

**Trinity Area School District  
Template for Curriculum Mapping, 2017-2018**

<b>Course: Honors Oracle II</b> <b>Grade: 10 - 12</b>	<b>Overview of Course:</b> <b>This course engages students to analyze complex business scenarios and create a data model—a conceptual representation of an organization’s information. This course culminates with a project that challenges students to design, implement, and demonstrate a database solution for a business or organization.</b>		
<b>Overarching Big Ideas, Enduring Understandings, and Essential Questions</b>			
<b>Big Idea</b>	<b>Standard(s) Addressed</b> Standards Used: CSTA K - 12 Computer Science Standards <a href="http://csta.acm.org/Curriculum/sub/K12Standards.html">http://csta.acm.org/Curriculum/sub/K12Standards.html</a>	<b>Enduring Understanding(s)</b>	<b>Essential Question(s)</b>
SQL – Structured Query Language: Retrieving and manipulating data from a database	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b></p> <p>4. Compare techniques for analyzing massive data collections.</p> <p>6. Analyze the representation and trade-offs among various forms of digital information.</p> <p>7. Describe how various types of data are stored in a computer system.</p> <p><b>5.3.A Computer Science in the Modern World - Collaboration</b></p> <p>1. Work in a team to design and develop a software artifact.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p>6. Select appropriate file formats for various types and uses of data.</p> <p>8. Explain the program execution process.</p> <p>9. Explain the principles of security by examining encryption, cryptography, and authentication techniques.</p> <p>11. Describe techniques for locating and collecting small and large-scale data sets.</p> <p>12. Describe how mathematical and statistical functions, sets, and logic are used in computation.</p> <p><b>5.3.A Computer Science in the Modern World - Computers and Communications Devices</b></p> <p>5. Explain the multiple levels of hardware and software that support program execution (e.g., compilers, interpreters, operating systems, networks).</p>	<p>The purpose of a database is to be able to retrieve data that will become information.</p> <p>Proper design of a database insures that the data is found in only one place, and in the right place. SQL is the international standard database language for accessing data.</p>	<p>What is SQL?</p> <p>Why is SQL important to a database?</p>

**5.3.A Computer Science in the Modern World - Community, Global, and Ethical Impacts**

2. Discuss the impact of computing technology on business and commerce (e.g., automated tracking of goods, automated financial transactions, e-commerce, cloud computing).
10. Describe security and privacy issues that relate to computer networks.

**5.3.B Computer Science Concepts and Practices - Computational Thinking**

3. Critically examine classical algorithms and implement an original algorithm.
4. Evaluate algorithms by their efficiency, correctness, and clarity.
5. Use data analysis to enhance understanding of complex natural and human systems.
9. Analyze data and identify patterns through modeling and simulation.

**5.3.B Computer Science Concepts and Practices - Collaboration**

1. Use project collaboration tools, version control systems, and Integrated Development Environments (IDEs) while working on a collaborative software project.
2. Demonstrate the software life cycle process by participating on a software project team.
3. Evaluate programs written by others for readability and usability.

**5.3.B Computer Science Concepts and Practices - Computing Practice and Programming**

4. Explore principles of system design in scaling, efficiency, and security.
5. Deploy principles of security by implementing encryption and authentication strategies.
6. Anticipate future careers and the technologies that will exist.
7. Use data analysis to enhance understanding of complex natural and human systems.
8. Deploy various data collection techniques for different types of problems.

**5.3.B Computer Science Concepts and Practices - Computers and Communications Devices**

1. Discuss the impact of modifications on the functionality of application programs.
3. Identify and select the most appropriate file format based on trade-offs (e.g., accuracy, speed, ease of manipulation).

**5.3.B Computer Science Concepts and Practices - Community, Global, and Ethical Impacts**

3. Summarize how financial markets, transactions, and predictions have been transformed by automation.
4. Summarize how computation has revolutionized the way people build real and virtual organizations and infrastructures.
6. Analyze the impact of government regulation on privacy and security.
7. Differentiate among open source, freeware, and proprietary software licenses and their applicability to different types of software.

	<p><b>5.3.C Topics in Computer Science</b></p> <p><b>5.3.C.1 AP Computer Science A</b></p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>		
DDL – Data Definition Language: Creating database tables	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b></p> <p>4. Compare techniques for analyzing massive data collections.</p> <p>6. Analyze the representation and trade-offs among various forms of digital information.</p> <p>7. Describe how various types of data are stored in a computer system.</p> <p><b>5.3.A Computer Science in the Modern World - Collaboration</b></p> <p>1. Work in a team to design and develop a software artifact.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p>6. Select appropriate file formats for various types and uses of data.</p> <p>8. Explain the program execution process.</p> <p>9. Explain the principles of security by examining encryption, cryptography, and authentication techniques.</p> <p>11. Describe techniques for locating and collecting small and large-scale data sets.</p> <p>12. Describe how mathematical and statistical functions, sets, and logic are used in computation.</p> <p><b>5.3.A Computer Science in the Modern World - Computers and Communications Devices</b></p> <p>5. Explain the multiple levels of hardware and software that support program execution (e.g., compilers, interpreters, operating systems, networks).</p> <p><b>5.3.A Computer Science in the Modern World - Community, Global, and Ethical Impacts</b></p> <p>2. Discuss the impact of computing technology on business and commerce (e.g., automated tracking of goods, automated financial transactions, e-commerce, cloud computing).</p>	DDL is a subset of SQL that works on objects, tables, rows and columns to create and modify database objects.	<p>How do you create a table in a database?</p> <p>What other objects are part of DDL?</p>

10. Describe security and privacy issues that relate to computer networks.

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- 1. Discuss the impact of modifications on the functionality of application programs.
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**5.3.B Computer Science Concepts and Practices - Community, Global, and Ethical Impacts**

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**5.3.C Topics in Computer Science**

	<p><b>5.3.C.1 AP Computer Science A</b></p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>		
<p>DML – Data Manipulation Language: Adding data to a database and Modifying data in a database</p>	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b> 4. Compare techniques for analyzing massive data collections. 6. Analyze the representation and trade-offs among various forms of digital information. 7. Describe how various types of data are stored in a computer system.</p> <p><b>5.3.A Computer Science in the Modern World - Collaboration</b> 1. Work in a team to design and develop a software artifact.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b> 3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing). 4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models). 5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions. 6. Select appropriate file formats for various types and uses of data. 8. Explain the program execution process. 9. Explain the principles of security by examining encryption, cryptography, and authentication techniques. 11. Describe techniques for locating and collecting small and large-scale data sets. 12. Describe how mathematical and statistical functions, sets, and logic are used in computation.</p> <p><b>5.3.A Computer Science in the Modern World - Computers and Communications Devices</b> 5. Explain the multiple levels of hardware and software that support program execution (e.g., compilers, interpreters, operating systems, networks). <b>5.3.A Computer Science in the Modern World - Community, Global, and Ethical Impacts</b> 2. Discuss the impact of computing technology on business and commerce (e.g., automated tracking of goods, automated financial transactions, e-commerce, cloud computing). 10. Describe security and privacy issues that relate to computer networks.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b></p>	<p>DML is a subset of SQL that makes changes to data in the database.</p> <p>These changes include adding data, changing data, deleting data, and merging data from multiple sources.</p>	<p>How are changes made to a database?</p> <p>What rules are important when making these changes?</p>

