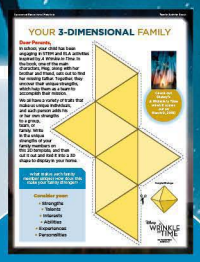
A WRINKLE IN TIME

STEM and ELA Lessons for Grades 4–6



Be sure to copy the parent letter and send it home for a fun **family activity**!

Dear Teachers,

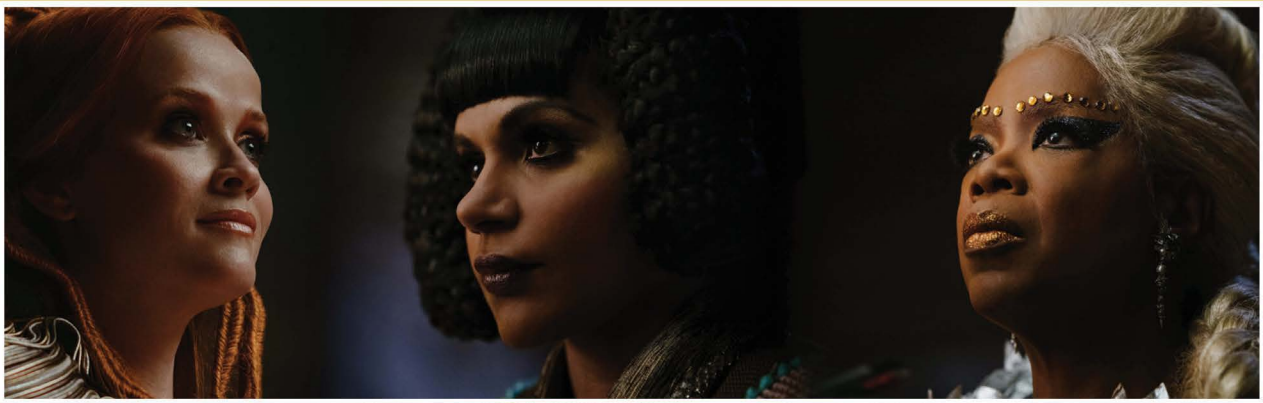
Get students collaborating and creating with an interdisciplinary project inspired by Disney's ***A Wrinkle in Time***. The project guides students to design a new galaxy while investigating planets, geometry, and mathematical patterns along the way!

Dive into the turnkey lessons to support your students in honing their research skills, using models and patterns to solve problems, and using evidence to support written arguments about the importance of differences in our world.

As students work together to meet these challenges, they will see firsthand that their unique strengths make for a stronger team!

CROSS-CURRICULAR CLASSROOM RESOURCES

These hands-on lessons are easy to implement and support STEM and ELA standards for grades 4–6.



Disney A WRINKLE IN TIME

IN THEATRES MARCH 9

INTERDISCIPLINARY PROJECT

In Disney's *A Wrinkle in Time*, Meg travels to a variety of planets invented by the author Madeleine L'Engle. Each of these planets poses unique challenges and requires different problem-solving skills.

In this interdisciplinary project, students will develop a galaxy as a class, with each student contributing a planet. Each lesson will focus on one aspect of the project—the planet's makeup, the planet's dimensions, the distance between planets, and the social aspects of the planet. Each lesson can also be taught individually, and the activities can be tailored to your students' grade level and individual needs.

Lesson 1: Planet Building Blocks *(Science/Astronomy)*

Goal: Students will explore the characteristics of planets and compare other planets with Earth.
Time: One or two 45-minute class periods
Materials: Activity Sheet 1; Internet access or print materials about the planets in the solar system
1. Brainstorm what students know about planets on the whiteboard or on chart paper. As a class, develop a working definition of the word *planet*.
2. Distribute Activity Sheet 1 and review the elements listed in the table. Make sure that students understand the vocabulary used.
3. Divide students into pairs, and assign each pair a planet to research.
4. Have students use a safe Internet search or print materials to research both Earth and their assigned planet. Make sure students are documenting where they find their information.
5. Ask students to complete the questions on Activity Sheet 1. Then invite students to share a surprising fact they learned from their research.

Interdisciplinary Project: Explain that students will now create and name their own planets. Ask students to include the same types of information that they explored in their research (elements, landforms, etc.). Have students save the information about their new planets to use for the interdisciplinary project.

