TEACHER PLATFORM – DIGITAL LICENSE
To implement the program into your classroom, the Teacher Platform license is a required component. The platform supplies all the content, tools and Professional Learning resources needed to be successful. With a digital license to the Anchored Science by Mi-STAR platform, teachers have 1 year access to the entire suite of middle school science units.

The platform includes:

- **Unit Curriculum**: student and teacher content including lesson-specific printables.
- **Instructional Resources**: includes lesson plans, slides, background content, checklists, synopsis videos, and more.
- **Unit Challenge Resources**: a list of student handouts and teacher slides to enhance the unit challenge experience.
- **NGSS Connections**: specific NGSS dimensions addressed in each of the units.
- **Unit Materials**: each unit provides a list of all consumable and non-consumable materials that must be acquired to complete the unit’s lesson activities.
- **Assessment Tools**: ready-to-use student documents, teacher instructions and options, answer keys, and scoring guidance.
- **Off-the-Shelf Lessons**: UCCC lesson plans designed to help students develop background knowledge and skills they need to complete a unit.
- **Career Connections**: a compilation of videos, articles and lesson ideas helpful to enhancing student understanding through the lens of NASA resources and professionals.
- **Professional Learning Tools**: enroll in on-demand courses and virtual events to keep you on track with your curriculum implementation.

When you log into your account you have access to your teacher dashboard where you can pin specific units, keep track of your Professional Learning Pathway, see the latest announcements & events, and have the teacher community forums at your fingertips.
Curriculum Components

STUDENT EDITION
The Student Edition is available as a convenient, consumable perfect bound print workbook, that has all lesson specific content and student-facing sheets including the unit challenge organizers, unit summary tables, career connections, and glossaries.

TEACHER EDITION
The Teacher Edition is available as a perfect bound print edition for ease of use for educators to save money and time away from the copier. The Teacher Edition provides lesson specific content as well as instructional resources all in one place.

PROFESSIONAL LEARNING
Professional learning is offered in a variety of virtual learning experiences, both synchronously and asynchronously, giving teachers voice and choice in how they learn. Teachers participate in on-demand Canvas courses as well as live virtual meeting events.

Each educator takes on their own Professional Learning Pathway through a series of phases:

Phase 1: Introduction to the Curriculum
Phase 2: Building Your Toolkit
Phase 3: Expanding Your Craft
UNIT 6.1
Water on the Move: The Water Cycle
Student Contents

My Bubble Map

Lesson 1  Where Is Water? .................................................................
Lesson 2  Gravity Makes Water Move ..............................................
Lesson 3  Water Moves in Unseen Ways ...........................................
Lesson 4  Particle Movement in Solids, Liquids, and Gases ...............
Lesson 5  How Water Changes State ................................................
Lesson 6  Human Impacts on the Water Cycle .................................
Lesson 7  If You’ve Got a Problem, Yo, I’ll Solve It ............................
Lesson 8  Culminating Experience .................................................
Unit Challenge Organizer ..............................................................
Unit Summary Table ......................................................................
Career Connection .......................................................................
Student Workbook

PRINT SAMPLER
Lessons 1 and 2
Unit 6.1 Unit Challenge Scenario

At the edge of our community used to be a forested park with a stream that was home to all kinds of wildlife. Locals and tourists would visit the park to enjoy all the trails throughout the forest and along the stream.

After a day of hiking, people would visit our downtown area where the stream that flowed through the park also flowed through downtown. This benefited the community because our downtown brought in a lot of money from tourism.

Then the forested park was replaced with a factory with a parking lot. The factory eventually shut down and was torn down. Now a concrete parking lot and an empty field is all that is left.

Along with losing the forested park, the community started having a problem with the stream sometime after the factory was built. After rainstorms the stream would flood the downtown area! Even after the factory was torn down, the flooding continued. It is so bad that flooding happens after almost every storm. The only time downtown does not flood is during winter.

The flooding is bad for the community because it has reduced the number of people who spend time downtown and shop at the local businesses. For example, the flooding forced a popular bike path in downtown to close. The local businesses are worried because fewer people are coming to shop, and a local environmental group is concerned about all the damage that the flooding is causing in the downtown area.