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**5.3.B Computer Science Concepts and Practices - Collaboration**

- 1. Use project collaboration tools, version control systems, and Integrated Development Environments (IDEs) while working on a collaborative software project.
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**5.3.B Computer Science Concepts and Practices - Computers and Communications Devices**

- 1. Discuss the impact of modifications on the functionality of application programs.
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**5.3.B Computer Science Concepts and Practices - Community, Global, and Ethical Impacts**

- 3. Summarize how financial markets, transactions, and predictions have been transformed by automation.
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**5.3.C Topics in Computer Science**

**5.3.C.1 AP Computer Science A**

**5.3.C.2 Projects-Based Courses**

	<p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>		
Database Integrity – Database Constraints	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b></p> <p>4. Compare techniques for analyzing massive data collections.</p> <p>6. Analyze the representation and trade-offs among various forms of digital information.</p> <p>7. Describe how various types of data are stored in a computer system.</p> <p><b>5.3.A Computer Science in the Modern World - Collaboration</b></p> <p>1. Work in a team to design and develop a software artifact.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p>6. Select appropriate file formats for various types and uses of data.</p> <p>8. Explain the program execution process.</p> <p>9. Explain the principles of security by examining encryption, cryptography, and authentication techniques.</p> <p>11. Describe techniques for locating and collecting small and large-scale data sets.</p> <p>12. Describe how mathematical and statistical functions, sets, and logic are used in computation.</p> <p><b>5.3.A Computer Science in the Modern World - Computers and Communications Devices</b></p> <p>5. Explain the multiple levels of hardware and software that support program execution (e.g., compilers, interpreters, operating systems, networks).</p> <p><b>5.3.A Computer Science in the Modern World - Community, Global, and Ethical Impacts</b></p> <p>2. Discuss the impact of computing technology on business and commerce (e.g., automated tracking of goods, automated financial transactions, e-commerce, cloud computing).</p> <p>10. Describe security and privacy issues that relate to computer networks.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b></p> <p>3. Critically examine classical algorithms and implement an original algorithm.</p> <p>4. Evaluate algorithms by their efficiency, correctness, and clarity.</p> <p>5. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>9. Analyze data and identify patterns through modeling and simulation.</p>	<p>Database constraints are database rules that are a part of SQL.</p> <p>Database constraints insure that the data is secure and reliable.</p>	<p>What is the purpose of a database constraint?</p> <p>What are the five types of constraints?</p> <p>What is the purpose of each?</p>

	<p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b></p> <ol style="list-style-type: none"> <li>1. Use project collaboration tools, version control systems, and Integrated Development Environments (IDEs) while working on a collaborative software project.</li> <li>2. Demonstrate the software life cycle process by participating on a software project team.</li> <li>3. Evaluate programs written by others for readability and usability.</li> </ol> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b></p> <ol style="list-style-type: none"> <li>4. Explore principles of system design in scaling, efficiency, and security.</li> <li>5. Deploy principles of security by implementing encryption and authentication strategies.</li> <li>6. Anticipate future careers and the technologies that will exist.</li> <li>7. Use data analysis to enhance understanding of complex natural and human systems.</li> <li>8. Deploy various data collection techniques for different types of problems.</li> </ol> <p><b>5.3.B Computer Science Concepts and Practices - Computers and Communications Devices</b></p> <ol style="list-style-type: none"> <li>1. Discuss the impact of modifications on the functionality of application programs.</li> <li>3. Identify and select the most appropriate file format based on trade-offs (e.g., accuracy, speed, ease of manipulation).</li> </ol> <p><b>5.3.B Computer Science Concepts and Practices - Community, Global, and Ethical Impacts</b></p> <ol style="list-style-type: none"> <li>3. Summarize how financial markets, transactions, and predictions have been transformed by automation.</li> <li>4. Summarize how computation has revolutionized the way people build real and virtual organizations and infrastructures.</li> <li>6. Analyze the impact of government regulation on privacy and security.</li> <li>7. Differentiate among open source, freeware, and proprietary software licenses and their applicability to different types of software.</li> </ol> <p><b>5.3.C Topics in Computer Science</b></p> <p><b>5.3.C.1 AP Computer Science A</b></p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>		
DCL –	<b>5.3.A Computer Science in the Modern World - Computational Thinking</b>	DCL is a subset of	Why is it

<p>Database Control Language: Granting and Revoking database privileges</p>	<p>4. Compare techniques for analyzing massive data collections. 6. Analyze the representation and trade-offs among various forms of digital information. 7. Describe how various types of data are stored in a computer system.</p> <p><b>5.3.A Computer Science in the Modern World - Collaboration</b> 1. Work in a team to design and develop a software artifact.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b> 3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing). 4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models). 5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions. 6. Select appropriate file formats for various types and uses of data. 8. Explain the program execution process. 9. Explain the principles of security by examining encryption, cryptography, and authentication techniques. 11. Describe techniques for locating and collecting small and large-scale data sets. 12. Describe how mathematical and statistical functions, sets, and logic are used in computation.</p> <p><b>5.3.A Computer Science in the Modern World - Computers and Communications Devices</b> 5. Explain the multiple levels of hardware and software that support program execution (e.g., compilers, interpreters, operating systems, networks). <b>5.3.A Computer Science in the Modern World - Community, Global, and Ethical Impacts</b> 2. Discuss the impact of computing technology on business and commerce (e.g., automated tracking of goods, automated financial transactions, e-commerce, cloud computing). 10. Describe security and privacy issues that relate to computer networks.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b> 3. Critically examine classical algorithms and implement an original algorithm. 4. Evaluate algorithms by their efficiency, correctness, and clarity. 5. Use data analysis to enhance understanding of complex natural and human systems. 9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b> 1. Use project collaboration tools, version control systems, and Integrated Development Environments (IDEs) while working on a collaborative software project.</p>	<p>SQL that will allow a database administrator to grant access to the database or parts of the database.</p>	<p>important to restrict access to databases?</p> <p>What kind of data needs to be protected, and why?</p>
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	<p>2. Demonstrate the software life cycle process by participating on a software project team. 3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b></p> <p>4. Explore principles of system design in scaling, efficiency, and security. 5. Deploy principles of security by implementing encryption and authentication strategies. 6. Anticipate future careers and the technologies that will exist. 7. Use data analysis to enhance understanding of complex natural and human systems. 8. Deploy various data collection techniques for different types of problems.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computers and Communications Devices</b></p> <p>1. Discuss the impact of modifications on the functionality of application programs. 3. Identify and select the most appropriate file format based on trade-offs (e.g., accuracy, speed, ease of manipulation).</p> <p><b>5.3.B Computer Science Concepts and Practices - Community, Global, and Ethical Impacts</b></p> <p>3. Summarize how financial markets, transactions, and predictions have been transformed by automation. 4. Summarize how computation has revolutionized the way people build real and virtual organizations and infrastructures. 6. Analyze the impact of government regulation on privacy and security. 7. Differentiate among open source, freeware, and proprietary software licenses and their applicability to different types of software.</p> <p><b>5.3.C Topics in Computer Science</b></p> <p><b>5.3.C.1 AP Computer Science A</b></p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>		
TCL – Transaction Control Language: Control the	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b></p> <p>4. Compare techniques for analyzing massive data collections. 6. Analyze the representation and trade-offs among various forms of digital information. 7. Describe how various types of data are stored in a computer system.</p>	TCL is a subset of SQL that will allow changes to the database to be reversed, or to be	Why is it important to be able to reverse a change (undo)

