Outbreak!

You have been contractually hired by the Dallas County Department of Health and Human Services to create a fact sheet about COVID-19 that will be mailed to every household in Dallas County. Your fact sheet can be no longer than a single page (front and back).

Your fact sheet must include the following:

- Describe a virus and how it is different from a cell
- Explain how viruses make copies of themselves
- Present a data table and graph of COVID 19 infections and deaths in Dallas County, by week
- Calculate the morbidity rate of COVID-19 in Dallas County, and compare this rate to the global estimate of 2-5%
- Provide guidance on how to reduce your risk of infection

Use the following attachments to build your fact sheet:
Viruses – will provide you essential knowledge about viruses
Viral Replication and Treatment – will provide more in depth knowledge about viral infections
Math Connections; Viruses – this activity will provide you with a blueprint to think about how to present your COVID-19 data in the fact sheet.
Dallas County COVID-19 Summary – Use this data summary to determine and share the most informative data about COVID-19.

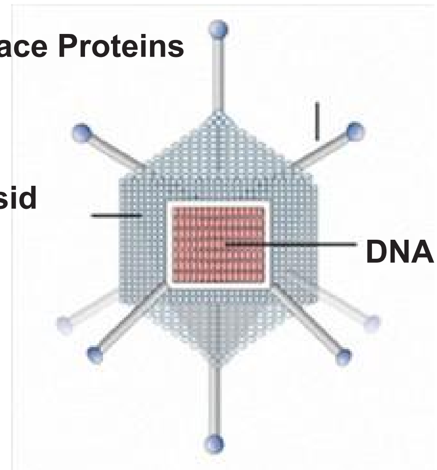
Reflect

Imagine a military base designed to keep invaders out. Soldiers patrol the fences and gates. Cameras are set up along the borders of the base to capture video of anyone who tries to get in. Sensors in the ground set off alarms if someone jumps over the fence. But, every day, the tiny invaders get past these complex security measures and take over the base. In this analogy, the military base is the human body and the tiny invaders are called *viruses*.

What are viruses? Are they alive? How do they make us sick?

Characteristics of Viruses

Viruses are nonliving particles. They do not eat, they do not have a metabolism, and they cannot move on their own. Viruses are not able to reproduce without living cells. They lack cytoplasm and membrane-bound organelles.



Viruses depend on living things to survive, and in doing so harm their cell **hosts**. This characteristic makes viruses parasites. Viruses are also very small. They are so small, in fact, that they are measured in nanometers (nm). One nanometer is 1 x 10^{-9} meters. The common cold virus is 75nm, about 100 times smaller than a red blood cell! Their tiny size is part of what makes viruses so good at invading living things. A virus is fairly basic in structure and contains only what it absolutely needs to survive.

host: organism that supports a parasite

- **Protein coat:** The outside of a virus is composed of a protective protein coat called a *capsid*. The capsid has surface proteins on it that help the virus invade cells. Protein coats come in many shapes and sizes. Some viruses are spherical in shape, while others look like rods. Some viruses also have a lipid envelope surrounding the protein coat.
- **Surface proteins:** *Surface proteins* are located on the virus's protein coat. They act as "keys" that bind with the host cell's receptor proteins, or "locks." The surface proteins allow the virus to bind to the host cell. Then, the virus can insert its genetic material into the cell or enter the cell itself. The surface proteins match up only with specific cells. This is why a virus can infect only certain cells in the body. For example, a virus with surface proteins that match up with liver cells cannot infect red blood cells.
- **Genetic material:** Like cells, viruses have genetic material. The genetic material in a virus may be single- or double-stranded RNA or DNA. As with **prokaryotic cells**, the genetic material is not contained within a nucleus. It is found inside the protein coat. Viruses vary in the size of their genome. Some viruses have as few as four genes, while others may have 1,000 genes. Viruses can copy their genetic material only while inside a host cell.

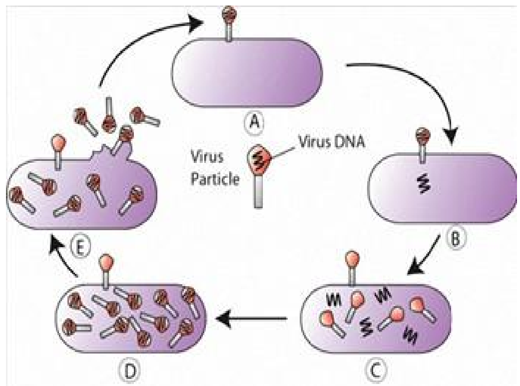
prokaryotic cell: a cell that does not contain a membrane-bound nucleus or other organelles

Look Out!

Not all viruses are bad. Scientists have found a way to use viruses to prevent disease. Most children in the United States are required to have certain vaccines before they enter school. A vaccine contains a weakened or inactive virus that is injected or sprayed into the body. The virus is not strong enough to cause the disease, but it does cause an immune response. The body learns to recognize and fight the virus. So, if the strong, active version of the virus ever attacks the body in the future, the body will be able to fight it off without getting the disease.

Viral Reproduction

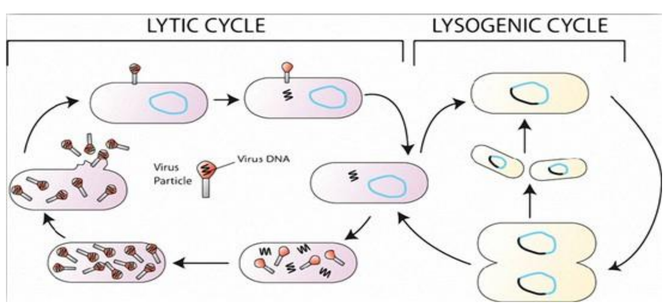
A virus can make copies of itself in two ways: lytic infection and lysogenic infection. Both of these methods involve the virus taking over a living cell in order to reproduce.



- **Lytic infection:** The *lytic* infection is so named because it causes the host cell to lyse, or be destroyed. The virus attaches to the host cell (A), where it either enters the cell or injects its genetic material into the cell (B). The virus now controls the host cell and directs the cell to make viral proteins and genetic material. The cell host cell is now filled with new virus particles (C). Think of this process as similar to breaking into a car factory and using the machinery to make your own kind of car (D). Eventually, the viral genes direct the production of enzymes that cause the release of newly produced viruses from the cell. The newly produced viruses escape the host cell either by causing it to burst or by encasing themselves within a piece of the cell membrane and then breaking away from the cell (E). Each of these new virus particles is capable of infecting another cell.
- **Lysogenic infection:** Think of the lysogenic infection as a sneaky attack compared to the lytic infection. In a *lysogenic infection*, the virus does not immediately kill its host cell. Like a lytic infection, the virus either enters the cell or injects its genetic material into the cell. The difference is that in a lysogenic infection the viral genetic material is inserted into the host cell's DNA. Whenever the host cell replicates its DNA, the viral genome is copied, too.

All of the host cell's **daughter cells** contain a copy of the virus genome. Eventually, something triggers the viral DNA to remove itself from the host's DNA. Common triggers include cellular stress or exposure to ultraviolet radiation. Once the viral DNA is triggered, the infection responds like a lytic infection. The host cell and its daughter cells replicate copies of the virus. Eventually, the cells lyse, or are destroyed, and viruses are released. Lysogenic viruses that you may be familiar with are those that cause cold sores and shingles.

