

*The Science of Flight: A Gateway to New Horizons*

Published by Jones and Bartlett

## **Aerospace Science 200:**

### **The Science of Flight: A Gateway to New Horizons**

*The Science of Flight: A Gateway to New Horizons* is an introductory course and customized textbook that focuses on how airplanes fly, how weather conditions affect flight, flight, flight and the human body, and flight navigation. The course is designed to complement materials taught in math, physics, and other science-related courses and is aligned with the National Science Education Standards, the Math Standards and Expectations, and ISTE National Educational Technology Standards for Students.

In this course, every lesson includes a “Quick Write” and a short story related to the lesson; a lesson; a “Learn About” that tells students what they’ll learn from the lesson; a list of vocabulary words in the lesson; “Wing Tips” that highlight specific and interesting facts; and facts; and many biographies and profiles. Each lesson closes with “Checkpoints” that will allow students to review what they have learned. An “Applying Your Learning” section at the end of each lesson presents discussion questions that will give them a chance to use what they have learned and provides another way to reinforce their understanding of the lesson’s content. The text has four chapters, each of which contains a number of lessons.

**The course outcomes are:**

1. Analyze the elements of flight.
2. Evaluate how atmospheric conditions affect flight.
3. Evaluate how flight affects the human body.
4. Analyze flight navigation and the purpose of aerial navigation aids.

#### ***The Science of Flight: A Gateway to New Horizons***

<b>Course Chapters</b>		<b>Recommended Hours</b>
Chapter One	How Airplanes Fly	18
Chapter Two	Working Through Flight Conditions	18
Chapter Three	Flight and the Human Body	18
Chapter Four	Flying From Here to There	18



## *Chapter 1: How Airplanes Fly*

### **1. Learning Outcomes**

- a. Outline the principles of flight.
- b. Determine the relationship between the four forces of flight and flight stability.
- c. Relate the parts of the airplane to their function in flight.
- d. Analyze aircraft motion and control.
- e. Compare and contrast the types of airplane engines.
- f. Identify the forces that drive the development of aerospace technology.

### **2. Chapter in Brief**

“Chapter 1: How Airplanes Fly” discusses the elements of flight. Lesson 1 describes the principles of flight, the theory of flight, airfoils, relative wind, and angle of attack. The second lesson looks at the physics of flight and flight’s four forces—lift, weight, thrust, and drag—and flight stability. Lesson 3 explores the various parts of an airplane and the functions each performs. Lesson 4 explains how an airplane moves and how the primary controls work. Lesson 5 compares the different types of aircraft engines and how they work. The last lesson covers aviation research and innovation.

## *Chapter 2: Working Through Flight Conditions*

### **1. Learning Outcomes**

- a. Analyze the atmosphere’s makeup.
- b. Analyze atmospheric components and their affect on weather.
- c. Evaluate the role of weather on air flight.
- d. Forecast stable and unstable conditions for air flight.
- e. Assess the role of meteorology in aviation.

### **2. Chapter in Brief**

“Chapter 2: Working Through Flight Conditions” explores how weather conditions affect flight. The first lesson analyzes Earth’s atmosphere, atmospheric motion, cloud types and how they form, and how the atmospheric layers impact flight. Lesson 2 looks at air masses and fronts, high and low pressure systems, and terrain factors that affect weather. The third lesson discusses how atmospheric instability, turbulence, and severe weather affect aviation. Lesson 4 covers how meteorologists forecast the weather, the instruments they use, and the various communications types used to provide pilots with weather information. Lesson 5 examines the effects of weather on aircraft—specifically ice formation, microbursts, sandstorms, and wake turbulence.

## ***Chapter 3: Flight and the Human Body***

### **1. Learning Outcomes**

- a. Relate the flight environment to the human body.
- b. Analyze the purpose and function of personal protective equipment.
- c. Analyze the four elements of navigation.