<p>flow of database transactions</p>	<p><b>5.3.A Computer Science in the Modern World - Collaboration</b>  1. Work in a team to design and develop a software artifact.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b>  3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).  4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).  5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.  6. Select appropriate file formats for various types and uses of data.  8. Explain the program execution process.  9. Explain the principles of security by examining encryption, cryptography, and authentication techniques.  11. Describe techniques for locating and collecting small and large-scale data sets.  12. Describe how mathematical and statistical functions, sets, and logic are used in computation.</p> <p><b>5.3.A Computer Science in the Modern World - Computers and Communications Devices</b>  5. Explain the multiple levels of hardware and software that support program execution (e.g., compilers, interpreters, operating systems, networks).</p> <p><b>5.3.A Computer Science in the Modern World - Community, Global, and Ethical Impacts</b>  2. Discuss the impact of computing technology on business and commerce (e.g., automated tracking of goods, automated financial transactions, e-commerce, cloud computing).  10. Describe security and privacy issues that relate to computer networks.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b>  3. Critically examine classical algorithms and implement an original algorithm.  4. Evaluate algorithms by their efficiency, correctness, and clarity.  5. Use data analysis to enhance understanding of complex natural and human systems.  9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b>  1. Use project collaboration tools, version control systems, and Integrated Development Environments (IDEs) while working on a collaborative software project.  2. Demonstrate the software life cycle process by participating on a software project team.  3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b></p>	<p>committed permanently.</p>	<p>to a database?</p> <p>Why are some transactions committed automatically?</p>
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**5.3.C Topics in Computer Science**

**5.3.C.1 AP Computer Science A**

**5.3.C.2 Projects-Based Courses**

**5.3.C.3 Courses Leading to Industry Certification**

**Big Ideas, Enduring Understandings, and Essential Questions Per Unit of Study**

Month of Instruction	Title of Unit	Big Idea(s)	Standard(s) Addressed	Enduring Understanding(s)	Essential Question(s)	Common Assessment(s) *	Common Resource (s)* Used
August	Introduction to SQL	<p>Introduction to Oracle Application Express</p> <p>SQL Introduction: Querying the Database</p> <p>Basic Table Modifications</p> <p>System Development Life Cycle</p>	<p><b>Standards Used:</b> CSTA K - 12 Computer Science Standards <a href="http://csta.acm.org/Curriculum/sub/K12Standards.html">http://csta.acm.org/Curriculum/sub/K12Standards.html</a></p> <p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b> 4. Compare techniques for analyzing massive data collections.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b> 3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing). 5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions. 8. Explain the program execution process. 11. Describe techniques for locating and collecting small and large-scale data sets.</p> <p><b>5.3.A Computer Science in the Modern World - Computers and Communications Devices</b> 5. Explain the multiple levels of hardware and software that support program execution (e.g., compilers, interpreters, operating systems, networks).</p> <p><b>5.3.A Computer Science in the Modern World - Community, Global, and Ethical</b></p>	<ul style="list-style-type: none"> <li>• Demonstrate successful access to the Oracle Application Express practice environment.</li> <li>• Create a table using a script in Oracle Application Express</li> <li>• Enter sample data into the table created and execute a defined query on the table to validate successful data insertion.</li> <li>• Application of the rules of SQL will display all columns and a subset of columns specified by criteria.</li> <li>• Add new data with a different value in the "type" column.</li> <li>• Refine the SQL query to display only those rows that have data with the new type.</li> </ul>	<p>What are the basic steps used to create a table using a script in Oracle Application Express?</p> <p>What are the rules of SQL? (Structured Query Language)</p> <p>How do you add a new column to a table?</p> <p>What commands are used to correct mistakes or make revisions to a table?</p> <p>What are the different stages of the system-development life cycle?</p>	<p>Exercises Quizzes Midterm Final Exam</p> <p><b>Vocabulary</b> - SQL (Structured Query Language) - Oracle Application Express - system-development life cycle (SDLC)</p>	<p><a href="http://learning.oracle.com">http://learning.Oracle.com</a></p> <p><a href="http://iacademy.oracle.com">http://iacademy.oracle.com</a></p>

		<p><b>Impacts</b> 2. Discuss the impact of computing technology on business and commerce (e.g., automated tracking of goods, automated financial transactions, e-commerce, cloud computing).</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b> 3. Critically examine classical algorithms and implement an original algorithm. 4. Evaluate algorithms by their efficiency, correctness, and clarity. 5. Use data analysis to enhance understanding of complex natural and human systems. 9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b> 3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b> 6. Anticipate future careers and the technologies that will exist. 7. Use data analysis to enhance understanding of complex natural and human systems. 8. Deploy various data collection techniques for different types of problems.</p> <p><b>5.3.B Computer Science Concepts and Practices - Community, Global, and Ethical Impacts</b> 3. Summarize how financial markets,</p>	<ul style="list-style-type: none"> <li>Utilization of the DELETE and ALTER TABLE commands will be used to correct mistakes or make revisions.</li> <li>List and describe the different stages of the system-development life cycle to identify the role of data modeling in the life cycle.</li> <li>Relate the project tasks to the different stages of the system-development life cycle.</li> </ul>	<p>What is the role of data modeling in the system-development life cycle?</p>		
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			<p>transactions, and predictions have been transformed by automation.</p> <p>7. Differentiate among open source, freeware, and proprietary software licenses and their applicability to different types of software.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>				
September	<p>SELECT Statements and Relational Database Technology</p>	<p>Anatomy of a SQL Statement</p> <p>Oracle Database Environment</p> <p>Using Applications</p> <p>Relational Database Technology</p>	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b></p> <p>4. Compare techniques for analyzing massive data collections.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p>8. Explain the program execution process.</p> <p>11. Describe techniques for locating and collecting small and large-scale data sets.</p> <p><b>5.3.A Computer Science in the Modern World - Computers and Communications Devices</b></p> <p>5. Explain the multiple levels of hardware and software that support program execution (e.g.,</p>	<ul style="list-style-type: none"> <li>• Match projection, selection, and join with their correct functions/capabilities.</li> <li>• Create a basic SELECT statement.</li> <li>• Use the correct syntax to display all rows in a table.</li> <li>• Use the correct syntax to select specific columns in a table, modify the way data is displayed, and/or perform calculations using arithmetic expressions and operators.</li> <li>• Explain the features and benefits that the Oracle 11g Database Environment provides</li> </ul>	<p>What is a basic SELECT statement?</p> <p>What are the features and benefits that the Oracle 11g Database Environment provides for businesses?</p> <p>What is the difference between application software and system software?</p> <p>What is a relational database?</p> <p>Why are</p>	<p>Exercises</p> <p>Quizzes</p> <p>Midterm</p> <p>Final Exam</p> <p><b>Vocabulary</b></p> <ul style="list-style-type: none"> <li>- SELECT statement</li> <li>- Oracle 11g Database</li> <li>- application software</li> <li>- system software</li> <li>- relational database</li> <li>- row</li> <li>- column</li> <li>- field</li> <li>- primary key</li> <li>- foreign key</li> </ul>	<p><a href="http://ilearning.oracle.com">http://ilearning.oracle.com</a></p> <p><a href="http://iacademy.oracle.com">http://iacademy.oracle.com</a></p>