> **daughter cells:**
> the cells produced during cell division



What Do You Think?

Viruses depend on living things for survival. Viruses can reproduce only if they are inside a living cell. Do you think viruses evolved before living things or after? Explain your reasoning.

Viral Diseases

Like a military base, our bodies have many defenses to prevent viruses from infecting our cells. The skin and the mucus lining the respiratory tract help prevent viruses from invading the body. But, every now and then, these tiny invaders slip past our defenses.

Viruses are the cause of a variety of diseases. Some you may have had yourself—the common cold, influenza (flu), chicken pox, and measles. Viruses can also cause more serious diseases, such as dengue fever (a disease spread by mosquitos, characterized by high fever), encephalitis (a disease characterized by swelling of the brain), small pox, and AIDS. Some viruses can even cause cancer by disrupting the normal cell cycle. Usually, a cell's DNA contains information about when the cell should stay at rest and when it should replicate. Some cancer-causing viruses are able to direct the cell to keep dividing over and over. The result is a large mass of cells called a

The symptoms of a disease are often due to the type of cell that is attacked by the virus. Remember that different viruses can infect only specific cells. Viruses that attack nerve cells, like the polio virus, can cause paralysis or loss of movement. When a nerve cell is killed by a viral infection, it is not replaced, because nerve cells do not reproduce. When enough nerve cells are killed, a person experiences paralysis. Some viruses infect white blood cells. White blood cells are part of a human body system that fights infections. When a virus kills white blood cells, the body can become more susceptible to further infection. The virus that causes the common cold infects cells in the respiratory tract. When attacked, these cells release mucus, which can result in a runny nose or cough. In this case, the symptoms are due more to the immune system response than to the actions of the virus itself!

The Immune System: Fighting Infections

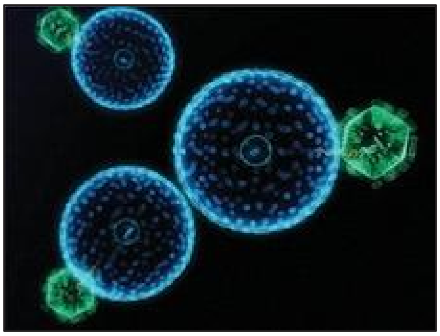
How does your body cope with a viral infection? As mentioned previously, the body's immune system fights the virus. Special cells in the immune system try to find and destroy any body cell that contains a virus. These immune cells can also direct an infected cell to self-destruct before the virus inside can make copies of itself. This process of self-destruction is called a*poptosis*. Some viruses have developed special proteins that inhibit apoptosis. This allows the virus to continue using the cell for reproduction. Sometimes the ways in which the body tries to fight the virus can end up hurting the body, too. For example, a fever is the body's way of trying to "cook" the virus to death. This attempt to control the infection can cause discomfort and even serious damage to the body, though that's rare. However, very high, prolonged fevers can cause seizures and brain damage.

What Do You Think?

Acquired Immunodeficiency Syndrome: AIDS

AIDS is caused by the human immunodeficiency virus (HIV). This virus causes a deficiency in the body's defenses by targeting and killing cells in the immune system. HIV targets helper T-cells, the very cells in the body that would be useful in fighting the viral infection. The virus is also able to hide from the immune system, allowing it to replicate without being detected.

HIV is a retrovirus. What does this mean? The prefix *retro-* means "backward." It refers to the backward way in which the virus **transcribes** DNA. In most viral infections, a virus first injects its genetic material into the cell, and the cell then makes RNA and proteins from the viral genes. In a retrovirus infection, the retrovirus injects its genetic material, RNA, along with an **enzyme** called reverse transcriptase, into the host cell. The host cell then makes double-stranded DNA from the viral RNA using the reverse transcriptase.



This model shows HIV (green) attacking white blood cells (blue).

transcribe: to convert the genetic information in DNA into RNA

enzyme: a protein that helps control a chemical reaction in the body

The viral DNA is then incorporated into the genome of the host cell. Some of the medicines that are used to treat HIV and other retroviruses attempt to inhibit reverse transcriptase. This prevents the virus from incorporating its DNA into the host cell's DNA and making copies of itself.

Although AIDS cannot be cured, it can be delayed with treatments that inhibit virus replication. For example, a drug called AZT inhibits the function of reverse transcriptase.

Career Corner: Virologists

Do you like solving medical mysteries? Do you like using laboratory equipment? If so, a career as a virologist might be in your future. A *virologist* is a scientist who studies viruses. Virologists may study the origin of a virus, its shape, its method of infection, the diseases it causes, and how to fight the diseases. Some virologists work in laboratories. Others travel to places where viral diseases are widespread within the population to learn more about the viruses. A virologist may work with other scientists to develop anti-viral medications and vaccines.

This virologist is using a micropipette to infect a culture of human cells with a virus.

Virologists work with sophisticated technology. Because viruses cannot usually be seen with a compound light microscope, virologists must use powerful electron microscopes to visualize viruses. By studying viral diseases, these scientists make a huge difference in the world. The work they do saves lives and prevents the spread of diseases.

What Do You Think?

What do you know?

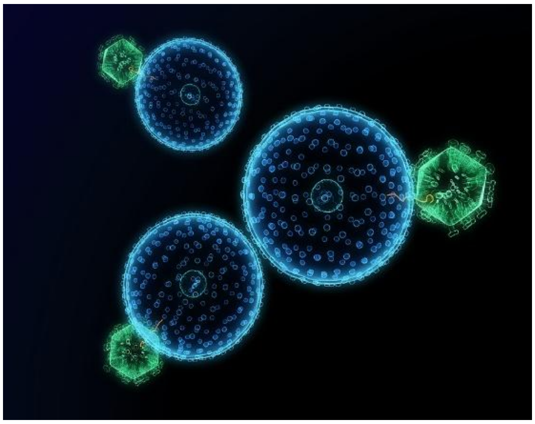
Use what you know about viruses to fill out the table below. First, decide if you agree or disagree with the statement in the left column. Then, provide an explanation for your decision in the right column.

Agree/Disagree?	Explanation
Viruses are nonliving. Agree Disagree	
Viruses are larger than most living cells. Agree Disagree	
A lytic infection involves incorporating viral DNA into a host cell's DNA. Agree Disagree	

Reading Science

Name: ______________________________ Date: __________

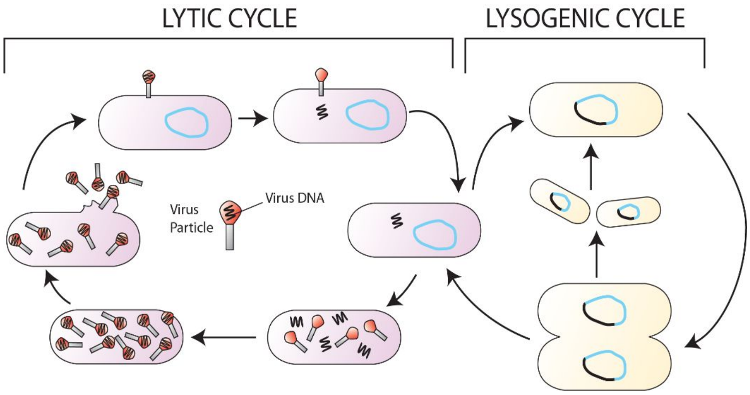
Viral Replication and Treatment



1 Viruses have been in the news alot lately, from the West Nile virus, to H1N1, to the bird flu. But, what exactly is a virus, and why is there such concern over the spread of these pathogens? The concern has to do with the structure and reproductive cycle of these disease-causing agents. Viruses are not structured like other biological organisms. In fact, viruses are not considered biological organisms at all. Let us take a closer look at the structure and reproductive systems of viruses. Then we can discuss why these factors make viruses so difficult to treat.

