Interactive Watershed online class
Teacher Notes

This online class will introduce students to the Long Island Sound Watershed Experience program that will take place this semester. It is designed to take one full class period. Feel free to expand on any information or concepts as you go along.

1. **Title Slide: Introduction**
   - This class is the first part of the students' water quality program. Along with this activity, they will be joining the SoundWaters staff at a coastal field site and one in-class session to test water quality and do field work. In order to understand the work they are doing at the field sites, they must understand how water quality is affected by our watershed.
   - The end of the slide show contains review questions of the information you will be covering. We have provided this for you to use as an individual graded assignment or just as a review for the class.

2. **Project Themes**

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4. **What is a watershed?**
   - Allow students time to look at the map and try to answer the question before bringing up the definition.
   - The area shaded in green is all part of our watershed.

5. **Boundaries of a Watershed**
   - Review definition of topography: the natural and man made features that shape the land
   - The orange arrows within the red line drain towards the central river, representing 1 watershed
   - The yellow arrows outside the red line drain away from the central river, representing a different watershed

6. **Boundaries of a Watershed**
   - Water drains from higher elevations to lower ones.
   - Highest elevation in our watershed is in the Green Mountains of Vermont – 4,380ft. The picture is of this mountain range.
   - "What is the lowest point in our watershed"
     - Answer: Sea Level (0ft)

7. **Watershed Map**
   - The Long Island Sound is the major body of water that borders Connecticut. If you go to the beach in Connecticut you are swimming in the Long Island Sound, not an ocean.

- Ask students: Why does the green area represent our watershed? What creates those boundaries?
- "How many states are in the Long Island Sound Watershed?"
  - Answer: 6 (CT, NY, RI, MA, NH, VT)
- "How many countries?"
  - Answer: 2 (USA, Canada)
- Quebec is the northernmost point in our watershed and the Long Island Sound is the southernmost point

8. Does Long Island Sound watershed contain smaller watersheds?

- Within a larger watershed there are smaller watersheds, areas that drain in to certain rivers, etc. This is based upon topography and the direction water moves.
- You are in the Housatonic subwatershed.

9. Long Island Sound is an estuary

- What is an estuary?
  - Answer: A body of water where rivers meet the ocean and make brackish water

10. Why does the LIS contain brackish water?

- What makes Long Island Sound brackish? Give students time to think about and answer this question before revealing the rest of the slide.
- "What are the fresh water inputs into Long Island Sound?
  - Answer: Rivers, streams, ponds, lakes, precipitation, and groundwater
- "What is the salt water input into Long Island Sound?"
  - Answer: The Atlantic Ocean

11. You are now going to…

- The following slides include a diagram of a watershed with numbers indicating the major features.
- After the animation, have students guess what each number represents. Then click for the answer

12. What do you think number 1 represents?

- Call attention to the snow on top of the mountains
- "What does number 1 represent?"
  - Answer: Highlands

13. 1 – Highlands

- Due to topography, the highlands, or mountains, are where a watershed begins. Remember water drains from higher to lower elevations.
- This photo was taken of the mountains in Quebec, where our watershed begins.

14. **What do you think number 2 represents?**
    - Call attention to the blue line
    - "What does number 2 represent?"
        - Answer: A river.

15. **2- River**
    - Snow melting from mountains flows downstream (lower elevations) forming rivers or adding to existing ones.

16. **Connecticut River**
    - The Connecticut River is the largest river in our watershed and a major source of freshwater for the Long Island Sound, but it is **not** the only freshwater source. Do you know any other rivers in our watershed (Housatonic, Thames, Saugatuck, etc)

17. **What do you think number 3 represents?**
    - Call attention to the smaller blue lines adding to the river
    - "What does number 3 represent?"
        - Answer: tributary

18. **3 - Tributaries**
    - Tributaries, smaller branches of rivers, can occur anywhere along the watershed and provide an important habitat for aquatic animals.
    - This is a Google maps image of Westbrook, CT (an eastern area of our watershed) showing tributaries of the Menunketesuck River.

19. **What do you think number 4 represents?**
    - Call attention to the 2 dense areas around the river
    - "What does number 4 represent?"
        - Answer: populated areas

20. **4 – Populated areas**
    - The first photo is of the Hartford, CT skyline, with the Connecticut River behind it. The second photo is of farm land along the Connecticut River.
    - Note the 2 very different uses and influences along the same river.