Lesson 2: Exploring Dimensions *(Geometry)*

Goal: Students will apply knowledge of 2D and 3D figures.
Time: One or two 45-minute class periods
Materials: Activity Sheet 2; larger copies of the five figures
Before You Begin: Prepare larger versions of the shapes on Student Activity Sheet 2 for students to use as models.
1. Distribute Activity Sheet 2.
2. As a class, **review** the definitions for 1D, 2D, and 3D figures. Have students take notes using the top part of Activity Sheet 2. Explain that a 1D figure is a straight line (has no width or height). A 2D figure is a flat shape (has width and height). And a 3D figure is one that has volume (width, height, and depth).
→ **For grades 5–6,** review the area and volume formulas:
Area = length × width
Volume = length × width × height
3. Demonstrate how a 2D shape consisting of six squares can be turned into a 3D cube.
→ **For grades 5–6,** find the surface area and volume of the cube as a class.
4. Challenge students to match the 2D shape on the activity sheet with its corresponding 3D shape.
→ **For grades 5–6,** have students calculate the surface area and volume of these figures (for question 5, they can calculate the surface area only).

Interdisciplinary Project: Explain that students will now create a 2D drawing of part of their invented planet. Have students choose a section of the surface of their planet. Will their planet be rocky or smooth? Will it have jagged mountains or rolling hills? After creating the drawing of the planet's surface, direct students to create a 3D model of the same part of the planet.

Lesson 3: Changing Distances
(Mathematics)

Goal: Students identify and analyze patterns using fractions.
Time: One to two 45-minute class periods
Materials: Activity Sheet 3; premeasured lengths of string, meter sticks, or tape measures
Before You Begin: Measure a length of string for each group. You can provide each group with the same length or different lengths, but ensure that the length you choose will be easily divisible for this assignment (e.g., 32 inches, 160 centimeters).
1. Explain that in *A Wrinkle in Time*, the character Mrs. Whatsit explains a type of space travel using fabric as a model. She folds the fabric in half to show that the distance is being shortened. Students will use a similar model to find the distance between two points.

2. Divide students into groups of three.
3. Distribute Activity Sheet 3, string, and meter sticks or measuring tapes to each group.
4. As a class, **review** how to make a data table and look for a pattern. Reference Activity Sheet 3 so that students will know how to record their results for the activity.
5. Model the process that students will follow—measure a length of string, record the measurement, then fold the string in half and measure again.
→ **For grades 5–6,** have students add an additional row to the data table to list each length as a fraction of the entire string (one-half, one-fourth, one-eighth, etc.).
6. After students have completed their data table, **discuss** the last question on Activity Sheet 3 and introduce the theory of Zeno's Paradox.

Interdisciplinary Project: On a piece of chart paper, draw a large circle to represent your class's galaxy and place a dot in the center of the circle. Invite each student to select a symbol or icon to represent their invented planet and mark it somewhere in the galaxy. On a separate sheet of paper, have students answer the following questions:
- **What is your planet's icon, and why did you select this icon?**
- **How would you describe your planet's position in the galaxy in relation to the center of the galaxy and/or to the surrounding planets?**
- **Why did you choose to place your planet there?**

When students have completed their writing, invite a few students to share their answers and discuss their responses as a class.

Lesson 4: How Much Should We Conform?
(English Language Arts)

Goal: Students will use evidence to support their ideas about conformity and diversity.
Time: One to two 45-minute class periods
Materials: Activity Sheet 4 (Lexile 1010L); paper and art supplies
Before You Begin:
Inspiration: The concept of sameness and conformity on the planet Camazotz.

1. As a class, **define** conformity and diversity. When do students see conformity and diversity in their own lives?
2. Using Activity Sheet 4, students will **read** and reflect on an article about Camazotz.
3. Explain that the class will engage in a debate about conformity versus diversity. Students can reference the classroom poster, Activity Sheet 4, and their own life experiences to make their arguments. Make sure to set discussion guidelines before beginning the debate.
4. Use these prompts to help guide the discussion:
- What are the dangers of conforming to what people expect all the time?
- What would happen if no one conformed at all? Are there times when conformity is a good thing?
- How much should people conform to expectations?

5. Ask students to imagine a world that forces conformity. How would that compare with a world that embraces differences?
6. Allow students to explore this question through writing or artwork.

Interdisciplinary Project: Ask students to determine how conformity and diversity would be handled on their invented planets. Each student will write a two-paragraph response to the following prompt:
- **What types of beings and creatures live on your invented planet? What do they have in common, and how are they diverse?**
- **How do these creatures handle conformity and diversity?**

As the culminating event, the class can organize a display of its entire galaxy and share its creations with the school community.