2 Most biological cells consist of a membrane that encloses genetic material in the form of a double-helix strand of DNA. This is true whether the cell is a prokaryotic bacteria, or a eukaryotic cell in a plant, animal, fungus, or protist. Viruses are different. First of all, viruses do not have cell membranes. The material inside the virus is enclosed in a protein shell called a capsid. Within the capsid is another structure called the viral envelope. Second, viruses do not always contain a double-helix strand of DNA. The genetic material inside the virus can come in a variety of forms, from a single strand of DNA to a strand of RNA. Third, viruses have no mechanisms for metabolism. They also do not have ribosomes. But, what truly distinguishes viruses from other biological structures is that viruses cannot replicate on their own. They can only reproduce within another cell, or a host cell. This is why many do not consider viruses to be living cells at all.

3 Viruses do not have metabolism, while all bacteria and other cells do. Also, viruses (unlike other biological cells) rely on other organisms to survive and replicate. They are considered a type of parasite because they need another organism to survive. Let us look at a specific type of virus, the bacteriophages, or phages. These types of viruses infect bacteria and are highly structured. Their replication methods are well documented. There are two main ways that these types of viruses can replicate within a host organism. Both of these methods make it very difficult to treat and destroy the virus once it has entered the host cell.



4 The first type of replication cycle seen in phages is the lytic cycle. Let us assume that this virus is infecting an *E. coli* bacterium. The phage has specific structures that fit into receptors on the plasma membrane of its host cell. It will land on the surface of the *E. coli* and inject its genetic material straight into the cell. The genetic material of the virus will form a circle and take control of the protein synthesis "machinery" of the host cell. At this point, the new genetic material will direct the host cell to start replicating viral parts from the host cell's molecules. The viral components will be replicated in pieces. They will then assemble within the cell. Once the cell produces 100 to 200 phage products, the cell will burst (lyse). This kills the host cell and releases the newly formed viruses, which will then infect other nearby cells.

5 The second type of replication cycle is the lysogenic cycle. In this cycle, the host cell is not killed. Instead, it is used to produce more of the viral genome. As with the lytic cycle, the virus will attach to the host's receptors and release its genetic information into the host cell. However, the viral genome will then become incorporated into the host cell's genome. Host cells with embedded viral genomes are called lysogens. Each time the host cell reproduces, it copies the viral genome and passes this information to each daughter cell. In this way, the information for creating more viruses is carried in a host organism without killing the host organism. However, at certain points, the viral replication cycle can switch from lysogenic to lytic and back again.

6 The viral replication cycle is the reason that viruses are so difficult to treat. Once the host cells are infected with the viral genetic material, it is almost impossible to remove. In other words, viral infections can not currently be cured. They can, however, be treated with medicines to lessen the symptoms. Often, certain lymphocytes in the body's immune system make enough antibodies to destroy more viruses than are being made. In this way, the disease is overcome. Sometimes viral infections can be prevented by immunizations or vaccines. People are exposed to pieces of specific disease-causing viruses. The body's immune system is triggered to prepare to fight the actual specific virus if it encounters one in the future. This is why many people in the United States are vaccinated against such viral diseases as chicken pox, the measles, and the flu. Unfortunately, HIV, the human immunodeficiency virus, infects and causes the death of the very cells that form antibodies to protect you. That is why people who are infected with HIV become sick due to infections that otherwise healthy people could successfully fight.

Math Connections

Name: ______________________________ Date: __________

Viruses

In March of 2014, the Ebola virus began to spread quickly in the West African countries of Sierra Leone, Senegal, Liberia, Guinea, and Nigeria. The virus known as Hemorrhagic Fever is spread through contact with skin and body fluids of infected individuals or animals. The symptoms can appear between 2 and 21 days after infection and may include high fever, headache, muscle aches, sore throat, and stomach pain. As symptoms progress the infected individuals will experience a decrease in the number of blood-clotting cells which leads to internal and external bleeding. The mortality rate of Ebola victims is up to 90% of those infected.

The data below shows the number of total cases per month in the countries named above.

Cumulative Infections and Monthly Deaths From Ebola

Report Dates	Cumulative Infections	Monthly Deaths
February 2014	59	33
March 2014	137	93
April 2014	241	162
May 2014	421	226
June 2014	759	467
July 2014	1603	887
August 2014	3707	1848

