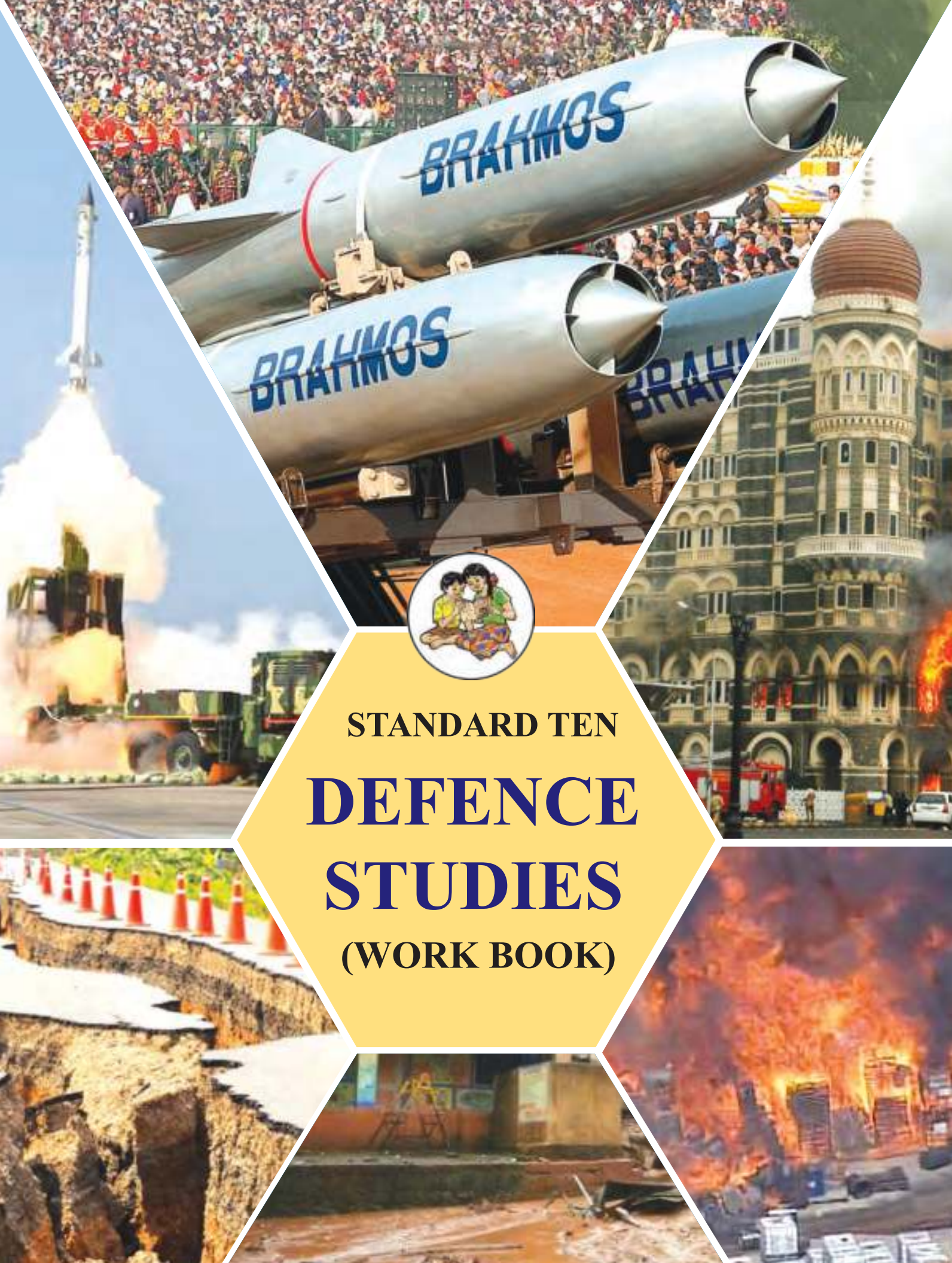

STANDARD TEN

DEFENCE STUDIES

(WORK BOOK)

The Constitution of India

Chapter IV A

Fundamental Duties

ARTICLE 51A

Fundamental Duties- It shall be the duty of every citizen of India–

(a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities, to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;

(k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

GALLANTRY AWARDS FOR ARMED FORCES

There are two categories of gallantry awards given to the persons of the armed forces.

Those for gallantry in the face of the enemy.

Param Vir Chakra (PVC)

Awarded for most conspicuous bravery or some daring or pre-eminent act of valour or self sacrifice, in the presence of the enemy, whether on land, at sea, or in the air.

Maha Vir Chakra (MVC)

For acts of gallantry in the presence of the enemy on land, at sea or in the air.

Vir Chakra (VrC)

For acts of gallantry in the presence of the enemy, whether on land or at sea or in the air.

Sena Medal

Awarded to an individual from the Army, for acts of exceptional devotion to duty or courage as have special significance for the Army.

Nao Sena Medal

Awarded to an individual from the Navy, for such individual acts of exceptional devotion to duty or courage as have special significance for the Navy.

Vayu Sena Medal (SM)

Awarded to an individual from the Air Force, for acts of gallantry in the presence of the enemy, whether on land or at sea or in the air.

Permission is granted for enforcing this workbook from the academic year 2018-19 in the meeting, held on the date 29.12.2017, of the coordination committee constituted by the Government resolution No: Abhyas-2116/(Pra.kra.43/16) S.D-4 dated 25.4.2016

DEFENCE STUDIES

(WORK BOOK)

STANDARD TEN

Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune 4.

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The Constitution of India

Preamble

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā
Drāvida-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,
Jaya jaya jaya, jaya hē.

PLEDGE

India is my country. All Indians are my brothers and sisters.

I love my country, and I am proud of its rich and varied heritage. I shall always strive to be worthy of it.

I shall give my parents, teachers and all elders respect, and treat everyone with courtesy.

To my country and my people, I pledge my devotion. In their well-being and prosperity alone lies my happiness.

Foreword

Dear Students,

I extend a very warm welcome to you in class X. It gives me immense pleasure to present the workbook for 'Defence Studies'

This workbook provides brief information about the changing concept of National Security along with Internal Security, Disaster management and the role of Armed Forces in Disaster Management. In the 21st century, we hope this subject will guide you to understand the necessary information about the subject 'Defence Studies' and the career opportunities in the field of Defence.

You know the importance of 'Defence Studies'. The main aim of this workbook of Defence Studies is to inculcate the values of National Security, National Interest and love for the country in you. You are going to study this subject through the activities like discussions, field visits and interviews. Do make sure that you participate in all these activities, as they will stimulate your thought process. There are sufficient places given in the workbook to write the information and points that you get through discussions. Take the help of your teachers, parents and classmates whenever necessary.

In this era of technological advancements, you must be very well versed with the use of computers and smart phones. Use technology appropriately while studying this workbook. This will make the learning process easier.

Do let us know about your feedback on what you liked and what you found difficult while studying this workbook.

Wish you all the best for your academic progress and a bright future.

Pune

Date: 18 March 2018, Gudhipadva
Indian Solar Year : 27 Phalgun 1939

(Dr. Sunil Magar)
Maharashtra State Bureau of Texbook
Production and Curriculum Research,
Pune

Defence Studies

An approach to teaching learning and conducting of activities

In the last year (Std IX) we studied the concept of national security. The focus was on the defence of India and the role played by the Armed Forces and the Para-Military forces to defend India from any aggression from external powers. You were also introduced to the role played by the Police in maintaining peace and security. The concept of security that is linked mainly with the defence of the country by the use of Armed Forces is a traditional approach to understanding national security. This is an important part of understanding the security of a country. This approach focuses on the security of the country and therefore is called state-centric. It focuses mainly on the utility of military power and its ability to defend the borders of our country.

This year we would expand the understanding of national security to such other areas that go beyond the traditional perspective of defence. National security is closely linked to the peace, stability and prosperity of the nation. Therefore all aspects that deal with the people and their daily lives are also to be understood. We now would study the problems of internal security and disaster management. There is also a chapter on how the developments in science and technology affect our national security.

This workbook includes a section on the possible career opportunities that students may think of in the areas that they have studied.

Teaching – Learning

(1) As the content matter has been presented in brief, the teachers are expected to explain this content as basis for their teaching. Use of references is highly recommended.