			<p>compilers, interpreters, operating systems, networks).</p> <p><b>5.3.A Computer Science in the Modern World - Community, Global, and Ethical Impacts</b></p> <p>2. Discuss the impact of computing technology on business and commerce (e.g., automated tracking of goods, automated financial transactions, e-commerce, cloud computing).</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b></p> <p>3. Critically examine classical algorithms and implement an original algorithm.</p> <p>4. Evaluate algorithms by their efficiency, correctness, and clarity.</p> <p>5. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b></p> <p>3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b></p> <p>6. Anticipate future careers and the technologies that will exist.</p> <p>7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>8. Deploy various data collection techniques for different types of problems.</p>	<p>for businesses.</p> <ul style="list-style-type: none"> <li>• Relate the steps in the system development life cycle (SDLC) to the development and design of the Oracle 11g Database product and the data-modeling process.</li> <li>• Distinguish between application software and system software and give an example of each.</li> <li>• Demonstrate use of Oracle Application Express to enter SQL statements that retrieve data.</li> <li>• Define and give an example of a relational database.</li> <li>• Identify table-key terms, including row, column, field, primary key, foreign key.</li> <li>• Relate the importance of databases to everyday life.</li> </ul>	<p>databases important to everyday life?</p>		
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			<p><b>5.3.B Computer Science Concepts and Practices - Community, Global, and Ethical Impacts</b></p> <p>3. Summarize how financial markets, transactions, and predictions have been transformed by automation.</p> <p>7. Differentiate among open source, freeware, and proprietary software licenses and their applicability to different types of software.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>				
September	Using the WHERE Clause	<p>Working with Columns, Characters, and Rows</p> <p>Limit Rows Selected</p> <p>Comparison Operators</p>	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b></p> <p>4. Compare techniques for analyzing massive data collections.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b></p> <p>3. Critically examine classical algorithms and implement an original algorithm.</p> <p>4. Evaluate algorithms by their efficiency, correctness, and clarity.</p>	<ul style="list-style-type: none"> <li>Apply the concatenation operator to link columns to other columns, arithmetic expressions, or constant values to create a character expression.</li> <li>The use of Column Aliases will rename columns in the query result.</li> <li>Enter literal values of type character, number, or date into a SELECT statement and define and use DISTINCT to eliminate duplicate rows.</li> </ul>	<p>What is Column Aliases?</p> <p>What function is used to eliminate duplicate rows?</p> <p>Why is it important, from a business perspective, to be able to easily limit data retrieved from a table?</p> <p>What are three comparison operators?</p> <p>What is the</p>	<p>Exercises</p> <p>Quizzes</p> <p>Midterm</p> <p>Final Exam</p> <p><b>Vocabulary</b></p> <ul style="list-style-type: none"> <li>WHERE clause</li> <li>Conditional Conditions: BETWEEN IN LIKE NULL</li> <li>Logical Conditions: AND OR NOT ORDER BY</li> </ul>	<p><a href="http://ilearning.oracle.com">http://ilearning.oracle.com</a></p> <p><a href="http://iacademy.oracle.com">http://iacademy.oracle.com</a></p>

		<p>5. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b></p> <p>3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b></p> <p>6. Anticipate future careers and the technologies that will exist.</p> <p>7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>	<ul style="list-style-type: none"> <li>• Display the structure of a table using DESCRIBE or DESC.</li> <li>• Edit, execute, and save SQL statements in Oracle Application Express.</li> <li>• Apply SQL syntax to restrict the rows returned from a query.</li> <li>• Demonstrate application of the WHERE clause syntax.</li> <li>• Construct and produce output using a SQL query containing character strings and date values.</li> <li>• Apply the proper comparison operator to return a desired result.</li> <li>• Demonstrate proper use of BETWEEN, IN, and LIKE conditions to return a desired result.</li> <li>• Distinguish between zero and the value of NULL as unavailable, unassigned, unknown,</li> </ul>	<p>difference between zero and the value of NULL as unavailable?</p> <p>What is the difference between zero and the value of NULL as unassigned?</p> <p>What is the difference between zero and the value of NULL as unknown?</p> <p>What is the difference between zero and the value of NULL as inapplicable?</p> <p>Why are comparison conditions used?</p> <p>What is the use of the NULL condition?</p>		
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				or inapplicable.			
September	Restricting Rows and Introduction to Functions	<p>Logical Comparisons and Precedence Rules</p> <p>Sorting Rows</p> <p>Introduction to Functions – Single Row Functions</p>	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b> 4. Compare techniques for analyzing massive data collections.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b> 3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing). 5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b> 3. Critically examine classical algorithms and implement an original algorithm. 4. Evaluate algorithms by their efficiency, correctness, and clarity. 5. Use data analysis to enhance understanding of complex natural and human systems. 9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b> 3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and</b></p>	<ul style="list-style-type: none"> <li>Evaluate logical comparisons to restrict the rows returned based on two or more conditions.</li> <li>Apply the rules of precedence to determine the order in which expressions are evaluated and calculated.</li> <li>Construct a query to sort a results set in ascending or descending order.</li> <li>Construct a query to order a results set using a column alias.</li> <li>Construct a query to order a results set for single or multiple columns.</li> <li>Differentiate between single-row functions and multi-row functions and the result returned by each.</li> </ul>	<p>What rules of precedence are needed to determine the order in which expressions are evaluated and calculated?</p> <p>Why would you construct a query to order results using a column alias?</p> <p>What is the difference between constructing a query to order results for a single column or for multiple columns?</p> <p>What is the difference between single-row functions and multi-row functions?</p> <p>What is the</p>	<p>Exercises Quizzes Midterm Final Exam</p> <p><b>Vocabulary</b> - rules of precedence - column alias - single-row functions - multi-row functions</p>	<p><a href="http://learning.ornl.gov">http://learning.ornl.gov</a></p> <p><a href="http://iacademy.ornl.gov">http://iacademy.ornl.gov</a></p>

