

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

<b>Course: Honors Oracle I 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>	<b>Enduring Understanding(s)</b>	<b>Essential Question(s)</b>
	<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>		
Data Modeling	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b></p> <p>2. Describe a software development process used to solve software problems (e.g., design, coding, testing, verification).</p> <p>3. Explain how sequence, selection, iteration, and recursion are building blocks of algorithms.</p> <p>4. Compare techniques for analyzing massive data collections.</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 - Computing Practice and Programming</b></p> <p>4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).</p> <p>6. Select appropriate file formats for various types and uses of data.</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 - 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>9. Analyze data and identify patterns through modeling and simulation.</p>	<p>Creating a data model is the first step to creating a database from a case study.</p> <p>Reviewing and rewriting the database requirements over a period of time will uncover components missed during early stages of case study.</p>	<p>What is the purpose of a data model?</p> <p>What are the components of a data model?</p> <p>How do the components of a data model transfer to a database?</p>

<p>Business Rules</p>	<p><b>5.3.A Computer Science in the Modern World - Computational Thinking</b>          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.  <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).  <b>5.3.B Computer Science Concepts and Practices - Computational Thinking</b>          5. Use data analysis to enhance understanding of complex natural and human systems.          9. Analyze data and identify patterns through modeling and simulation.  <b>5.3.B Computer Science Concepts and Practices - Community, Global, and Ethical Impacts</b>          3. Summarize how financial markets, transactions, and predictions have been transformed by automation.</p>	<p>Understanding business rules is necessary to create a data model.</p> <p>Discussion of case study business rules with peers will expose design elements to be added to the data model.</p>	<p>What are structural business rules and why are they important to Database Design?</p> <p>What are procedural business rules and why are they important to Database Design?</p> <p>What types of business rules are enforceable only through programming logic?</p>
<p>Presentation Skills</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.          2. Use collaborative tools to communicate with project team members (e.g., discussion threads, wikis, blogs, version control, etc.).          3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.          4. Identify how collaboration influences the design and development of software products.  <b>5.3.B Computer Science Concepts and Practices - Collaboration</b>          2. Demonstrate the software life cycle process by participating on a software project team.  <b>5.3.C .2 Topics in Computer Science - Projects-Based Courses</b></p>	<p>Components of a project presentation demonstrate knowledge and understanding of data model and business rules.</p> <p>Documentation and proof of understanding are necessary to designing a database.</p>	<p>Why is it important to present a database solution?</p> <p>What components of a database solution should be explained in detail?</p>
<p>Portfolio</p>	<p><b>5.3.A Computer Science in the Modern World - Collaboration</b>          3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.  <b>5.3.A Computer Science in the Modern World - Computing Practice and Programming</b>          10. Explore a variety of careers to which computing is central.</p>	<p>Creating a portfolio of accomplishments is needed to apply to colleges, apply for scholarships, and to obtain a job after graduation.</p>	<p>What information is necessary to have available for a job interview, for a scholarship interview, for a college interview?</p>

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

1. Compare appropriate and inappropriate social networking behaviors.

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

6. Anticipate future careers and the technologies that will exist.

Why is it necessary to have the information in an organized portfolio?

**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 the Oracle Academy	Data vs. Information  History of the database  Major transformations in computing	<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.                      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>                      3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.</p> <p><b>5.3.A Computer Science in the Modern World – Computing Practice and Programming</b>                      10. Explore a variety of careers to which computing is central.                      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 – Community, Global, and Ethical Impacts</b></p>	<ul style="list-style-type: none"> <li>• Distinguish between data and information and understand how data becomes information.</li> <li>• The evolution of a database and examples of its role in the business world.</li> <li>• Historical contributions in database development and design.</li> <li>• The database development process.</li> <li>• Major transformations enabled by changes in computing day-to-day activities</li> </ul>	What is the difference between data and information?  How does data become information?  What are three examples of jobs, salary, and opportunities available that could result from participating in the Academy?  What is an important historical contribution in database development and design?  How do day-to-day activities relate to major	Exercises Quizzes Midterm Final Exam  <b>Vocabulary</b> - data - information - hardware - operating system - software	<a href="http://learning.oracle.com">http://learning.oracle.com</a>