1. Calculate the percent of the those infected who have died from the disease and record the figures in the chart below.

Month	Percent of Death
February	
March	
April	
May	
June	
July	
August	

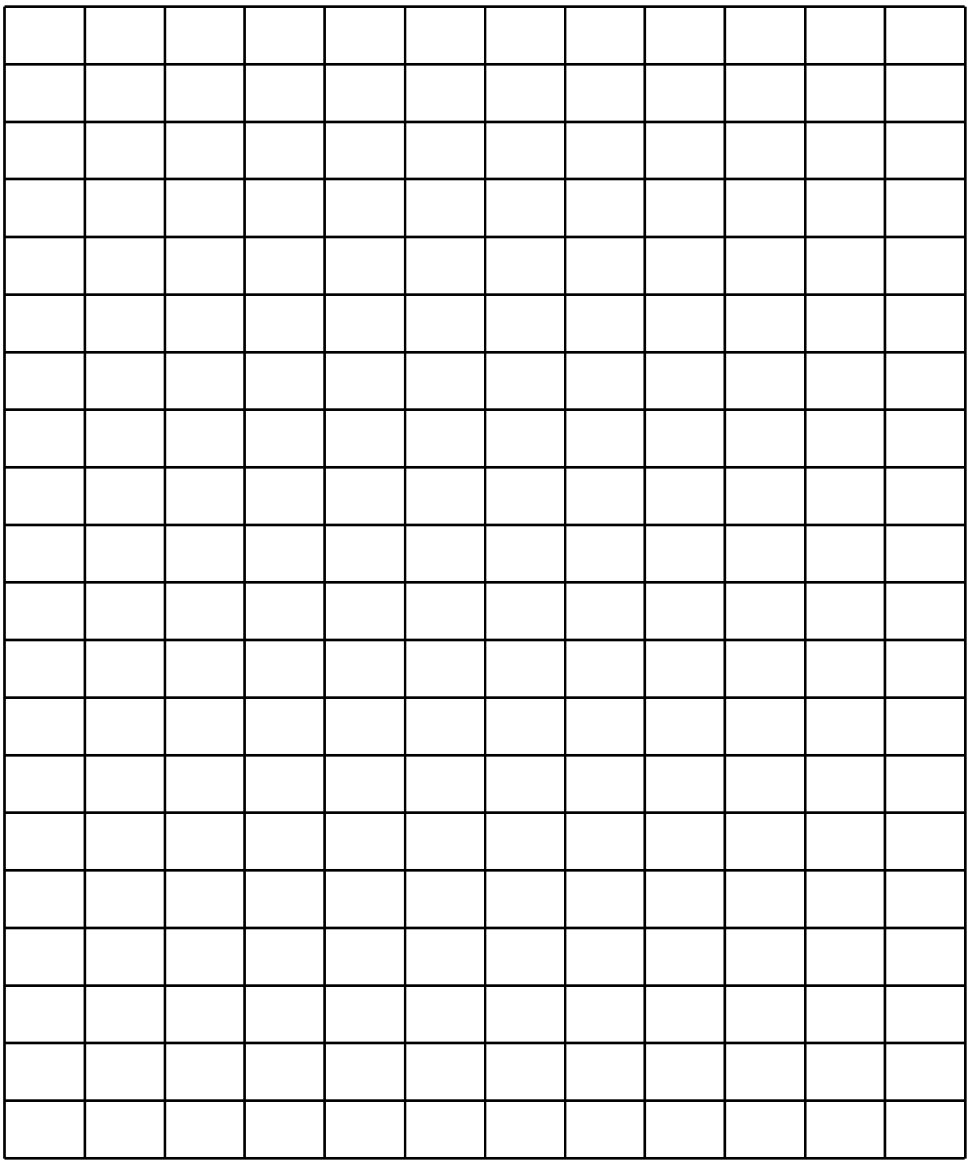
Math Connections

2. The mortality rate of Ebola victims is about 90%. Does the data support this figure? Justify your position as to why this is. What factors might influence the rate?

3. Create a scatterplot using the data from the first page. Use the total monthly deaths as the *x*-values and the cumulative infections as the *y*-values.

Ebola Virus 2014: Cumulative Infection vs. Monthly Deaths

Number of Cumulative Infections



Number of Monthly Deaths

Math Connections

4. What is the percent increase during the time period from February 2014 to August 2014?

5. Draw a trendline through the data on the graph.

6. What is the rate of increase on your graph (slope)? What is the meaning of the slope?

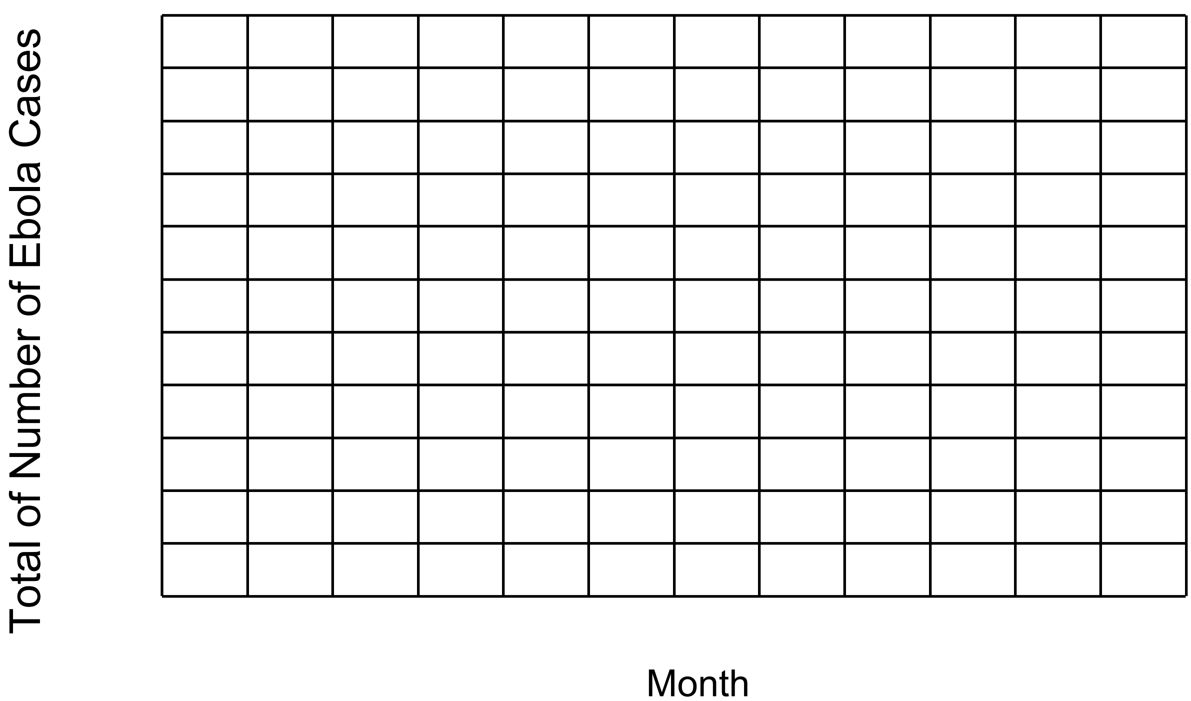
7. What is the y-intercept of your graph? What is the meaning of the y-intercept?

8. Create an equation to describe the line.

9. What does this equation represent?

10. Graph the total number of people infected per month on the chart below.

The Growth of Ebola Cases in West Africa in 2014



Dallas County Health and Human Services
2019 Novel Coronavirus (COVID-19) Summary

May 12, 2020

- As of May 12, 2020, DCHHS is reporting 236 additional cases of 2019 novel coronavirus (COVID-19), bringing the total case count in Dallas County to 6,359, including 148 deaths.
- Of 1,113 cases requiring hospitalization, two-thirds (66%) were under 65 years of age, and about half did not have any chronic health conditions. Diabetes has been an underlying high-risk health condition reported in under a third of all hospitalized patients with COVID-19.
- Of cases requiring hospitalization who reported employment, over 80% have been critical infrastructure workers, with a broad range of affected occupational sectors, including: healthcare, transportation, food and agriculture, public works, finance, communications, clergy, first responders and other essential functions.
- Thirty-nine percent (39%) of deaths have been associated with long-term care facilities.
- The percentage of respiratory specimens testing positive for SARS-CoV-2 was 9.4% at area hospitals in week 18.

Figure 1. Daily and cumulative COVID-19 cases by date of test collection, Dallas County: March 10 – May 12, 2020*

**Data received as of 8:00 pm, May 7, 2020, for residents of Dallas County tested with known specimen collection dates. All data are preliminary and subject to change as cases represented are being actively investigated and as additional reports are received for the most recent week.*

