

Health & Disease



Name _____

Class _____

Teacher _____

L1 Health

The definition of disease by the World Health Organization (WHO) is:

"Any deviation from the normal structure or function of any body part, organ, or system that is manifested by a characteristic set of symptoms"

Diseases are major causes of ill health but other factors including diet, stress and life situations may have a profound effect on physical and mental health.

Communicable diseases spread from one person to another or from an animal to a person.

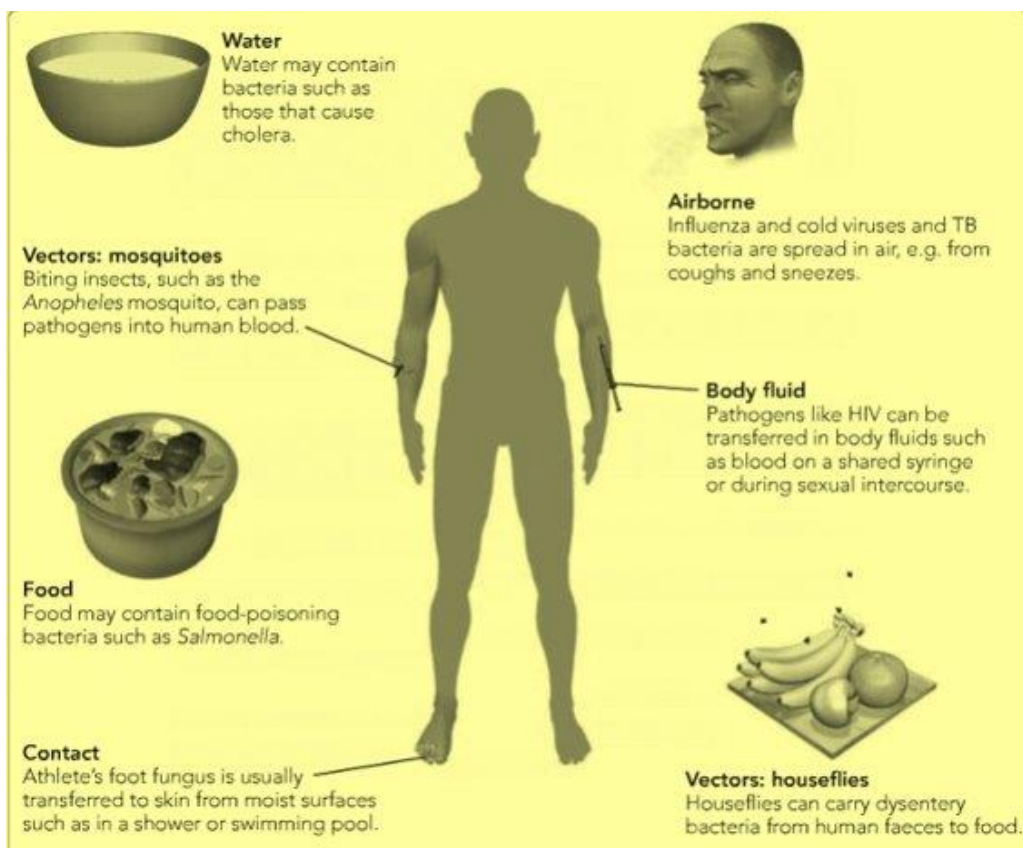
The spread often happens via airborne pathogen viruses or bacteria, but also through blood or other bodily fluid.

The terms infectious and contagious are also used to describe communicable disease.

Non-communicable diseases are not passed from person to person. They are of long duration and generally slow progression.

The 4 main types of non-communicable diseases are:

1. Cardiovascular diseases (like heart attacks and stroke),
2. Cancers
3. Chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma)
4. Diabetes.



Some diseases may occur because of other diseases:

Defects in the immune system mean that an individual is more likely to suffer from infectious diseases. Viruses living in cells can be the trigger for cancers (cells dividing uncontrollably) Immune reactions initially caused by a pathogen can trigger allergies such as skin rashes and asthma. Severe physical ill health can lead to depression and other mental illness.