(2) To make learning effective the teachers must encourage students to participate actively. Discuss the given activities in the class and ensure that children also present them in a written form.

(3) At least once a week, ask children to discuss security issues that appear in the newspapers and magazines - Encourage them to express their individual opinions on such security issues.

(4) Organize field visits considering the situation. It helps children to develop their leadership qualities, co-operative spirit, communication skill etc.

Evaluation :

(1) There is no separate written examination for this course.

(2) The written work stated in the workbook carries 40% weightage.

(3) The discussions, field visits, interviews, role playing are tools for evaluation and they carry 60% weightage.

(4) The total marks are to be converted into grades and to be awarded to the students.

Competency statements for Defence Studies : Standard 10th

Sr. No.	Content	Statements
1.	**The changing nature of the concept of National Security**	❍ Nurturing the sense of patriotism and nationalism. ❍ Understanding the expanding scope of national security. ❍ Understanding the essentials of human security. ❍ Understanding the essentials of comprehensive security.
2.	**Internal Security**	❍ Internal security challenges. ❍ Analysis of the internal security threats faced by the nation. ❍ Role of the Armed Forces in internal security.
3.	**Disaster Management**	❍ Understanding the concept of Disaster Management. ❍ Differentiating between hazards and disasters. ❍ Natural and man made disasters. ❍ Understanding the Disaster Management cycle.
4.	**Role of Armed Forces in Disaster Management**	❍ Impact of natural disasters on national security. ❍ Role and responsibilities of the Armed Forces in disaster management. ❍ Stages of Disaster Management.
5.	**Science, Technology and National Security**	❍ Relationship of Science Technology and Engineering with National Security. ❍ Space and Missile Technology. ❍ Nuclear science and its application. ❍ Electronics and Cyber Technology. ❍ Emerging technologies in defence applications.
6.	**Career opportunities in Defence Services**	❍ To understand the opportunities for service in defence services and methods of entry

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3.	Disaster Management	15
4.	Role of Armed Forces in Disaster Management.	24
5.	Science, Technology and National Security	30
6.	Career Opportunities in the Armed Forces	43

Chapter 1
Changing Nature of the Concept of National Security

Traditionally, National Security implied physical protection of the state from external aggressions. The military dimension of security is an important part but it is not the sole component of National Security. To be truly secure, a nation needs other forms of security. Besides the military aspect of security; many other aspects like diplomacy or politics; society; environment; energy and natural resources; economics and human resources; are equally important as a whole. The aim of national security is to achieve peace and harmony among people, i.e. socio - political and individual life stability through good governance; resulting in nation-building.

National survival which is the core of national security, also relies on effective conservation of our environment so that industrial and technological growth go hand in hand with environment. Ecological balance is a shared responsibility of all, as individuals, families, and communities. Another important element for our national survival is national unity. This unity is an outcome of the tradition, culture, history that makes people proud of their country. Thus while the traditional aspect of security is important there are other dimensions that need to be studied.

In the Indian context, the term security is represented by more than one word in Sanskrit language. In Sanskrit, the words ‘rakshah, rakshanam, rakshakah; derived from the root ‘raksh’ (meaning protecting, defending, watching) and the word ‘suraksha’, all mean security. Similarly, the word ‘abhayam’ means fearlessness, elimination of fear, safety and security. Kautilya in the 'Arthashastra'; divides the concept of security into internal and external security. Internal security, functionalised as ‘dandaniti’ argues that the fundamental duty of the government is to maintain public order; and to maintain, protect and increase the wealth of the country.

Chanakya, (4th century BCE) otherwise known as Kautilya or Vishnugupta was an Indian scholar teacher, Philosopher, Economist, Jurist and Royal Advisor. He authored the ancient Indian political treatise, 'The Arthashastra'.

While the traditional approach to security remains very relevant today, there are some other dimensions that need to be understood. In the decade of 1980s and 1990s a lot of new

thinking was done on the concept of security. Some of the important contributions that were made, include the following:

1. Willy Brandt's report titled '*North-South : A Programme for Survival*' and '*Common Crisis : North South Cooperation for World Recovery*' : These reports focused on the problem of development and how military resources can be used for development of the country.

2. Olof Palme's report titled '*Independent Commission on Disarmament and Security Issues*': This report suggested the approach of 'common security'. This meant that one country cannot become secure by making the other country insecure. They must search for common security.

Willy Brandt was a German statesman and politician who served as Chancellor of the Federal Republic of Germany (West Germany) from 1969 to 1974. He was awarded the 'Nobel Peace Prize' in 1971 for his efforts to strengthen cooperation in Western Europe and to achieve reconciliation between West Germany and the countries of Eastern Europe.

Olof Palme was the Prime Minister of Sweden who chaired the Independent Commission on Disarmament and Security in Geneva. He acted as UN special envoy to mediate in the war between Iran and Iraq.

What is a non-state actor?

A non-state actor is any organisation that is not a part of the Government. It works for a specific purpose for which it is created. Some of the important organisations work in the area of environment, health, women and child development etc. They are also referred to as Non-Governmental Organisations or Voluntary Organisations.

Comprehensive Security

The age of globalisation that came in the 1990s saw a lot of changes taking place in the world. The world became interdependent in the area of economy and technology. Communication became faster and cheaper due to TV, mobile phones, internet etc. Non-state actors (or non-governmental organisations and voluntary organisations) became more active and relevant in day to day life.

It is in this context that the concepts of 'Comprehensive Security' and 'Human Security' became important. These concepts link the security of the country to the security of the people and society. The main areas that are included in the concept of Comprehensive Security are :

i. **Environmental Security :** The issues involved in the environmental sector include ecological problems like pollution, energy problems, population issues, food related problems, climate change, water resource management etc.

ii. **Economic Security :** This focuses on the problems of poverty, employment opportunities etc.

iii. **Societal Security :** The issues of migrations, social conflicts based on religion, ethnicity or caste are discussed here.

iv. **Political Security :** Threats from the political conflicts based on ideology or religions, form part of this issue.

Human Security

Today the term used is 'Human Security'. The Human Development Report of the United Nations has brought in this new thought in the security issues. The 1994 Human Development Report (HDR) highlighted two major components of human security that were in the Universal Declaration of Human Rights: 'Freedom from fear' and 'Freedom from want'. The 1994 Report introduced the concept of human security, which equates security with people rather than territories and with development rather than weapons. It examines both the national and the global concerns of human security. The 1994 HDR was even more specific, listing seven essential dimensions of human security :

i. **Economic security :** People must have an assured basic income.

ii. **Food security :** All people must get and afford to have basic food.

iii. **Health security :** Threat to health security is usually greatest for poor people and those living in rural areas. People must have access to health services.

iv. **Environmental security :** Intensive industrialisation and population growth have put a lot of strain on environment. It is necessary to protect the ecosystem.

v. **Personal security :** Threats can be of many kinds like torture, war, crime, domestic violence, rape, child abuse etc. People must feel secure and protected from all kinds of violence.

vi. **Community security :** People get security by being in a family, community, caste or ethnic group etc. Such groups offer practical support.

vii. **Political security :** People should be able to live in a society that will honour their basic human rights.

The focus of the concept of human security is thus on the people. It focuses on humanitarian values, on the dignity of the individual, on concepts such as social justice, freedom and equality. Human security is not concerned with weapons; it is concerned with human life and dignity

Human Development Index

Mahbub ul Haq first drew global attention to the concept of human security in his Human Development Report, submitted in the 1994 United Nation's Development Programme. Haq devised the Human Development Index along with Amartya Sen which has become one of the most influential and widely used indices to measure human development across countries. The HDI has been used since 1990 by the United Nations Development Programme for its annual Human Development Reports.

Activities

1. Find out an NGO in your locality. Find out what work it does. Discuss it in the classroom and write a note on it. (Students can write about different NGOs)

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2. Meet a political or a social leader or a government official. Find out his/her thoughts on the social or political or environmental problems faced by India. Discuss the same in the classroom and write your views on how to solve the problems mentioned by the person.

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Chapter 2

Internal Security

The defence of the 'territory, sovereignty and freedom of the country' is the fundamental aspect of India's security policy. Even though this approach to security is important, it is not the only approach to the understanding of the broad range of security issues that a nation faces. Security policy, in a wider sense, encompasses the economic, industrial, and technological base; the cohesiveness of the socio-cultural structure; the resilience and stability of the political system; and the efficacy of diplomacy. There is a need to connect the military capability approach to security policy with the domestic policy. This chapter goes beyond conventional approaches that identify security with the defence of frontiers and focuses on the emergent threat of internal security. This threat is an important challenge to India's national security today.