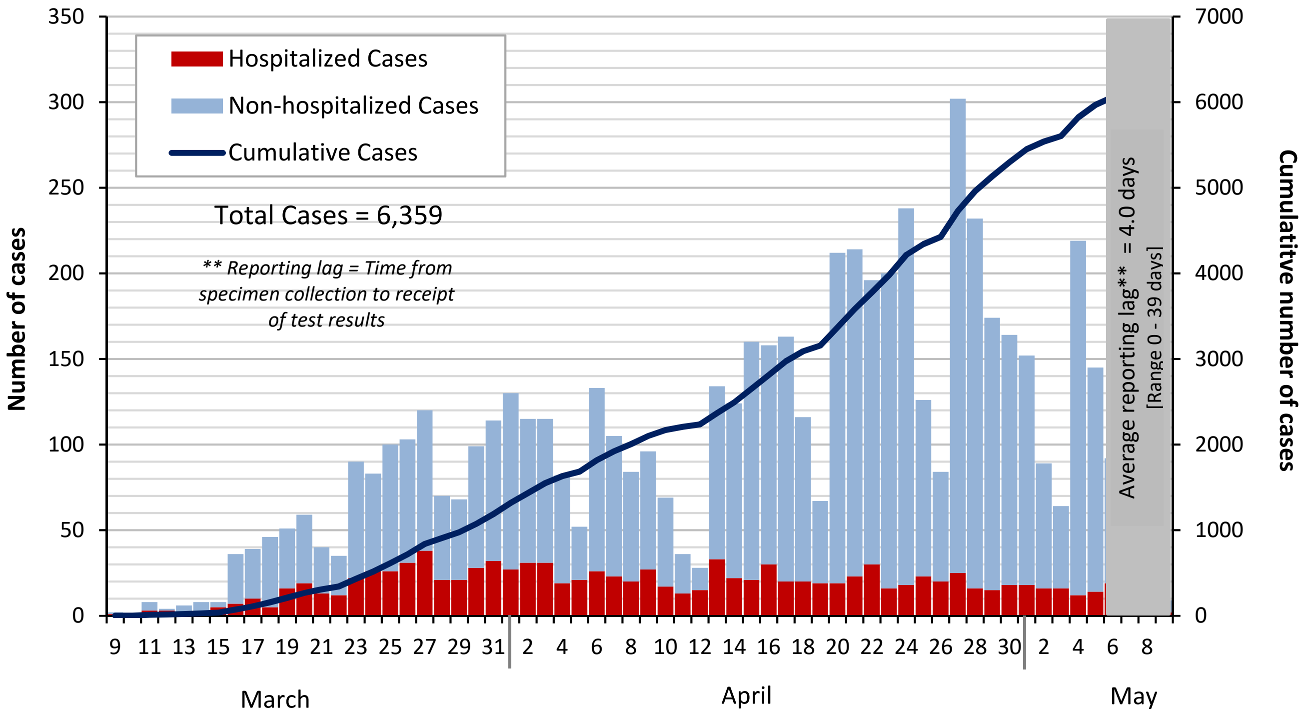


Table 1. Source of laboratory testing for confirmed cases of COVID-19, Dallas County

Source of Laboratory Testing for Reported Positive PCR Tests	# Tests (N=6,359)	% of Total Cases
Commercial or Hospital Laboratory*	5,794	91%
Dallas LRN Laboratory	554	9%
Other Public Health Laboratory	11	0%

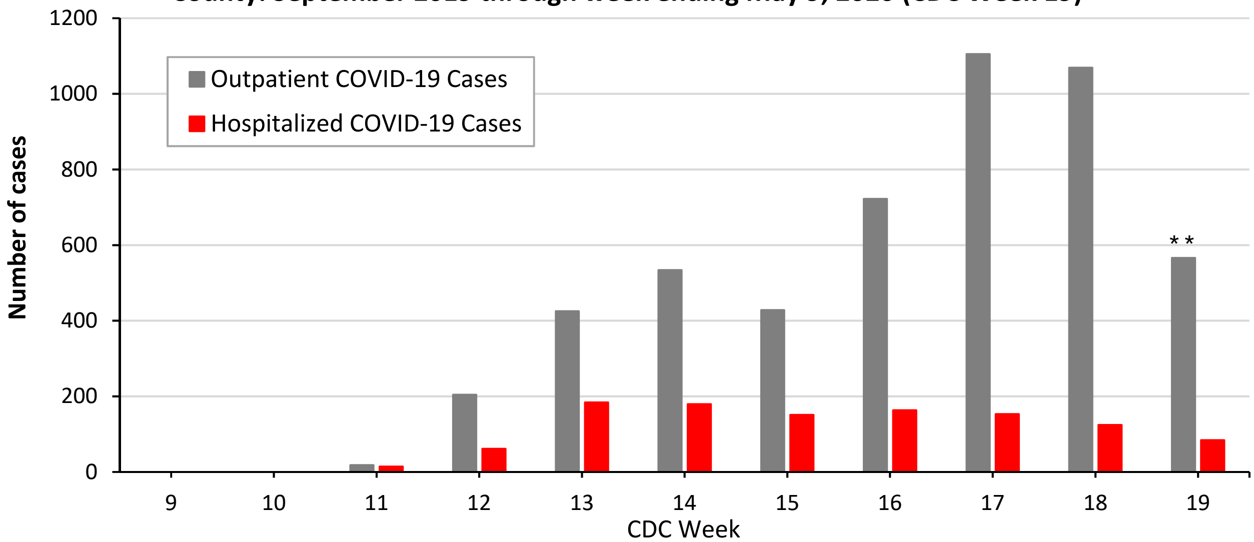
** Includes: AIT, ARUP, CPL, Excelsior, LabCorp, Magnolia, Medfusion, Prism, Quest, Viracor, and multiple hospital laboratories*

Table 2. Characteristics of cumulative confirmed COVID-19 cases, Dallas County: March 9 – May 11, 2020

		Number	% of Total Cases[+]
Total Cases in Dallas County residents		N = 6,359	100%
Age Group (years)	0 to 17	357	6%
	18 to 40	2,412	39%
	41 to 64	2,642	42%
	≥65	851	13%
Sex	Female	2,675	46%
	Male	3,104	54%
Not Hospitalized *(Includes: Outpatient, urgent care, drive-through, ED)*		5,246	82%
Ever Hospitalized		1,113	18%

[+]*Percentages calculated among cases with known age/sex*

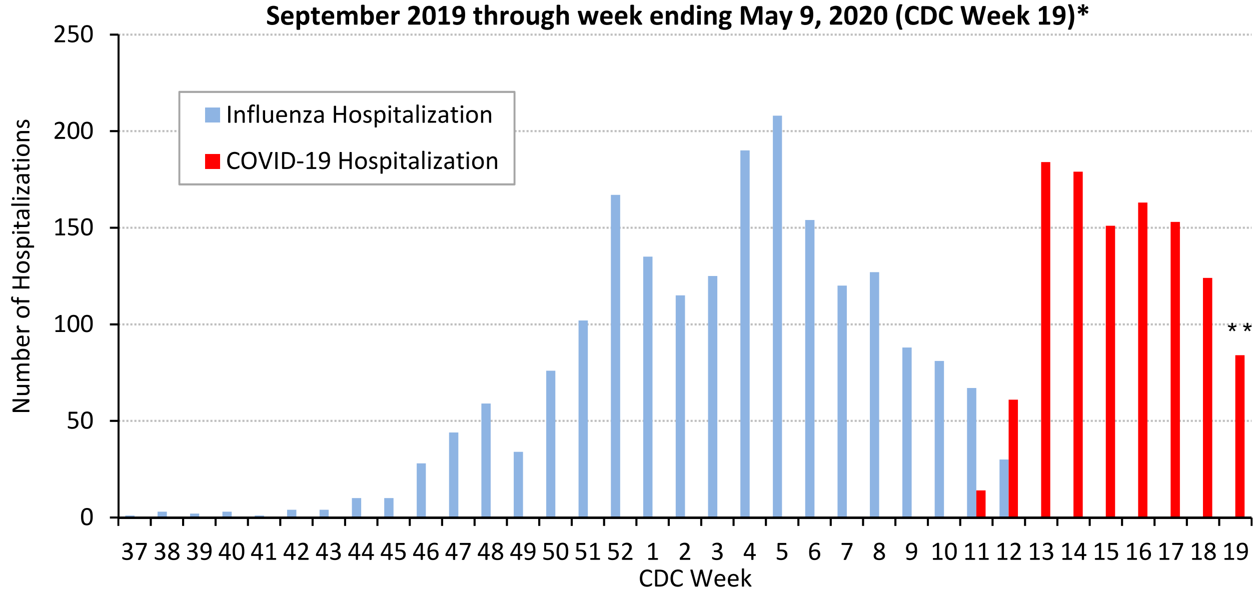
Figure 2. Non-hospitalized* and hospitalized COVID-19 Cases by week of test collection, Dallas County: September 2019 through week ending May 9, 2020 (CDC Week 19)*



*Non-hospitalized includes all patients not admitted to acute-care hospitals (e.g. outpatient, urgent care, drive-through, ED-only, LTCF)

** All data are preliminary and subject to change as cases represented are being actively investigated and as additional reports are received.