### **2. Chapter in Brief**

“Chapter 3: Flight and the Human Body” covers how flight affects the human body. Lesson 1 discusses the four zones of the flight environment, the physical laws of gases, the respiration and circulation processes, G-forces, spatial disorientation, motion sickness, and other stresses. Lesson 2 describes the protective equipment and aircrew training used by pilots and astronauts and the function and use of flight simulators.

## ***Chapter 4: Flying from Here to There***

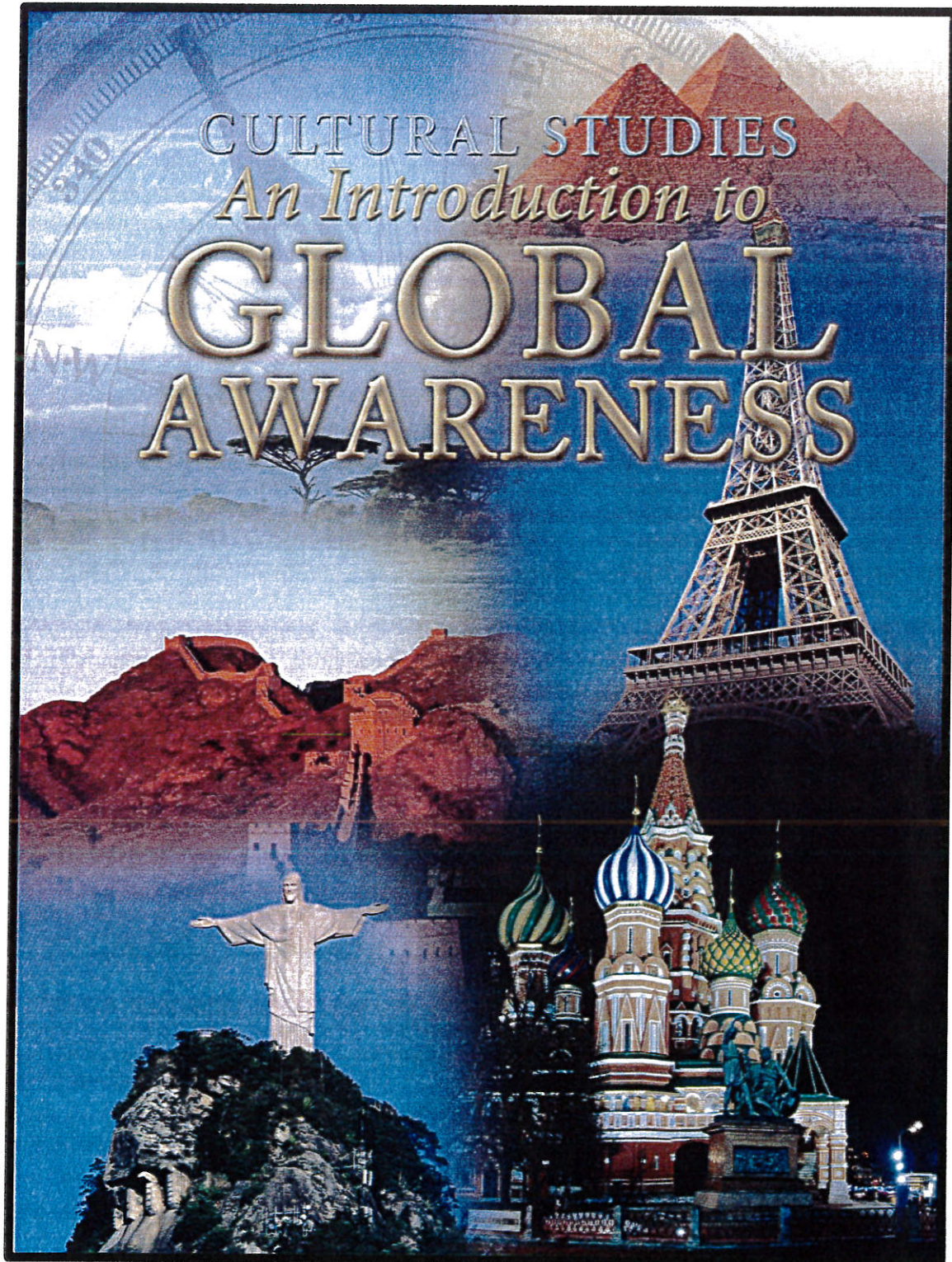
### **1. Learning Outcomes**

- a. Analyze the four elements of navigation.
- b. Assess the purpose and function of navigational aids.
- c. Relate the role of dead reckoning to navigation.
- d. Distinguish among the primary flight instruments.
- e. Analyze the developments of navigational technology.

### **2. Chapter in Brief**

“Chapter 4: Flying From Here to There” discusses flight navigation and the purpose of navigation aids. The first lesson explores the elements and history of navigation and navigation instruments, along with direction and chart projections. Lesson 2 looks at navigational aids—clocks, compasses, maps, and air navigation charts—flight planning, and procedures to perform when lost. Lesson 3 explains the principles of dead reckoning, the wind triangle, and inertial navigation systems. The fourth lesson covers the primary flight instruments a pilot uses: the airspeed indicator, altimeter, horizontal situation indicator, and altitude indicator. The final lesson describes the uses of navigation technology using the plotter, dead reckoning computer, radio aids to navigation, global positioning system, and computer flight-planning tools.





*Cultural Studies: An Introduction to Global  
Awareness*

Published by Jones and Bartlett



## **Aerospace Science 220: Cultural Studies: An Introduction to Global Awareness**

This is a customized course about the world's cultures. The course is specifically created for the US Army, Marine Corps, Navy, and Air Force Junior ROTC programs. It introduces students to the world's cultures through the study of world affairs, regional studies, and cultural awareness. The course delves into history, geography, religions, languages, culture, political systems, economics, social issues, environmental concerns, and human rights. It looks at major events and significant figures that have shaped each region. Throughout the course, there are readings, video segments, hands-on activities, other optional activities, technology enrichment, and assessments to guide in the reinforcement of the materials.