The UN High Level Panel on 'Threats, Challenges and Changes' argues that today's threats recognize no national boundaries but are connected, and must be addressed at the global, regional and national levels. It identifies areas of threats with which the world must be concerned:

- Economic and social threats, including poverty, infectious diseases and environmental degradation.
- Inter-State conflict.
- Internal conflict, including civil war, genocide and other large-scale atrocities.
- Nuclear, radiological, chemical and biological weapons.
- Terrorism.

Some Internal Security Threats to India

This section would now focus on the following threats to India's internal security:

1. Cross-Border terrorism in Jammu & Kashmir.
2. Left Wing Extremism in certain areas.
3. Terrorism.
4. Cross border terrorism in the North Eastern region of India.

1. Jammu and Kashmir

The state of Jammu and Kashmir consists of three regions: Ladakh, Jammu and Kashmir. This state shares borders with Pakistan, Afghanistan and China; thus making it a very important state of the Indian Union. You have studied the border disputes that exist between India and Pakistan and India and China in the region of Jammu and Kashmir.

You may have read about various conflicts that exist between various militant groups and Indian security forces in Kashmir. The State of Jammu & Kashmir (J&K) has been affected by terrorist and separatist violence, sponsored and supported from across the border, for more than two and half decades. The militancy in the State is linked with infiltration of terrorists from across the border. Sometimes there is an increase in infiltration from the Pakistan side and the Indian security forces have to respond to ensure that the terrorists are prevented from entering Indian Territory.

There have been many instances in Kashmir where young children were used by militants to throw stones on security forces. There have also been instances where the militants have burned down several school buildings. The militants have also attacked residential cantonments of security forces that have resulted in the killing of security forces and civilians.

Photos of Schools burned in Kashmir

The Union Government and the State Government, has adopted a multi-pronged approach to contain cross border infiltration. This is done in the following ways :

i. Construction of border fencing.

ii. Improved technological surveillance.

iii. Improved intelligence.

iv. Discouragment of the the local youth from joining militancy.

The government has also tried to ensure that the socio-economic problems faced by the people of the state are properly looked into. To achieve this, there is a need to maintain peace and stability in the region. Therefore the government seeks to provide an opportunity to all the sections of the population to participate in the decision making process. The Government of India has launched a scheme called 'UDAAN' that aims at skills development of the state's unemployed youth, to enable them to seek employment in various industries.

The state of Jammu and Kashmir faces another important problem. The growth of militancy in early 1990s, resulted in the displacement of a large number of Kashmiri Pandit families along with some Sikh and Muslim families from the Kashmir Valley to Jammu,

Delhi and other parts of the country. The Indian government has been providing relief and rehabilitation to the displaced people from Kashmir.

Border fencing in Jammu area

2. Left Wing Extremism

The origin of the left wing extremist movement otherwise called the Naxalite movement can be traced to the Telangana movement (1946-51).

Telengana Movement : The region, now being called Telangana, was part of the erstwhile Hyderabad state which became part of India. The Telengana movement was a rebellion by the peasant community against the feudal lords of Telengana. The Telengana movement was a product of the efforts by communist and socialist parties to organise the peasantry against injustices committed by the feudal lords.

In 1967 protests were held in Naxalbari against the feudal system in India. Since the protest began in Naxalbari it has been called Naxalite movement. They are also referred to as 'Maoists' because they follow the ideology of Mao Zedong (Mao Tse-tung). This movement is known to follow violent means to promote their ideology. This has resulted in loss of lives and property.

Today the Communist Party of India (Maoist) is the most important group that is part of the Left Wing Extremism. This group has tried to establish itself in some areas of Jharkhand-Andhra Pradesh-Odisha border, tri-junction of Kerala-Karnataka-Tamil Nadu and tri-junction of Madhya Pradesh- Maharashtra-Chhattisgarh.

Naxalbari

What is Left Wing Extremism?

In 2004, the People's War (PW), then operating in Andhra Pradesh, and the Maoist Communist Centre of India (MCCI), then operating in Bihar and adjoining areas, merged to form the CPI (Maoist) Party. The CPI (Maoist) Party, is the major Left Wing Extremist outfit that has been included in the Schedule of Terrorist Organisations along with all its formations and front organisations under the Unlawful Activities (Prevention) Act, 1967. The CPI (Maoist) philosophy is to use armed insurgency to overthrow the Government.

3. Terrorism

Terrorism has been defined as an application of violence or the threat to use violence with an intention to create panic in the society. It may appear to use guerrilla tactics, but it differs from guerrilla warfare. Unlike the guerrillas the terrorists do not hold on to any territory. It is called 'asymmetric warfare' because there is no pattern to the nature of violent attacks that are conducted. It is used to create panic in society by targeting the people who cannot defend themselves. Therefore the targets are called 'soft targets'. For example, there would be attacks on buses, trains, train or bus stations, cinemas, theatres, markets, malls, etc. It is deliberate and has political motivations.

The terrorists usually fight for some abstract ideology or belief. They are usually a part of some organisation that promotes these beliefs. Modern day terrorism is international in nature. Today, the terrorists and their organisations conduct terrorist acts in various countries.

Some of the examples of international terrorist attacks

i. Attack in the United States (popularly called the 9/11 attack) where terrorists used airplanes to destroy American targets in New York (World Trade Center) and Washington D. C. (Pentagon) on 11 September 2001.

ii. In 2005 there were series of terrorist suicide bomb attacks at Bali (Indonesia). Bombs exploded at two tourist sites in Jimbaran Beach Resort and in Kuta, both in south Bali.

iii. In 2015 there were three suicide bombers that struck during a football match in the city of Paris in France. This was followed by several mass shootings and suicide bombings at cafes and restaurants

iv. In 2017, an attack took place on the London Bridge in United Kingdom, when a van left the road and struck a number of pedestrians. After the van crashed, the terrorists ran to the nearby Borough Market area and began stabbing people in and around restaurants and pubs.

Some examples of terrorist activities in India

i. **Attack on the Indian Parliament On 13 December 2001 :** Five heavily-armed terrorists, allegedly belonging to terror groups Lashkar-e-Taiba and Jaish-e-Mohammed, attacked the Parliament complex in New Delhi and opened fire indiscriminately.

ii. **Attack in Mumbai :** On 26 November 2008 a series of terrorist attacks took place in Mumbai. The places where the attacks took place included the Chhatrapati Shivaji Maharaj Railway Terminal, the Oberoi Trident and Taj Palace Hotels, Leopold Café, Cama Hospital, Nariman House. Metro Cinema, and some other places. The attacks were conducted by members of the Laskar-e-Taiba, an organisation based in Pakistan.

Parliament Attack

Mumbai Attack

How does one protect oneself from terrorism?

The fight against terrorism has to be a coordinated effort. Good governance will result in ensuring that the various services and facilities that the government provides to the citizens, reach those who need them the most. The intelligence and law enforcement agencies have to anticipate, identify, track and destroy terrorism. It is also necessary for the civil society to ensure that they do not promote any kind of terrorist activity. They should also educate the public about the possible threats and how to handle them. One needs to be vigilant about one's own surroundings and note anything that looks abnormal. If one sees any suspicious person or unattended bag or items the police should be informed immediately. It is wrong to encourage terrorists out of fear or for monetary gain.

4. North East Region

The North Eastern Region comprises eight States, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. This region has more than 200 ethnic groups which have distinct languages, dialects and sociocultural identities. The North East holds an important position from a strategic point of view as these states share their borders with other countries like Bangladesh, Bhutan, Myanmar and China.

The security situation in the North Eastern States has remained complex because of diverse demands of ethnic groups and various militant outfits. This is a remote and relatively under developed region with a deprived population which feels neglected. This has been a source of insurgency. This has been supported by China and insurgents have taken refuge in Myanmar and Bangladesh. Some of the major militant groups include the United Liberation Front of Assam, National Democratic Front of Bodoland, Mizo National Front, National Socialist Council of Nagaland and the Karbi Peoples Liberation Tigers.

The North Eastern Council was set up as an advisory body in 1972. Today it functions as the Regional Planning Body for the North Eastern Region. It has taken up several infrastructure and social sector projects of critical importance for socio-economic progress of the region.