			<p>1. Compare appropriate and inappropriate social networking behaviors.</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 – Computing Practice and Programming</b></p> <p>6. Anticipate future careers and the technologies that will exist.</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.</p> <p><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>	<ul style="list-style-type: none"> <li>• e-businesses that use database software to ensure success</li> <li>• Overall mission of the Oracle Cooperation</li> </ul>	<p>transformations enabled by changes in computing?</p> <p>How is e-business essential to database software success?</p> <p>What is the overall mission of the Oracle Corporation?</p>		
September	What is Data Modeling?	<p>Conceptual &amp; Physical Models</p> <p>Entities, instances, attributes, and identifiers</p> <p>Entity relationship modeling and</p>	<p><b>5.3.A Computer Science in the Modern World – Computational Thinking</b></p> <p>2. Describe a software development process used to solve software problems (e.g., design, coding, testing, verification).</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</p>	<ul style="list-style-type: none"> <li>• The importance of describing information requirements</li> <li>• Distinguish between a conceptual model and the physical implementation</li> <li>• Understanding the</li> </ul>	<p>What are the information requirements?</p> <p>What is the difference between a conceptual model and physical implementation?</p> <p>What are five</p>	<p>Exercises Quizzes Midterm Final Exam</p> <p><b><u>Vocabulary</u></b> - entity - instance of an entity - attribute - value</p>	<p><a href="http://ilearning.oracle.com">http://ilearning.oracle.com</a></p>

		ERDs	<p>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.  2. Use collaborative tools to communicate with project team members (e.g., discussion threads, wikis, blogs, version control, etc.).  3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.</p> <p><b>5.3.A Computer Science in the Modern World – Computing Practice and Programming</b>  4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).  6. Select appropriate file formats for various types and uses of data.  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 – 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).</p>	<p>reasoning for building a conceptual data model.</p> <ul style="list-style-type: none"> <li>• Compare and contrast entities and instances of entities.</li> <li>• Identify and describe attributes for a given entity and provide sample values to support its inclusion in a data model.</li> <li>• Understand how to apply the rule that an attribute can have only one value at a given point in time.</li> <li>• Selecting and justifying a unique identifier (UID) for an entity.</li> <li>• Identify an entity relationship diagram (ERD)</li> <li>• That data modeling process facilitates communication</li> </ul>	<p>reasons for building a conceptual data model?</p> <p>What are two examples of a conceptual model?</p> <p>What are two examples of a physical model?</p> <p>What is an entity? Give an example.</p> <p>What is the difference between an entity and an instance of an entity?</p> <p>What are three attributes for a given entity?</p> <p>What is the difference between an attribute and its value?</p> <p>What is the difference between mandatory and optional attributes?</p> <p>What is the</p>	<ul style="list-style-type: none"> <li>- unique identifier (UID)</li> <li>- entity relationship diagram (ERD)</li> </ul>	
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			<p><b>5.3.B Computer Science Concepts and Practices – Computational Thinking</b> 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> 2. Demonstrate the software life cycle process by participating on a software project team.</p> <p><b>5.3.B Computer Science Concepts and Practices – Community, Global, and Ethical Impacts</b> 3. Summarize how financial markets, transactions, and predictions have been transformed by automation.</p> <p><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>	<p>between designer and client preventing costly mistakes or misunderstandings in a subsequent physical database design.</p> <ul style="list-style-type: none"> <li>• Data models the ‘ideal system.’</li> </ul>	<p>difference between volatile and nonvolatile attributes?</p> <p>What is the meaning of implementation-free as it relates to data models and database design?</p> <p>What are four goals of entity relationship modeling?</p>		
September	Entity Relationship Diagramming	<p>Identifying relationships ER diagramming conventions</p> <p>Speaking ERD and drawing relationships</p> <p>Matrix Diagrams</p>	<p><b>5.3.A Computer Science in the Modern World – Computational Thinking</b> 2. Describe a software development process used to solve software problems (e.g., design, coding, testing, verification). 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>	<ul style="list-style-type: none"> <li>• Interpret and describe relationship optionality and cardinality.</li> <li>• Relate entities by applying the rules of cardinality and optionality.</li> <li>• Construct ER diagram</li> </ul>	<p>What is relationship optionality?</p> <p>Describe relationship cardinality.</p> <p>Give an example that relates entities by applying the rules of cardinality and optionality.</p>	<p>Exercises Quizzes Midterm Final Exam</p> <p><b><u>Vocabulary</u></b> - relationship optionality - relationship cardinality - matrix diagram</p>	<p><a href="http://ilearning.org/acle.com">http://ilearning.org/acle.com</a></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>2. Use collaborative tools to communicate with project team members (e.g., discussion threads, wikis, blogs, version control, etc.).</p> <p>3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.</p> <p><b>5.3.A Computer Science in the Modern World – Computing Practice and Programming</b></p> <p>4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).</p> <p>6. Select appropriate file formats for various types and uses of data.</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 – 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</b></p>	<p>components that represent entities and attributes according to diagram conventions.</p> <ul style="list-style-type: none"> <li>• State and understand relationships between entities and draw and label relationships correctly on an ERD.</li> <li>• Identify relationships using a matrix diagram and draw an ERD from a matrix diagram.</li> </ul>	<p>What are the relationships between entities in precise words (ERDish)?</p> <p>Identify relationships using a matrix diagram.</p>		
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			<p><b>Practices – Computational Thinking</b>  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>  2. Demonstrate the software life cycle process by participating on a software project team.</p> <p><b>5.3.B Computer Science Concepts and Practices – Community, Global, and Ethical Impacts</b>  3. Summarize how financial markets, transactions, and predictions have been transformed by automation.</p> <p><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>				
October	Supertypes, Subtypes, and Business Rules	Supertypes and subtypes  Documenting business rules	<p><b>5.3.A Computer Science in the Modern World – Computational Thinking</b>  2. Describe a software development process used to solve software problems (e.g., design, coding, testing, verification).  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</b></p>	<ul style="list-style-type: none"> <li>Guidelines for modeling subtype and supertype entities in ERDs.</li> <li>Understand the definition and rules relating to subtypes and being able to apply them by evaluating the accuracy of ERDs.</li> <li>Understand the</li> </ul>	<p>What is a subtype?</p> <p>What is a supertype?</p> <p>What are the rules relating entities and subtypes?</p> <p>Evaluate the accuracy of ER diagrams by applying the rules of subtype and</p>	<p>Exercises  Quizzes  Midterm  Final Exam</p> <p><b><u>Vocabulary</u></b>  - subtype  - supertype  - structural business rule  - procedural business rule</p>	<a href="http://ilearning.org/acle.com">http://ilearning.org/acle.com</a>