Independent practice

1. What is the difference between communicable and non-communicable diseases?
2. What does the phrase transmitted between individuals mean?
3. What is a pathogen?
4. Give three examples of pathogens
5. Give three examples of communicable diseases
6. Give at least three factors that can affect a persons chances of being ill
7. Which two pathogens are the most common causes of communicable diseases?
8. Why are viruses not considered living things?
9. What do bacteria release to make you feel ill?
10. Suggest a way that a pathogen could enter your body
11. Extended writing: explain how pathogens that spread through water often cause diarrhoea
12. How can the spread of diseases via air droplets be prevented?

L2 Mental Health

Health includes physical, mental and social well-being.

Mental health issues include stress, anxiety and depression.

There are lots of causes of mental health issues and many things we can all do to look after our mental health.

Being physically fit is just one aspect of health. Being healthy means having a positive state of physical, mental and social well-being. It is not just being free from diseases or injuries. Our health is linked to how we are physically, mentally and emotionally.

For many years when people talked about their 'health' mental health was not part of the conversation as few people understood its importance. Recently more and more people understand that mental and physical health are both extremely important. We are all used to taking care of our own physical health by being hygienic, eating healthily and exercising. However, some people are still less used to taking care of their mental health.

Mental health issues affect around 25% of people each year, they often feel alone. As with all health issues, it is really important to seek help when needed.

There is a wide range of mental health issues. Examples include stress, anxiety and depression, together with less common ones such as obsessive-compulsive disorder and post-traumatic stress disorder.

Hormone responses

When something stressful or frightening happens, the body's nervous system releases cortisol and adrenaline. This prepares the body for fight (defending yourself), flight (running away) or freeze (preparing to protect yourself).

Stress, anxiety and depression are common mental health issues. They have a range of symptoms, which can be mild or severe.

Stress

Feeling stressed is a natural reaction that can help people get things done or be more motivated. For example, knowing the science test is on Monday may cause a student to feel stressed, but it will also motivate them to revise on the weekend.

When stress is constant or unmanageable it can become a problem and cause the following symptoms: Physical symptoms such as aches, dizziness or stomach problems. Changes in behaviour such as being snappy, forgetful, difficulty concentrating or making decisions. Increased worrying, feeling overwhelmed, difficulty sleeping or eating.

Anxiety

Anxiousness is the feeling of unease, worry or fear. Most people feel anxious about some things, for example a visit to the dentist, but anxiety occurs when these feelings are more constant. The symptoms include:

Feeling restless or worried. Having trouble concentrating or sleeping. Dizziness or a more noticeable heartbeat.

Depression

Feeling unhappy, sad or upset are emotions which everyone feels at certain points. Depression can include these feelings, but it also has a wide range of symptoms which include: Lasting feelings of unhappiness and hopelessness, feeling very tearful, tired and sleeping badly. Losing interest in the things you usually enjoy. Loss of appetite. Aches and pains.

Causes of mental health issues

There is a wide range of causes of mental health issues, which often overlap. They include:

Bullying or other abuse. Losing someone close to you. Isolation or loneliness. Discrimination. Trauma or neglect. Physical health problems. Drug and alcohol addiction.

Improving mental health

Independent practice

1. What are some common mental health issues?
2. What can people do to maintain physical health?
3. How many people a year are affected by mental health issues?
4. What is important to do when suffering from mental health issues?
5. What are some less common mental health issues?
6. What hormones does the body release in stressful situations?
7. What do these hormones prepare you to do?
8. What are some symptoms of stress?
9. What are some symptoms of anxiety?
10. What are some symptoms of depression?
11. Extended writing: what can an individual do to avoid all of the common causes of mental health issues in their life.
12. Recall what we mean by the term mental health
13. Describe Hormone responses associated with mental health
14. Describe some common mental health issues
15. Recall factors which can affect mental health
16. Describe some ways to improve mental health

L3 Disease

A *pathogen* is a microorganism that causes a disease. There are four main types.