Unfortunately, the planning committee does not know what causes the stream to flood downtown. There have not been changes in the amount of rain and snow over the years. Since the flooding started after the factory was built, the planning committee thinks that this problem has something to do with how the land changed. The owner of the land where the factory used to be is willing to donate the land to the town, but only if the town’s planning committee can convince the owner that the town will make changes to the empty land to help people, businesses, and the environment thrive.
The planning committee is so excited about building on the empty land that they already came up with a large list of ideas. Their list includes ideas like a rain garden, skate park, or even an indoor waterpark! They need you to identify which solutions on the list could improve community well-being and which ones will not. They will take your improved list of ideas and use it to help convince the owner to donate the land!
## Defining the Problem

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who am I helping?</td>
<td></td>
</tr>
<tr>
<td>What’s the problem?</td>
<td></td>
</tr>
<tr>
<td>What’s my role?</td>
<td></td>
</tr>
<tr>
<td>What do I have to do?</td>
<td></td>
</tr>
</tbody>
</table>
Lesson 2

Uncover Investigation

Station A: Soil Column Model

Set Up (to be completed by student groups or the teacher)

1. Cut off the top of one bottle.
2. Cut off the bottom of the other bottle.
3. Place the screen inside the opening of the “Bottom Missing” bottle to keep the soil from falling out.
4. Fill the “Bottom Missing” bottle halfway with soil.
5. Place the bottle filled with soil into the “Top Missing” bottle.
6. The model should look similar to the image to the right.

Directions: Pour water onto a soil surface that represents the ground.

Make a prediction
What will happen when water is poured on the soil? Describe your thinking.

Observations

1. Set a timer for one minute.
2. Add 200 mL of water into the soil column bottle.
3. After one minute, use the soil column to answer the following questions.
4. What happened to the water that you poured into the soil column bottle? Complete the model on the next page to show what you observed. Make sure to include where water was located and use arrows to indicate the movement of water.
5. What pathway did the water take?

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
6. Does this evidence support your prediction? Why or why not?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

7. How does this model relate to the real world?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Station B: Land Cover Model

Set Up (to be completed by student groups or the teacher)
1. Cut a rectangular window along the side of the bottle.
2. Lay the bottle on its side, window facing up.
3. Add the soil to the cut bottle, spreading it out evenly.
4. Move the cut bottle to the edge of the table, with the opening hanging over the edge.
5. Use blocks or books to hold up the back of the bottle 5-10 cm, so that water will flow toward the opening.
6. Slowly add water until the model just begins to drip, this will keep water from getting trapped in the bottle. (See set up drawing on the next page.)

Directions: Pour water onto a soil surface that represents the ground.

Make a prediction
What would happen if water falls on the soil? Describe your thinking.

Observations
1. Set a timer for 30 seconds.
2. Place a cup underneath the bottle opening hanging over the edge.
3. Add 200 mL of water to the uphill side of the cut bottle, make sure to catch any water that leaves the bottle.
4. Let water flow through for 30 seconds.
5. Remove the cup with water and lay the Land Cover Model flat on the desk so that no more water leaks out.
6. What happened to the water that you poured into the bottle? Complete the model below to show what you observed. Make sure to include where water was located and use arrows to indicate the movement of water.
7. What pathway did the water take?


8. Does this evidence support your prediction? Why or why not?


9. How does this model relate to the real world?
Station C: Landform Tarp Model

Set Up (to be completed by student groups or the teacher)

1. Model 1: Arrange crumples of paper in one pan to represent higher elevation like a mountain range.
2. Model 2: Arrange crumples of paper in the other pan to represent landforms like a plain with small hills separated by small valleys.
3. For both models: Place one piece of plastic wrap over each pan, tucking in the corners. Press the plastic wrap into the landforms to take the same shape. If you are not using food coloring to help see the water, dust each model with chalk, clay dust, flour, or another appropriate substance.

Directions: You will spray water on surfaces that represent two different landscapes—a mountainous region and a hills/plains region.

Make a prediction

1. What will happen when water is poured onto the surface? Describe your thinking.
Observations
Model 1: Mountains
1. Use a spray bottle to simulate rainfall over the pan with the mountain range. Spray approximately 70 times.
2. Describe and draw what happens to the water below. Use arrows to show the movement of the water.

Model 2: Hills/Plains
3. Use a spray bottle to simulate rainfall on the pan with the lower hills and valleys. Again, spray approximately 70 times.
4. Describe and draw what happens to the water below. Use arrows to show the movement of water.
5. Does this evidence support your prediction? Why or why not?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

6. Why did the water move? How do you know?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

7. What will happen as more rain occurs?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
8. How are these models different when it rains?

9. What real-world Earth components do each of the parts of the model represent?

Station D: Groundwater Model
Directions: You will watch a video of water flowing through sand.

Make a Prediction
1. What will happen when water is poured onto the surface? Describe your thinking.
Observations
1. Create a model showing what you observed in the video. Use arrows to show the movement of water.

2. Does this evidence support your prediction? Why or Why not?

3. How does this model relate to the real world?
Put It All Together

Directions: The model below represents a cross-section of a landscape with a lake/river on the right side.

1. Add the four (4) pathways that water took at each of the stations to the model.
2. Use arrows to show the direction of water movement and label each arrow appropriately.
Lesson 2 Article: Level A

My assigned article from __________________________________________________________

is titled __________________________________________________________

Use the rubric below to create a One Pager on the next page.