			<p><b>World –Collaboration</b></p> <p>1. Work in a team to design and develop a software artifact.</p> <p>2. Use collaborative tools to communicate with project team members (e.g., discussion threads, wikis, blogs, version control, etc.).</p> <p>3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.</p> <p><b>5.3.A Computer Science in the Modern World – Computing Practice and Programming</b></p> <p>4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).</p> <p>6. Select appropriate file formats for various types and uses of data.</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 – 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>definition and rules relating to supertypes and being able to apply them by evaluating the accuracy of ERDs.</p> <ul style="list-style-type: none"> <li>• Define and compose a structural business rule and diagram business rules when they can be represented in an ER model.</li> <li>• Define and compose a procedural business rule and recognize that some business rules will require programming.</li> </ul>	<p>supertype.</p> <p>What is the definition and composition of a structural business rule?</p> <p>What is the definition and composition of a procedural business rule?</p>		
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			<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>2. Demonstrate the software life cycle process by participating on a software project team.</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.</p> <p><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>				
October	Working with Entity Relationships	<p>Relationship transferability</p> <p>Relationship types</p> <p>Resolving many-to-many relationships</p> <p>Understanding CRUD requirements</p>	<p><b>5.3.A Computer Science in the Modern World – Computational Thinking</b></p> <p>2. Describe a software development process used to solve software problems (e.g., design, coding, testing, verification).</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>	<ul style="list-style-type: none"> <li>• The association between entities expresses how the data is mutually related.</li> <li>• Understanding the difference between transferable and nontransferable relationships.</li> <li>• Illustrate nontransferable relationships on</li> </ul>	<p>What is the difference between transferable and nontransferable relationships?</p> <p>What are two examples of one-to-one relationship?</p> <p>What are two examples of one-to-many relationship?</p> <p>What are two</p>	<p>Exercises</p> <p>Quizzes</p> <p>Midterm</p> <p>Final Exam</p> <p><b><u>Vocabulary</u></b></p> <ul style="list-style-type: none"> <li>- transferable relationships</li> <li>- nontransferable relationships</li> <li>- one-to-one relationship</li> <li>- one-to-many relationships</li> <li>- many-to-many</li> </ul>	<p><a href="http://ilearning.org/acle.com">http://ilearning.org/acle.com</a></p>