			<p><b>Practices - Computing Practice and Programming</b></p> <p>6. Anticipate future careers and the technologies that will exist.</p> <p>7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>		<p>difference between the results returned by single-row functions and multi-row functions?</p>		
September	Using Character, Number, and Date Functions	<p>Case and Character Manipulation</p> <p>Number Functions</p> <p>Date Functions</p>	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b></p> <p>4. Compare techniques for analyzing massive data collections.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p>12. Describe how mathematical and statistical functions, sets, and logic are used in computation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b></p> <p>3. Critically examine classical algorithms and implement an original algorithm.</p> <p>4. Evaluate algorithms by their efficiency,</p>	<ul style="list-style-type: none"> <li>• Select and apply single-row functions that perform case conversion and/or character manipulation.</li> <li>• Select and apply character case-manipulation functions LOWER, UPPER, and INITCAP in a SQL query.</li> <li>• Select and apply character-manipulation functions CONCAT, SUBSTR, LENGTH, INSTR, LPAD, RPAD, TRIM, and REPLACE in a SQL query.</li> <li>• Write flexible queries using substitution</li> </ul>	<p>What are three ways functions of SQL can manipulate data?</p> <p>What is an example of a flexible query using substitution variables?</p> <p>What is the difference between the results obtained from the TRUNC function and the ROUND function, when they are applied to a numeric value?</p>	<p>Exercises</p> <p>Quizzes</p> <p>Midterm</p> <p>Final Exam</p> <p><b>Vocabulary</b></p> <p>- Character Case-Manipulation Functions: LOWER UPPER INITCAP</p> <p>- Character-Manipulation Functions: CONCAT SUBSTR LENGTH INSTR LPAD RPAD TRIM REPLACE</p>	<p><a href="http://ilearning.org">http://ilearning.org</a></p> <p><a href="http://iacademy.org">http://iacademy.org</a></p>

		<p>correctness, and clarity.</p> <p>5. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b></p> <p>3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b></p> <p>6. Anticipate future careers and the technologies that will exist.</p> <p>7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>	<p>variables.</p> <ul style="list-style-type: none"> <li>• Select and apply the single-row number functions ROUND, TRUNC, and MOD in a SQL query.</li> <li>• Distinguish between the results obtained when TRUNC is applied to a numeric value and ROUND is applied to a numeric value.</li> <li>• State the implications for business when applying TRUNC and ROUND to numeric Values.</li> <li>• Select and apply the single-row functions MONTHS_BETWEEN, ADD_MONTHS, NEXT_DAY, LAST_DAY, ROUND, and TRUNC that operate on date data.</li> <li>• Date functions Transform Oracle dates into date data or a numeric value.</li> <li>• Demonstrate proper</li> </ul>	<p>What are the implications for business when applying TRUNC and ROUND to numeric values?</p> <p>How do date functions transform Oracle dates into date data or a numeric value?</p> <p>What are the implications for world businesses to be able to easily manipulate data stored in date format?</p>	<ul style="list-style-type: none"> <li>- Single-row number Functions: ROUND TRUNC MOD</li> <li>- Single-row Functions: MONTHS_BETWEEN ADD_MONTHS NEXT_DAY LAST_DAY SYSDATE</li> </ul>	
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				<p>use of the arithmetic operators with dates.</p> <ul style="list-style-type: none"> <li>• Demonstrate the use of SYSDATE and date Functions.</li> <li>• State the implications for world businesses to be able to easily manipulate data stored in date format.</li> </ul>			
September	Using Single Row Functions	<p>Conversion Functions</p> <p>NULL Functions</p> <p>Conditional Expressions</p>	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b></p> <p>4. Compare techniques for analyzing massive data collections.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p>12. Describe how mathematical and statistical functions, sets, and logic are used in computation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b></p> <p>3. Critically examine classical algorithms and implement an original algorithm.</p>	<ul style="list-style-type: none"> <li>• Provide an example of an explicit data-type conversion and an implicit data-type conversion.</li> <li>• Explain why it is important, from a business perspective, for a language to have built-in data-conversion capabilities.</li> <li>• Construct a SQL query that correctly applies TO_CHAR, TO_NUMBER, and TO_DATE single-row functions to produce a desired result.</li> <li>• Apply the appropriate date and/or character</li> </ul>	<p>What is an example of an explicit data-type conversion?</p> <p>What is an example of an implicit data-type conversion?</p> <p>Why is it important, from a business perspective, for a language to have built-in data-conversion capabilities?</p> <p>How can you use YYYY and</p>	<p>Exercises</p> <p>Quizzes</p> <p>Midterm</p> <p>Final Exam</p> <p><b>Vocabulary</b></p> <ul style="list-style-type: none"> <li>- explicit data-type conversion</li> <li>- implicit data-type conversion</li> <li>- Functions: TO_CHAR, TO_NUMBER, TO_DATE, COALESCE, NVL, NVL2, NULLIF, DECODE, CASE</li> <li>- nested</li> </ul>	<p><a href="http://learning.ornacle.com">http://learning.ornacle.com</a></p> <p><a href="http://iacademy.ornacle.com">http://iacademy.ornacle.com</a></p>

