2. Exercise: Scientific Approach

Objectives

- To be cognizant of the benefits of exercises.
- To understand the importance of warming up.
- To comprehend the importance of cooling down.
- To fathom the effect of exercises on various body systems.

Our ancestors have been telling us for centuries the need for exercise. The deadly coronavirus pandemic has created a fear with regards to health. The emergence of such diseases in the future is inevitable. To overcome such emergencies, the body's defense mechanism is its immune system. Regular exercise helps strengthen the immune system.

So, let us learn about exercise with a scientific approach.

1. Exercise

Exercise is the planned, structured, repetitive and purposeful movement of the body which is designed to improve or maintain physical fitness e. g. pushups, squats, running, etc. All the above factors should be considered to get the benefit of any exercise.

2. Importance of Warm Up

The body must be prepared to perform any exercise. This requires stimulation of the joints and muscles. Generally, sport or a fitness program requires vigorous physical activity. In preparation, all body systems and organs need to be activated to work at an intense level. A proper warm up prepares the individual to perform efficiently without hurting.

Thus, warming up of the body before a workout:

- Improves range of motion in joints, flexibility of muscles and ligaments.
- Reduce the chances of injuries.
- Psychologically prepare the individual for the activity
- Improve reflexes.

Hence, warm up should be an integral part of daily exercise. Every physical activity, exercise or game should always begin with a proper warm up.

3. Cooling Down

After any type of training involving physical exercise or playing sports a cool down is must. Cooling down is necessary to:

- Gradually bring the heartbeat to normal.
- Bring the elevated respiratory rate to normal.
- Reduce the fatigue experienced in the muscles.
- Bring to normal the various systems of the body.

4. Importance of regular exercises

- Controls and maintains the weight.
- Maintain a healthy and symmetric physique.
- Increases the physical abilities.
- Exercise increases the strength and flexibility of the body.
- Improves functioning of the body's internal systems – respiratory, digestive, circulatory, etc.

- Cholesterol levels is regulated.
- Toughens and strengthens the body.
- Increases immunity.
- Reduces mental stress and keeps the mind refreshed.
- Increases efficiency in daily work, boosting self-esteem.
- Reduces sluggishness and enables sound sleep.

5. Effect of exercise and training on various body systems

Have you ever observed or recorded changes in your body while exercising? Running causes rapid breathing and increased heart rates. The body experiences pain or soreness. One or more such effects are experienced by the body, both, while or after exercise. Now you may wonder, why these changes are happening in the body?

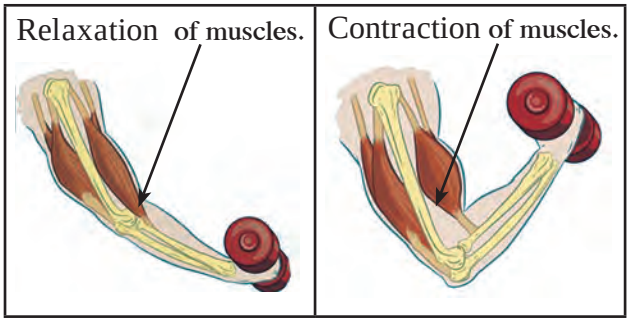
When exercising, the body needs additional energy as the muscles need to do the extra work. Various systems in the body have to work to provide this additional energy. The body's circulatory system, respiratory system and muscular system work together to provide the excess energy required during exercise

The muscles need more oxygen when exercising. Therefore, the respiratory system increases respiration rate and circulatory system increases the rate of blood circulation. This allows for large amount of oxygenated blood to be transported to the different parts of the body that need oxygen. Isn't this all fun? So, let us learn the changes that take place in the body due to exercise.

1. Muscular System

The continuous contraction and relaxation of the muscle fibres allows for various movements in the body. This requires constant supply of oxygen to the muscle.

Therefore, blood flow towards the muscle is increased in the body. Exercises like weight training increase the size of the muscles as it involves repetitive contraction and relaxation of the muscle involved



During exercises, multiple muscle groups are used and they need to work efficiently. Exercise helps muscles to perform better. Exercising increases number and size of mitochondria in the muscles. Due to this, the exchange of gases between the blood vessels around the muscles increases. Stretching exercise decreases the amount of lactic acid (which is a by-product created during exercise). If this lactic acid gets stored in the muscle, pain and stiffness of muscle is experienced and may cause injury.