Twenty First Century Skills as defined by the Partnership for 21<sup>st</sup> Century Skills are integrated into the course. These include learning and innovation (thinking) skills—critical thinking and problem solving, creativity and innovation, and communication and collaboration; information, media and technology skills—information literacy, media literacy, and ICT (information, communications and technology) literacy; and life and career skills—flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility. Again, the content of this course is correlated using the National Geography and Social Studies Standards. These include the National Geography Standards - *Geography for Life*; and the *National Council for the Social Studies* (NCSS) standards. In addition, the technology enrichment activities are correlated to the *National Education Technology Standards for Students* (NETS•S).

### **The course objectives are:**

1. Know how historical, geographic, religious, and ethnic factors have shaped the six major regions of the world.
2. Know how economic, political, and social factors impact cultures.
3. Know how environmental resources influence global economic development.
4. Know how population density, famine, war, and immigration influence the world.
5. Know how the economic systems of communism and capitalism have shaped the six major regions of the world.
6. Comprehend how cultural perspectives of time, space, context, authority, interpersonal relationships, and orientation to community affect interactions among people.

## *Cultural Studies: An Introduction to Global Awareness*

<b>Course Chapters</b>		<b>Recommended Hours</b>
Chapter One	The Middle East	12
Chapter Two	Asia	12
Chapter Three	Africa	12
Chapter Four	Russia and the Former Soviet Republics	12
Chapter Five	Latin America	12
Chapter Six	Europe	12

### **Introduction: What is Global Awareness?**

The focus of the introduction is to explain the concept of global awareness and the importance of being aware of global trends. We are living in a global village. Technological advancements, especially in computer hardware and software and fiber optics, have reduced the time it requires to communicate across the world. This has resulted in a global economy in which China, India, Pakistan, and other developing nations are now having a major cultural and economic impact on the world. It is essential that we adapt ourselves to the rapid changes in the global economy in order to sustain the social and economic stability in the United States.