			<p>1. Work in a team to design and develop a software artifact.</p> <p>2. Use collaborative tools to communicate with project team members (e.g., discussion threads, wikis, blogs, version control, etc.).</p> <p>3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.</p> <p><b>5.3.A Computer Science in the Modern World – Computing Practice and Programming</b></p> <p>4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).</p> <p>6. Select appropriate file formats for various types and uses of data.</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 – 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>5. Use data analysis to enhance understanding of complex natural and</p>	<p>ERDs.</p> <ul style="list-style-type: none"> <li>Recognize and give examples of a one-to-one, one-to-many, and many-to-many relationships.</li> <li>Recognize redundant relationships and remove them from the ERD.</li> <li>Identify attributes which belong to many-to-many relationships and demonstrate the steps to resolve the relationship using an intersection entity.</li> <li>Identify the UID of an intersection entity and represent it in the entity relationship diagram.</li> <li>Create ER models that reflect all business rules gathered during an interview process.</li> </ul>	<p>examples of many-to-many relationship?</p> <p>What are three attributes which belong to many-to-many relationships?</p> <p>What are the steps needed to resolve a many-to-many relationship using an intersection entity?</p> <p>What is the process needed to create, retrieve, update, and delete (CRUD) requirements of the business?</p>	<p>relationships - CRUD analysis (create, retrieve, update, and delete)</p>	
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			<p>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> 2. Demonstrate the software life cycle process by participating on a software project team.</p> <p><b>5.3.B Computer Science Concepts and Practices – Community, Global, and Ethical Impacts</b> 3. Summarize how financial markets, transactions, and predictions have been transformed by automation.</p> <p><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>	<ul style="list-style-type: none"> <li>• Validate your ER model by performing a CRUD analysis. (create, retrieve, update, and delete)</li> </ul>			
November	Unique Identifiers and Normalization	Artificial, composite and secondary UID Normalization and First Normal Form Second Normal Form Third Normal Form	<p><b>5.3.A Computer Science in the Modern World – Computational Thinking</b> 2. Describe a software development process used to solve software problems (e.g., design, coding, testing, verification). 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>	<ul style="list-style-type: none"> <li>• Normalization is a process for assigning attributes to entities, and further explains the steps to normalize the attributes defined in entities.</li> <li>• Many ERDs require normalization and asks participants to recognize the first, second, and third levels of normalization.</li> </ul>	<p>What are the different types of unique identifiers (UIDs)?</p> <p>What is a candidate UID and explain why an entity can sometimes have more than one candidate UID?</p> <p>What are two issues of identification in the real world?</p> <p>What is the purpose</p>	<p>Exercises Quizzes Midterm Final Exam</p> <p><b><u>Vocabulary</u></b> - normalization - First Normal Form - Second Normal Form - Third Normal Form</p>	<p><a href="http://learning.ornacle.com">http://learning.ornacle.com</a></p>

