

Teacher's Guide

Cape Fear Water Crisis

Students will:

- “engage in argument from evidence to explain that the good health of humans and the environment requires: monitoring of the hydrosphere, water quality standards, methods of water treatment, maintaining safe water quality, and stewardship”.
- learn about the Cape Fear Water Crisis in North Carolina.

This lesson is flexible. Here are some suggestions for two 45-minute classes or one block lesson.

Day 1 (45 min)

- Hook (5 min): Four Corners Poll “Would you drink this water?”
- Background + Vocabulary (10 min): Read short summary together on student sheet, highlight key terms (stewardship, PFAS, point vs nonpoint, treatment steps)
- Data Investigation (20 min): Students work in groups with data table.
Guiding questions:
 - Which sample(s) meet the PFAS safety limit?
 - What is the most likely cause of the unsafe values?
 - Which treatment steps could help? Which might not work well for PFAS?
- Quick Share Out (10 min): Groups summarize findings

Day 2 (45 min)

- Review Data (5 min): Brief recap from Day 1
- Role Prep (10 min): Students get role cards, meet with role teams
- Water Summit Debate (20 min): Groups present, rebut, and negotiate
- CER Wrap-Up (10 min): Students argue individually in writing whether stricter monitoring/treatment is needed

Block Lesson Option (90 minutes)

Run the full 2-day version in one class period. Students get:

- Data analysis → deeper prep time
- Debate → longer rebuttal/discussion
- CER writing → more time for strong reasoning

Notes:

- The dataset provided is fictional but modeled on real patterns from North Carolina.
- *ppt* = *parts per trillion*

Misconceptions to Watch:

- “If water looks clear, it’s safe” → Not necessarily; some contaminants are invisible.
- “All water treatment removes all contaminants” → Traditional steps don’t fully remove PFAS.
- “Only factories cause pollution.” → Point vs nonpoint sources both matter.

At a Glance



Data analysis with data modeled after real-world patterns



Role-play debate with four perspectives



CER Writing



Teacher directions and sample answer key included



and more!

What's Included:



**Teacher Slides and Student Sheets
(background, data analysis, debate
prep, CER)**



Four Corners Poll Posters



Debate Role Cards



Example Student KEY



Teacher's Guide

Chemicals Found in Cape Fear River Drinking Water

Is it safe?



PFAS Found in Cape Fear River Drinking Water



Would you Why

- Stand at the corner that
- Yes, No, Maybe, Need
- Share one reason. You can change your mind

The Cape Fear River is a main source of drinking water for hundreds of thousands of people in North Carolina. Scientists discovered a group of chemicals called PFAS (sometimes called "forever chemicals") in the water. One type, called GenX, c

The problem?

- PFAS don't break down in the environment.
- They can build up in the environment.
- Regular water filters

The government is working on keeping the water safe. Communities, schools, and businesses are using different ideas

Debate Rules

Group: 4-6 members
Minutes each: 1-2



stewardship: the responsible care and management of Earth's resources (like water, air, and land) to keep them safe and healthy for people and the environment

contamination: the presence of harmful substances in the environment (like chemicals or waste) that make water, air, or soil unsafe

Debate Norms

- Use evidence.
- Speak respectfully.
- One speaker at a time.



You will debate
write your own recommendation

Today you will debate
a recommendation
"forever chemicals"
the Cape Fear River

Four Corners Poll

Yes

No

Maybe

Need More Info

Name _____

Date _____

Cape Fear Water Crisis

The Cape Fear River is a main source of drinking water for hundreds of people in North Carolina. Scientists discovered a group of chemicals called "forever chemicals" in the river. One type, called GenX, came from an industrial facility.

The problem?

- PFAS don't break down, so they stay in the environment.
- They can build up in the bodies of people and animals.
- Regular water filters can't remove them.

The government has set safety limits for PFAS. This is a challenge. Communities, scientists, industry, and consumers should decide what to do next.

Vocabulary

- **stewardship**: the responsible care and management of (natural resources and land) to keep them safe and healthy.
- **contamination**: the presence of harmful substances (like chemical waste) that make water, air, or soil unsafe.
- **point source pollution**: pollution that comes from a single factory or a sewage treatment plant.
- **nonpoint source pollution**: pollution that comes from many sources, like rain or runoff, like fertilizer from farms.
- **PFAS (GenX)**: human-made "forever chemicals" that stay in the environment and in living organisms.

Name _____

Date _____

Directions: Review the data in the table and answer the questions below.

Cape Fear River PFAS Monitoring Data

Chemical	EPA Safe Limit	Near Chemical Plant (Raw Water)	Fayetteville Intake (Raw Water)	Finished Drinking Water
PFOA	10 ppt	15 ppt	10 ppt	2 ppt
PFOS	10 ppt	15 ppt	10 ppt	3 ppt
PFNA	10 ppt	15 ppt	10 ppt	1 ppt
PFDA	10 ppt	15 ppt	10 ppt	1 ppt

Claim - Evidence - Reasoning

Name _____

Date _____

Question: Should North Carolina require stricter monitoring and treatment of the Cape Fear River?

Claim:

Evidence:

Reasoning:

Name _____

Cape Fear

Now, you will work in groups to look at the data. Write 2-3 points using at least 2 pieces of evidence. Once you are finished, we will debate.

- **Scientists**: present water test results
- **Community**: share health concerns
- **Industry**: defend operations or suggest improvements
- **Government**: decide on safety standards

Our role: _____

Evidence we will use:

Our main message:

Debate Roles

Community Member 

I need clean, safe water for my family. I have concerns about the water quality and daily life. I want the government to take action.

System helpers:

"I don't know..."
"It affects my family..."
"I don't know..."

Industry Rep

You will:

- defend your company's role.
- suggest alternatives or improvements.
- try to avoid blame while showing concern.

Sentence stem helpers:

- "Our company has already..."
- "We are willing to..."

Government Official

You will:

- listen to all sides.
- decide if stricter rules are needed.
- balance public health, economy, and environment.

Sentence stem helpers:

- "Based on the evidence..."
- "I propose..."

© Bright in the Middle

© Bright in the Middle

© Bright in the Middle