Pathogen	Example in animals	Example in plants
Viruses	HIV potentially leading to AIDS	Tobacco mosaic virus
Bacteria	Salmonella	Agrobacterium
Fungi	Athlete's foot	Rose black spot
Protists	Malaria	Downy mildew

All types of pathogens have a simple life cycle. They infect a host, reproduce themselves or replicate if it is a virus, spread from their *host* and infect other *organisms*. They also all have structural *adaptations* that make them successful at completing their life cycles, which enable them to cause further disease.

Diseases caused by pathogens are called *communicable diseases*. This means they can be transferred from one person to another.

There are other types of disease which cannot be caught, these are known as non-communicable diseases:

1. Inherited genetic disorders like *cystic fibrosis*.
2. *Deficiency diseases* which are caused by a lack of essential vitamins or *minerals*, such as *scurvy* which occurs when an individual has insufficient vitamin C.
3. Diseases like cancer that develop as a result of exposure to *carcinogens* or develop naturally as cell division occurs incorrectly.

All organisms are affected by pathogens. Even bacteria are infected by certain types of virus. Some of these infections can be transferred to organisms of a different species. *Transmission* can occur in a number of important ways, as shown in the table below.

Type	Examples
Direct contact	This can be sexual contact during intercourse or non-sexual contact, like shaking hands.
Water	Dirty water can transmit many diseases, such as the cholera bacterium.
Air	When a person who is infected by the common cold sneezes, they can spray thousands of tiny droplets containing virus particles to infect others.
Unhygienic food preparation	Undercooked or reheated food can cause bacterial diseases like <i>Escherichia coli</i> which is a cause of food poisoning.
Vector	Any organism that can spread a disease is called a vector. Many farmers think tuberculosis in their cattle can be spread by badgers.

The *transmission of pathogens* can be prevented or reduced in several ways. A few important methods of doing this are shown in the table below.

Method	Example	How it works
Sterilising water	Cholera	Chemicals or UV light kill pathogens in unclean water.
Suitable hygiene - food	Salmonella	Cooking foods thoroughly and preparing them in hygienic conditions kills pathogens.
Suitable hygiene - personal	Athlete's foot	Washing surfaces with disinfectants kills pathogens. Treating existing cases of infection kills pathogens.
Vaccination	Measles	Vaccinations introduce a small or weakened version of a pathogen into your body, and the immune system learns how to defend itself.
Contraception	HIV/AIDS	Using barrier contraception, like condoms, stops the transfer of bodily fluids and sexually transmitted diseases.

Defects in the immune system mean that an individual is more likely to suffer from infectious diseases. Viruses living in cells can be the trigger for cancers (cells dividing uncontrollably) Immune reactions initially caused by a pathogen can trigger allergies such as skin rashes and asthma. Severe physical ill health can lead to depression and other mental illness.

Independent practice

1. What is a pathogen?
2. How many types of pathogens are there
3. Name the types of pathogens with common examples
4. Describe a pathogens life cycle
5. What do we call pathogens that spread from host to host?
6. What are the three examples of non-communicable diseases?
7. What word is used to describe the spread of diseases?
8. Extended writing: explain how disease can be spread and what we can do to prevent it.
9. What can communicable diseases go on to cause?

L4 Curing Diseases

One simple way to reduce the risk of infection is to maintain personal hygiene and to keep hospitals clean. In the 19th century, Ignaz Semmelweis realised the importance of cleanliness in hospitals. However, although his ideas were successful, they were ignored at the time because people did not know that diseases were caused by pathogens that could be killed.

Many types of medicines and chemicals have been developed to help prevent and treat diseases.

Chemicals that kill microorganisms outside the body are known as *antiseptics*.

Antiseptics can be used to clean an open wound as well as surfaces on objects such as toilets. Antiseptics therefore help to **prevent** the spread of disease.

Antibiotics are medicines that interfere with the growth of bacterial cells. This means that the bacteria die as they cannot reproduce. Antibiotics can therefore be used to **treat** bacterial infections such as Salmonella food poisoning and tuberculosis.

Antibiotics will only kill bacterial cells. This means that these medicines will not work against fungi or viruses.