		<p>2. Use collaborative tools to communicate with project team members (e.g., discussion threads, wikis, blogs, version control, etc.).</p> <p>3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.</p> <p><b>5.3.A Computer Science in the Modern World – Computing Practice and Programming</b></p> <p>4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).</p> <p>6. Select appropriate file formats for various types and uses of data.</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 – 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>5. Use data analysis to enhance understanding of complex natural and human systems.</p> <p>9. Analyze data and identify patterns</p>	<ul style="list-style-type: none"> <li>• Define the different types of unique identifiers (UIDs).</li> <li>• Define a candidate UID and explain why an entity can sometimes have more than one candidate UID.</li> <li>• Analyze business rules and choose the most suitable primary UID from the candidates.</li> <li>• Recognize and discuss the issues of identification in the real world.</li> <li>• Define the purpose of normalization in database model.</li> <li>• Determine if an entity conforms to the rule of First Normal Form and be able to convert an entity to First Normal Form if needed.</li> </ul>	<p>of normalization in database models?</p> <p>What is the rule of the First Normal Form in the normalization process?</p> <p>What is the rule of the Second Normal Form in the normalization process?</p> <p>Explain how to apply the rule of the Second Normal Form to resolve a violation in a model.</p> <p>What are two transitive dependencies in a data model?</p> <p>What is the rule of the Third Normal Form in the normalization process?</p> <p>Explain how to apply the rule of the Third Normal Form to resolve a</p>		
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			<p>through modeling and simulation.</p> <p><b>5.3.B Computer Science Concepts and Practices – Collaboration</b> 2. Demonstrate the software life cycle process by participating on a software project team.</p> <p><b>5.3.B Computer Science Concepts and Practices – Community, Global, and Ethical Impacts</b> 3. Summarize how financial markets, transactions, and predictions have been transformed by automation.</p> <p><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>	<ul style="list-style-type: none"> <li>• Define the rule of Second Normal Form in the normalization process.</li> <li>• Examine a nonnormalized entity and determine which rule (or rules) of normalization are being violated.</li> <li>• Identify transitive dependencies in a data model.</li> <li>• Examine a nonnormalized entity and determine which rule (or rules) of normalization are being violated.</li> </ul>	violation in a model.		
November	Arcs, Hierarchies, and Historical Data	Arcs Hierarchies and recursive relationships  Modeling historical data	<p><b>5.3.A Computer Science in the Modern World – Computational Thinking</b> 2. Describe a software development process used to solve software problems (e.g., design, coding, testing, verification). 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</p>	<ul style="list-style-type: none"> <li>• The three main types of constraints are unique identifiers, arcs, and domains, which must be listed in a separate document as part of the metadata associated with the model.</li> </ul>	<p>Define the term “constraint” as it applies to data modeling.</p> <p>What is an example of an exclusive OR relationship in a business scenario?</p> <p>What is the</p>	<p>Exercises Quizzes Midterm Final Exam</p> <p><b><u>Vocabulary</u></b> - constraint (data modeling) - exclusive OR relationship - arc</p>	<p><a href="http://ilearning.org/acle.com">http://ilearning.org/acle.com</a></p>

			<p>stored in a computer system.</p> <p><b>5.3.A Computer Science in the Modern World –Collaboration</b></p> <ol style="list-style-type: none"> <li>1. Work in a team to design and develop a software artifact.</li> <li>2. Use collaborative tools to communicate with project team members (e.g., discussion threads, wikis, blogs, version control, etc.).</li> <li>3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.</li> </ol> <p><b>5.3.A Computer Science in the Modern World – Computing Practice and Programming</b></p> <ol style="list-style-type: none"> <li>4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).</li> <li>6. Select appropriate file formats for various types and uses of data.</li> <li>11. Describe techniques for locating and collecting small and large-scale data sets.</li> </ol> <p><b>5.3.A Computer Science in the Modern World – Community, Global, and Ethical Impacts</b></p> <ol style="list-style-type: none"> <li>2. Discuss the impact of computing technology on business and commerce (e.g., automated tracking of goods, automated financial transactions, e-commerce, cloud computing).</li> </ol>	<ul style="list-style-type: none"> <li>• Identify an exclusive OR relationship in a business scenario.</li> <li>• Diagram an arc constraint to represent an exclusive OR relationship.</li> <li>• Distinguish between the use of an arc and a subtype in the data model.</li> <li>• Define and give an example of a hierarchical relationship and recursive relationship.</li> <li>• Identify the UIDs in a hierarchical model.</li> <li>• Represent a recursive relationship in an ERD given a scenario.</li> <li>• Construct a model using both recursion and hierarchies to express the same</li> </ul>	<p>difference between the use of an arc and a subtype in a data model?</p> <p>What is a hierarchical relationship? Give an example.</p> <p>What is a recursive relationship? Give an example.</p> <p>Why is it necessary to track data that changes over time?</p>	<ul style="list-style-type: none"> <li>- hierarchical relationship</li> <li>- recursive relationship</li> </ul>	
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			<p><b>5.3.B Computer Science Concepts and Practices – Computational Thinking</b>  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>  2. Demonstrate the software life cycle process by participating on a software project team.</p> <p><b>5.3.B Computer Science Concepts and Practices – Community, Global, and Ethical Impacts</b>  3. Summarize how financial markets, transactions, and predictions have been transformed by automation.</p> <p><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>	<p>conceptual meaning.</p> <ul style="list-style-type: none"> <li>• Identify the need to track data that changes over time and construct an ERD model that incorporates elements of “data over time.”</li> <li>• Identify and construct the UID of an entity that stores historical data given a business scenario.</li> <li>• Apply the rules of entity-relationship diagramming to create an ERD that reflects the business rules</li> </ul>			
December	ERD Project Presentation	Presentation of the ERD to the client Modeling change – time Modeling change – price Adding the time element to an ERD	<p><b>5.3.A Computer Science in the Modern World –Collaboration</b></p> <ol style="list-style-type: none"> <li>1. Work in a team to design and develop a software artifact.</li> <li>2. Use collaborative tools to communicate with project team members (e.g., discussion threads, wikis, blogs, version control, etc.).</li> <li>3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.</li> </ol>	<ul style="list-style-type: none"> <li>• Identify a data-modeling project to solve a business information need.</li> <li>• Demonstrate essential skills in solving business problems using technology and professionally presenting these solutions.</li> </ul>	<p>How can you describe an ER model to a client using non-technical terms?</p> <p>How can you share an ER model with a client in an engaging way?</p> <p>When do we use date as an attribute</p>	Exercises Quizzes Midterm Final Exam	<a href="http://ilearning.oracle.com">http://ilearning.oracle.com</a>

