Subject:	Computer Science	**Course/Grade Level:**	Database Programming / 11th-12th
Focus Statement:	Students will design and develop databases for use in real-world applications.		

Outcome 1:

CTE.DATA.1		**Students will utilize HTML and CSS to create a basic website.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.DATA.1.1	Apply HTML tags to change the appearance of a web page.
NA	NA	CTE.DATA.1.2	Use IDs and classes to modify elements of a web page.
NA	NA	CTE.DATA.1.3	Manipulate tables using CSS or HTML to alter table design/presentation.
NA	NA	CTE.DATA.1.4	Attach a link to an image.
NA	NA	CTE.DATA.1.5	Attach a link to text.

Outcome 2:

CTE.DATA.2		**Students will understand the purpose and terminology of databases.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.DATA.2.1	Define the term “database.”
NA	NA	CTE.DATA.2.2	Define the term “DBMS.”
NA	NA	CTE.DATA.2.3	Define the term "database instance.”

NA	NA	CTE.DATA.2.4	Define the term “schema.”
NA	NA	CTE.DATA.2.5	Define the term "data independence.”
NA	NA	CTE.DATA.2.6	Define DCL, DDL, and DML.
NA	NA	CTE.DATA.2.7	Describe the advantages and disadvantages of a relational database.

Outcome 3:

CTE.DATA.3		**Students will create entity-relationship diagrams to describe the structure of data.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.DATA.3.1	Demonstrate how to represent an entity in an ER diagram.
NA	NA	CTE.DATA.3.2	Demonstrate how to represent a relationship in an ER diagram.
NA	NA	CTE.DATA.3.3	Demonstrate how to represent attributes in an ER diagram.
NA	NA	CTE.DATA.3.4	State the degree of a given relationship in an ER diagram.
NA	NA	CTE.DATA.3.5	Demonstrate how to represent the cardinality of a relationship.
NA	NA	CTE.DATA.3.6	Explain when attributes are necessary on a relationship.
NA	NA	CTE.DATA.3.7	Demonstrate how to represent weak entities in an ER diagram.
NA	NA	CTE.DATA.3.8	Explain a situation where a recursive relationship would be necessary in an ER diagram.
NA	NA	CTE.DATA.3.9	Demonstrate how to represent inheritance in an ER diagram.
NA	NA	CTE.DATA.3.10	Demonstrate how to represent aggregation in an ER diagram.
NA	NA	CTE.DATA.3.11	Create a full ER diagram for a given situation
NA	NA	CTE.DATA.3.12	Create an attribute table for a given situation.
NA	NA	CTE.DATA.3.13	Convert an ER diagram into SQL tables.

Outcome 4:

CTE.DATA.4		**Students will understand the basic structure and terminology of the relational database model.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.DATA.4.1	Demonstrate how to display a relation/table in written form.
NA	NA	CTE.DATA.4.2	Know the properties of the attributes/columns of a relation.
NA	NA	CTE.DATA.4.3	Know the properties of the tuples/rows of a relation.
NA	NA	CTE.DATA.4.4	Describe super keys, candidate keys, primary keys, and foreign keys.
NA	NA	CTE.DATA.4.5	Describe the characteristics of a relation.
NA	NA	CTE.DATA.4.6	Describe the domain, entity integrity, and referential integrity constraints of a relation.

Outcome 5:

CTE.DATA.5		**Students will demonstrate how to normalize relations.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.DATA.5.1	Describe the benefits and drawbacks to normalizing a relation.
NA	NA	CTE.DATA.5.2	Explain the principle of functional dependency.
NA	NA	CTE.DATA.5.3	Normalize a relation into first normal form (1NF).
NA	NA	CTE.DATA.5.4	Normalize a relation into second normal form (2NF).
NA	NA	CTE.DATA.5.5	Normalize a relation into third normal form (3NF).

Outcome 6:

CTE.DATA.6		**Students will utilize SQL to retrieve data from a relational database.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.DATA.6.1	Write a SQL query to select all of the rows from a table.
NA	NA	CTE.DATA.6.2	Write a SQL query to select specified columns from a table.
NA	NA	CTE.DATA.6.3	Write a SQL query using the WHERE clause to limit the data retrieved.
NA	NA	CTE.DATA.6.4	Write a SQL query using comparison operators.
NA	NA	CTE.DATA.6.5	Write a SQL query using the AND or OR operators.
NA	NA	CTE.DATA.6.6	Sort the results of a SQL query using the ORDER BY clause.
NA	NA	CTE.DATA.6.7	Write a SQL query using the DISTINCT statement.
NA	NA	CTE.DATA.6.8	Write a SQL query utilizing multiple tables in the FROM clause.
NA	NA	CTE.DATA.6.9	Write a SQL query utilizing multiples tables in the WHERE clause.
NA	NA	CTE.DATA.6.10	Write a multiple-row SQL query.
NA	NA	CTE.DATA.6.11	Write a SQL query using multiple-row functions.
NA	NA	CTE.DATA.6.12	Write a SQL query using the GROUP BY clause.
NA	NA	CTE.DATA.6.13	Write a SQL query using the LIKE clause to match strings.
NA	NA	CTE.DATA.6.14	Write a SQL query using aliases.

Outcome 7:

CTE.DATA.7		**Students will utilize SQL to update and remove data from a relational database.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.DATA.7.1	Write a SQL query to create a table.
NA	NA	CTE.DATA.7.2	Write a SQL query to alter a table.
NA	NA	CTE.DATA.7.3	Write a SQL query to remove a table.
NA	NA	CTE.DATA.7.4	Write a SQL query to insert data into a table.
NA	NA	CTE.DATA.7.5	Write a SQL query to delete data from a table.
NA	NA	CTE.DATA.7.6	Write a SQL query to update data in a table.

Outcome 8:

CTE.DATA.8		**Students will utilize PHP to connect to SQL databases and output results of SQL queries.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.DATA.8.1	Understand how HTML, Javascript, MySQL, and PHP work together.
NA	NA	CTE.DATA.8.2	Output data using the PHP echo or print functions.
NA	NA	CTE.DATA.8.3	Output HTML code in PHP.
NA	NA	CTE.DATA.8.4	Define variables in PHP.
NA	NA	CTE.DATA.8.5	Utilize variables in PHP.
NA	NA	CTE.DATA.8.6	Utilize arrays in PHP.
NA	NA	CTE.DATA.8.7	Utilize if statements in PHP.
NA	NA	CTE.DATA.8.8	Utilize loops in PHP.
NA	NA	CTE.DATA.8.9	Establish a connection to a MySQL server through PHP.
NA	NA	CTE.DATA.8.10	Execute a SQL query through PHP.
NA	NA	CTE.DATA.8.11	Output the results of a SQL query through PHP.

Outcome 9:

CTE.DATA.9		**Students will optimize SQL queries to enhance performance.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.DATA.9.1	Utilize the LIMIT command to stop queries when they find the desired number of results.
NA	NA	CTE.DATA.9.2	Explain the benefits and drawbacks of using indexes.
NA	NA	CTE.DATA.9.3	Utilize indexes to improve the performance of SELECT queries.
NA	NA	CTE.DATA.9.4	List the situations where an index would be called for.
NA	NA	CTE.DATA.9.5	Utilize the EXPLAIN command to determine the performance of a query.
NA	NA	CTE.DATA.9.6	Rank the query types from fastest to slowest.