Figure 3. Influenza and COVID-19 hospitalizations by week of admission, Dallas County: September 2019 through week ending May 9, 2020 (CDC Week 19)*



* Dallas County residents diagnosed with confirmed COVID-19 by PCR testing.

** All data are preliminary and subject to change as cases represented are being actively investigated and as additional reports are received.

Table 3. Characteristics of cumulative hospitalized confirmed COVID-19 cases, Dallas County: March 10 – May 12, 2020

		Hospitalized Cases	%
Ever Hospitalized		N = 1,113	18% of Total Cases
Admitted to Intensive Care Unit		350	31%
Mechanical Ventilation		213	19%
Sex	Male	632	57%
	Female	481	43%
Age Group (years)	0-17	11	1%
	18-40	191	17%
	41-64	536	48%
	≥65	375	34%
Presence of ≥1 high risk condition		561	50%
Diabetes		315	28%
Lung Disease *(e.g. COPD, asthma)*		144	13%
Heart Disease *(e.g. CHF)*		152	14%
Kidney Disease *(e.g. ESRD, dialysis)*		105	9%
Cancer, Immune-compromise		97	9%
Pregnancy		15	1%
Race/ Ethnicity	White	181	16%*
	Hispanic	494	44%*
	Black	233	21%*
	Other	44	4%*
	Non-reported/ Unknown	161	14%

** Percentages can also be calculated to exclude cases for which race/ethnicity was not reported*

Table 4. Characteristics of cumulative confirmed COVID-19 deaths, Dallas County: March 10 – May 12, 2020

Death classified as confirmed if decedent was a Dallas County resident with a positive COVID-19 PCR test. Data are obtained from ME, hospitals, and vital statistics.		Confirmed Deaths	% [1]
		N = 148	2% of Total Cases
Sex	Male	97	66%
	Female	51	34%
Age Group (years)	17-40	10	7%
	41-64	38	26%
	≥65	100	67%
Resident of a Long-Term Care Facility		57	39%
Presence of ≥1 high risk condition		93	72%**
Diabetes		51	40%**
Race/ Ethnicity	White	51	**34%** (29% of population)[2]
	Hispanic	49	**33%** (41% of population)[2]
	Black	36	**24%** (24% of population)[2]
	Asian	6	**4%** (7% of population)[2]

[1] *Percentages calculated among those with known underlying health conditions or race/ethnicity as reported by medical provider*

[2] *2019 U.S. Census population estimates for Dallas County*

Table 5. Respiratory virus testing by North Texas hospitals: March 29 – May 2, 2020 (CDC Weeks 14-18)

Week Ending	4/4/20		4/11/20		4/18/20		4/25/20		5/2/20	
PCR Tests for:	Positive/ Total Tests	% Positive	Positive/ Total Tests	% Positive	Positive/ Total Tests	% Positive	Positive/ Total Tests	% Positive	Positive/ Total Tests	% Positive
SARS-CoV-2 Novel Coronavirus	370 /2,736	**13.5%**	327 /2,920	**11.2%**	364 /3,221	**11.3%**	378 /3,409	**11.1%**	295 /3,134	**9.4%**
Influenza	5 /1,067	**0.4%**	1 /308	**0.3%**	0 /560	**0%**	1 /442	**0.2%**	0/ 98	**0%**
Seasonal (non-SARS-2) Coronavirus	9 /545	**1.7%**	0 /293	**0%**	1 /456	**0.2%**	0 /202	**0%**	0/ 119	**0%**
Adenovirus (respiratory)	11 /560	**2.0%**	5 /293	**1.7%**	3 /440	**0.7%**	2 /362	**0.6%**	3/ 119	**2.5%**
Metapneumovirus	29 /630	**4.6%**	14 /293	**4.8%**	6 /444	**1.4%**	2 /362	**0.6%**	1/ 119	**0.8%**
Rhinovirus/Enterovirus	43 /630	**6.8%**	18 /293	**6.1%**	20 /444	**4.5%**	16 /362	**4.4%**	5/ 119	**4.2%**
RSV	4 /763	**0.5%**	1 /350	**0.3%**	1 /461	**0.2%**	0 /370	**0%**	1/ 121	**0.8%**

Data sources: National Respiratory and Enteric Virus Surveillance System and additional hospitals voluntarily reporting directly to DCHHS. Testing denominators include out-of-county patients and testing performed only through hospitals in Dallas County. (Does not include FEMA drive-thru clinics)

Table 6. Transmission risk factors for cumulative confirmed COVID-19 cases, Dallas County

Exposure Risk Factor	**Cases** (N= 6,359)	**% of Total Cases**
International Travel	58	1.1%
Domestic Travel (Out-of-state)	124	2.3%
Cruise Ship Travel	9	0.2%
Long-Term Care Facility (Residency)	365	6.0%
County Jail (Inmate)	290	4.6%
State Jail (Inmate--TDCJ COVID-19 Medical Action Center)*	23	0.4%
Homeless Shelter	47	0.8%
Meat/Food Processing Facilities	82	1.4%
Close contact or Presumed Community Transmission**	5,361	84.3%

**TDCJ cases are under the jurisdiction of the Texas Department of State Health Services*

***Includes: household transmission, and cases with no other exposure risk factors identified*

Table 7. Summary of weekly influenza and COVID-19 hospitalizations and deaths from Dallas County hospitals, Vital Statistics and Medical Examiner's office

Week Ending	03/07	03/14	03/21	03/28	04/04	04/11	04/18	04/25	05/02	05/09	9/08/19–Present
CDC Week	10	11	12	13	14	15*	16*	17*	18*	19*	
Influenza hospitalizations[1]	81	67	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,990
Influenza ICU admissions[1]	9	7	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	281
Confirmed influenza-associated deaths[2]	2	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	25
COVID-19 hospitalizations[3]	0	14	61	184	179	151*	163*	153*	124*	84*	1,113*
COVID-19 ICU admissions[3]	0	7	29	60	61	53*	44*	42*	30*	24*	350*
Confirmed COVID-19-associated deaths	0	0	3	11	9	16*	31*	27*	27*	23*	148*