			<p><b>5.3.B Computer Science Concepts and Practices – Collaboration</b>  2. Demonstrate the software life cycle process by participating on a software project team.</p> <p><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>	<ul style="list-style-type: none"> <li>• Demonstrate effective team-building skills</li> <li>• Track responsibility and progress on a project by using a project-management document.</li> <li>• Show evidence of progress on the final presentation project by filling in the final project tracking grid.</li> </ul> <p>Create sample tables from the final project presentation ERD</p> <ul style="list-style-type: none"> <li>• Insert sample data into the created tables</li> <li>• Produce query output using Oracle Application Express</li> </ul> <p>Lesson 2: Preparing Written Documentation</p> <ul style="list-style-type: none"> <li>• Compose well-organized written documentation to</li> </ul>	<p>and DAY as an entity in a data model?</p> <p>What are at least three time-related constraints that can result from a time-sensitive model?</p> <p>What is an example of a conditional non-transferability in a time-constrained model? Explain.</p> <p>What is the meaning of journaling/logging?</p> <p>What is the business need for journaling/logging?</p>		
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				<p>accompany a presentation</p> <ul style="list-style-type: none"><li>• Create a rough draft for the written documentation, review, and finalize</li><li>• Construct entity relationship diagrams that demonstrate industry conventions.</li><li>• Prepare tables and visuals that support their database documentation.</li><li>• Demonstrate and provide examples of table formatting for database documentation.</li><li>• Demonstrate the use of a central message and supporting arguments for a final presentation.</li><li>• Demonstrate logical analysis of the business rules, operations, and</li></ul>			
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				<p>processes in a way that is clear and easy for the client to understand.</p> <ul style="list-style-type: none"> <li>• Demonstrate the selection of appropriate business attire for a final presentation.</li> </ul>			
December	Drawing Conventions and Generic Modeling	Drawing conventions for readability Generic Modeling	<p><b>5.3.A Computer Science in the Modern World – Computational Thinking</b></p> <p>2. Describe a software development process used to solve software problems (e.g., design, coding, testing, verification).</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>2. Use collaborative tools to communicate with project team members (e.g., discussion threads, wikis, blogs, version control, etc.).</p> <p>3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.</p>	<ul style="list-style-type: none"> <li>• Apply the Oracle drawing conventions to a data-model diagram.</li> <li>• Identify high-volume entities in a data-model diagram and explain their significance to the business .</li> <li>• Redraw a given data-model diagram to increase clarity and readability.</li> <li>• Recognize the usefulness of dividing a complex ERD into a number of functional subdiagrams.</li> <li>• Define generic</li> </ul>	<p>What are two high-volume entities and their significances to a business?</p> <p>What is the usefulness of dividing a complex ERD into a number of functional subdiagrams?</p> <p>What is generic modeling?</p> <p>What are the advantages and disadvantages of generic modeling?</p>	<p>Exercises Quizzes Midterm Final Exam</p> <p><b>Vocabulary</b> - generic modeling</p>	<p><a href="http://ilearning.oracle.com">http://ilearning.oracle.com</a></p>