21. **What do you think number 5 represents?**
    - Call attention to the mouth of the river
    - "What does number 5 represent?"
        - Answer: body of water

22. **5 –Body of water**
    - This photo is of the mouth of the Connecticut River in Old Lyme, CT, which is where the river meets Long Island Sound.

- Remind students that not all watersheds have a final body of water that is brackish. Watersheds could end with freshwater as well (watersheds of smaller rivers, lakes, etc)
- A Sound is similar to a bay in that both contain brackish water and are enclosed bodies of water. Typically, a Sound is a larger body of water than a Bay in size and depth.

23. Can humans affect the quality…

- Allow the students to look at the image and think about how water moves through the entire watershed.
- What types of things can impact water as it moves through the watershed?
- "Can humans affect the quality of the water as it travels through the watershed?"

24. As Water Moves Over Land

- Negative influences on water as it moves over land
  - Point source pollution – a pollutant introduced at a single location. Ex. – throwing garbage into a body of water, dumping into a storm drain, or a drainage pipe from a specific factory being directly discharged into a body of water.
  - Non-point source pollution – pollution that occurs from an unidentifiable origin. Non-point pollution can come from rural areas (i.e. farm waste) and from urban areas (i.e. gas and oil runoff)
    - The lower picture shows sediment from erosion entering the rivers and draining into Long Island Sound. What could cause erosion such as this? Have the students think of recent weather events

25. As Water Moves Over Land

- Positive influences to surrounding areas
  - The fresh water that moves through a watershed is utilized by people in rural and urban areas in many ways.
  - Ask your students if they are on city or well water? Well water is obtained through aquifers in the ground. Water consumed from a tap has traveled through our watershed in some way.
- Positive influences to the water itself
  - Many elements of the land act as a natural filter for the water traveling over or through it, adding necessary minerals and nutrients to the water itself.
- The picture is of the West Branch Reservoir in Litchfield County. A reservoir is a large natural or artificial lake used as a water supply source.

26. Lets go global

27. World Water Supply

- 75% of the world is water… Of that 97% is salt water, 2.5% is frozen fresh water, and 0.5% is usable fresh water

- Note: "salt water" includes ocean water and brackish water. This is not usable for drinking purposes. Why?
- "What is meant by 'frozen fresh water' and where is it found?"
- Are the students surprised at 0.5% being usable fresh water? Is that only for drinking? What else could that be used for? Can we run out of fresh water?

28. How healthy is your water
- "Can you think of why these things would be tested?"
- These are all tests that we will be doing at our field sites.
- The photo includes some of the equipment we will be using

29. And you will test these too
- You will conduct different tests each time you see SoundWaters this year.

30. Collecting Data
- Students will be conducting experiments and collecting various data points throughout this program.
- They will be able to compare results across different field sites as well as seasonal changes.
- This is why scientists collect data to make comparisons over time and monitor the health and stability of ecosystems.
- What types of data do you think are important to collect about the Long Island Sound Watershed?

31. Let's put it all together
- The following slides contain review questions from the PowerPoint. You may use this as an individual or group assessment.

32. Which watershed do you live in?
- Long Island Sound Watershed

33. What is an estuary?
- A body of water where rivers meet the ocean and make brackish water

Name 1 fresh water source and 1 salt water source for Long Island Sound
- Fresh = river, stream, precipitation, groundwater
- Salt = Atlantic Ocean

34. What determines the boundaries of a watershed?
- The topography which includes natural and man made features that shape the land

35. Identify the numbered parts of the watershed
- 1 – Highlands, 2 – River, 3 – Tributary, 4 – Populated Areas, 5 – Body of water

36. **Name a positive and negative influence as water moves through the watershed**
    - Positive – water as a drinking source, adding minerals to the water
    - Negative – Pollution sources including point source and non-point source

37. **Remember, only 0.5% of the world's water is usable fresh water**

38. **Measuring water quality is a way to ensure the health of the water we use every day**

39. **Congratulations!**

40. **Additional Resources**

41. **Photo sources**

We hope you enjoy this program and thank you in advance for your participation. We encourage you to become familiar with this PowerPoint and if you have any questions or comments, please do not hesitate to contact us

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