		<p>4. Evaluate algorithms by their efficiency, correctness, and clarity.</p> <p>5. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b></p> <p>3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b></p> <p>6. Anticipate future careers and the technologies that will exist.</p> <p>7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>	<p>format model to produce a desired output.</p> <ul style="list-style-type: none"> <li>• Explain and apply the use of YYYY and RRRR to return the correct year as stored in the database.</li> <li>• Demonstrate and explain the evaluation of a nested function.</li> <li>• Explain the use of the COALESCE and the NVL Functions.</li> <li>• Explain the use of general functions to deal with null values in data.</li> <li>• Construct and execute a SQL query that correctly applies NVL, NVL2, NULLIF, and COALESCE single-row functions.</li> <li>• Compare and contrast the DECODE and CASE functions.</li> <li>• Construct and execute a SQL query that correctly uses the DECODE and</li> </ul>	<p>RRRR to return the correct year as stored in the database?</p> <p>How does the evaluation of a nested function work?</p> <p>What are four general functions that work with any data type and relate to handling null values?</p> <p>Why do we use the COALESCE and the NVL Functions?</p> <p>Why do we use of general functions to deal with null values in data?</p> <p>What is the difference between the DECODE and</p>	<p>function</p>
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				<p>CASE functions.</p> <ul style="list-style-type: none"> <li>• Construct and execute two methods for implementing IF-THEN-ELSE conditional logic.</li> </ul>	CASE functions?		
October	Executing Database Joins	<p>Cross Joins and Natural Joins</p> <p>Join Clauses</p> <p>Inner Versus Outer Joins</p> <p>Self Joins and Hierarchical Queries</p>	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b></p> <p>4. Compare techniques for analyzing massive data collections.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b></p> <p>3. Critically examine classical algorithms and implement an original algorithm.</p> <p>4. Evaluate algorithms by their efficiency, correctness, and clarity.</p> <p>5. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b></p> <p>3. Evaluate programs written by others for</p>	<p>CASE functions.</p> <ul style="list-style-type: none"> <li>• Construct and execute a natural join using ANSI-99 SQL join syntax.</li> <li>• Create a cross join using ANSI-99 SQL join syntax.</li> <li>• Define the relationship between a cross join and a Cartesian product.</li> <li>• Define the relationship between a natural join and an equijoin.</li> <li>• Explain why it is important to have a standard for SQL as defined by ANSI.</li> <li>• Describe a business need for combining information from multiple data sources.</li> <li>• Construct and execute a join with the ANSI-99 USING and ON clauses.</li> </ul>	<p>What is relationship between a cross join and a Cartesian product?</p> <p>Why it is important to have a standard for SQL as defined by ANSI?</p> <p>Explain a possible business need for combining information from multiple data sources?</p> <p>What is the difference between an inner and an outer join?</p> <p>What is the basic concept of</p>	<p>Exercises</p> <p>Quizzes</p> <p>Midterm</p> <p>Final Exam</p> <p><b>Vocabulary</b></p> <ul style="list-style-type: none"> <li>- ANSI-99 SQL join syntax</li> <li>- cross join</li> <li>- Cartesian product</li> <li>- natural join</li> <li>- equijoin</li> <li>- Clauses: USING ON</li> <li>- hierarchical query</li> </ul>	<p><a href="http://learning.ornacle.com">http://learning.ornacle.com</a></p> <p><a href="http://iacademy.ornacle.com">http://iacademy.ornacle.com</a></p>

			<p>readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b></p> <p>6. Anticipate future careers and the technologies that will exist.</p> <p>7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computers and Communications Devices</b></p> <p>1. Discuss the impact of modifications on the functionality of application programs.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>	<ul style="list-style-type: none"> <li>• Construct and execute an ANSI-99 query that joins three tables.</li> <li>• Compare and contrast an inner and an outer join.</li> <li>• Construct and execute a query to use a left outer join.</li> <li>• Construct and execute a query to use a right outer join</li> <li>• Construct and execute a query to use a full outer join.</li> <li>• Construct and execute a SELECT statement to join a table to itself using a self-join.</li> <li>• Interpret the concept of a hierarchical query.</li> <li>• Create a tree-structured Report.</li> <li>• Format hierarchical Data and be able to exclude branches from a tree structure.</li> </ul>	a hierarchical query?		
October	Working	Review of	<b>5.3.A Computer Science in the Modern</b>	<ul style="list-style-type: none"> <li>• Determine the correct</li> </ul>	How would you	Exercises	<a href="http://ile">http://ile</a>

	<p>With Group Functions</p>	<p>Joins</p> <p>Group Functions</p> <p>COUNT, DISTINCT, NVL</p>	<p><b>World - Computational Thinking</b></p> <p>4. Compare techniques for analyzing massive data collections.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p>12. Describe how mathematical and statistical functions, sets, and logic are used in computation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b></p> <p>3. Critically examine classical algorithms and implement an original algorithm.</p> <p>4. Evaluate algorithms by their efficiency, correctness, and clarity.</p> <p>5. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b></p> <p>3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and</b></p>	<p>join syntax to use given a scenario requiring the join of data from two or more tables.</p> <ul style="list-style-type: none"> <li>Define and give an example of the seven group functions: SUM, AVG, COUNT, MIN, MAX, STDDEV, VARIANCE.</li> <li>Construct and execute a SQL query using group functions.</li> <li>Construct and execute group functions that operate only with numeric data types.</li> <li>Construct and execute a SQL query using the COUNT group function.</li> <li>Use DISTINCT and the NVL function with group functions.</li> </ul>	<p>determine the correct join syntax to use given a scenario requiring the join of data from two or more tables?</p> <p>What is the difference between the group functions of SUM, AVG, and COUNT?</p> <p>What is the difference between the group functions of MIN and MAX?</p> <p>What is the difference between the group functions of STDDEV and VARIANCE?</p>	<p>Quizzes</p> <p>Midterm</p> <p>Final Exam</p> <p><b>Vocabulary</b></p> <p>- Group Functions:</p> <p>SUM</p> <p>AVG</p> <p>COUNT</p> <p>MIN</p> <p>MAX</p> <p>STDDEV</p> <p>VARIANCE</p>	<p><a href="http://arning.oracle.com">arning.oracle.com</a></p> <p><a href="http://iacademy.oracle.com">http://iacademy.oracle.com</a></p>
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			<p><b>Programming</b>          6. Anticipate future careers and the technologies that will exist.          7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>				
October	Using Complex SQL with Aggregated Data	<p>Using GROUP BY and HAVING clauses</p> <p>Using ROLLUP and CUBE Operations, and GROUPING SETS</p> <p>Using SET Operators</p>	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b>          4. Compare techniques for analyzing massive data collections.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b>          3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).          5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.          12. Describe how mathematical and statistical functions, sets, and logic are used in computation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b>          3. Critically examine classical algorithms and implement an original algorithm.          4. Evaluate algorithms by their efficiency, correctness, and clarity.</p>	<ul style="list-style-type: none"> <li>• Construct and execute a SQL query using GROUP BY.</li> <li>• Construct and execute a SQL query using GROUP BY ... HAVING.</li> <li>• Construct and execute a GROUP BY on more than one column.</li> <li>• Use ROLLUP to produce subtotal values.</li> <li>• Use CUBE to produce cross-tabulation values.</li> <li>• Use GROUPING SETS to produce a single result set.</li> <li>• Use the GROUPING function to identify the extra row values</li> </ul>	<p>What is the difference between the GROUP BY and the GROUP BY...HAVING clauses?</p> <p>What are nest group functions?</p> <p>What is the purpose of SET Operators?</p>	<p>Exercises          Quizzes          Midterm          Final Exam</p> <p><b>Vocabulary</b>          - Clauses:            GROUP BY            GROUP BY...            HAVING          - nest group functions          - SET Operators</p>	<p><a href="http://ilearning.org">http://ilearning.org</a></p> <p><a href="http://iacademy.org">http://iacademy.org</a></p>

