

|   |  |
|---|--|
| Middle-level CTE Learning Experience Title: Birds in Our Backyard<br>Educator: Tonya Lackey, Westport Central School District<br>Length of Lesson: 11 days ( 40 minute periods)<br>Grade Level: 7-8 | CTE Area: Technology and Engineering Education<br>CTE Theme: Problem Solving and Innovation<br>CTE Content: Design<br>Date Created: September 10, 2019 |
|---|--|

|  |  |
|--|--|
|  |  |
|--|--|

Curriculum Goal

Students identify a problem that requires a designed solution such as a new product that can be made from recycled materials. Students develop a problem

ty  
g cultural global competence

Education Association

Students will be knowledgeable about the world of work, explore career options, and relate personal skills, aptitudes, and abilities to future career decisions.

Standard 2: Integrated Learning

Students will demonstrate how academic knowledge and skills are applied in the workplace and other settings.

Standard 3a: Universal Foundation Skills

Students will demonstrate mastery of the foundation skills and competencies essential for success in the workplace.

Learning Objectives

Problem Solving and Innovation

2. Design Process (Proactive)

Students will

- a) Implement a formal design process to solve a given problem by
  - a. Defining the problem being addressed
  - b. Defining criteria that must be met through the finished design
  - c. Defining constraints that must be adhered to
  - d. Brainstorming and examining possible solutions
  - e. Selecting the best solution for evaluation
  - f. Developing and constructing a prototype or model of the selected design
  - g. Testing and evaluating the prototype and model against the design criteria and constraints
  - i. Evaluating their use of the design process and how it impacted their final solutions
- b) Demonstrate personal development of design skills through practice of these skills in a variety of classroom applications

Design

1.The Attributes of Design

Students will

- a) Define design as a creative planning process used to develop products and systems
- b) Elaborate on how every design has the potential to be improved
- c) Define criteria and constraints and how they are applied as design requirements

2. Engineering Design

Students will



|   |   |  |            |
|---|---|--|------------|
|   | <p>attract birds to our region?</p> <p>5) Have you observed birds around your home?</p> <p>6) What types of birds have you seen? Can you identify them?</p> <p>7) What characteristics are common for most birds? What characteristics are different?</p>   |  |            |
| Do-now/Hook                                       | <p>Day 1 (cont.)</p> <p>Teacher will tell a story: Have you ever quietly walked through the woods and listened to the many sounds in the upper canopy? Have you ever wondered what made the sounds you hear? And why they made that particular sound? Over the next several weeks we'll investigate the types of birds who reside in our backyard through observations and research. We learn about the optimal design for a birdhouse for each species. We design and build a birdhouse for each species we observe and design and build an observation station that includes a placard with a QR code that can be scanned to access information on the species of bird that is occupying the birdhouse.</p> | <p>Day 1 (cont.)</p> <p>Students engage in a discussion focused on bird watching and birdhouses.</p> | 30minutes  |
| Procedure for Instruction/<br>Learning Activities | <p>Day 2</p> <p>Intro to the Sibley Bird App</p> <p>Pre-Class Prep:</p> <p>Download the Sibley Bird App onto an iOS (iPad, iPod, iPhone) or Android (Samsung Phone or Tablet, etc.) device</p>  | <p>Day 2</p> <p>Ask questions and engage in discussion</p>   | 10 minutes |

<http://www.sibleyguides.com/about/the->

nature trail, take note of bird species present and bird songs heard, complete the "Nature Trail Observation" handout.

Today we take a walk along the nature trail. We spend time sitting quietly, listening to our surroundings and observing the resident birds. It is very important that we are quiet for this activity. You complete the "Nature Trail Observation" handout with the use of your Sibley Bird App.

Guide students through the trail. Encourage the students to sit in one spot and be still and quiet. Encourage the students to record the bird sounds and take pictures using the tablets/iPads for later research.

Allow five minutes to remind students to reflect on today's observations and submit a journal entry via Google docs prior to next class. If time permits lead a group discussion on what observations the students noted.