#### **Objectives**

- a. Comprehend how global cultures and interactions impact relationships between different cultural groups.
- b. Know the significance of global economics, trade, and markets.
- c. Know how the effects of global growth raises environmental concerns over natural resources.
- d. Comprehend how ethics, religion, poverty, wealth, and views of human rights influence people.
- e. Know how changes in technology and education influence the competition for jobs.

## ***Chapter 1: The Middle East***

### **1. Chapter Objectives**

- a. Know why the Middle East is viewed as a cradle of western civilization.
- b. Know the characteristics of Judaism, Christianity, and Islam.
- c. Know about changes in the Middle East during the 20<sup>th</sup> Century.
- d. Know the different groups of people who live in the Middle East.
- e. Know what historical events contributed to the founding of modern Israel.
- f. Know about the historical events associated with the Six-Day War of 1967.
- g. Comprehend how the Yom Kippur War of 1973 affected Arab-Israeli relations.
- h. Know the various attempts at lasting peace in the Middle East.
- i. Know the historical situation of Iraq under the rule of Saddam Hussein.
- j. Know the historical events associated with the 1991 Persian Gulf War.
- k. Know the events surrounding the 2003 US invasion of Iraq.
- l. Know the US attempts to stabilize Iraq since the 2003 invasion.
- m. Know the general impact of terrorism in the world.
- n. Know how radical Islamist beliefs contribute to terrorism.
- o. Know the events associated with the 9/11 attacks and the Global War on Terror.
- p. Know the importance of the production and distribution of oil and energy.
- q. Comprehend how the clash of Middle Eastern and Western cultures affects relationships between people from Middle Eastern and people from Western cultures.
- r. Know the importance of nuclear nonproliferation and the Iranian Issue for the United States.
- s. Know the importance of the water problem in the Middle East.

### **2. Chapter In Brief**

“Chapter 1: The Middle East” reviews the region from its earliest days as the cradle of Western civilization and the birthplace of Judaism, Christianity, and Islam. It then looks at the more recent challenges of war and terrorism. It considers changes the Middle East underwent in the twentieth century and the spread of nuclear weapons there in the twenty-first. Any discussion of this region must include its most sought after natural resource: oil.



## *Chapter 2: Asia*

### **1. Chapter Objectives**

- a. Know the geographic locations of Japan, Korea, China, India, Pakistan, and Afghanistan.
- b. Know the major religions of Asia.
- c. Know the main ethnic groups of Asia.
- d. Know the history of the unitary government and the rule of warlords in China.
- e. Know what caused the shift from isolation to openness in Japan.
- f. Know the impact of domination and division on Korea.
- g. Know the political and economic impact of World War II on China and Japan.
- h. Know that Japan, South Korea, and China have become economic powerhouses.
- i. Know the pre-colonial history of the Mughals in the Indian sub-continent.
- j. Know the encounter with Europe and the colonial period in the region.
- k. Know the history of the struggle for independence in South Asia.
- l. Know what caused the partition and war between India and Pakistan.
- m. Know how Muslim-Hindu strife affects the politics and economics of South Asia.
- n. Know which groups have struggled for control in Afghanistan and why.
- o. Know the impacts of industrialization and pollution in China and India.
- p. Know the interactions between the rich, urban, and the poor rural areas in Asia.
- q. Know the role of women in India, Pakistan, and Afghanistan.
- r. Know China's one-child policy.
- s. Comprehend the challenges of human trafficking and sex tourism in Asia.
- t. Comprehend the dilemma that North Korea creates for the US.
- u. Know the important issues of nuclear nonproliferation in India and Pakistan.
- v. Comprehend the impacts of global wages, labor, outsourcing, and offshoring in the US.
- w. Know why Asia represents a new target market for US corporations.
- x. Know the effects of Asian imports on the US market and economy.
- y. Comprehend the human rights issues in various Asian nations.