Role of the Armed Forces in internal security situations

India has faced several challenges to national integration from within and without. The Indian army has been called to assist the civilian authority for the maintenance of law and order, maintenance of essential services, assistance during natural calamities, etc. The task of maintaining internal security is essentially that of the Police Force, but under some critical circumstances it becomes necessary for the government to deploy the Armed Forces. The Armed Forces have been called in to help to maintain security in Kashmir and the North East India.

There are certain rules and regulations that govern the use of Armed Forces when they act in aid of the civil authority. They are based on the following principles: Necessity, Minimum Force, Impartiality and Good Faith. Thus there should be justification for every action that the troops take while acting in this role. It is expected that the least amount of force be used. The force to be used would depend on the situation and the professional judgement of

the concerned Commander. Further, the troops are not to take sides in any conflict situation, especially in the context of religious/caste conflicts; and these principles are to be followed in good faith.

Have you heard of a 'Flag March' by the Army?

When there is a severe riot and unrest and the police and the paramilitary is unable to handle the situation, the army is called to restore peace in the area disturbed by the riots. At such times, the Army conducts a parade in the streets to show their presence and indicate to the people that they are ready to ensure that there is peace and order in the area.

Activities

1. Write names of some of the terrorist groups that operate in Jammu and Kashmir. Can you also name the leaders of these groups?

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2. Paste a newspaper report on any terrorist attack in India and discuss it in the class.

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3. On the map of India look at the 'Red Corridor' that describes the region affected by the Naxalite militancy. Identify the districts in Maharashtra that are part of the 'Red Corridor'.

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4. Discuss in the classroom and write a note: Can problems be resolved by peaceful means? Is it necessary to use violent means to get our demands satisfied?

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5. List the examples of international terror attacks?

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6. List the precautionary measures for terrorist attacks?

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Chapter 3

Disaster Management

Internal security also includes aspects like natural and man-made disasters. It brings together the Police, Paramilitary and the Armed Forces along with immigration and customs, firefighters and the civil society on a single platform to tackle these disasters.
This chapter focuses on various hazards and disasters that we see happening around us.

Hazards and Disasters

Hazards : A Hazard is a phenomenon that has the potential to cause threats to life, property, environment and normal processes. Hazards are natural and human induced. Earthquakes, Floods, Tsunami Landslides and Droughts are some of the natural hazards. Industrial accidents, road accidents and most of the fires are typical examples of Human Induced Hazards.

Natural hazards exist in some specific geographical areas, while human induced hazards are due to human errors or failure of some processes and could happen everywhere. Hazards may become active suddenly or build up slowly.

Disasters : Disasters are the occurrences caused due to some hazards that become active and go out of control. Thus, they are events that cause substantial damage to property and environment and loss or injury to life, creating imbalance in society and disturbing its normalcy. It takes tremendous efforts by the entire nation state and the populace to restore normalcy.

Disasters could be sudden or slow in their build-up and occurrence. Ill-effects of disasters depend upon the intensity and speed of the occuring hazard that causes disaster. It also depends upon the vulnerability of the population and infrastructure.

Types of Disasters

Natural Disasters	**Manmade Disasters**
(Earthquake, floods, Landslides, Tsunami, Cyclone Droughts Precipitation and cloud burst)	(Road accidents, Fire, Industrial accidents and Biological hazards)

Natural Disasters

Natural disasters are mostly the ones that cannot be prevented. They cause great losses and damages. Earthquakes, Floods, Landslides, Tsunamis, Droughts, Lightning Strikes, Cloud Bursts, Heavy Rainfall (precipitation) and Cyclones are some of the most commonly experienced natural disasters in India. Every disaster has complex ill-effects. They are generally in the form of deaths and injuries to living beings, damage to property and infrastructure resulting in economic losses, loss of crops and vegetation, industrial losses and even degradation of environment. All these effects lead to disturbance of life and exert great social, administrative and economic burdens on the society. Let us study these disasters.

Earthquakes :

When an earthquake takes place, it causes building structures to collapse. The collapsed buildings cause loss of lives and injuries. There are many secondary effects like landslides, dam bursting, snapping of high tension overhead wires, electrocution and even fires. Large scale epidemics spread because of decaying of the dead and contamination of water. Sometimes, the earth's surface cracks. Water streams change their courses. There is tremendous economic loss and social ill-effects.

Earthquakes are a common phenomenon all over the world. Construction technology is now evolving to construct earthquake resistant structures. Earthquakes measure from intensity 0.1 to 9.9 (10 being hypothetical) on a Richter Scale.

Earthquake Damage

Richter Scale	Effects
1.0	Not felt by humans
3.0	Felt by a few people on the upper stories of tall buildings
3.5	Felt by people lying down on hard surfaces
4.0	Felt indoors by many and by very few outside the buildings
4.5	Generally felt by everyone.
5.0	Trees sway, chandeliers swing, loose objects shift and fall causing damage
6.0	Cracking of walls and plaster falls
6 to 7	Chimneys fall, weak structures collapse
7.0	Some structures collapse, pipes break
7.5	Ground cracks, many buildings collapse, landslides occur
8.0	Most buildings and bridges collapse
Greater than 8	Total destruction, triggers tsunami (if under oceanic surface)

Floods :

Floods occur in many countries of the world. Almost 65% of India's main land is prone to floods. Floods cause havoc in states like Bihar, UP, Maharashtra, West Bengal, North East states and Orissa quite frequently. Floods are of two types – the flowing ones and sedentary ones. Flowing ones are because of overflowing rivers and sedentary ones are

because the heavy rains cause submergence of low laying areas in urban centres. The rain data and monitoring of water levels allows a fair warning period today. This ensures that people can be shifted to safer areas and help save their lives.

Effects of floods are in the form of submergence of areas causing damage to houses and properties, spoilage of crops and vegetation and drowning of people and cattle. Further, the secondary effects are in the form of displacement of population, Dam Bursts (due to water pressure) damage to infrastructure (Bridges, Railway Lines, Power Grids, Mobile Towers and many more). Epidemics also get triggered after floods.

Flood Situation

Landslides :

Landslide is a phenomenon where mud and rocks that form hills and mountains come sliding down with great force. This is due to natural causes like heavy rain or human intervention done through building of railway lines, digging canals, digging tunnels, mining for gravel etc.

In 2005, several people lost their lives in Jui village in Raigad District of Maharashtra. In 2014, there was a massive landslide in Malin village in Pune district. Careful observation allows a fair judgment of a possible landslide so as to plan for precautionary measures.

Landslide in Raigad District - 2005

Landslide at Malin Village in Pune District - 2014

Tsunami :

Tsunami is a Japanese word that means "Giant Wave". This is caused by a strong earthquake or a volcanic eruption that occurs below the ocean waters (crust below the ocean waters). In India, Tsunami struck the coastal regions in December 2004. In March 2011, Japan suffered great losses due to Tsunami that had followed a massive Earthquake. Tsunami waves are known to be as high as 30 mtr (height of a 10 storey building approximately!). Tsunami warning systems are now available in the world. Tsunami waves travel nearly upto 1 km inland. It can submerge the coastal belt, destroy houses and infrastructure and kill people because of drowning and collapsing of infrastructure. The secondary effects are disruption of communications, spread of epidemics and loss of coastal crops.

A Picture Showing Tsunami Wave

Cyclones :

Cyclones are climatic hazards. Cyclones originate on land masses as well as oceanic water surfaces. The latter ones are more frequent and violent. Cyclones damage houses, infrastructure, uproot trees and electric poles, break overhead cables cutting lines of communication. Cyclones are accompanied by rain in the coastal areas.

India's East Coast experiences cyclones quite often. Cyclonic winds are known to travel at speeds greater than 200 km per hour. The nucleus may be of high pressure or low pressure around which the surrounding air spins. The cyclones may spin clockwise or anti-clockwise and may be termed as cyclones and anti-cyclones. Weather satellites do give us warnings of building up of a cyclone and its movement pattern.

Cyclone

Destruction During Orissa's Super Cyclone in 1999

Droughts, Heavy Precipitation and Cloud Bursts :

While Heavy Precipitation and Cloud Bursts are sudden and more local in their geographical expanse, the droughts are slow in becoming effective and cover vast tracts of land mass. Warning of Cloud Bursts and precipitation is now available through weather radars. Drought conditions depend upon rainfall and ground water levels. These can be predicted on the basis rainfall data and measurement of water tables.

