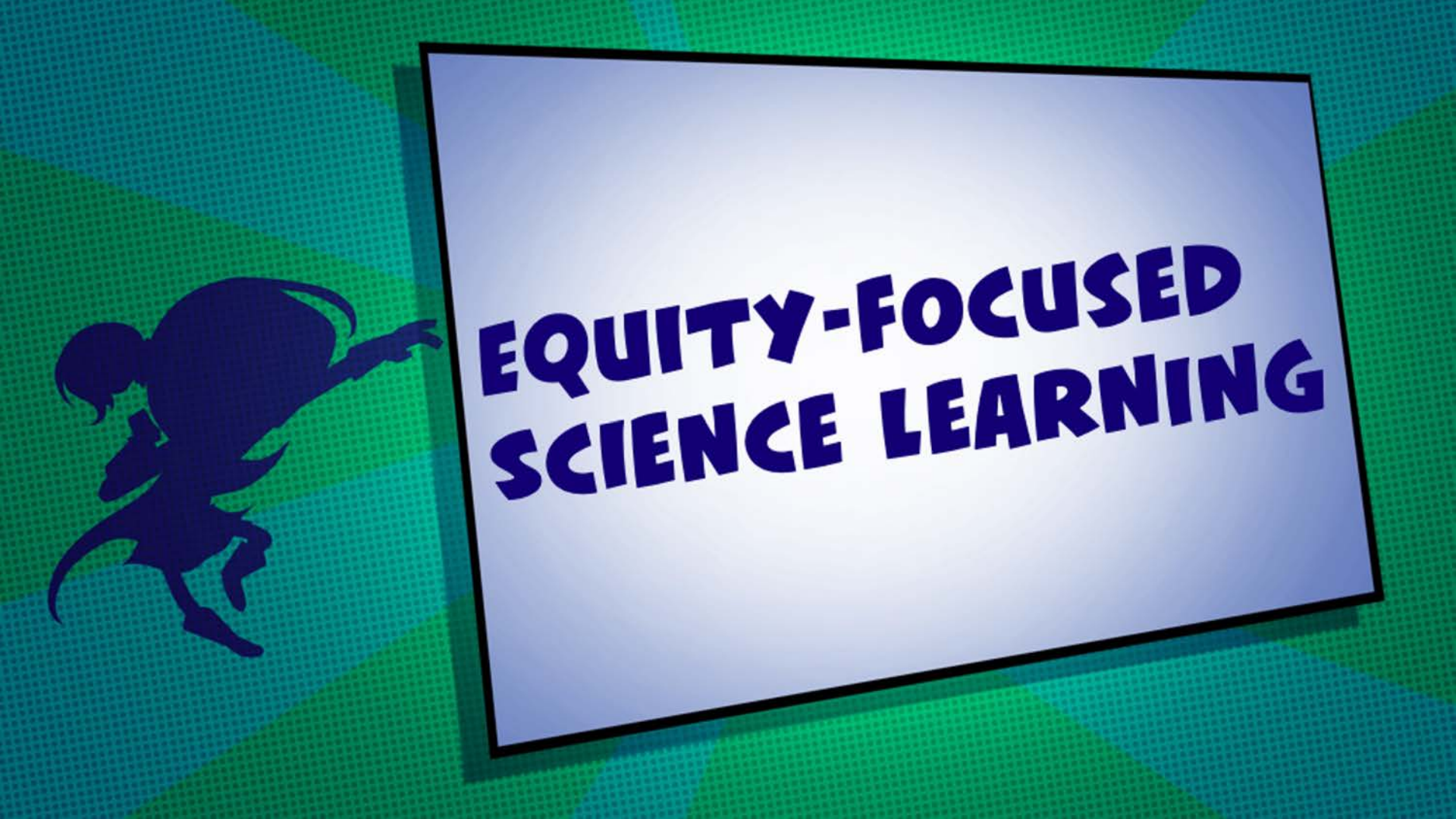



# LEARNING CONTENT

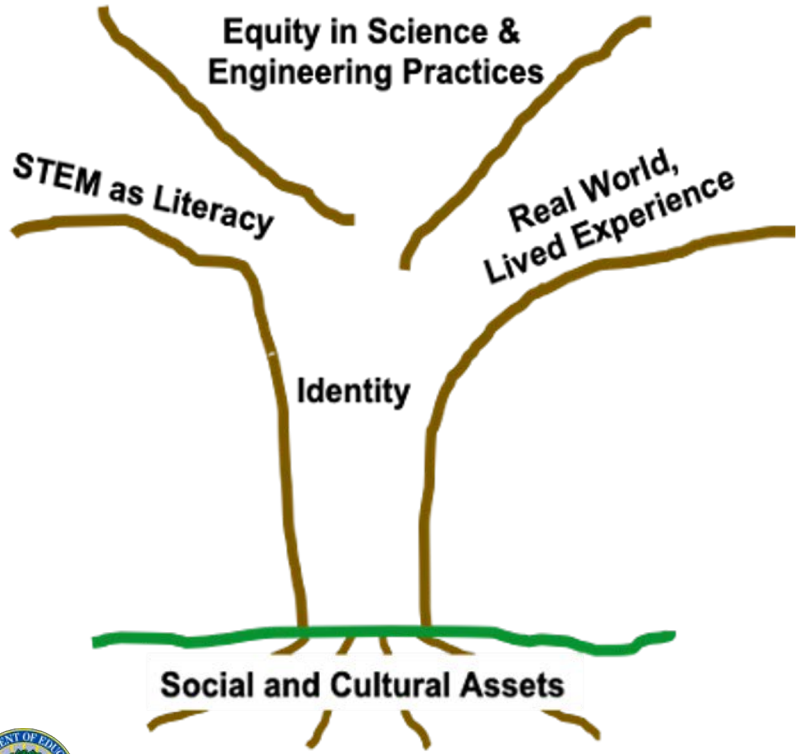
## 25 Playlists

- 40 TV shows
  - Two 11-minute episodes each
- 16 digital games
- Science Power Notebook
- 8 Analog games
- 50 Hands-on Activities
- E-Articles

# LEARNING ENVIRONMENTS


EQUITY-FOCUSED
SCIENCE LEARNING

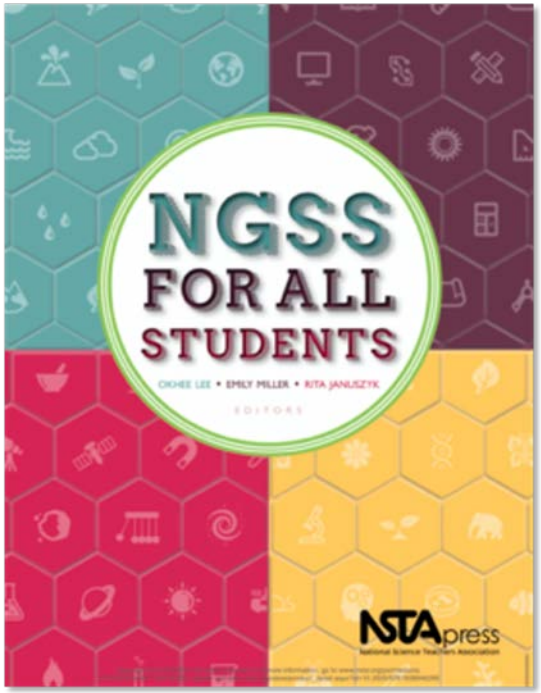
# TRANSFORMATIVE TRANSMEDIA FRAMEWORK FOR EARLY STEM LEARNERS




1. Help young learners connect their racial, cultural and STEM identities.
2. Create real world STEM experiences grounded in the realities of diverse learners' lives.
3. Integrate social and cultural assets in young learners' STEM powers and experiences.
4. Engage young learners in the Science and Engineering Practices in ways that build equity.
5. Help young learners experience STEM as literacy.

https://www.learntechlib.org/primary/p/217700/

# Effective Equity Strategies




- Appendix D of NGSS
- Case studies
- "What teachers *can do*"
- Research based recommendations

https://my.nsta.org/resource/99134

# EFFECTIVE EQUITY STRATEGIES

From NGSS for ALL Students

| Demographic Group | Student Engagement | Classroom Support Strategies | School Support Systems | Home and Community |
|---|---|---|---|---|
| Economically Disadvantaged Students | Students' sense of place | Project-based learning | School resources and funding | Students' funds of knowledge |
| Racial and Ethnic Groups | Multimodal experience | Multiple representations; culturally relevant pedagogy | Role models and mentors | Community involvement; culturally relevant pedagogy |
| Students with Disabilities | Accommodations and modifications | Differentiated instruction; UDL; RTI | Accommodations and modifications | Family outreach |
| English Language Learners | Discourse practices | Language and literacy support | Home language support | Home culture connections |

# 1. SCIENCE CONNECTED TO LOCAL PLACES

Connect science to children's "sense of place"—the physical, historical and socio-cultural aspects of their local community.