#### Day 4

Determine the top 5/2 (s) i t s te a nd

begin research on the optimal design of a birdhouse for our top 5 most frequently observed birds. First we must compare our observation notes.

Do a "gallery walk" to determine which bird was the most frequently observed.

Students walk about the room reading each of the Nature Trail Observation cards displayed.

10 minutes

Instruct partners on how to create a tally chart for each bird observed. Then instruct them on how to turn their tally chart in to a graph to determine the top 5 most frequently observed birds. Help the students create the charts in either a spreadsheet program or on paper.

Students create a tally chart for each bird observed by the class. Using the tally chart the student creates a graph that helps determine the top 5 most frequently observed birds. Students gather data.

15 minutes

Students display their tally charts for a second "gallery walk."

This time the students provide feedback on their classmates charts. The students write one thing they like and ask a question regarding something they see on the graph that could be improved or was not clear. For example, "I like how you chose different colors for each type of bird.", "I wonder if you would have provided a title on your chart if that would make it more clear?", "Did you think of....?", etc.

10minutes

Day 5

Tell students: Yesterday we determined the top 5 birds that we observed on our nature walk. Today we will research the best design for a birdhouse for each type of bird.

Day 5

Instruct students to use the internet to conduct research on

Students conduct research on different kinds of birdhouse designs that are best for our top 5

different types of birdhouses.  
Provide them with websites for



caulking compound, etc.

Tools: hand saw, tape measure or ruler, drill, chisel or knife, hammer, screwdriver, Safety glasses.

Plans for birdhouses.

Discuss with class safety rules and features of each tool and material.

Explain in detail how to appropriately use the tools and materials.

Provide students with a starting point for the building of the birdhouse. Give students guidance on how to measure and cut materials. Guide students to attach materials successfully. Remind students 'Function before Decoration'

Day 9

Instruct students to create a Google Doc with information that summarizes all the facts students have learned about the birds in the neighborhood.

Teach students how to create a QR Code. Once students create and print their QR code, laminate them and attach them to a post. Place this post near where students hang their birdhouses.

Day 10

Take students out onto nature trail again to determine the best location to hang their birdhouse and QR post. Help students install

|  |  |   |              |
|--|--|---|--------------|
|  | <p>birdhouse. Did students make a successful birdhouse? Did birds move into it?</p> <p>Day 11 (Closure)<br/>         Teacher assigns students to write a short 3-4 paragraph essay answering the following questions: What went well throughout the process, What did not go well throughout the process, What would you change about your birdhouse or QR code presentation, List three things you learned, List one thing you wish to learn more about. List one thing you would do differently next time.</p> | <p>Day 11<br/>         Students write a short 3-4 paragraph essay answering the following questions: What went well throughout the process, What did not go well throughout the process, What would you change about your birdhouse or QR code presentation, List three things you learned, List one thing you wish to learn more about. List one thing you would do differently next time.</p> | <p>40min</p> |
|--|--|---|--------------|

Differentiation

Students will be grouped by their abilities and interests. Teacher will provide scaffolded support where needed. Students who have physical disabilities will be accommodated for. Students who are meeting all of the expectations will be challenged to go above and beyond.



|  |  |  |   |  |
|--|--|--|---|--|
| Maintains Focus to Completion of the Project     | Stays focused consistently, prioritizes tasks, recognizes time constraints of projects, and avoids distractions while meeting deadlines.           | Develops a timeline for the work to be completed and stays focused throughout the project.                                   | Is occasionally off task in regards to accomplishing the project, thus only a portion of it is completed.                           | Is often off task and does not complete the project.   |
| Resolves Problems that Arise in Completing Tasks | Easily and quickly identifies resources that may help solve a specific problem and applies critical thinking to using those resources effectively. | Identifies resources that may help solve a specific problem and applies critical thinking to using that resources correctly. | Sometimes identifies resources that may help solve a specific problem but does not apply critical thinking to using that resources. | Neither identifies resources that may help solve a specific problem nor applies critical thinking to aid in problem-solving. |