Antibiotic	How it works
Penicillin	Breaks down cell walls
Erythromycin	Stops protein synthesis
Neomycin	Stops protein synthesis
Vancomycin	Stops protein synthesis
Ciprofloxacin	Stops DNA replication

The first antibiotic - **penicillin** - was discovered in 1928 by Alexander Fleming. He noticed that some bacteria he had left in a petri dish had been killed by naturally occurring *Penicillium* mould.

Since the discovery of penicillin, many other antibiotics have been discovered or developed. Most antibiotics used in medicine have been altered chemically to make them more effective and safer for humans.

Antivirals- It is difficult to develop drugs that can kill viruses. This is because the virus infects a cell and hijacks the cell's machinery in order to create more copies of itself. Destroying the virus will often mean destroying the cell that the virus is inside of. *Antivirals* are drugs that stop viruses from replicating. They can be used to treat viral infections. Antivirals are specific to one type of virus.

Different types of medicines are available to treat many different *diseases*. Some medicines only treat the symptoms and others cure the disease by killing the pathogens.

Painkillers are chemicals that relieve the symptoms but do not kill the pathogens.

Common examples include paracetamol and aspirin, and they can relieve a headache or a sore throat.

As the symptoms are treated, your immune system still needs to combat the pathogen.

Independent practice

1. Recall the difference between an antibiotic and a painkiller
2. Describe how antibiotics must be used to treat bacterial illness
3. Compare the effectiveness of antibiotics when used to treat viral and non-communicable illness
4. Describe other methods to treat diseases.
5. What is one simple way to reduce the risk of infection?
6. Why were the ideas of Ignaz Semmelweis ignored?
7. What are antiseptics and what can they be used for?
8. How do antibiotics work?
9. Why can antibiotics not be used on viruses?
10. Give two examples of antibiotics and state how they work
11. What was the name of the first antibiotic?
12. Who discovered the first antibiotic?
13. Why are viruses difficult to treat?

L5 Preventing Disease

Detecting diseases early and treating them will prevent their spread but there are other ways where the spread of pathogens and disease can be reduced:

Improving hygiene - improving hygiene can greatly reduce the spread of disease. Washing hands after using the loo and sneezing can reduce the spread of many diseases. Sneezing into the tissue, then disposing of the tissue is also useful. Cleanliness in food preparation can reduce the spread of disease. This involves using cleaning products on surfaces before and after cooking and reducing cross-contamination of produce and meats. Hygienic waste disposal and sewage treatment is also important for controlling the spread of disease.

Avoiding infected individuals - if someone is infected, then being around them is dangerous. Therefore we often want to reduce exposure of people to an infected person by isolating infected individuals. For example, if a child has chicken pox, the school should advise against them coming into the classroom, where they could infect other students.

Drugs and medicines - some drugs will help to kill pathogens quickly once they have entered the body, reducing whole-body infection and spread of the pathogen. For example, **antibiotics** work against bacterial pathogens.

Vector control - many communicable diseases spread via vectors, which are carriers. For example, malaria spreads via mosquitos. We can therefore eradicate or control the population of vectors, for example by using mosquito spray when going to malaria-risk areas.

Vaccination - people can be vaccinated against many diseases by introducing them to harmless antigens from a microorganism, which are then used to create **antibodies** against this pathogen. For example, the Hepatitis B vaccination will help to protect against Hepatitis B infection. The vaccination doesn't stop the infection from happening, but it helps the body respond very quickly to any infection.

Independent practice

1. Describe how we can prevent certain types of communicable disease.
2. Describe how we can reduce the risk of certain type of non-communicable disease
3. Compare methods of preventing diseases
4. Give six ways of improving hygiene which can prevent the spread of diseases.
5. What can be done to avoid infected individuals?
6. How do some drugs and medicines work?
7. What is a vector?
8. What is one way malaria spread can be reduced?
9. How does vaccination work?