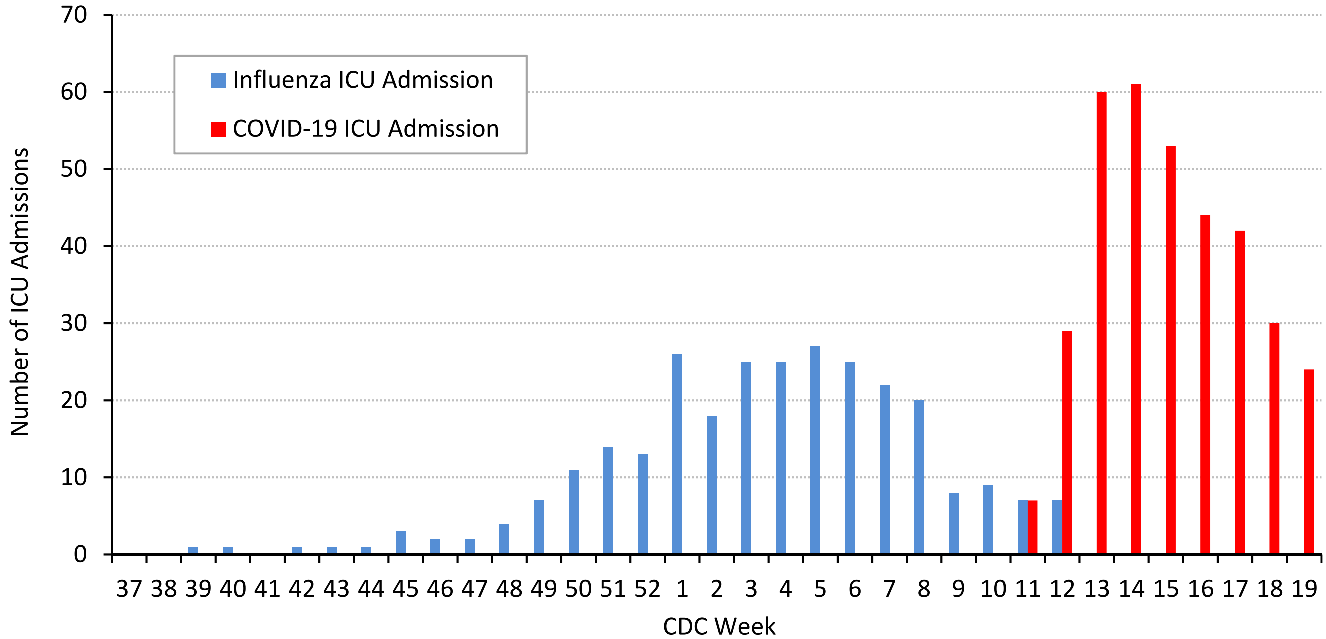
**All data are preliminary and subject to change as additional information is received.*

[1] Reflects all influenza-associated hospitalizations reported from 14 hospitals located within Dallas County by week of any positive influenza tests.

[2] Confirmed influenza-associated deaths as defined by a positive laboratory test and any of the following: (1) death certificate denotation, (2) medical record documentation of compatible symptoms and clear progression from illness to death, or (3) determination by the County Medical Examiner's office (ME) of no alternate cause of death. Does not include possible influenza-associated deaths with pending determination of primary cause of death.

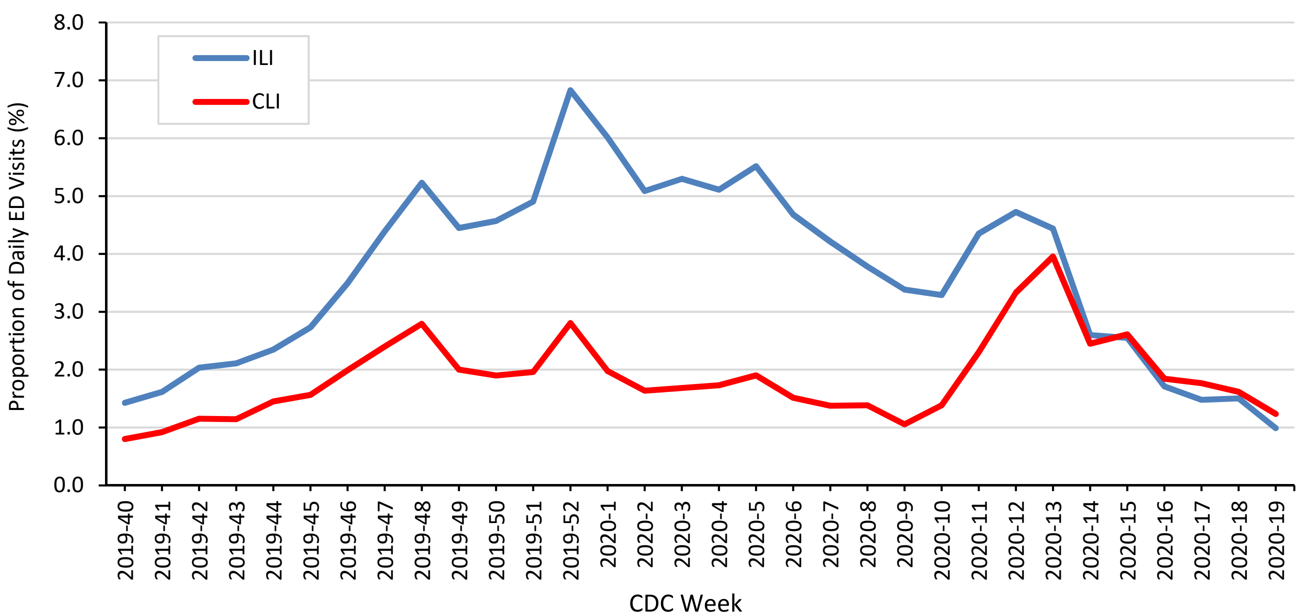
[3] Reflect all COVID-19-associated hospitalizations reported from area hospitals within Dallas County by week of admission; data as of 7:00 pm yesterday.

Figure 4. Intensive care unit hospitalizations for influenza and COVID-19 by week of admission, Dallas County: September 2019 through week ending May 9, 2020 (CDC Week 19)*



** Dallas County residents reported with confirmed COVID-19 by PCR testing as of 7:00 pm yesterday. All data are preliminary and subject to change as cases represented are being actively investigated and as additional reports are received for the most recent week.*

Figure 5. Syndromic surveillance of emergency department visits for COVID-like illness (CLI)* and Influenza-like illness (ILI), Dallas County: September 29, 2019 – May 9, 2020**



ESSENCE Data is from 18 hospital emergency departments voluntarily reporting numbers of persons presenting with self-reported chief complaints.
** CLI is defined as chief complaint of fever and cough or shortness of breath or difficulty breathing.*
***ILI is defined as chief complaint of fever and cough or sore throat or mention of influenza.*

Table 8. Occupations of hospitalized patients with confirmed COVID-19, Dallas County, 3/10 – 5/3/20

