



Water Quality Unit Review

Key Points:

- Humans must drink water to live, but some water is healthier than other water. That means that humans need a way to measure if water is healthy enough to drink.
- We've developed ways to measure how healthy water is (like temperature, pH, etc.)
- We've also developed technology that lets us measure how healthy water is.
- Humans pollute water sometimes. If we can tell the one place where pollution comes from, it is point-source pollution. If it comes from more than one place, it's non-point-source pollution.

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How Do We Measure How Healthy Water Is?

Because humans can get sick if we drink unhealthy water, scientists need a way to measure how healthy water is. They've come up with a few ways, including measures of water's temperature, pH, turbidity, dissolved oxygen, and number of bio-indicators.

Temperature: A healthy water system has **moderate to cool temperatures**.

Dissolved oxygen: A healthy water system holds oxygen for the aquatic organisms that live in it. **High levels of dissolved oxygen are best** for organisms. Cool water can hold more dissolved oxygen than warmer water, so dissolved oxygen and temperature are

related.

pH: pH is a measure of how acidic or basic water is, and it's measured on a scale from 0 (acidic) to 14 (basic). A healthy water system has a **pH between 8.0-9.0**, so the pH is slightly basic.



A hand covered in algae from an algal bloom.

Nitrates: Nitrates are nitrogen compounds found in fertilizers. When too many nitrates are found in a water system, it can cause an **algal bloom**, or too much algae to live in the water. This causes high turbidity and lowers dissolved oxygen levels.

Bio-indicators:

These are organisms that are sensitive to pollution. If there are quite a few bio-indicators in a water system, that lets us know that the system is not very polluted.

Turbidity:

Turbidity is a measure of how clear water is. Healthy water has **low turbidity** because it's clear. High turbidity (murky water) is a sign of an unhealthy water system.

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Protecting Water Resources

We don't have an unlimited amount of freshwater, so scientists have had to develop ways to ensure that water stays healthy.

They have convinced the U.S. legislature to pass laws about how much pollution can be in water. The EPA

(Environmental Protection Agency) monitors the **wastewater** that is disposed in the United States to ensure that our rivers, lakes, and streams stay healthy.

Each state gets to set its own standards for water quality as well. They can be stricter

than the U.S. standards, but they can't be less strict than the standards the federal government sets.

To make sure that these standards are met, scientists constantly use technology to measure how healthy our water systems are.

Water Quality

We don't have an unlimited amount of freshwater, so we have to be careful that the freshwater we have stays clean and free of pollution.

Pollution of our Water

When scientists think about the pollution of our water, they think a lot about how humans pollute the water in the world. Polluted water is water that has been adversely affected by the addition of large amounts of materials into the water.

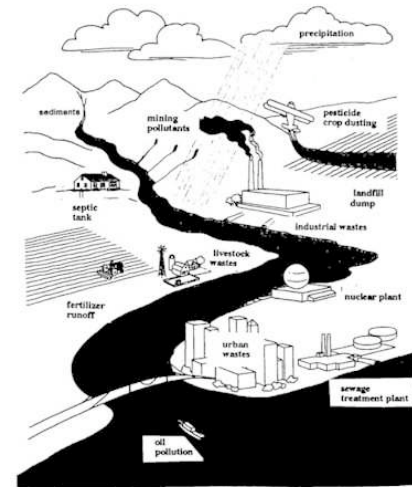
Humans do this by releasing **pollutants**, or any substance that can cause harm to the environment, into water.

Some examples include toxic chemicals, human/animal wastes, and pesticides that can run into (or be dumped into)

water systems.

If you can point to where the pollutant is coming from, the pollution is an example of **point-source pollution**. When oil spills from an oil tanker into water, that's an example of point-source pollution. If we know exactly where the pollution is coming from, we can usually clean it up (although we don't always choose to do so).

Some pollution comes from more than one source. **Non-point-source pollution** comes from many places or a



source that's not easy to identify. Some examples of non-point-source pollution include sand, oil, and grit from city streets or chemical run-off from the fertilizers used on farms or golf courses.

Technology and Monitoring the Hydrosphere

Scientists have to monitor the hydrosphere to ensure that it stays healthy, so they've developed some systems to help them do that.

Remote sensing technology allows scientists to use satellite images to monitor the earth. These satellites can help scientists identify amounts and locations of different types of algae, dissolved organic chemicals,

and sediments in the ocean and large lakes.

Global positioning systems (GPS) use satellites to pinpoint locations on earth. These units are used to monitor where buoys that monitor the ocean are located. This helps the scientists make accurate maps of the water systems.

Finally, **geographic informa-**

tion systems (GIS) are mapping software that can create different layers of a map of the same layer. Each of those layers can contain different information about the area, like water temperature, nitrate levels, pH, and dissolved oxygen content. Scientists can use all this data to determine whether a water system is healthy or not.

Wastewater Treatment

Any water that runs into a drain is called **wastewater**. Because we only have a limited amount of freshwater, we need to clean that wastewater so that we can reuse it.