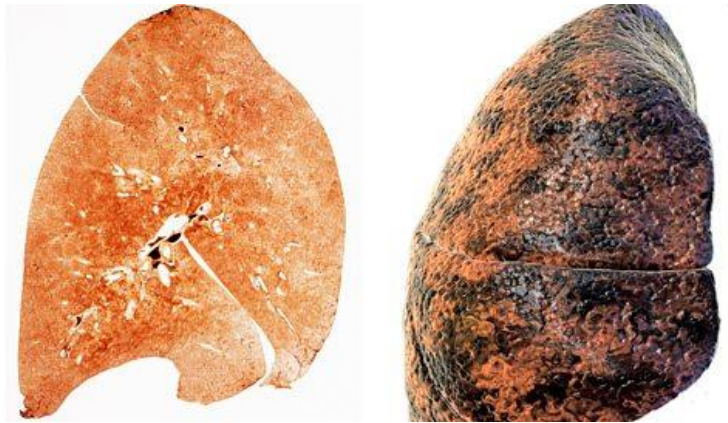
L6 Smoking

Smoking increases the risk of *cardiovascular disease* in several ways:

Smoking damages the lining of the *arteries*, including the *coronary arteries*. The damage encourages the build-up of fatty material in the arteries. This can lead to a *heart attack* or a *stroke*.

- Inhalation of *carbon monoxide* in cigarette smoke reduces the amount of oxygen that can be carried by the blood.
- The *nicotine* in cigarette smoke increases the heart rate, putting strain on the heart.
- Chemicals in cigarette smoke increase the likelihood of the *blood clotting*, resulting in a heart attack or stroke.

Lung disease



Sections of a healthy lung and a smoker's lung, showing tar deposits

A person may develop *COPD* - chronic obstructive pulmonary disease. This condition includes the diseases *chronic bronchitis* and *emphysema*.

In *COPD*:

- smoking damages the *bronchioles* and can eventually destroy many of the *alveoli* in the lungs
- the airways become inflamed and *mucus*, which normally traps particles in the lungs, builds up
- the patient becomes breathless, and finds it more and more difficult to obtain the oxygen required for *respiration*

The damage caused by *COPD* is permanent. The disease cannot be cured and can result in death. It is essential that the person seeks medical help to try to prevent progression of the disease.

Lung cancer

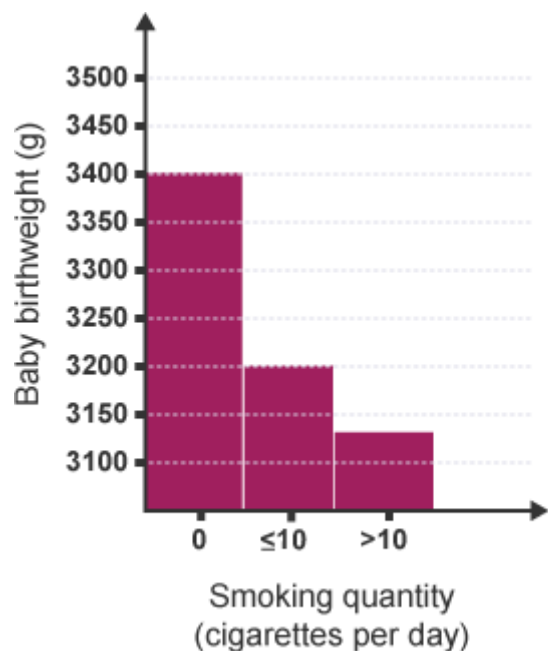
The carcinogens in cigarette smoke also cause lung cancer. Almost all cases of lung cancer are caused by smoking. The vast majority of cases of lung cancer lead to death.

Note that the trend in the rate of developing lung cancer for women has been increasing, while in men is decreasing. The main reason is because numbers of female smokers - unlike men - continued to increase in the 1950s and 1960s before starting to fall. Cancer may take some years to develop, so a fall in female rates of lung cancer is likely to occur later. Evidence also suggests that women are more susceptible to developing the condition.