### **2. Chapter In Brief**

“Chapter 2: Asia” begins with a general overview of Eastern religions and the region’s peoples. Students will study Japan, Korea, and China in East Asia, as well as India, Pakistan, and Afghanistan in South Asia. The chapter looks at what unites and what divides these countries. The chapter also tackles Asia’s environmental and social challenges and researches the region’s impact on US security and its economy.

## ***Chapter 3: Africa***

### **1. Chapter Objectives**

- a. Know the five major regions of Africa.
- b. Know the natural resources of Africa.
- c. Know the distinctive characteristics of African culture.
- d. Know the main ethno-linguistic groups in Africa.
- e. Know the main language groups in Africa.
- f. Comprehend how Islam, Christianity, and indigenous religions influence Africa.
- g. Know the pre-colonial period of African history.
- h. Know the colonial period of African history.
- i. Know the history and impacts of African independence.
- j. Comprehend how ethnic and sectarian politics undermined democracy in Africa.
- k. Comprehend the tensions between Arabs and Africans in Sudan.
- l. Comprehend the tensions between Hutus and Tutsis in Rwanda.
- m. Comprehend the tensions between Afrikaners, English, and Africans in Zimbabwe and South Africa.
- n. Know the civil wars of Liberia, Sierra Leone, and the Congo.
- o. Know the main health challenges in Africa.
- p. Know the extent and impact of AIDS in Africa.
- q. Know the recurring problems with famine in Africa.
- r. Know the main environmental issues facing Africa.
- s. Know the human rights issues in Africa.
- t. Know the challenges of resources and commerce in the regions of Africa.
- u. Know the immigration trends associated with Africa.
- v. Comprehend the challenges associated with pirating and lawlessness in Somalia.
- w. Comprehend the US and European development efforts in Africa.

### **2. Chapter In Brief**

“Chapter 3: Africa” covers a continent subject to outside influences, from Arab merchants and Islam to European traders and Christianity. Ethnic clashes have long marred the region. Pirates patrol some areas and hinder trade. AIDS, malaria, and other diseases kill thousands each year. Yet Africa is rich with natural resources, such as oil and diamonds, and US and European development agencies are working hard to help. This chapter looks at the area’s potential and what’s being done to encourage it.



## ***Chapter 4: Russia and the Former Soviet Republics***

### **1. Chapter Objectives**

- a. Know the geographic locations of Russia and the countries of the former Soviet Republics.
- b. Know the major religious groups of Russia and the former Soviet Republics.
- c. Know the historical context of Russia from the Kievan Rus through the time of Peter the Great.
- d. Know how events from the Nineteenth Century and World War I contributed to the October Revolution.
- e. Know the economic and political impacts of World War II and the Cold War on Russia.
- f. Know the effects of the fall of communism.
- g. Know the characteristics of communism as an economic system.
- h. Know the economic and political influence of Marx, Lenin, and Stalin on communism in Russia.
- i. Know how the Soviet economic system worked and eventually failed.
- j. Know the importance of the export of resources for the restructured Russian economic system.
- k. Know the political and economic influence of Russia on the Ukraine, Belarus, and Moldova.
- l. Know the political and economic influence of Russia on the Baltic States.
- m. Know the political and economic influence of Russia on Armenia, Georgia, and Azerbaijan.
- n. Know the political and economic influence of Russia on Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, and Turkmenistan.
- o. Comprehend the historic relationship between Russia and the United Nations.
- p. Comprehend the historic relationships between Russia and neighboring European nations.
- q. Comprehend the historic relationship between Russia and the three major Asian nations China, Japan, and Korea.
- r. Comprehend the historic relationships between Russia and the United States.
- s. Know the impact of the restructured Russian economic system on worldwide democracy.
- t. Know the Russia-US challenges of nuclear threats, nonproliferation, and missile defense.
- u. Know the impacts on the United States caused by Russian oil production and distribution.
- v. Know the importance of the cooperation in space between Russia and the United States.