# 2. CULTURALLY RELEVANT PEDAGOGY

Empower children to be doers of science by valuing the knowledge and experiences from their families and communities.

# 3. REAL-WORLD, HANDS-ON LEARNING

Engage children's curiosity through real-world and hands-on experiences.

# 4. MULTIMODAL EXPERIENCES, MULTIPLE REPRESENTATIONS

Use multimodal experiences and multiple representations to engage all children.

# 5. Discussion and Reflection

Facilitate discussion of ideas and reflection about science experiences.

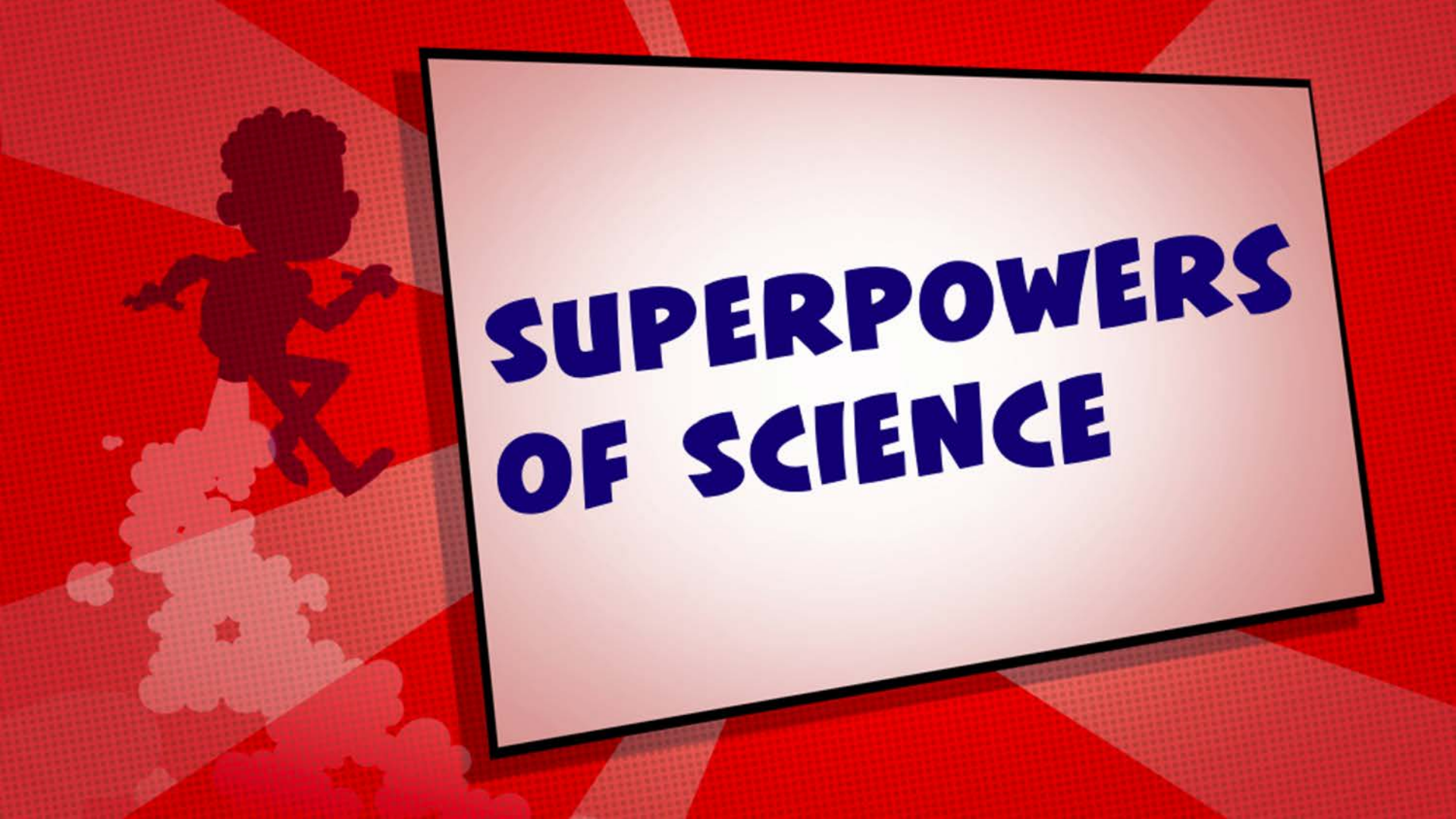
# 6. Home and Community Partnerships

Support ongoing learning by connecting home, community, and the learning program.