Man-made Disasters

Road Accidents :

Road accidents are a common phenomenon in India. Most of the road accidents are attributed to the lack of road discipline. Reasons of road accidents are – rash driving, not following the traffic rules (like jumping the 'Red Signal', drunken driving and not maintaining driving norm.) Many accidents occur because of bad road and weather conditions. Pedestrians crossing the roads without due precaution is also a major reason. Unauthorized encroachments of the roads by hawkers and faulty parking of vehicles reduces space available to the traffic and increases road densities. Vehicle maintenance is also a major cause. After an accident, deaths and injuries occur because of non-usage of helmets by two wheeled riders or non-use of the seat belts by the occupants of the four-wheeled vehicles.

Fires :

The number of deaths due to fire is very high in India. Nearly 8% of all deaths in India occur due to fires. We hear of fires during festive seasons, as people use fire crackers. We also see domestic fires occurring while using cooking gas. Fires also occur in Industries due to failure of machines and industrial processes.

Industrial Accidents

With greater industrialization and automation, the threats of industrial accidents have enhanced. In India, Bhopal gas tragedy of 1984 had been the worst known industrial accident. Industrial accidents occur in the form of fires, chemical spillages and gas leakages. Most industrial accidents occur due to negligence, human errors and non-standard operations. When safety rules are flouted, accidents take place. However, industrial accidents are known to occur also as a result of some natural calamities. (like Earthquakes and Tsunamis).

Biological Hazards

Biological hazards occur due to natural disasters as well as human behavior. Creation of garbage, contamination of river water, open drains and gutters and unclean habits are the human induced causes that result into wide spread diseases and epidemics. Allowing water accumulation that enhances the chances of mosquito breeding, contamination of food and drinking water are the major reasons of biological disasters. Cholera, Typhoid, Malaria, Dengue, Chikun Gunya are the most common diseases that spread through water and food contamination and mosquito breeding.

Prevention and Preparedness

Prevention and preparedness are two key components of disaster management. We will see what we can do to prevent and prepare ourselves to face these problems.

Prevention

It has become possible to prevent man-made disasters due to research in new technologies. Preventive actions have helped to control disasters. Government has an important role to play in preventing disasters. Similarly, every citizen is an important player in preventing a disaster. Although natural phenomenon like precipitation, movement of Earth's crust and lightning cannot be prevented, precautions to protect lives and infrastructure could be taken to avoid losses and destruction. Such actions are called Mitigation.

Preparedness

Much as we may wish to be free of dangers, many dangers – Natural and Human induced lurk around all of us. Thus it is important for us to be well prepared to face the dangers. We may take all efforts to prevent hazards from getting converted into disasters. We may attempt to reduce the adverse impacts which are called mitigation measures. Preparations are of many types – creating warning systems, having adequate resources, having reactive forces in readiness and increasing awareness of the population and most importantly, have Disaster Management plans ready.

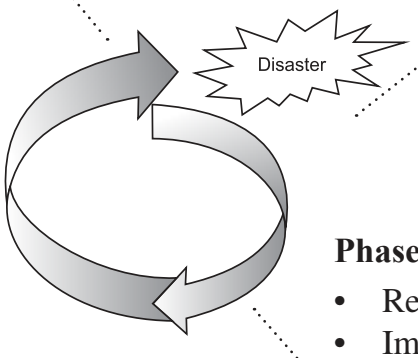
Disaster Management Cycle

Phase 1 : Pre Disaster phase

- Identify Hazards and Threats
- Take Preventive and Mitigation Measures
- Prepare for Responding

Phase 2 : During Disaster phase

Immediate rescue and relief



Phase 3 : Post Disaster phase

- Relief
- Immediate recovery to semi-normalcy
- Rehabilitation of life and restoration of infrastructure

Further development and resilience

Disaster Management Cyclic Process

Step 1 : Identification and Analyses of possible Hazards, Vulnerability and Risks in a given area. This is called 'Threat Assessment Stage'.

Step 2 : Taking actions to prevent the hazards from getting activated. These are called 'Preventive Measures'.

Step 3 : When a hazard (like a natural hazard) cannot be controlled or prevented, the next best action is to minimize the damage/ loss/ destruction (or in short, the risk). This is called 'Mitigation Stage'.

Step 4 : Preparing to face a hazard when it turns into a disaster. It ranges from personal level to the level of own family, a community, a village, a city or the entire nation. This is part of 'Preparatory Stage'.
The First Four steps are part of 'Pre-Disaster Activity Phase'.

Step 5 : Actual response of saving lives, property and infrastructure by evacuating these from hazardous area and also rescuing people, animals or important material from the ill-effects of a hazard is called "Response". This step forms part of 'During-Disaster Activity Phase'

Step 6 : Relief and Rehabilitation of affected population, Restoration of normalcy and reconstruction of damaged infrastructure falls under the purview of 'Post Disaster Recovery Phase'.

Activities

1. Make a list of Natural and Human Induced Disasters (caused due to human error or negligence) in a tabular form:

Sr. No.	Name of Natural Disaster	Name of Human Induced Disaster

2. Refer to the internet and see the Earthquake Zoning Map of India. Now, take a political map of India and draw Earthquake zones on that map, clearly demarcating different zones.

3. Survey your locality (including your own house) and indicate the buildings that are old, structurally weak and unsafe to live. Make three lists – Very Unsafe, Partially Unsafe and Safe.

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4. Make a list of items that are kept in the First Aid Box.

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Chapter 4 Role of Armed Forces in Disaster Management

In the last chapter we studied various man-made and natural disasters. There are several agencies that work for disaster management. This chapter will focus mainly on the role played by the Armed Forces in this area.

Effects of Natural Disasters on Security of the Country

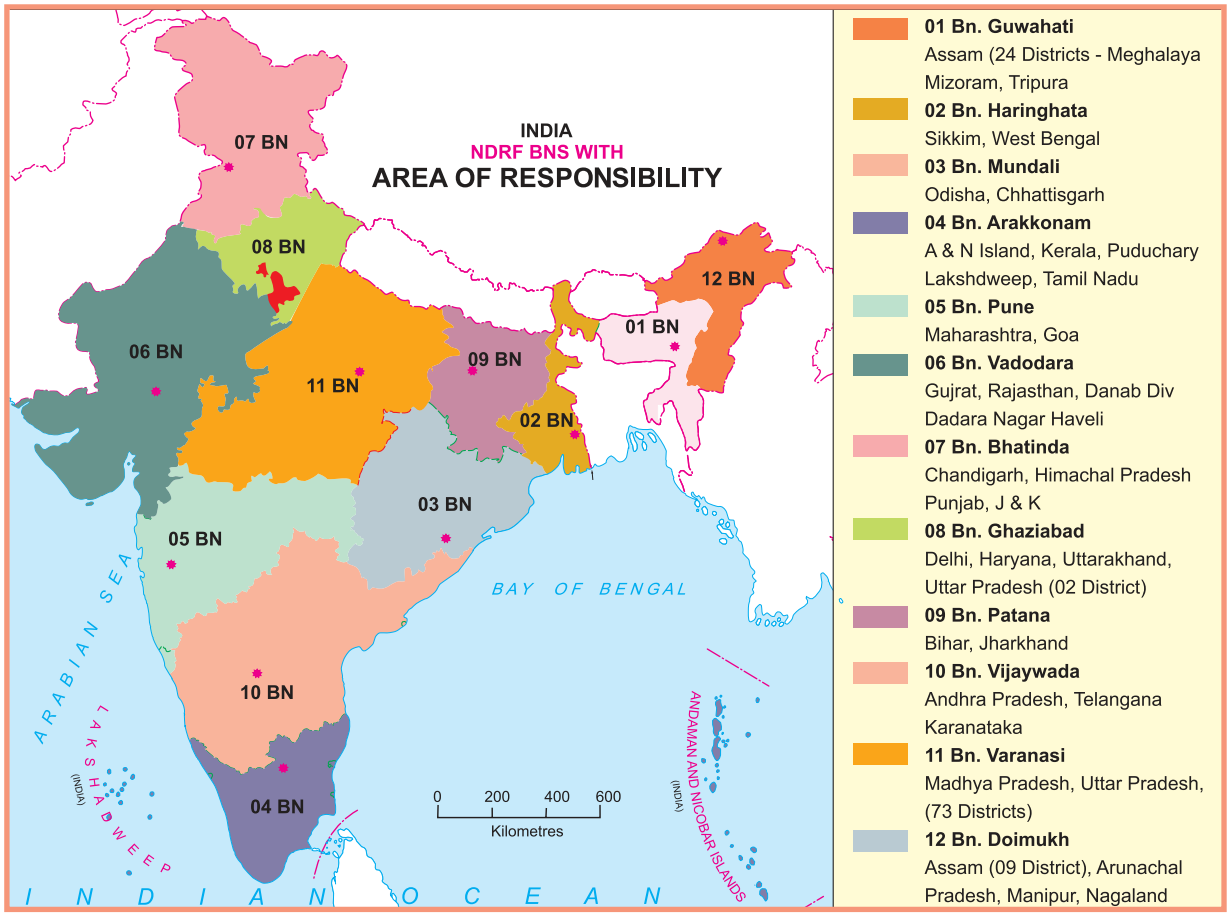
Disasters cause loss of lives and property and create socio-economic problems. They also have an adverse impact on the security of the country. Some of the examples of the past are as under:

1. **Earthquakes :** Earthquakes in Gujarat in 2001 caused damage to Air Force stations and Army areas. In Sikkim, earthquake caused landslides and disrupted road communications preventing logistic supplies and movement of troops to and from border areas.
2. **Cloud Bursts :** Cloud burst in Ladakh region, particularly in Leh, disrupted road communications and disturbed logistic supply lines of the army.
3. **Cyclones :** Cyclone in Odisha affected the Naval bases.
4. **Tsunami :** Tsunami of December 2004 caused damage to Naval bases in Visakhapattanam, Andaman and Nicobar islands. It also damaged the Air Force runways and infrastructure of the air bases in Andaman and Nicobar islands disturbing their operations for a few days.
5. **Floods :** The floods in Kedarnath region broke the land communications with the border areas in the Central Sector of the Himalayan ranges against China.
6. **Fires :** Fires have affected reserve ammunition stores & dumps of the Armed Forces.
7. **Marine Disasters :** The fire and explosion in a submarine resulted in loss of a submarine of the Indian Navy in 2013.

National Disaster Management Authority

The Ministry of Home Affairs of the Government of India is primarily responsible for coordination of relief, response and overall natural disaster management. The National Disaster Management Authority (NDMA), headed by the Prime Minister, and State Disaster Management Authorities (SDMAs) headed by respective Chief Ministers, are the organisations that look after disaster management issues in India. The National Disaster Response Force (NDRF) was created for the purpose of specialized response to natural and man-made disasters.

The NDRF consists of battalions from the Border Security Force (BSF), Central Reserve Police Force (CRPF), Central Industrial Security Force (CISF), Indo-Tibetan Border Police (ITBP) and Sashastra Seema Bal (SSB). Each battalion has specialist teams



(Ref.: www.ndrf.gov.in/ndrf)

including engineers, technicians, electricians, dog squads and medical/paramedics. All the battalions have been equipped and trained to respond to natural as well as man-made disasters. Battalions are also trained and equipped for response during chemical, biological, radiological and nuclear (CBRN) emergencies. These NDRF battalions are located at 12 different locations in the country based on the vulnerability profile of the country and to cut down the response time for their deployment at the disaster site.

Roles and Responsibilities of the Armed Forces in Disaster Management

While the NDRF is mainly responsible for disaster management, the Armed Forces under the Ministry of Defence are also called upon to intervene in times of a crisis. This activity is conducted by the Armed Forces as 'aid to civil authority'. Safeguarding the people of the Nation, the assets and interests against natural calamities or human induced crisis form part of these duties.

To facilitate performances of such duties the entire country is divided into Operational Command structure for war time and peace time crisis. Availability of resources, high standard of discipline and training and responsive organizational structure make the Armed Forces highly effective during disasters. They are relied upon as the "last resort" by the government.

The role of Armed Forces can be seen at three stages: (i) planning done during the pre-disaster stage; (ii) preparations done during the warning period and (iii) post disaster response.

1. Pre-disaster Stage

This is the stage when planning is done for a possible disaster. The following are the main activities conducted during the pre-disaster stage :

- Assessment of possible threats (hazards) and the likely vulnerabilities and risks.
- Maps are updated with the help of GIS systems.
- Communication channels between the Armed Forces and civilian counterparts are examined.
- Possible helipads, landing grounds, resource bases are decided.
- Contingency plans are prepared.

2. Warning Stage

This is the stage when there is an advance warning about a disaster. This may be a flood, cyclone, tsunami, etc. In case there is likely to be a severe disaster the civil administration warns the Armed Forces about it so that they can be prepared for action. The Armed Forces then can ensure that communication channels are kept open, and the necessary resources are kept ready.

3. Post Disaster Response

Once the disaster takes place the Armed Forces take up the following tasks :

- Search and Rescue mission of the affected population.
- Evacuation and rescue of population and those who are threatened and establishment of shelter camps.
- Offering immediate relief to the victims to include emergency medical aid, supply of rations and essential commodities.

These operations are carried out by the Army, Navy and the Air Force depending on the need. For example the Navy can deploy under water diver's and ships for search missions, the Air Force can conduct rescue missions with helicopters or drop food packets during floods and the Army can provide shelter and medical help. The Army is also used to bring peace and order in an area that is affected by militant agitations.

Thus one can summarise that the Armed Forces perform the following main tasks

1. **Command and Control :** Having a central command centre for coordination and control of rescue missions.
2. **Logistics Support :** Provide supplies like food and water and ensure that communication channels are kept open.
3. **Setting up and running of Relief Camps :** These camps are necessary for disaster affected people.
4. **Medical Aid :** Temporary hospitals are set up for urgent medical attention.
5. **Construction and Repair/Restoration of Roads and Bridges :** It is necessary to restore road and rail communication as soon as possible after any disaster, like floods or earthquakes so that relief material is transported quickly.

IAF helicopter in relief operations

Medical evacuation

Army rescue during floods

Search and Rescue

Naval Divers

Activities

1. Find out how the Armed Forces have helped the people during the following disasters, discuss in the class and write notes on them :

   i. Gujarat Earthquake (2001) - Areas affected: Bhuj, Ahmedabad, Gandhinagar, Kutch, Surat, Surendranagar district, Rajkot district, Jamnagar and Jodia

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   ii. The Indian Ocean Tsunami (2004) - Areas affected: Parts of southern India and Andaman Nicobar Islands

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iii. Uttarakhand Flash Floods (2013) - Areas affected: Gobindghat, Kedar Dome, Rudraprayag district, Uttarakhand, Himachal Pradesh, Western Nepal

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iv. Kashmir Floods (2014) - Areas affected: Srinagar, Bandipur, Rajouri etc.

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Chapter 5
Science, Technology and National Security

In your Ninth Standard Work Book on Defence Studies, you had learnt that; to protect its national interests and core values in this world, a nation requires to develop credible National Power. You also learnt about the various factors which go into constituting National Power. Among the material factors; Science, Technology and Manufacturing capability are factors which need to be developed by our nation on priority if it aspires to become a modern, developed, and prosperous Nation State.

Relationship between Science, Technology and Engineering

Technology is often developed from the basic knowledge of science combined with engineering. For example, science might study the flow of electrons in electrical conductors by using already-existing tools and knowledge. This new-found knowledge may then be used by engineers to manufacture new tools and machines such as semiconductors, computers, and other forms of advanced technology. In this sense, scientists and engineers may both be considered as technologists. Therefore the three fields i.e. Science, Technology and Engineering are often considered as one for the purposes of research and development.

Science is the systematic study of the structure and behaviour of the physical and natural world. Technology is the application of practical sciences for Industry or Commerce. Technology refers to methods, systems, and devices which are the result of scientific knowledge being used for practical purposes. A modern example is the rise of Information Technology (IT) which is the combined application of Computer Science and Electronics. Engineering is the application of mathematics, as well as scientific, economic, social, and practical knowledge. This helps to invent, innovate, design, and manufacture, materials, components, tools, machines, weapon systems etc.