			<p>5. Use data analysis to enhance understanding of complex natural and human systems. 9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b> 3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b> 6. Anticipate future careers and the technologies that will exist. 7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>	<p>created by either a ROLLUP or CUBE operation.</p> <ul style="list-style-type: none"> <li>• Define and explain the purpose of SET Operators</li> <li>• Use a SET operator to combine multiple queries into a single query.</li> <li>• Control the order of rows returned using SET operators.</li> </ul>			
November	Creating Subqueries	<p>Fundamentals of Subqueries</p> <p>Single Row Subqueries</p> <p>Multiple-row Subqueries</p> <p>Correlated Subqueries</p>	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b> 4. Compare techniques for analyzing massive data collections.</p> <p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b> 3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p>	<ul style="list-style-type: none"> <li>• Define and explain the purpose of subqueries for retrieving data.</li> <li>• Construct and execute a single-row subquery in the WHERE clause.</li> <li>• Distinguish between single-row and multiple-row subqueries.</li> </ul>	<p>Explain the purpose of subqueries for retrieving data?</p> <p>What is the difference between single-row and multiple-row subqueries?</p> <p>What is the</p>	<p>Exercises Quizzes Midterm Final Exam</p> <p><b>Vocabulary</b> - subquery - Operators: EXIST NOT EXISTS IN ANY ALL</p>	<p><a href="http://learning.ornl.gov">http://learning.ornl.gov</a></p> <p><a href="http://iacademy.ornl.gov">http://iacademy.ornl.gov</a></p>

		<p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b>  3. Critically examine classical algorithms and implement an original algorithm.  4. Evaluate algorithms by their efficiency, correctness, and clarity.  5. Use data analysis to enhance understanding of complex natural and human systems.  9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b>  3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b>  6. Anticipate future careers and the technologies that will exist.  7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>	<ul style="list-style-type: none"> <li>• Distinguish between pair-wise and non-pair-wise subqueries</li> <li>• Use the EXIST and NOT EXISTS operators in a query.</li> <li>• Construct and execute a single-row subquery in the WHERE clause or HAVING clause.</li> <li>• Construct and execute a SELECT statement using more than one subquery.</li> <li>• Construct and execute a SELECT statement using a group function in the subquery.</li> <li>• Use the comparison operators IN, ANY, and ALL correctly in multiple-row subqueries.</li> <li>• Construct and execute a multiple-row subquery in the WHERE clause or HAVING clause.</li> <li>• Describe what happens if a multiple-row</li> </ul>	<p>difference between pair-wise and non-pair-wise subqueries?</p> <p>What happens if a multiple-row subquery returns a null value?</p> <p>When should multiple-row subqueries be used?</p> <p>When it is safe to use a single-row Subquery?</p> <p>What would an example be of when correlated subqueries are needed?</p>		
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				<p>subquery returns a null value.</p> <ul style="list-style-type: none"> <li>• Understand when multiple-row subqueries should be used and when it is safe to use a single-row Subquery.</li> <li>• Create a subquery using the EXIST and NOT EXISTS operators to test for returned rows from the subquery.</li> <li>• Identify when correlated subqueries are needed.</li> <li>• Construct and execute correlated subqueries.</li> <li>• Construct and execute named subqueries using the WITH clause.</li> </ul>			
November	Constructing DML Statements	<p>Insert Statements</p> <p>Updating Column Values and Deleting Rows</p> <p>DEFAULT</p>	<p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p>	<ul style="list-style-type: none"> <li>• Give examples of why it is important to be able to alter the data in a database.</li> <li>• Construct and execute INSERT statements which insert a single row using a VALUES clause.</li> </ul>	<p>Give two examples of why it is important to be able to alter the data in a database?</p> <p>How do foreign-key integrity</p>	<p>Exercises</p> <p>Quizzes</p> <p>Midterm</p> <p>Final Exam</p> <p><b>Vocabulary</b></p> <p>- Statements:</p> <p>INSERT</p> <p>UPDATE</p> <p>DELETE</p>	<p><a href="http://ilearning.oracle.com">http://ilearning.oracle.com</a></p> <p><a href="http://iacademy.oracle.com">http://iacademy.oracle.com</a></p>

		<p>Values, MERGE, and Multi-Table Inserts</p>	<p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b>  3. Critically examine classical algorithms and implement an original algorithm.  4. Evaluate algorithms by their efficiency, correctness, and clarity.  5. Use data analysis to enhance understanding of complex natural and human systems.  9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b>  3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b>  6. Anticipate future careers and the technologies that will exist.  7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>	<ul style="list-style-type: none"> <li>• Construct and execute INSERT statements that use special values, null values, and date values.</li> <li>• Construct and execute INSERT statements that copy rows from one table to another using a Subquery.</li> <li>• Construct and execute an UPDATE statement.</li> <li>• Construct and execute a DELETE statement.</li> <li>• Construct and execute a query that uses a subquery to update and delete data from a table.</li> <li>• Construct and execute a query that uses a correlated subquery to update and delete from a table.</li> <li>• Explain how foreign-key and primary-key integrity constraints affect UPDATE and DELETE statements.</li> </ul>	<p>constraints affect UPDATE and DELETE statements?</p> <p>How do primary-key integrity constraints affect UPDATE and DELETE statements?</p> <p>When is it needed to specify a DEFAULT value?</p>	<p>MERGE - DEFAULT value</p>	
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				<ul style="list-style-type: none"> <li>• Understand when to specify a DEFAULT value.</li> <li>• Construct and execute a MERGE statement.</li> <li>• Construct and execute DML statements using subqueries.</li> <li>• Construct and execute multi-table inserts.</li> </ul>			
December	Working With DDL Statements	<p>Creating Tables</p> <p>Using Data Types</p> <p>Modifying a Table</p>	<p><b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b></p> <p>3. Critically examine classical algorithms and implement an original algorithm.</p> <p>4. Evaluate algorithms by their efficiency, correctness, and clarity.</p> <p>5. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and</b></p>	<ul style="list-style-type: none"> <li>• List and categorize the main database objects.</li> <li>• Describe how database schema objects are used by the Oracle database.</li> <li>• List and provide an example of each of the number, character, and date data types.</li> <li>• Create a table using the appropriate data type for each column.</li> <li>• Explain the use of external tables.</li> <li>• Query the Data Dictionary to obtain the names and other</li> </ul>	<p>What are three main database objects?</p> <p>How are database schema objects used by the Oracle database?</p> <p>How are external tables used?</p> <p>Give two examples of organizations and personal situations where it is important to know to which</p>	<p>Exercises</p> <p>Quizzes</p> <p>Midterm</p> <p>Final Exam</p> <p><b>Vocabulary</b></p> <ul style="list-style-type: none"> <li>- database objects</li> <li>- external tables</li> <li>- Data Types: <ul style="list-style-type: none"> <li>TIMESTAMP</li> <li>TIMESTAMP WITH TIME ZONE column</li> <li>INTERVAL YEAR TO MONTH</li> <li>INTERVAL DAY TO SECOND</li> </ul> </li> <li>- FLASHBACK QUERY</li> </ul>	<p><a href="http://ilearning.Oracle.com">http://ilearning.Oracle.com</a></p> <p><a href="http://iacademy.Oracle.com">http://iacademy.Oracle.com</a></p>