# RESULTS

- Educators APPRECIATE TRAINING in Effective Equity Strategies
- Evidence shows educators are USING Effective Equity Strategies

> "You have a diverse group of characters that you can talk about within the lessons and they can see, and it talks about their strengths. It's good for my students. They can see themselves in the characters… They acknowledge it and see it."
>
> – Hero Elementary Educator


SUPERPOWERS
OF SCIENCE

# INTEGRATING SCIENCE + LITERACY

## SCIENCE AND ENGINEERING PRACTICES

Utilize the skills, thinking, and language of Scientific Inquiry and Engineering Design.

- Ask questions
- Define problems
- Plan and carry out investigations
- Analyze & interpret data
- Construct explanations
- Design solutions
- Obtain information
- Communicate information

## LITERACY & ENGLISH LANGUAGE ARTS

Produce and receive communication in a variety of forms.

- Speaking
- Listening
- Writing informational texts
- Reading informational texts
- Vocabulary

http://nstahosted.org/pdfs/ngss/PracticesVennDiagram.pdf

# SUPERPOWERS OF SCIENCE

INVESTIGATE!

ASK QUESTIONS!

COLLECT INFORMATION!

COMPARE!

LOOK FOR PATTERNS!

NAME THE PROBLEM!

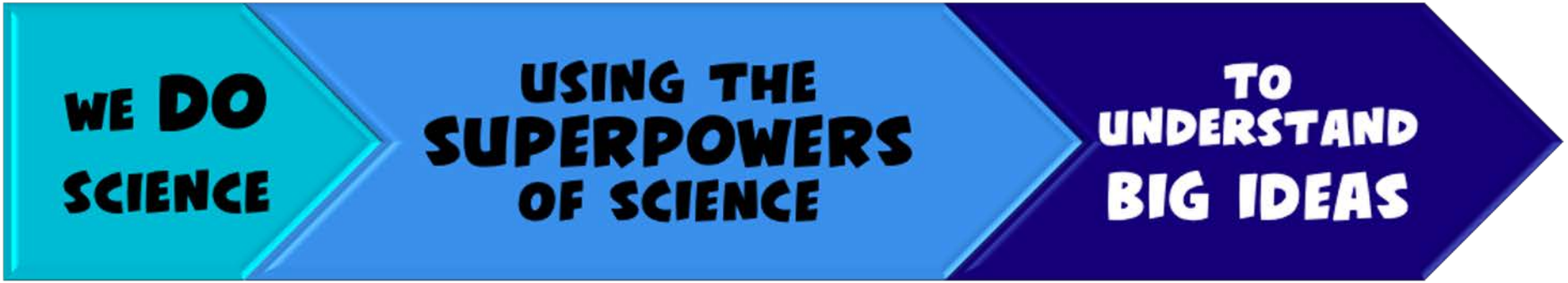
FIGURE OUT A SOLUTION!

MAKE SENSE!

SHARE WHAT YOU KNOW!

EXPLAIN!

# PEDAGOGY: CONSTRUCTIVIST, EXPERIENTIAL



| SUPERPOWERS OF SCIENCE | CHILD-FRIENDLY LANGUAGE |
|---|---|
| **ask questions** | ask • wonder |
| **collect information** | collect information • find evidence • get data |
| **compare** | compare • what's the same and what's different |
| **explain** | explain • figure out what happened • use evidence to explain |
| **figure it out** | create a way to fix it • figure out a way to solve • fix the problem • solve • what are your ideas |
| **investigate** | find out • investigate |
| **keep track of data** | keep track • keep track of data • write it down |
| **learn more information** | learn something new • check it out • read about • check with someone who knows |

| SUPERPOWERS OF SCIENCE | CHILD-FRIENDLY LANGUAGE |
| --- | --- |
| **look for patterns** | find patterns • I've noticed that before • it keeps happening • look for patterns |
| **make sense of information** | make sense of data • make sense of information • what does that tell you |
| **name the problem** | know the problem • understand the problem • what do we need to fix • what's the problem |
| **observe** | notice • observe |
| **plan an investigation** | make a plan |
| **predict** | predict • tell what you think happens next |
| **share what you know** | share your ideas • share information • talk about what you found out |
| **test** | see what happens • test your idea • try it |

# How to Hero: Investigate!

# EXAMPLE: LAND & WATER PLAYLIST

# PLAYLIST: LAND AND WATER

| | |
|---|---|
| HANDS-ON ACTIVITY | Let's Model Land Forms |
| NOTEBOOK | I Know a Land Form |
| SONG | "Let's Compare" |
| VIDEO | *Back on Track* |
| E-ARTICLES | PebbleGo |
| VIDEO | *Track That Pack* |
| NOTEBOOK | Water Can Move |
| HANDS-ON ACTIVITY | Bodies of Water |
| ANALOG GAME | Water Works |

# PLAYLIST: LAND AND WATER

## BACK ON TRACK
### COVIEWING GUIDE

**SPARKS' CREW INVESTIGATES THE LAND FORMS IN CITYTOWN TO FIX A MODEL.**

**STORY SUMMARY**

Mr. Quivers' toy train display looks just like Citytown! Unfortunately, his dog Bitsy wrecks the model. Sparks' Crew investigates the land forms that make up Citytown so they can put the model back together.