2. Cardiovascular System

Deoxygenated blood is transported from heart to the lungs, where oxygen is mixed with the blood in the respiration process. This oxygenated blood is transported back to the heart and is then pumped to the different parts of the body. During exercise, the need for oxygen elevates heart rate (number of heartbeats in one minute), to ensure the supply of oxy-

genated blood. Blood circulation in the body increases temporarily (from 5 to 6 litres of blood to 20 to 25 litres) during exercise.

It is important to know that exercising regularly over a period will improve the efficiency of the heart. The heart rate is reduced and the efficiency in blood circulation is still maintained despite the lower heart rate. Resistance training makes the right ventricle of the heart muscle thicker, which helps the heart to contract forcefully and allows more blood to be pumped from the heart in one beat (contraction). Regular exercises like running, swimming, cycling increases size of left ventricle. This allows for increased amount of oxygenated blood from lungs into the heart. It means that the body is now supplied with more oxygenated blood.

Such efficiency of the cardiac muscle is seen in those who regularly exercise or are sportspersons and such a heart is called as 'Athlete's Heart'. The product of the heart rate and amount of oxygenated blood pumped out in one-minute forms the 'cardiac output'. This output is generally more in players and those who regularly exercise as compare to a layperson.

3. Respiratory System

The body needs more oxygen during exercise and in order to fulfil this need, a lot of changes take place in the respiratory system. Normally, in resting time the respiratory rate is 12 to 14 breaths' a minute and is called the respiratory rate.

While exercising, the need for oxygen increases temporarily, which causes respiratory rate to increase as long as exercise continues. Prolonged training can increase the depth of respiration. It is the volume of air entering the lung during a single breath. Regular exercising reduces the rate of respiration and increases the depth of respiration.

Prolonged training improves the respiratory system allowing more air to be carried into the lungs. The air sacks in the lungs exchange gases i.e. oxygen and carbon dioxide, more efficiently. The efficient absorption of oxygen into the blood in turn increases the supply of oxygenated blood to the body.

Do you know?

• Obesity is a disease of the body. This reduces the vitality in the body. An obese person cannot perform a physically active and heavy work. At the same time, normal work causes the body to fatigue easily. Uncontrollable obesity becomes a cause for many diseases. An obese person indirectly invites diseases like heart ailments, blood pressure and diabetes. Lack of exercise is one of the causes of obesity. The reasons for no exercise range from lack of time or space available, sedentary work occupation, reduced mobility and restraint of the mind.

Exercise

Q. 1. Fill in the blanks with appropriate words.

1) Blood circulation in the body increases temporarily upto ..... litres during exercise.

2) Stretching exercise decreases the amount of ..... .

3) After any type of exercise ..... is necessary.

4) After any type of exercise ..... is a must.

5) While exercising the need for ……. increases temporarily.

Q. 2. Match the following.

'A' Group	(Answers)	'B' Group
1) Corona Virus	(.....)	a) mental preparation of sport.
2) Warm up	(.....)	b) to bring the tired muscle to normal.
3) Cooling down	(.....)	c) increase in physical ability.
4) Regular Exersise	(.....)	d) to increase the immunity against the disease

Q.3. Write whether true or false.

1. The body should be prepared before doing any exercise.

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2. Cooling down after exercise is not necessary to get the body back to normal.

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3) The cholesterol level in the body gets uncontrolled due to regular exercise.

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4) The heartbeats come to normal with a cooling down.

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5) The cardiac output of a person doing regular exercise or a player is more than that of a normal person.

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Q. 4. Write in short.

1) Write down the importance of warm up.

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2) Why cooling down is necessary after exercise?

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3) Write the benefits of regular exercise.

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4) What is the effect of load training on circulatroy system?