		<p><b>Practices - Collaboration</b> 3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b> 4. Explore principles of system design in scaling, efficiency, and security. 6. Anticipate future careers and the technologies that will exist. 7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p> <p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>	<p>attributes of database objects.</p> <ul style="list-style-type: none"> <li>• Create a table using <code>TIMESTAMP</code> and <code>TIMESTAMP WITH TIME ZONE</code> column data types.</li> <li>• Create a table using <code>INTERVAL YEAR TO MONTH</code> and <code>INTERVAL DAY TO SECOND</code> column data types.</li> <li>• Give examples of organizations and personal situations where it is important to know to which time zone a date-time value refers.</li> <li>• Explain why it is important to be able to modify a table.</li> <li>• Explain and provide an example for each of the DDL statements <code>ALTER</code>, <code>DROP</code>, <code>RENAME</code>, and <code>TRUNCATE</code>, and the effect each has on tables and columns.</li> <li>• Construct a query and</li> </ul>	<p>time zone a date-time value refers?</p> <p>How are tables and columns affected by the DDL statement <code>ALTER</code>?</p> <p>How are tables and columns affected by the DDL statement <code>DROP</code>?</p> <p>How are tables and columns affected by the DDL statement <code>RENAME</code>?</p> <p>How are tables and columns affected by the DDL statement <code>TRUNCATE</code>?</p> <p>Explain the <code>FLASHBACK QUERY</code> on a table?</p> <p>Explain the <code>FLASHBACK table</code></p>	<p>- <code>FLASHBACK table</code></p>	
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				<p>execute the ALTER TABLE commands ADD, MODIFY, and DROP.</p> <ul style="list-style-type: none"> <li>• Explain and perform FLASHBACK QUERY on a table.</li> <li>• Explain and perform FLASHBACK table operations.</li> <li>• Track the changes to data over a period of time.</li> <li>• Explain the rationale for using TRUNCATE versus DELETE for tables</li> <li>• Add a comment to a table using the COMMENT ON TABLE command.</li> <li>• Name the changes that can and cannot be made to modify a column.</li> <li>• Explain when and why the SET UNUSED statement is advantageous.</li> </ul>	<p>operations?</p> <p>What is the difference in the rationale for using TRUNCATE versus DELETE for tables?</p> <p>What are the changes that can be made to modify a column?</p> <p>What are the changes that cannot be made to modify a column?</p> <p>When and why is the statement SET UNUSED advantageous?</p>		
January	Creating and	Defining NOT	<b>5.3.A Computer Science in the Modern</b>	• Define the term	What does the	Exercises	<a href="http://ile">http://ile</a>

	<p>Managing Constraints</p> <p>NULL and UNIQUE Constraints</p> <p>PRIMARY KEY, FOREIGN KEY, and CHECK Constraints</p> <p>Managing Constraints</p>	<p><b>World - Computing Practice and Programming</b></p> <p>3. Use various debugging and testing methods to ensure program correctness (e.g., test cases, unit testing, white box, black box, integration testing).</p> <p>5. Use Application Program Interfaces (APIs) and libraries to facilitate programming solutions.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b></p> <p>3. Critically examine classical algorithms and implement an original algorithm.</p> <p>4. Evaluate algorithms by their efficiency, correctness, and clarity.</p> <p>5. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>9. Analyze data and identify patterns through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices - Collaboration</b></p> <p>3. Evaluate programs written by others for readability and usability.</p> <p><b>5.3.B Computer Science Concepts and Practices - Computing Practice and Programming</b></p> <p>6. Anticipate future careers and the technologies that will exist.</p> <p>7. Use data analysis to enhance understanding of complex natural and human systems.</p> <p><b>5.3.C.2 Projects-Based Courses</b></p>	<p>"constraint" as it relates to data integrity</p> <ul style="list-style-type: none"> <li>• State when it is possible to define a constraint at the column level and when it is possible at the table level</li> <li>• State why it is important to give meaningful names to constraints.</li> <li>• State which data integrity rules are enforced by NOT NULL and UNIQUE constraints</li> <li>• Write a CREATE TABLE statement which includes NOT NULL and UNIQUE constraints at the table and column levels.</li> <li>• Explain how constraints are created at the time of table creation.</li> <li>• Define and give an example of a PRIMARY KEY, FOREIGN KEY, and CHECK constraint.</li> <li>• Explain the purpose of</li> </ul>	<p>term "constraint" as it relates to data integrity?</p> <p>Give an example of when it is possible to define a constraint at the column level?</p> <p>Give an example of when it is possible to define a constraint at the table level?</p> <p>What data integrity rules are enforced by NOT NULL constraints?</p> <p>What data integrity rules are enforced by UNIQUE constraints?</p> <p>At the time of table creation, how are constraints created?</p>	<p>Quizzes Midterm Final Exam</p> <p><b>Vocabulary</b></p> <ul style="list-style-type: none"> <li>- constraint (data integrity)</li> <li>- Integrity Rules: NOT NULL UNIQUE</li> <li>- CASCADE syntax</li> </ul>	<p><a href="http://arning.oracle.com">arning.oracle.com</a></p> <p><a href="http://iacademy.oracle.com">http://iacademy.oracle.com</a></p>
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			<p><b>5.3.C.3 Courses Leading to Industry Certification</b></p>	<p>defining PRIMARY KEY, FOREIGN KEY, and CHECK constraints.</p> <ul style="list-style-type: none"> <li>• Demonstrate the creation of constraints at the column level and table level in a CREATE TABLE statement.</li> <li>• Evaluate a business problem requiring the addition of a PRIMARY KEY and FOREIGN KEY constraint and write the code to execute the change.</li> <li>• Query the data dictionary for USER_CONSTRAINTS and interpret the information returned.</li> <li>• There are four different functions that the ALTER statement can perform on constraints.</li> <li>• Write ALTER TABLE statements to add, drop, disable, and enable constraints.</li> <li>• Name a business function that would</li> </ul>	<p>What is an example of a PRIMARY KEY constraint?</p> <p>What is an example of a FOREIGN KEY constraint?</p> <p>What is an example of a CHECK constraint?</p> <p>What is an example of a business problem requiring the addition of a PRIMARY KEY and FOREIGN KEY constraint?</p> <p>What are four different functions that the ALTER statement can perform on constraints?</p> <p>What is a</p>		
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				<p>require a DBA to drop, enable and/or disable a constraint, or use the CASCADE syntax.</p> <ul style="list-style-type: none"> <li>• Query the data dictionary for USER_CONSTRAINTS and interpret the information returned.</li> </ul>	<p>business function that would require a DBA to drop?</p> <p>What is a business function that would enable and/or disable a constraint?</p> <p>What is a business function that would use the CASCADE syntax?</p>		
Final Project	Cumulative	Cumulative	<b>Cumulative</b>	Cumulative	Cumulative	Cumulative	<a href="http://ilearning.oracle.com">http://ilearning.oracle.com</a>  <a href="http://iacademy.oracle.com">http://iacademy.oracle.com</a>

\* Some teachers may need to think about the assessments and resources used in order to determine the Big Ideas, Enduring Understandings, and Essential Questions embedded in their courses. At this point in your curriculum mapping, you might want to ignore the “Common Assessments” and “Common Resources Used” columns. However, you may use them if you wish.