



Toxicology Unit Review

Key Points:

- Being around chemicals can have a big impact on humans. We need to learn about toxicology so that we can keep our bodies healthy.
- Human bodies can't handle exposure to certain chemicals. If we are exposed to those chemicals, we are more likely to develop certain diseases.
- A lot of the time, poor people are impacted by pollution while wealthier people use their influence to ensure that pollution won't be placed in their neighborhoods.

Inside this issue:

Toxicology: The Effects of Chemicals on Organisms	1
Pollution: Who Gets Affected Most?	1
Chemicals: The Risks and Benefits	2
Cancer	2
Other Diseases	2

Eighth Grade 2008-2009

Volume 1, Issue 1

Toxicology: The Effects of Chemicals on Organisms

When organisms are exposed to chemicals, different factors help determine how the organisms will respond. Some organisms won't be affected by a chemical; others will be greatly affected by even a small amount of the chemical. Doctors and pharmacists spend a lot of time thinking about the following factors.

Dose: The dose is simply the amount given to the organism. When a doctor prescribes a drug, the dose is the amount a person should take. Oftentimes, a higher dose will affect an organism more than a lower dose.

Potency: The potency of a chemical is how powerful that chemical is. Any drug that

has a big effect on someone when they are given a low dose of the chemical is said to have a high potency.

Exposure time: The exposure time is the length of time that someone is around the chemical.

Individual susceptibility: Individual organisms can respond to the same dose of the same chemicals in different ways. An organism's individual susceptibility depends on its physical and genetic make-up. (Remember the individual susceptibility lab we did in class—all of our heart rates

responded differently to the amount of caffeine in one can of Coca-Cola.)

Concentration: The concentration of a chemical is the amount of chemical in a certain amount of space. When we're thinking

about that, we need to remember that Jalen would have a lower concentration of a chemical in his body than Maya would in her body if they were both given the same dose of a chemical. This is true because Jalen is bigger than Maya.



Pollution: Who Gets Affected Most?

In the United States, it sometimes seems that poor people are more affected by pollution and exposure to chemicals than wealthier people. For example, during the movie *A Civil Action*, we saw that a poor community in Woburn, Massachusetts, saw

many children develop diseases and die because they were exposed to chemicals. We also saw this happen in the state of North Carolina as we studied what happened in Warren County with the PCB landfill that was built there.



To be a smart citizen, you have to think about whether chemicals are worth the risk that they pose to your body. You can definitely decide that some chemicals are worth the risk while other aren't! When scientists (or you) weigh the risks and compare them to the benefits of using a chemical, we are doing a **risk-benefit analysis**. When considering whether it is safe to use a chemical in the United States, scientists always consider how safe the chemical is and its potential side effects.

Food Preservatives: Food can spoil really quickly, but there are chemicals we can add to ensure that our food stays fresh.

Benefit: Our food stays fresh.
Risk: Some people have allergies or a food intolerance to certain preservatives. An **allergy** is an immune system response to proteins in certain foods while a **food intolerance** occurs when a body has an inability to digest a certain food.

Chemicals and our Crops: Sometimes people argue about

whether we should use chemicals on the crops that farmers grow.

Benefit: We get more crops! **Risk:** Sometimes fertilizers and pesticides can run off into the streams around the farm where they are being used.

Sanitation: Oftentimes, we use chlorine to sanitize our water.

Benefit: It purifies our water.

Risk: Some people think that chlorine smells or tastes bad.



Cancer

Cancer is a group of diseases caused by abnormal cell growth and reproduction. Our cells normally reproduce and divide using controlled cell division. When a person's body has cancer, their cells are dividing uncontrollably. When this occurs, our cells often form a large mass known as a **tumor**.

There is more than one type of

cancer that can impact humans and our bodies. Some types of cancer (like lung cancer) are caused by exposure to certain chemicals called **carcinogens**, which are just cancer-causing chemicals. For example, lung cancer can be caused by the carcinogens in tobacco products. Other cancers can be caused by exposure to asbestos, which used to be used to



insulate homes, and radon, a gas present in some rocks. Many people try to avoid exposing themselves to carcinogens.

Other Diseases

Other diseases can also be caused by exposure to chemicals. Some of those diseases are discussed here.

Fetal Alcohol Syndrome: When a mother drinks alcohol regularly during her pregnancy, oftentimes her baby will be born with fetal alcohol syndrome, which can result in learning disabilities, behavioral problems, and slow growth.

Heart Disease: Heart dis-



ease is the number one cause of death in the United States. It's caused when the arteries that supply blood to the heart

are narrowed or blocked. This can be caused by the nicotine in tobacco or cholesterol, a fatty acid that forms deposits on the walls of our arteries.

Asthma: Asthma is caused when the bronchi, air passages that lead from the throat to the lungs, become inflamed. Breathing becomes more difficult. Asthma is caused by inhaling harmful chemicals such as cleaning products or aerosol deodorants.

Chemicals can help humans (like when sick organisms take medicine), but they can also harm humans (like when humans are more likely to develop cancer due to carcinogen exposure).

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."

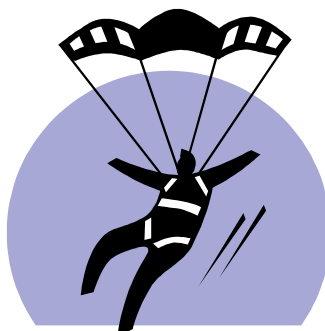
Inside Story Headline

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.