Scientific, Technological and Industrial Development in India

Looking back into ancient and medieval history, India gave the world great knowledge in Astronomy, Mathematics, Textiles and in many other fields. Until the 17th century India was economically and militarily at par with the European nations. In 1780 Tipu Sultan surprised the British forces in battle by using rockets against them; the British copied these rockets and used them against Napoleon in Europe in 1812. The industrial revolution in Europe in the 18th century rapidly changed the industrial capacity of Europe and it progressed rapidly. However, due to the British rule such an industrial revolution did not take place in India.

India has taken major strides in science and technology since its independence and today it is recognized for its achievements in many fields. These include Agriculture, Textiles, Health-care and Pharmaceuticals, Information-Technology, Space Technology, Defence Technologies and Nuclear Technology.

Several initiatives have been taken in the field of Science and Technology by the Indian government to enhance the security of the Nation. Some of these initiatives were for civilian use while some had defence applications. It is necessary to understand that it

is not possible to say that certain technology is only for civilian use or for defence use. For example, satellites are used for regular mobile phone communication; they are also used by Defence Forces for their communication. Similarly, Nuclear Science is used for production of electricity; it is also used for production of nuclear weapons.

Dual-Use Technology : It is that technology which can satisfy more than one goal at any given time. Thus, expensive technologies used for military purposes can also be used to benefit civilian interests for peaceful purposes, these are termed as dual use technologies. Example : Global Positioning System - GPS

This chapter focuses on three areas of technology that are used by the Armed Forces to ensure security of India : Space Technology, Nuclear Technology and Electronics. All these are 'dual use' technologies.

Space Technology

Space technology is critical to human survival and progress. Satellites are now being used for many purposes: Meteorology, Television Broadcasting, Mobile Telephony, Navigation and Internet. Space systems are also used in multiple fields, such as Financial Management, education, Tele-Medicine, Scientific Research and Disaster Management. The use of outer space is also done for military support functions like reconnaissance, communication and navigation.

Space technology is an area of notable success, thanks to the efforts of Dr Vikram Sarabhai and many other scientists. The Indian Space Research Organisation (ISRO), has made the nation self-sufficient in building and launching rockets, spacecraft and satellites. Space Technology also provides the ability to build missiles for military purposes.

The Indian Space Research Organisation (ISRO) was set up in 1969. Its vision was to harness space technology for national development. India produced its first indigenous satellite, Aryabhata, in 1975. This was launched by a Soviet (rocket) termed as space launch vehicle. India's first successful space launching programme was accomplished in 1983. Starting with Rohini, ISRO has developed several Satellite Launch Vehicles (SLVs), Augmented Satellite Launch Vehicles, Polar Satellite Launch Vehicles and Geosynchronous Satellite Launch Vehicles. The use of the Indian Remote Sensing Satellite (IRS) for reconnaissance purposes is the first major defence application of the Indian satellite.

Dr. Vikram Ambalal Sarabhai (1919-1971) is considered as the Father of the Indian space program. The establishment of the Indian Space Research Organization (ISRO) was one of his greatest achievements.

Missile Technology

The Integrated Guided Missile Programme began in 1983. The five missile programmes included in this category are :

(i) Agni, an Intermediate Range Ballistic Missile

(ii) Trishul, a low-level quick reaction surface to air missile (SAM)

(iii) Akash, a medium to high altitude (SAM)

(iv) Prithvi, a tactical surface to surface missile (SSM)

(v) Nag, a third generation anti-tank missile.

The Integrated Guided Missile Development Program laid down the foundation of missile technology. Development of a number of different types of missiles with improved technology and capability followed. These included the **Prithvi II** and **III** Short Range Surface to Surface Ballistic Missiles, **Agni III** and **Agni IV** Surface to Surface Intermediate Range Ballistic Missiles, **Agni V** Surface to Surface Intercontinental Ballistic Missiles, the **Brahmos** Supersonic Cruise Missile, the **Nirbhay** Subsonic Cruise Missile, Submarine launched **K4** and **K15** Ballistic Missiles, the **Pradyuman** and **Prithvi** Air Defence Surface to Air Missiles and the **Astra** Air to Air Missile.

Dr. A P J Abdul Kalam (1931 – 2015) was responsible for the evolution of ISRO's launch vehicle programme. He took up the responsibility of developing Indigenous Guided Missiles at Defence Research and Development Organisation. He was the Chief Executive of Integrated Guided Missile Development Programme (IGMDP). He is popularly known as India's Missile Man. Dr. Kalam became the 11th President of India on 25th July 2002.

Classification of Missiles

A combination of factors is generally used to classify a missile, Range being one of the factors :

Tactical Missile : For example Prithvi I (150-300 kms)

Short Range Ballistic Missile : For example Agni 1. (300-1000 kms)

Medium Range Ballistic Missile : For example Agni II and K4 Sagarika. (1000-3500 kms)

Intermediate Range Ballistic missile : For example Agni III and Agni IV. (3500 - 5500 kms)

Intercontinental Ballistic Missile : For example Agni V. (more than 5500 kms)

Prithvi Missile I and II

Agni Missile

Trishul Missile

Nag Missile

Akash Missile

Brahmos Missile

Height : 22.7m
Lift-off weight : 17 t
Propulsion : All Solid
Payload mass : 40 kg
Orbit : Low Earth Orbit

SLV-3

ASLV

Height : 23.5m
Lift-off weight : 39 t
Propulsion : All Solid
Payload mass : 150 kg
Orbit : Low Earth Orbit

PSLV-XL

Height : 44m
Lift-off weight : 320 t
Propulsion : Solid & Liquid
Payload mass : 1860 kg
Orbit : 475 km Sun Synchronous Polar Orbit (1300 kg In Geosynchronous Transfer Orbit)

GSLV Mk II

Height : 49m
Lift-off weight : 414 t
Propulsion : Solid, Liquid & Cryogenic
Payload mass : 2200 kg
Orbit : Geosynchronous Transfer Orbit

GSLV Mk III

Height : 43.43 m
Lift-off weight : 640 t
Propulsion : Solid, Liquid & Cryogenic
Payload mass : 4000 kg
Orbit : Geosynchronous Transfer Orbit

Pokhran Test Site

India began its nuclear programme soon after independence. Two scientists, Meghanand Saha and Homi Bhabha played an important role in the development of India's nuclear policy. India's nuclear policy revolved around two principles: promotion of research and development for harnessing nuclear energy for peaceful purposes, and attainment of self-sufficiency in the nuclear programme.

Use of atomic energy for electricity production was considered as the most important aspect of atomic research. Nuclear energy is going to play an increasingly important role in India's energy security and sustainable development plans.

The Department of Atomic Energy (DAE), was established in 1954. Its task is the development of nuclear power technology, applications of radiation technologies in the fields of agriculture, medicine, industry, and basic research. The Department of Atomic Energy's vision is to empower India through technology, creation of more wealth and providing better quality of life to its citizens.

India carried out its first nuclear test at Pokhran in 1974. India made it clear to the world that this test was carried out for peacful purposes. The then Prime Minister Indira Gandhi clarified in the Parliment that this Nuclear Test was essential for research and development of peaceful uses of nuclear energy.

Dr. Homi Jehangir Bhabha (1909-1966) was a multifaceted personality, a scientist, visionary and institution builder. Bhabha was instrumental for the formation of Atomic Energy Commission in 1948 and the Department of Atomic Energy in 1954. He chalked out a focussed research and minerals exploration programme for nuclear energy. He was such a visionary that he had realized the importance of nuclear power programme way back in 1950s and enunciated a nuclear programme so as to meet the energy security of the nation.

Nuclear Weapon Test

In 1998 India carried out several nuclear tests again at Pokhran. India declared that it was now a nuclear weapons state. The then Prime Minister Atal Behari Vajpayee's statement after the nuclear tests gives the reasons for India's decision to become a nuclear weapons country. He said that nuclear weapons had increased in our neighbourhood. India has also been the victim of terrorism, militancy and clandestine war. At a global level, the nuclear weapons states have not taken any steps in moving towards a nuclear-weapon-free-world. Therefore for India's national security India became a nuclear weapons country. India does not intend to use these weapons for aggression or for mounting threats against any country. These are weapons of self-defence, to ensure that India is not subjected to nuclear threats or coercion. India has not given up its policy of peaceful uses of nuclear technology. It continues to support global nuclear disarmament. But it wants to develop its nuclear weapons capability so that it can defend itself.