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Q. 5. Write your view

1. What will you do to protect yourself from Corona Virus?

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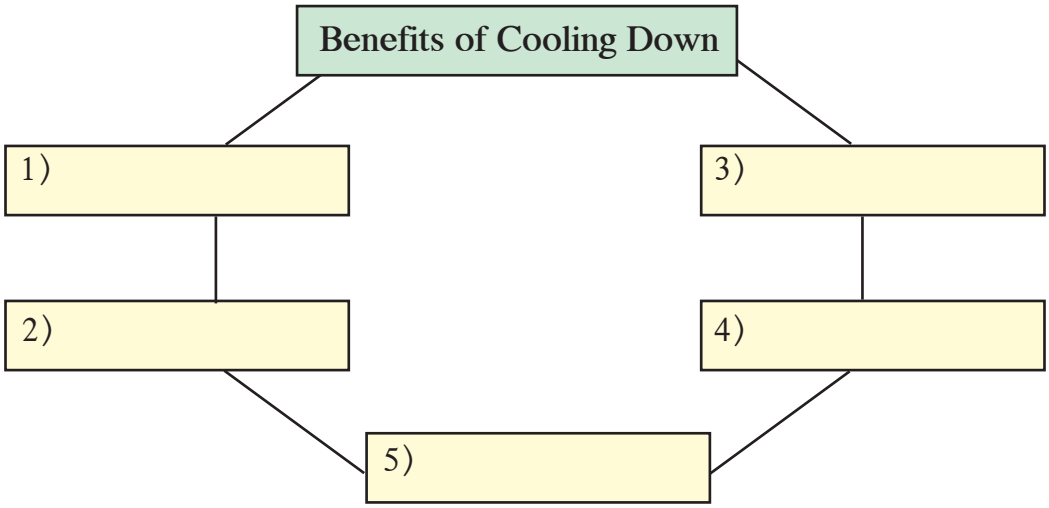
Q. 6. Complete the following figure.

1)



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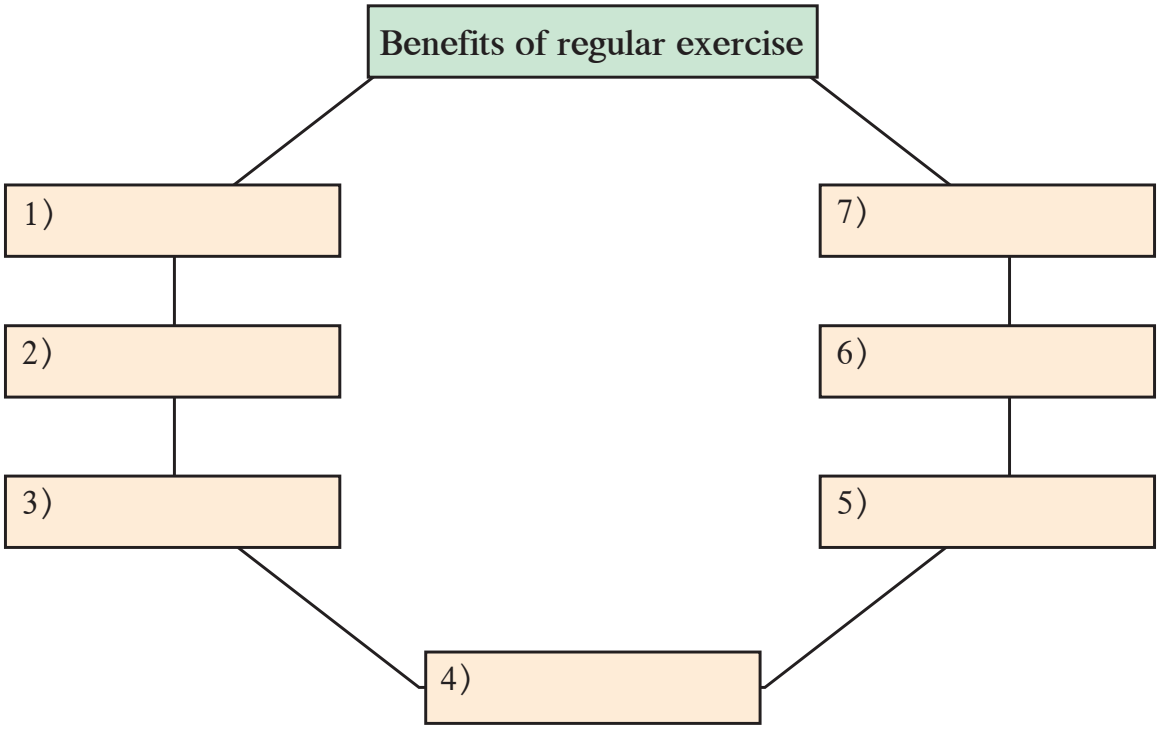

Supplementary Study :

1) Learn about the various joints that are useful for facilitating the movement of the human body using the internet.
2) Record the functions of various organs and system in the human body by browsing the internet.