			<p><b>5.3.A Computer Science in the Modern World – Computing Practice and Programming</b></p> <p>4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).</p> <p>6. Select appropriate file formats for various types and uses of data.</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 – 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>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>2. Demonstrate the software life cycle process by participating on a software project team.</p>	<p>modeling and evaluate and describe the advantages and disadvantages of generic modeling.</p> <ul style="list-style-type: none"> <li>• Construct a generic version of a more specific data model.</li> </ul>			
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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><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>				
January	Transforming From Conceptual Model to Physical Model	Introduction to relational database concepts Basic mapping Relationship mapping Subtype mapping	<p><b>5.3.A Computer Science in the Modern World – Computational Thinking</b></p> <p>2. Describe a software development process used to solve software problems (e.g., design, coding, testing, verification).</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>2. Use collaborative tools to communicate with project team members (e.g., discussion threads, wikis, blogs, version control, etc.).</p> <p>3. Describe how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.</p>	<ul style="list-style-type: none"> <li>Define a primary key, foreign key, and the column-integrity rule.</li> <li>Identify row, column, primary key, unique key, and foreign key given a diagram of a table containing these elements and the violations of data-integrity rules.</li> <li>Distinguish entity relationship models from database models and describe the terminology mapping between a conceptual model and a relational database model.</li> <li>Understand and</li> </ul>	<p>What is a primary key?</p> <p>What is a foreign key?</p> <p>What is column-integrity rule?</p> <p>Given a diagram of a table, how do you identify a row, column, primary key, unique key, and foreign key?</p> <p>What are the violations of data-integrity rules?</p> <p>What is the difference between entity relationship models and database models?</p>	<p>Exercises Quizzes Midterm Final Exam</p> <p><b>Vocabulary</b></p> <ul style="list-style-type: none"> <li>primary key</li> <li>foreign key</li> <li>integrity rule</li> <li>conceptual model</li> <li>relational database model</li> </ul>	<p><a href="http://learning.ornacle.com">http://learning.ornacle.com</a></p>

			<p><b>5.3.A Computer Science in the Modern World – Computing Practice and Programming</b>  4. Apply analysis, design, and implementation techniques to solve problems (e.g., use one or more software lifecycle models).  6. Select appropriate file formats for various types and uses of data.  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 – 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).</p> <p><b>5.3.B Computer Science Concepts and Practices – Computational Thinking</b>  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>  2. Demonstrate the software life cycle process by participating on a software project team.</p>	<p>apply the Oracle naming conventions for tables and columns used in relational models.</p> <ul style="list-style-type: none"> <li>• Transform an entity into a table diagram</li> <li>• Apply the rule of relationship mapping to correctly transform 1:M and barred relationships.</li> <li>• Apply the rule of relationship mapping to correctly transform M:M relationships.</li> <li>• Transform 1:1 relationships.</li> <li>• Apply the rule of relationship mapping to correctly transform relationships in an arc.</li> <li>• State and apply the table, column, identifiers, relationship, and</li> </ul>	<p>Describe the terminology mapping between a conceptual model and a relational database model.</p> <p>What are the table, column, identifiers, relationship, and integrity constraint rules for mapping subtype implementations?</p> <p>What are the table, column, identifiers, relationship, and integrity constraint rules for mapping supertype implementations?</p> <p>What are the table, column, identifiers, relationship, and integrity constraint rules for mapping subtype and supertype arc implementations?</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><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>	<p>integrity constraint rules for mapping supertype and subtype implementations and supertype and subtype arc implementations.</p>			
September – January	Portfolio	Documentation of Accomplishments	<p><b>5.3.C .2 Topics in Computer Science – Projects-Based Courses</b></p>	<ul style="list-style-type: none"> <li>Documentation of accomplishments will aid students in job searches, scholarship applications, and college entrance tasks.</li> </ul>	What skills and accomplishments are needed to achieve success in the real world?	Portfolio	<a href="http://ilearning.org/acle.com">http://ilearning.org/acle.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.