### **2. Chapter In Brief**

“Chapter 4: Russia and the Former Soviet Republics” tracks the Cold War struggle between communism and capitalism. Students will study how the Soviet Union’s economy operated and why it failed. In addition, the chapter deals with Russia’s relationships with Asia, Europe, America, and the United Nations. It also looks ahead to such things as the challenges to US-Russian relations.

## ***Chapter 5: Latin America***

### **1. Chapter Objectives**

- a. Know the geographic locations of the five major regions of Latin America.
- b. Know the major religious groups and languages of Latin America.
- c. Know the history before the Spanish conquest and the consequences of the Spanish conquest of Latin America.
- d. Know some key historical events associated with Latin America since independence.
- e. Know the challenges of the region's economic systems.
- f. Know the challenges related to the political struggle for power.
- g. Comprehend how weak governments, corruption, and crime affect economic development.
- h. Know about the struggle for power between church and state.
- i. Know how free trade agreements have affected the region.
- j. Know the key factors that drive and sustain the drug trade.
- k. Know how the drug trade undermines local governments and damages economies.
- l. Know how the US and local governments have tried to cut off the drug trade.
- m. Know how reliance on commodities versus manufactured goods impacts poverty.
- n. Comprehend the impact of racial and socioeconomic divisions in Latin America.
- o. Know how poor education, urban overcrowding, and high population growth contribute to poverty.
- p. Know the challenges of environmental pollution and deforestation.
- q. Know the history of US relations with Cuba.
- r. Know the history of US relations with Haiti.
- s. Know the challenges of migration from Latin America to the United States.
- t. Know the effects on the US of the political and economic challenges in Latin America.

### **2. Chapter In Brief**

“Chapter 5: Latin America” reviews the region’s history before and after European conquest. It considers the tug-of-war between church and state, the effects of wide social and economic divisions, and struggles with weak governments and corruption. The chapter also examines the effects of poverty and population growth on the region and its flow of migrants northward.



## ***Chapter 6: Europe***

### **1. Chapter Objectives**

- a. Know the geographic locations of the major nations of Europe on a map.
- b. Know how Ancient Greece and the Roman Empire influenced Europe's development.
- c. Know how Christianity, Islam, and Judaism affected the development of Europe.
- d. Know how nationalism destroyed the continental European empires.
- e. Know how Marxism, socialism, and fascism affected the development of Europe.
- f. Know the origins of the European Union.
- g. Know which countries are members of the European Union.
- h. Know the political and economic structure of the European Union.
- i. Know the importance of the Euro as a world currency.
- j. Know why European countries have permitted immigration
- k. Know why immigrants have had difficulty assimilating into European societies.
- l. Know the difficulties Al Qaeda and its allies have posed for Europe.
- m. Know the background of ethnic and religious strife in Northern Ireland.
- n. Know how Yugoslavia was created after World War I.
- o. Know how World War II affected Yugoslavia.
- p. Know the role of Josip Broz Tito in uniting Yugoslavia after World War II.
- q. Know how Yugoslavia dissolved into seven independent countries.
- r. Know the history of ethnic cleansing in the Balkans.
- s. Know why the United States intervened in the two world wars and fought the Cold War.
- t. Know the historic purpose and current activities of North Atlantic Treaty Organization (NATO).
- u. Comprehend the importance to the US economy of trade with Europe.
- v. Comprehend the development of human rights and democracy in Eastern Europe following the Soviet Union's collapse.

### **2. Chapter In Brief**

“Chapter 6: Europe” explains how the ancient Greeks and Romans molded Europe's character. It shows how their influence eventually extended to the founding principles of the United States. The chapter also delves into Europe's colonial ambitions, the effects of new nationalism on old empires, and the effects of fascism and communism. The chapter looks in depth at the collapse of Yugoslavia into seven independent countries, and the violence involved. And students will explore the European Union's history, including its expansion to include countries trying to leave Russia's sphere of influence.