Occupation	**Position**	**Sector**
Critical Infrastructure Workers*	**Hospitalized Cases** (%) of Total Employed	
Healthcare and Public Health		50 (18%)
Nurse, LVN, CNA	13	
Physician	5	
Other: Dentist, dietary, home health, medical assistant, mental health, PCT, pharmacist, physical therapy, facilities, administrative	29	
Transportation and Logistics		44 (16%)
Airline/Airport	10	
Parcel or postal delivery	7	
Cab/rideshare or bus driver	7	
Other: Mechanic, truck driver, freight, railroad	20	
Food and Agriculture		41 (15%)
Grocery	13	
Restaurant	15	
Other: Food processing, production, supply	13	
Other Community/Government Essential Functions		19 (8%)
Clergy (Pastor, priest)	6	
Education (Teacher, administration)	5	
Judicial system (Attorney)	4	
Real estate services	3	
Public Works and Infrastructure Support Services		22 (8%)
Construction/Contractor	15	
Financial *(Accounting, bank, insurance)*		14 (5%)
Communications and Information Technology		12 (4%)
Commercial Facilities *(Building materials, painting, warehouse)*		11 (4%)
Hygiene Services *(Custodian, Lawn Service)*		9 (3%)
Law Enforcement, Public Safety, First Responders		7 (3%)
Critical Manufacturing *(Manufacturing metal, packaging)*		4 (2%)
Energy/Utilities *(Electricity, petroleum, gas)*		2 (1%)
Non- Critical Infrastructure Workers *(Includes retail, personal services)*		42 (15%)
Non-Employed *(Includes retired)*		265
Student		4
Not reported		426
Total		972

** Includes only residents of Dallas County with self-reported occupational information. All data is preliminary and subject to change.*

***CISA Advisory Memorandum on Identification of Essential Critical Infrastructure Workers During COVID-19 Response, April 17, 2020 .*

Table 9. Cumulative COVID-19 cases by city of residence within Dallas County as of May 12, 2020
(e.g. Does not include cases who reside in portions of cities which are not within Dallas County.)

City of Residence	Cases (N=6,359)	% of Total Cases
Addison	23	0.4%
Balch Springs	61	1.0%
Carrollton	74	1.2%
Cedar Hill	95	1.5%
Cockrell Hill	13	0.2%
Coppell	28	0.4%
Dallas	3,538	55.6%
DeSoto	137	2.2%
Duncanville	100	1.6%
Farmers Branch	83	1.3%
Garland	541	8.5%
Glenn Heights	16	0.3%
Grand Prairie	275	4.3%
Highland Park	18	0.3%
Hutchins	33	0.5%
Irving	668	10.5%
Lancaster	105	1.7%
Mesquite	285	4.5%
Richardson	119	1.9%
Rowlett	68	1.1%
Sachse	13	0.2%
Seagoville	17	0.3%
Sunnyvale	9	0.1%
University Park	25	0.4%
Wilmer	14	0.2%
Wylie	1	0.0%

CDC Priorities for COVID-19 Testing *(rev. date: 5/3/20)*

(See CDC Guidance for Evaluating and Reporting Persons Under Investigation (PUI) at:
https://www.cdc.gov/coronavirus/2019-nCoV/hcp/clinical-criteria.html)

High Priority

- Hospitalized patients **with** symptoms
- Healthcare facility workers, workers in congregate living settings, and first responders **with** symptoms
- Residents in long-term care facilities or other congregate living settings, including prisons and shelters, **with** symptoms

Priority

- Persons **with** symptoms of potential COVID-19 infection, including: fever, cough, shortness of breath, chills, muscle pain, new loss of taste or smell, vomiting or diarrhea and/or sore throat.
- Persons **without** symptoms who are prioritized by health departments or clinicians, for any reason, including but not limited to: public health monitoring, sentinel surveillance, or screening of other asymptomatic individuals according to state and local plans.

Many Thanks to:

Our area hospitals and healthcare providers for reporting lab-confirmed COVID-19 cases

Our DCHHS Case and Contact Investigations Team volunteers from:

Dallas County Medical Society

UT Southwestern Medical School

Texas A&M College of Medicine

UTHealth School of Public Health

Retired School Nurses

New COVID-19 cases are reported as a daily aggregate, with this cumulative summary updated Tuesdays and Fridays.

DCHHS COVID-19 Summaries and Case Report Form are accessible at:
https://www.dallascounty.org/departments/dchhs/2019-novel-coronavirus.php

DCHHS Acute Communicable Disease Epidemiology Division: COVID-19@dallascounty.org

Summer Science Assignment
MYP Grading Rubric

<table>
<tr><th colspan="6">Evaluative Criteria</th></tr>
<tr><th>Task</th><th>0</th><th>1-2</th><th>3-4</th><th>5-6</th><th>7-8</th></tr>
<tr>
<td>Criterion A:
Knowing and Understanding</td>
<td>The student does not reach a standard identified by any of the descriptors that follow</td>
<td>i. state scientific knowledge
Describes how viruses are different from cells OR explains how viruses make copies of themselves; however, there are major inaccuracies.</td>
<td>i. outline scientific knowledge
Describes how viruses are different from cells OR explains how viruses make copies of themselves with minor errors.</td>
<td>i. describe scientific knowledge
Describes how viruses are different from cells AND explains how viruses make copies of themselves; however, there are some minor inaccuracies.</td>
<td>i. explain scientific knowledge
Describes how viruses are different from cells AND explains how viruses make copies of themselves.</td>
</tr>
<tr>
<td>Criterion C:
Processing and Evaluating</td>
<td>The student does not reach a standard identified by any of the descriptors that follow</td>
<td>i. Collect and present data in numerical and/or visual forms.
Has tables OR graphs of COVID-19 infections AND/OR deaths. Minor errors on tables or graphs present.
ii. interpret data
Correctly calculated morbidity rate for Dallas County, but no comparison to global estimate is made.</td>
<td>i. Correctly collect and present data in numerical and/or visual forms.
Has both tables and graphs of COVID-19 infections AND deaths in Dallas County, but with major errors, omissions, or mismatch between tables and graphs.
ii. Accurately interpret data and explain results.
Correctly calculates morbidity rate, but makes incorrect comparison to global estimates.</td>
<td>i. Correctly collect, organize, and present data in numerical and/or visual forms.
Has both tables and graphs of COVID-19 infections AND deaths in Dallas County, with minor errors or omissions.
ii. Accurately interpret data and explain results using scientific reasoning.
Incorrect morbidity rate calculation, but correct scientific comparison to global estimate based on rate calculated.</td>
<td>i. Correctly collect, organize, transform and present data in numerical and/or visual forms.
Accurate and complete table and graph of COVID-19 infections AND deaths in Dallas County
ii. Accurately interpret data and explain results using correct scientific reasoning.
Correctly calculates morbidity rate for Dallas County and makes correct scientific comparison to global estimate.</td>
</tr>
</table>

Criterion D: *Reflecting on the impacts of Science*	The student does not reach a standard identified by any of the descriptors that follow	iii. **Apply** scientific language to communicate understanding but does so **with limited success**. • Fact sheet lacks professional look or organization. –AND- • Frequent instances of scientific terminology missing or incorrectly used.	iii. **Sometime apply** scientific language to communicate understanding. • Fact sheet lacks professional look or organization. –OR- • Professional looking fact sheet with frequent grammatical or spelling errors. –OR- • Frequent instances of scientific terminology missing or incorrectly used. –OR- • Fact sheet is longer than 1 page; front and back.	iii. **Usually apply** scientific language to communicate understanding **clearly and precisely**. • Professional looking fact sheet with few grammatical or spelling errors. • Proper scientific terminology mostly used throughout.	iii. **Consistently apply** scientific language to communicate understanding **clearly and precisely**. • Professional looking fact sheet with few grammatical or spelling errors. • Proper scientific terminology used throughout.