Activity Sheet 1 Name: _____

PLANET **BUILDING BLOCKS**

In *A Wrinkle in Time*, the characters travel to a variety of different planets, each with its own geography and creatures. The planets in our solar system are also unique. Use the chart and questions below to research the characteristics of Earth and another planet that you select.

Characteristic	Earth	Planet _____
Most common element (e.g., carbon, iron, oxygen, etc.)		
Type of atmosphere		
Landforms		
Orbit		
Number of moons		

In what ways are the two planets most similar? _____

_____

_____

_____

_____

In what ways are the two planets most different? _____

_____

_____

_____

_____

List the source(s) you used to find this information: _____

_____

_____

_____

_____

Activity Sheet 2 Name:

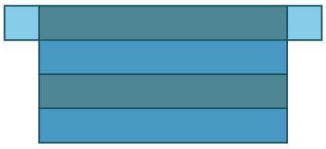
EXPLORING **DIMENSIONS**

In *A Wrinkle in Time*, the characters use different dimensions to travel through space and time. Complete the rest of the chart below to review our world's three dimensions.

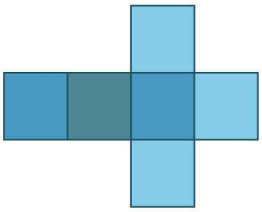
Dimension	First Dimension	Second Dimension	Third Dimension
Drawing			
Definition			a figure that has volume (length, width, and height)
Example	a straight line		

Can you match each of the nets (flat shapes) below with the three-dimensional version? Use the full-size models that your teacher provides for help.

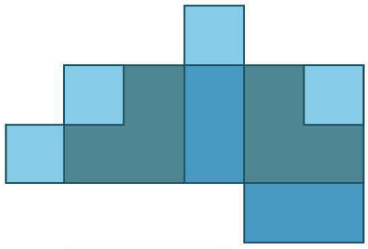
1. _____



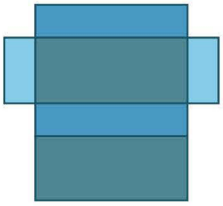
2. _____



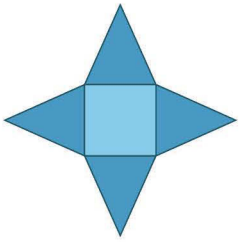
3. _____



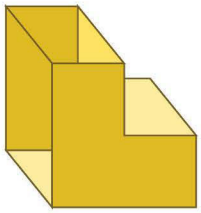
4. _____



5. _____



A.



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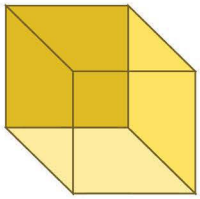

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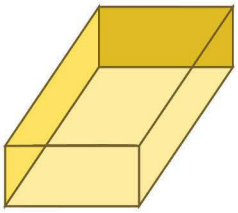

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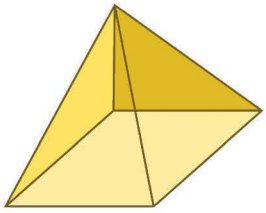

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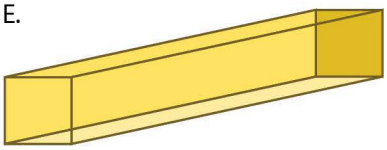


Name:

CHANGING **DISTANCES**

In *A Wrinkle in Time*, the character Mrs. Whatsit explains a type of space travel by using fabric as a model. In math, the shortest distance between two points is a straight line—but in Mrs. Whatsit's model, there is a faster way to travel!

What would happen if you tried to shorten a distance by dividing it in half again and again? You'll explore this question with your group today.

Process:

1. **Measure** the full length of the string. Be precise! Select a unit of measurement and use it consistently throughout the activity.
2. **Fold** the string in half and measure again. Add the information to the data table.
3. **Fold** the string, measure, and record. Repeat this process until you have folded the string at least five times.

Number of Folds	0	1	2	3	4	5
Length of String						

Describe the patterns you notice in your folded string. _____

_____

_____

_____

_____

CHALLENGE QUESTION:

If you continue folding the string, will the length ever become zero? Explain why or why not.

_____

_____

_____

_____

_____

_____

_____

HOW MUCH SHOULD WE **CONFORM**?

Read this article about one of the settings in *A Wrinkle in Time*. Then follow the prompts below to complete the activities.

Have you ever felt pressure to be like everyone else? In *A Wrinkle in Time*, Meg, one of the main characters, has trouble fitting in at school. When she sets off on a journey to save her missing father, she encounters a planet where there are great pressures to conform.