Nuclear Non-proliferation Treaty (NPT)

The NPT is an international treaty whose objective is to prevent the spread of nuclear weapons and weapons technology, to promote cooperation in the peaceful uses of nuclear energy and to further the goal of achieving nuclear disarmament and general and complete disarmament. This treaty was signed in 1968. India did not join this treaty. The treaty prohibits those countries that do not have nuclear weapons to produce nuclear weapons. But it does not place any restrictions on those countries that have nuclear weapons. This is discriminatory. Therefore India refused to join the agreement.

Countries having nuclear weapons

According to the Stockholm International Peace Research Institute (SIPRI) the following countries have nuclear weapons: the United States, Russia, the United Kingdom, France, China, India, Pakistan, Israel and North Korea. (SIPRI information of January 2016)

Nuclear power plant

The plant converts nuclear energy into useful power. In a nuclear electric plant heat produced by a reactor is used to produce steam to drive a turbine that in turn drives an electricity generator.

Electronics

The Government of India's National Policy on Electronics (NPE) announced in 2012 seeks to promote Electronics System Design & Manufacturing (ESDM) in the country. One of the important objectives of this policy is to develop a partnership between ESDM and the core sectors of the economy like Defence, Atomic Energy and Space. It also plans to create a complete secure cyber eco-system in the country to secure Information and communication technology (ICT) infrastructure and cyber space of the country.

Electronics is an important part of India's defence preparedness. It is used in communications by satellite phones; radars; guided missiles; electronic circuits in various equipments etc. India started a program to develop indigenous supercomputers and supercomputing technologies. These supercomputers were also capable of assisting in the development of Nuclear Weapons. PARAM 800 was the first super computer developed by the Centre for Development of Advanced Computing (C-DAC). Dr. Vijay Bhatkar played an important role in its development.

Param Super Computer

The coming together of multiple technologies with the internet and the growth of social networking has added a new dimension to discussions on cyber security. The use of internet is enormous. People use the web and social networking sites every day. It is impossible to carry out surveillance of all that happens in cyberspace. The rapid advancement in technologies has led to new forms of threats which need to be understood and tackled.

Cyber security threats today have become increasingly sophisticated and complex. There can be attacks on such basic social necessities as power supplies, banking, railways, air traffic control, etc. Hackers can target government ministries, banks, utilities, other key infrastructure, and companies nationwide, demanding ransom. These acts are not a traditional law and order problem. Therefore it would be difficult to deal with them. To tackle this problem the Indian government has introduced the National Cyber Security Policy in 2013 to provide an umbrella framework for defining and guiding actions related to cyber security.

For details see :

National Cyber Security Policy-2013 (NCSP-2013)

Ministry of Electronics and Information Technology of the Indian Government

http://meity.gov.in/writereaddata/files/National_cyber_security_policy-2013_0.pdf

Promotion of Science and Technology through Education

Various scientific educational and research facilities have been established and are functioning to meet the needs of the nation. Some of these are under the control of various ministries of the government, some others are autonomous, details regarding a few which are important for students interested to become scientists and technologists are given below. Detailed information on these can be accessed on the links to various ministries in the website of the government of India at https://india.gov.in/.

Prominent Educational Institutions for Students

- The Indian Institutes of Science Education and Research (IISER)
- The Indian Institutes of Technology (IIT)

Prominent Research Organisations

- The Department of Atomic Energy (DAE).
- Indian Space Research Organisation (ISRO).
- Council of Scientific and Industrial Research (CSIR)
- Centre for Development of Advanced Computing (C-DAC)
- Indian Institute of Science (IISc).
- Tata Institute of Fundamental Research (TIFR)

Defence Oriented Research and Development Establishments

- Defence Research and Development Organisation (DRDO).

Futuristic Game Changer Technologies in the Field of Defence

- Artificial Intelligence and Robotics.
- Particle beam or laser beam weapons.
- Electromagnetic propulsion.
- Light weight Super alloys and composites having high strength and heat resistance.
- Nano Technology and Miniaturisation of systems.
- Stealth technology which can defeat detection by radars.

Activities

1. Search for information on Chandrayan and Mangalyan. Discuss these achievements in the classroom.

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2. What is GPS? What are its uses?

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3. What is the importance of nuclear energy for India? Collect information about one or two nuclear power plants in India.

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4. Collect information about cyber threats to national security. Find out the various means used to fight cyber threats.

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5 Collect pictures of missiles from newspapers and magazines and paste them below along with brief details about them :

6 Collect pictures of sattelite from newspapers and magazines and paste them below along with brief details about them :

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Chapter 6
Career Opportunities in the Armed Forces

Please note the following :

1. The information provided is to be treated as a guideline. The Balbharati or the board of authors, compilers and the publisher bear no legal or moral responsibility for the authenticity of this information.
2. Read Employment News for advertisements related to recruitment.
3. Visit concerned websites for further latest information.

Officers in Armed Forces (Entries after X + II)

(Please refer to the UPSC and Armed Services websites and Employment News for schedules and latest parameters.)

1. National Defence Academy (NDA), Pune
2. Technical Entry for the Army and the Navy
3. Armed Forces Medical College (AFMC)
4. Armed Forces Medical College entry for Nursing Stream

Officers in Armed Forces (Entries after graduation)

(Can be attempted while in the final year of gradution)

1. Through Combined Defence Services entrance examination. (Permanent Commission stream or Short Service Commission stream.)
2. Entry for Engineers in all three Services
3. Legal cadre and Education Cadre

Note : All entries (except AFMC and Nursing) have SSB interview procedure.

Entries in Non-Officer Cadre

These are announced by the Directorate of Recruitment for entry as Jawans, Airmen and Naviks. Minimum qualifications are X + II. Some craftsmen are also recruited after X std. There are also technical entries for diploma holders as direct recruitment at Non-Commissioned Officer levels (Naiks and Havildars or equivalent ranks in the Navy and the Air Force).

Websites for Recruitment in the Armed Forces

For Army :

http://www.joinindianarmy.nic.in/

For Navy :

https://www.joinindiannavy.gov.in/

For Air Force :

http://indianairforce.nic.in/

Websites for Recruitment in Indian Paramilitary Forces

1. Border Security Force (BSF)

http://bsf.nic.in/en/career.html

2. Central Industrial Security Force (CISF)

http://www.cisf.nic.in/RECRUITMENT_files/RECRUITMENT.html

3. Central Reserve Police Force (CRPF)

http://crpf.nic.in/recruitment.htm

4. Indo Tibetan Border Police (ITBP)

http://itbpolice.nic.in/itbpwebsite/index.html

5. Sashastra Seema Bal (SSB)

http://www.ssbrectt.gov.in/

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GALLANTRY AWARDS FOR ARMED FORCES

Those for gallantry other than in the face of the enemy.

Ashoka Chakra (AC)

Awarded for most conspicuous bravery, or some act of daring or pre-eminent act of valour or self-sacrifice otherwise than in the face of the enemy.

Kirti Chakra (KC)

Awarded for conspicuous gallantry otherwise than in the face of the enemy.

Shaurya Chakra (SC)

Awarded for gallantry otherwise than in the face of the enemy.

Besides acts of gallantry, there are also awards for other than gallantry actions and achievements, some of these are.

Param Vishisht Seva Medal

For distinguished service of the most exceptional order.

Ati Vishisht Seva Medal

For distinguished service of an exceptional order.

Vishisht Seva Medal

For distinguished service of a high order.

Sarvottam Yudh Seva Medal

For distinguished service of the most exceptional order during War/conflict/hostilities.

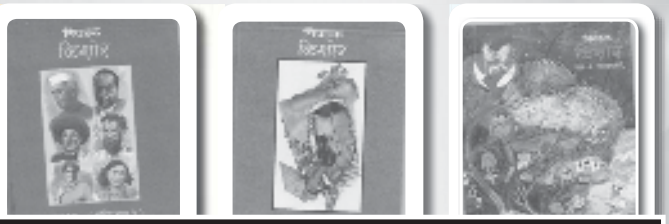
Uttam Yudh Seva Medal

For distinguished service of an exceptional order during war/ conflict/hostilities.

Yuddh Seva Medal

For distinguished service of a high order during war/conflict/ hostilities.

किशोर



कथा, कविता, कादंबरीका, एकांकिका, दीर्घकथा, गंमतगाणी, ललित, छंद, चरित्र, विज्ञान, देश-देशांतर, लोककथा

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