Effects of smoking on babies

For mothers who smoke during pregnancy:

- smoking increases the risk of *miscarriage*
- the babies and children are more likely to suffer from respiratory infections and an increased risk of *asthma*
- the long-term physical growth and intellectual development of the baby/child is affected
- there is an increased risk of birth defects
- the birthweight of the baby is reduced



Independent Practice

1. In what ways does smoking increase the risk of cardiovascular disease?
2. What can this lead to?
3. What does COPD stand for?
4. Can it be cured?
5. How does COPD effect the lungs?
6. What kind of cancer does smoking cause?
7. What are carcinogens?
8. Why is lung cancer for women increasing?
9. In what ways does smoking effect babies during pregnancy?
10. State the addictive drug within cigarettes
11. Describe the short-term effects of smoking on the body
12. Compare the lungs of a healthy person and of someone that smokes regularly.

L7 Stimulants & Depressants

Stimulants and depressants are types of substances that are often misused. Chronic misuse of these drugs can lead to addiction. Due to the prevalence of recreational drug use, it's important to be familiar with the effects of each type of drug to be able to recognize the signs of misuse, addiction, and overdose. Both stimulants and depressants claim lives every year due to overdose and other health problems related to long-term use. Stimulants, often called "uppers," are the kinds of drugs that make people feel supercharged with energy and focus, even to the point of feeling invincible. The most used stimulants include:

Caffeine, Nicotine, Cocaine/crack cocaine, Methamphetamine (meth), MDMA (ecstasy), Adderall and Ritalin.

Caffeine and nicotine are, of course, legal and mild stimulants that many people use them to get themselves going throughout the day, but they come with their own adverse side effects, especially if the drink or cigarette includes harmful additives. Cocaine, meth, and ecstasy are mainly considered to be "street" drugs that have few legitimate medical uses. Drugs like Adderall and Ritalin are stimulant medications that are mostly used legally to treat medical conditions, but they have been increasingly misused by individuals without a prescription.

Depressants come in several different categories, including legal and socially approved intoxicants, highly illegal street drugs, and different types of prescription anxiety medications. They work by inhibiting the central nervous system and slowing the heart rate and respiratory and gastrointestinal systems.

Common depressants with misuse potential include Alcohol, Valium, Xanax, Amobarbital, Phenobarbital.

Prescription depressants include benzodiazepines (Valium and Xanax) and barbiturates (amobarbital and phenobarbital). These medications were prescribed for decades as supposed solutions to stress and anxiety disorders. Barbiturates came first, but it was soon found that these drugs were both highly addictive and had a high potential for overdose. Benzodiazepines were developed as a safer alternative, but they are still both addictive and dangerous.

Stimulants speed up the central nervous system and depressants do the opposite, slowing it and all the parts of the body controlled by the central nervous system down. Stimulants make the person using them feel more confident, alert, and energetic. They send the central nervous system into overdrive, increasing heart and breathing rates, suppressing appetite, and causing a spike in blood pressure. Certain stimulants can cause a rush of euphoria, especially if they're taken via common misuse methods like snorting, smoking, or injection.

Depressants can also cause euphoria, but they slow down the central nervous system instead of accelerating it, resulting in a pleasurable, relaxing feeling.

Depressants slow heart rate and respiration, which is incredibly dangerous in high doses.

Though stimulants may make individuals feel great temporarily, they typically include negative side effects and result in a "crash" when the drug leaves the system, causing symptoms like fatigue, inability to focus, and depression.

Stimulants increase heart rate and blood pressure, making them can be very risky for anyone with heart problems or who already has an increased risk of stroke. They can also cause very unpleasant psychological side effects, especially for those who have an underlying mental illness like anxiety, panic disorders, or issues with paranoia.

Stimulant overdose deaths are most often caused by sudden heart failure, heart attack, stroke, or hyperthermia - a condition in which the body becomes dangerously overheated.

In the long-term, continued stimulant misuse can result in a weakening of artery walls or inflammation of the heart muscle as high blood pressure wears them down.

Stimulants also restrict blood flow to the gastrointestinal tract, leading to ulcers and tears.

Studies have suggested that long-term stimulant use may lead to significant permanent changes in the brain, including a reduction of the white matter that's responsible for impulse control, stress management, and decision-making. Psychological symptoms related to stimulant misuse may also continue long after an individual quits, especially anxiety and depression. There's even increasing evidence of a link between stimulants like cocaine and Parkinson's disease.