On the fictional planet Camazotz, everyone acts exactly the same way. Their houses are identical, children all play the same game, and people even think alike. If people on Camazotz stray from what they are supposed to do, they are punished. This planet is controlled by one mind, and people are not seen as individuals.

The force that controls Camazotz says that it is a wonderful place because people are not unhappy. Since people there do not have to make decisions, they do not worry and are happy. Meg, however, decides she would rather be herself, even if it is not always easy. She knows that she, Charles Wallace, and Calvin have unique strengths. Their unique strengths make a strong team—one that's strong enough to save her father from the terrifying world of Camazotz.

Discuss the following ideas or questions and use evidence from the text or your life in your argument.

1. To ***conform*** means to make your appearance or behavior match what other people are doing.

2. Even though *A Wrinkle in Time* is science fiction, real people can understand what Meg experiences on Camazotz.

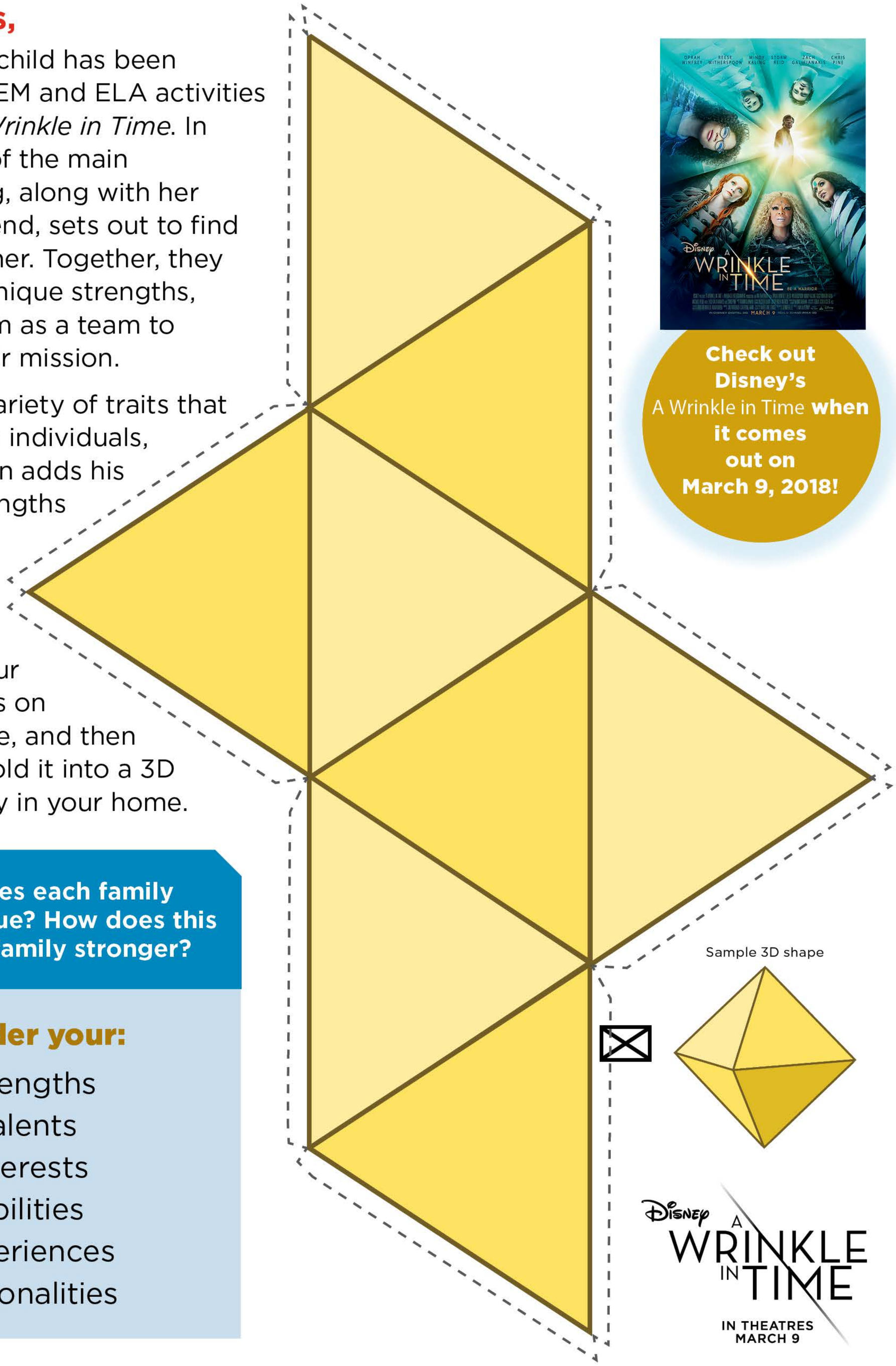
3. Are there times when conforming to expectations is a good idea?