**HOW DOES SPARKS' CREW USE SCIENCE TO SOLVE THE PROBLEM?**

The Team **records** and **shares data** by taking pictures of Citytown. Then they **compare** the images to the model train set to identify where the pieces go.

# PLAYLIST: LAND AND WATER

| 1:54-2:38 | HOW DOES MR. QUIVERS DESCRIBE A MODEL? |
|---|---|
| WHAT'S HAPPENING ONSCREEN? | Sparks' Crew looks at the model of Citytown. They find some some small buildings and tell what the buildings are. Mr. Quivers tells them that the model looks like the real Citytown, but smaller. |
| SCIENCE FOCUS | The kids **observe** the buildings. They begin to **make sense of the information**. They **learn more information** about models from Mr. Quivers. |

| 4:30-5:47 | HOW DOES SPARKS' CREW WORK TOGETHER TO FIX THE MODEL? |
|---|---|
| WHAT'S HAPPENING ONSCREEN? | Lucita takes a picture of the Snack Shack in Citytown. She sends the picture to AJ and Sara. AJ and Sara put the Snack Shack model in the right place. And Fur Blur helps! |
| SCIENCE FOCUS | Lucita **shares information** to help put the model back together. AJ and Sara **compare** the photo to their model to make sure they have the Snack Shack model in the right place. |

# PLAYLIST: LAND AND WATER



**Draw a land form that is near where you live.**
**Tell what you know about the land form.**

# PLAYLIST: LAND AND WATER

## BODIES OF WATER
### ACTIVITY

**MAKE A MODEL OF A LAKE, A RIVER, OR AN OCEAN.**

### DOING SCIENCE
Children **investigate** different bodies of water on Earth. Children **observe** pictures of bodies of water. They describe and **compare** the bodies of water. They use materials —including real water—to create models of a lake, ocean, or river to show differences between these bodies of water. They **share information** about local bodies of water.

### SCIENCE BIG IDEAS
There are many different types of bodies of water on Earth. We can make models of bodies of water to find out how bodies of water are alike and different.

### SCIENCE QUESTIONS
What types of water bodies are there on Earth?
How are these bodies of water alike or different?

# PLAYLIST: LAND AND WATER

## REFLECT

1. Post children's lists of what makes rivers, oceans, and lakes special. Read the lists aloud.
   - Have children identify the differences between:
     - Rivers and oceans.
     - Rivers and lakes.
     - Lakes and oceans.
   - Identify what's the same between rivers and oceans. Circle these items.
   - Identify what's the same between rivers and lakes. Put boxes around them.
   - Identify what's the same between lakes and oceans. Underline these items.
2. Have children name some bodies of water that are near their neighborhood, town, etc. What are the lakes, rivers, or oceans that are closest to them? Have children describe a nearby body of water with a partner. If you have photos of local bodies of water, display them as the children discuss.

# HOME AND DISTANCE RESOURCES

## For Educators

- Videos of Activities
- Live Distance Demo Plans for Activities and Analog Game
- Distance Implementation and Pacing Guide

## For Families

- Family Coviewing Guides
- Videos of Activities
- Do-At-Home Versions of Activities
- Play-At-Home Version of Analog Game


Collections > **Hero Elementary™**

**In This Collection:** *Media Gallery (14), Video (14) for Grades K-2*

The Science and Engineering Practices are skills that can make all humans truly super. At HERO ELEMENTARY™, these practices are known as the SUPERPOWERS OF SCIENCE and they combine science and literacy to build powerful learning. HERO ELEMENTARY engages children as scientists and communicators, to learn about the natural and human-made world. The HERO ELEMENTARY collection offers videos, digital games, and hands-on investigations for educators to use in the classroom. Sparks' Crew, the diverse team of students at HERO ELEMENTARY, models ways to use science and literacy to help their community and save the day. HERO ELEMENTARY inspires children to do real science to make a difference in their world.

https://pbslearningmedia.org/collection/hero-elementary/