This cleansing process happens in a **wastewater treatment plant**. Wastewater treatment plants are facilities that remove wastes from water and then release the clean water into a lake or stream. These plants

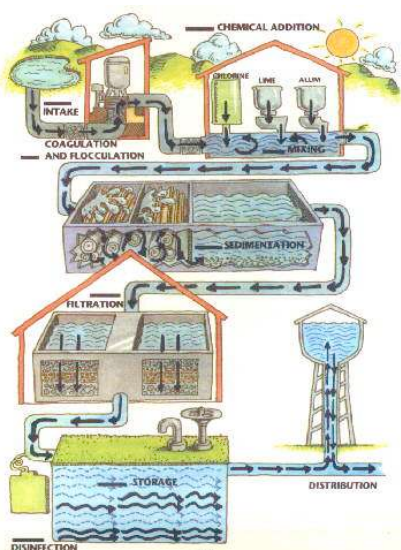
help keep polluted water from getting into clean water systems.

The water in a wastewater treatment plant goes through the following stages to be cleaned:

1. **Coagulation:** A chemical called alum is added to water to cause dirt and other particles to clump together. The clumps are called **floc**.
2. **Sedimentation:** The

heavy particles (the floc) settle to the bottom.

3. **Filtration:** The water passes through filters to help remove smaller particles.
4. **Disinfection:** A small amount of chlorine is added to the water to kill bacteria and other microbes.
5. **Storage:** The water is stored in a tank (or a water tower!) until the community needs it again.



Inside Story Headline

This story can fit 150-200 words.

One benefit of using your newsletter as a promotional tool is that you can reuse content from other marketing materials, such as press releases, market studies, and reports.

While your main goal of distributing a newsletter might be to sell your product or service, the key to a successful newsletter is making it useful to your readers.

A great way to add useful con-

tent to your newsletter is to develop and write your own articles, or include a calendar of upcoming events or a special offer that promotes a new product.

You can also research articles or find "filler" articles by accessing the World Wide Web. You can write about a variety of topics but try to keep your articles short.

Much of the content you put in your newsletter can also be used for your Web site. Microsoft Publisher offers a simple way to convert your newslet-

ter to a Web publication. So, when you're finished writing your newsletter, convert it to a Web site and post it.



Caption describing picture or graphic.

Inside Story Headline

This story can fit 100-150 words.

The subject matter that appears in newsletters is virtually endless. You can include stories that focus on current technologies or innovations in your field.

You may also want to note business or economic trends, or make predictions for your

customers or clients.

If the newsletter is distributed internally, you might comment upon new procedures or improvements to the business. Sales figures or earnings will show how your business is growing.

Some newsletters include a column that is updated every issue, for instance, an advice

column, a book review, a letter from the president, or an editorial. You can also profile new employees or top customers or vendors.

"To catch the reader's attention, place an interesting sentence or quote from the story here."

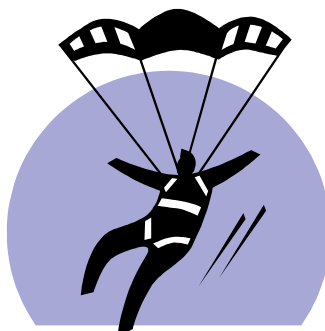
Inside Story Headline

This story can fit 75-125 words.

Selecting pictures or graphics is an important part of adding content to your newsletter.

Think about your article and ask yourself if the picture supports or enhances the message you're trying to convey. Avoid selecting images that appear to be out of context.

Microsoft Publisher includes thousands of clip art images



Caption describing picture or graphic.

from which you can choose and import into your newslet-

ter. There are also several tools you can use to draw shapes and symbols.

Once you have chosen an image, place it close to the article. Be sure to place the caption of the image near the image.



Primary Business Address
Your Address Line 2
Your Address Line 3
Your Address Line 4
Phone: 555-555-5555
Fax: 555-555-5555
E-mail:
someone@example.com

Your business tag line
here.

WE'RE ON THE WEB!

EXAMPLE.MICROSOFT.CO

M

This would be a good place to insert a short paragraph about your organization. It might include the purpose of the organization, its mission, founding date, and a brief history. You could also include a brief list of the types of products, services, or programs your organization offers, the geographic area covered (for example, western U.S. or European markets), and a profile of the types of customers or members served.

It would also be useful to include a contact name for readers who want more information about the organization.

Back Page Story Headline

This story can fit 175-225 words.

If your newsletter is folded and mailed, this story will appear on the back. So, it's a good idea to make it easy to read at a glance.

A question and answer session is a good way to quickly capture the attention of readers. You can either compile questions that you've received since the last edition or you can summarize some generic questions that are frequently asked about your organization.

A listing of names and titles of managers in your organization is a good way to give your newsletter a personal touch. If

your organization is small, you may want to list the names of all employees.

If you have any prices of standard products or services, you can include a listing of those here. You may want to refer your readers to any other forms of communication that you've created for your organization.

You can also use this space to remind readers to mark their calendars for a regular event, such as a breakfast meeting for vendors every third Tuesday of the month, or a biannual charity auction.

If space is available, this is a good place to insert a clip art



Caption describing picture or graphic.

image or some other graphic.