YOUR **3-DIMENSIONAL** FAMILY

Dear Parents,

In school, your child has been engaging in STEM and ELA activities inspired by *A Wrinkle in Time*. In the book, one of the main characters, Meg, along with her brother and friend, sets out to find her missing father. Together, they uncover their unique strengths, which help them as a team to accomplish their mission.

We all have a variety of traits that make us unique individuals, and each person adds his or her own strengths to a group, team, or family. Write in the unique strengths of your family members on this 2D template, and then cut it out and fold it into a 3D shape to display in your home.



Check out Disney's A Wrinkle in Time **when it comes out on March 9, 2018!**

What makes each family member unique? How does this make your family stronger?

Consider your:

- Strengths
- Talents
- Interests
- Abilities
- Experiences
- Personalities

Sample 3D shape

Disney A WRINKLE IN TIME

IN THEATRES MARCH 9

STRENGTH IN **DIFFERENCES**

What are your own strengths?
What are our strengths as a class?

List your strengths

I AM

List our class's strengths

WE ARE

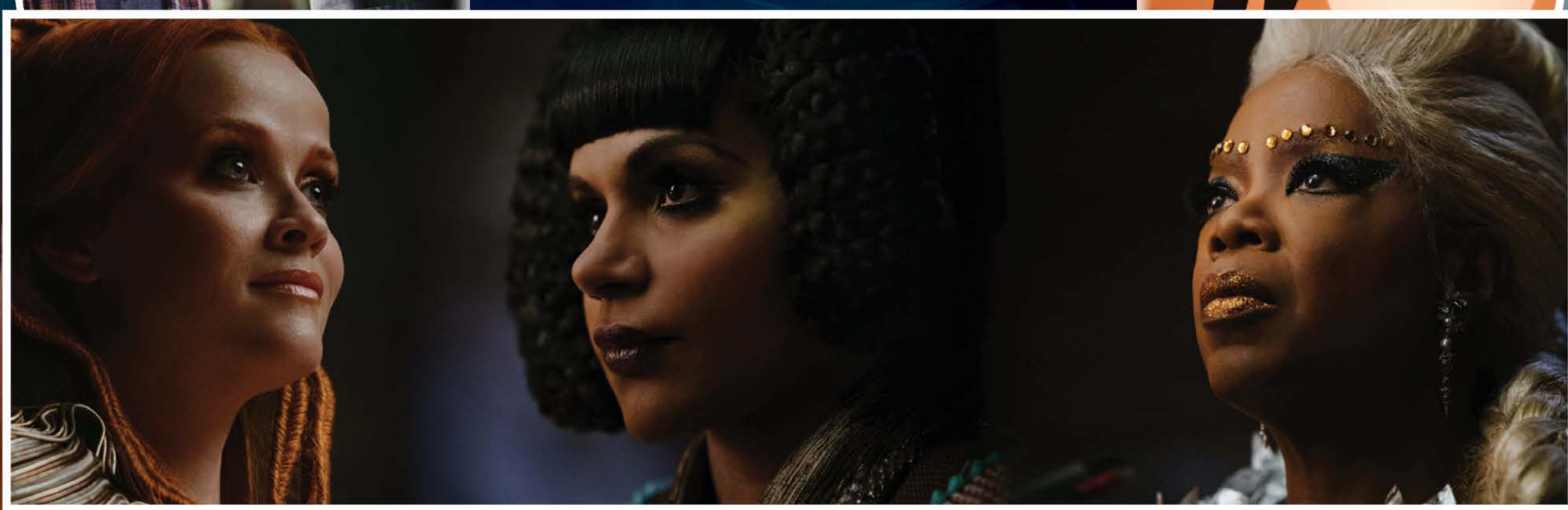
Each of us has our own strengths that make us unique.
When we bring them together, we are even stronger.

Disney A WRINKLE IN TIME

IN THEATRES
MARCH 9

Rediscover the Wonder

Disney will bring *A Wrinkle in Time* into classrooms and homes with free STEM and ELA activities.



Disney's film adaptation of *A Wrinkle in Time* will be in theatres on March 9, 2018.
Watch the trailer at Walt Disney Studios Canada's YouTube page:
https://www.youtube.com/watch?v=bocp6eKDyKA&t