Depressants are particularly dangerous when it comes to the potential for overdose, especially since these drugs are often mixed with one another to intensify the euphoric effects. Artificially slowing down the central nervous system always comes with risks as it controls the essential functions of the heart and lungs. An overdose of depressants can cause someone's breathing to slow to the point that not enough oxygen can reach the brain and other vital organs. This can quickly lead to brain damage, coma, and death.

Depressant overdose symptoms can include Disorientation, Unconsciousness, No response to stimuli, Floppy arms or legs, bluish lips or fingernails, Cold or clammy skin, Snoring or gurgling sounds, Shallow or no breathing.

Overdose deaths from these drugs have claimed many lives and are only increasing, especially from prescription opioids.

Long-term effects of depressants can typically be found around the liver and digestive system. Alcohol is very hard on the liver, and long-term, heavy misuse is closely connected to conditions like fatty liver, alcoholic hepatitis, and liver damage or failure. Long-term use of depressant medications can also lead to psychological depression and increases the chance of experiencing paradoxical effects like anxiety and panic attacks. Some long-term users have developed chronic fatigue syndrome that lasts even after they've gotten clean. Insomnia and sexual dysfunction are also common. At the same time, withdrawal symptoms from certain depressants can be seriously dangerous.

People who misuse stimulants may start out seeming like they're in a better place than they were before, with more energy, an increased ability to get work done, and, in the case of some stimulants, a more positive attitude. However, over time, as users develop a tolerance and need higher and higher doses to get the same effect, people around them may begin to notice severe crashes, depression, irritability, and agitation. Excitability can turn to anxiety and paranoia, and as obtaining the drug becomes top priority, responsibilities may begin to fall to the wayside, resulting in overall diminished effectiveness in work or school.

Physical effects that can be signs of stimulant use include: Dilated pupils, Restlessness, Weight loss, Dental problems from teeth grinding or smoking, Twitches or tics. Insomnia can also become a serious problem as stimulants keep users awake, or they may develop strange sleeping patterns, such as staying up for days at a time followed by sleeping for 24 hours or more.

Depressant misuse, on the other hand, can make a person appear lazy. Unlike stimulants, depressants make a person slow down. Users are more likely to want to sit around and relax or sleep. They may lose interest in formerly loved hobbies, old friends, or even personal hygiene. Many of the symptoms may appear very similar to simple depression. These can include: Poor concentration, Slow or slurred speech, Frequent drowsiness, Impaired coordination, Impaired memory, Dizziness. Physical signs like a slow or irregular heartbeat and low blood pressure are also hints that the problem is depressant misuse and not depression, as are side effects like constipation, itching of the skin, and difficulty urinating.

Similarities Between Stimulants and Depressants

While stimulants and depressants are essentially opposites, all drugs of misuse have certain key similarities. All drugs listed have the potential to be addictive and take over a person's life, and all require professional treatment if an addiction disorder develops. The human brain will also adjust itself to any of these drugs, producing tolerance and the emergence of unpleasant withdrawal symptoms if an individual stops taking them all at once. There are both legal and illegal drugs in each class, and the legal ones can be quite beneficial if taken as directed by a medical professional. Whether an upper or downer, there is no drug that is 100% safe to use, and misuse of a drug increases all risks of use. There are many specific drugs not listed here that could fit into either category that can be just as dangerous.

Independent practice

1. What do people often do when it comes to stimulants and depressants?
2. What can continual use of these drugs lead to?
3. Stimulants are commonly called _____ and depressants are commonly called _____
4. Some of the more commonly used stimulants are.
5. What is cocaine, meth and ecstasy known as?
6. How do depressants work?
7. What are prescription drugs?
8. What is the crash that comes after taking stimulants?
9. Why are stimulants risky for people with heart problems?
10. How are stimulants linked to mental health?
11. Extended writing: evaluate the long-term problems associated with chronic stimulant and depressant use.
12. Extended writing: Evaluate whether drugs should be made legal based in the long-term effects of the drugs.