1. Divide your page into five sections. Leave room around the edge for a border. You can make the sections in whatever shape you want. Put your name on it.

2. In the sections, draw and/or write:
   a. Three quotes from people in the article that describe the problem.
   b. A system model that shows how water is moving during some of the flooding described in the article.
   c. Tell how runoff is involved in the flooding.
   d. Tell how climate change is involved in the flooding.
   e. How does this problem affect you, your family, or other people? Give two examples.

3. Make a border for the entire page. Use a word or symbol as part of the border design.

4. Use a lot of color and illustrations throughout your page.

Sample one page information graphics.
Lesson 2 Article: Level B

My assigned article from ____________________________________________ is titled ____________________________________________

Use the rubric below to create a One Pager on the next page.

1. Divide your page into five sections. Leave room around the edge for a border. You can make the sections in whatever shape you want. **Put your name on it.**

2. In the sections, draw and/or write:
   a. Three quotes from people in the article that describe the problem.
   b. A system model that shows how water is moving during some of the flooding described in the article.
   c. Tell how more runoff is involved in the flooding.
   d. Tell how climate change is involved in the flooding.
   e. How does this problem affect you, your family, or other people? Give two examples.

3. **Make a border** for the entire page. Use a word or symbol as part of the border design.

4. Use a lot of **color and illustrations** throughout your page.

Sample one page information graphics.
Lesson 2 Article: Level C

My assigned article from ____________________________________________

is titled ____________________________________________

Use the rubric below to create a One Pager on the next page.

1. Divide your page into five sections. Leave room around the edge for a border. You can make the sections in whatever shape you want. **Put your name on it.**

2. In the sections, draw and/or write:
   a. Three quotes from people in the article that describe the problem.
   b. A system model that shows how runoff is moving during some of the flooding described in the article.
   c. Tell how climate change is involved in increasing the number and severity of rain events.
   d. How does this problem affect you, your family, or other people? Give two examples.
   e. How could engineers use gravity to change where the flood waters flow?

3. **Make a border** for the entire page. Use a word or symbol as part of the border design.

4. Use a lot of **color and illustrations** throughout your page.

Sample one page information graphics.
Lesson 2 & 3

Forrested Lot Model

Pathways of Water: Forrested Lot

- Forest
- Soil
- Stream
- Groundwater in soil

System Boundary

Name: __________________ 
Date: _______ 
Section: _______
**Unit Summary Table**

**Lesson 2 Lesson Discovery Question:**
*What causes water to go into a stream?*

<table>
<thead>
<tr>
<th>A. What activity did we do?</th>
<th>We used 4 models:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. <em>We used a soil column to model how water moves into the ground.</em></td>
</tr>
<tr>
<td></td>
<td>2. <em>We poured water over forest soil to model how water runs over the ground.</em></td>
</tr>
<tr>
<td></td>
<td>3. <em>We created different landscapes and sprayed water over the different landscapes to test how the shape of the land affects how water runs over it.</em></td>
</tr>
<tr>
<td></td>
<td>4. <em>We watched a video of a groundwater model and observed how water moves through the ground.</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. What evidence did we gather?</th>
</tr>
</thead>
</table>

| C. My answer to the Lesson Discovery Question: | |
|-----------------------------------------------| |

| D. Connecting my ideas to the Unit Challenge: | |
|-----------------------------------------------| |
# Career Connection

## 6.1 Civil Engineering Career Connection

**Directions:** Choose three careers (trade & college educated) involved in or associated with civil engineering using the given links. Research the information outlined in the table about each job. Would one of them be a good fit for you?

- Construction & Skilled Trade Careers [https://thebestschools.org/careers/construction-skilled-trade-careers/](https://thebestschools.org/careers/construction-skilled-trade-careers/)
- U.S. Bureau of labor Statistics (Click on our state) [https://www.bls.gov/](https://www.bls.gov/)
- Occupational Outlook Handbook [https://www.bls.gov/ooh/a-z-index.htm](https://www.bls.gov/ooh/a-z-index.htm)
- Career One Stop [https://www.careeronestop.org/](https://www.careeronestop.org/)
- Nepris (online live conversations with industry professionals) [https://nepris.com/home/v4](https://nepris.com/home/v4)
- Michigan Department of Technology, Management & Budget [https://milmi.org/](https://milmi.org/)

<table>
<thead>
<tr>
<th>Investigate</th>
<th>Career #1</th>
<th>Career #2</th>
<th>Career #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of pay that can be earned.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of education needed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duties for this professional.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What would the work environment be like?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Important qualities for this professional.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Important qualities for this professional.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Would this field interest you? Why or why not?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Student Glossary