Feature Lesson: Discovery Research of Quadratics

**Class:** Algebra  
**Subject:** Quadratics  
**Lesson Title:** Discovery and Research of Quadratics  
**Lesson Length:** 2-3 days (90 minute class)

The purpose of this lesson is to help students understand how to:  
- Recognize Quadratics in the world we live in  
- How to solve and graph them  
- How to learn the NC Standard Course of Study Algebra II Content

**Content Objectives:** All students will create a discovery presentation based on the vocabulary given for quadratics

1. ELL students will define of a quadratic.  
2. ELL students will investigate the vocabulary and search for multimedia that will help them learn about quadratics  
3. ELL students will create a presentation based on discovery research to share with the class.

**Language Objectives:** All students will present discovery data to class

1. ELL students will read reference texts and research information regarding technology.  
2. ELL students will have a written form of the presentation

**Culture Objectives:**  
1. ELL students will be placed in a group with a non ELL student. This group will work together to present what they have discovered about Quadratics. Students will openly discuss what they have found and decide whether or not it will help them or anyone else in the class master a skill involving quadratics (native and non native English speaker learning “foreign words” together.)
### North Carolina Standard Course of Study

<table>
<thead>
<tr>
<th>Lesson</th>
<th>NC Course of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphing Quadratic Functions</td>
<td>2.02, 2.09</td>
</tr>
<tr>
<td>Solving by Factoring</td>
<td>2.02, 1.03, 2.09</td>
</tr>
<tr>
<td>Solving by finding Square Roots</td>
<td>2.02; 1.03, 2.09</td>
</tr>
<tr>
<td>Solving by completing the square</td>
<td>2.02; 1.02, 1.03, 2.09</td>
</tr>
<tr>
<td>Quadratic Formula and Discriminant</td>
<td>2.02; 1.02, 2.09</td>
</tr>
<tr>
<td>Modeling using Quadratics</td>
<td>2.03, 2.04</td>
</tr>
<tr>
<td>Complex Numbers</td>
<td>1.02</td>
</tr>
</tbody>
</table>

### Teacher Materials:
- paper
- pens/pencils
- computers with Internet access for research
- Smart notebook or some other presentation software
- Projector screen for viewing group presentations
- Speakers for audio to project

### Part I - Individual:
Students will individually research to define quadratic vocabulary. They should also be looking for multimedia to help define or understand the term and to also be more prepared for Activity 2. Be sure to properly cite all resources and don’t hesitate to use hyperlinks in your presentation to make it easy to navigate.

### Part II - Group:
In groups, students will be assigned two of the vocabulary terms to create a more in-depth presentation to share with the class. You may use any presentation software or method to present your terms. I encourage you to search for media that you find engaging and more creative than you would normally encounter in a traditional lecture or from a textbook. Every group member must participate equally. See attached rubric. Use images and pictures to describe the result of an quadratic.
Guidelines for Presentation

- Correct grammar (spelling, verb usage, etc) should be evident
- Incorporation of pictures that are relevant to topic
- Correct citations and references
- Be unique and creative consider creating your own video or web page
- Speak clearly
- Rotate and delegate to all group members and Be prepared for questions
- Refer to the rubric to make sure everything is covered

Assessment: Use the attached rubric for grading the research process and the discovery presentation.

Instructional Technology Used for Teaching and Learning:

By allowing students to do self discovery we are more likely to have students engaged and taking ownership of their own learning. 21st Century learners are likely to make a topic far more interesting and memorable using multimedia. Using technology will not only help them learn content and remember it but it will also help their audience of peers learn from their presentation.
Name of Group
Members: __________________________________________________
________________________________________________________
________________________________________________________

**Rubric for Quadratic Research**

<table>
<thead>
<tr>
<th></th>
<th>Exemplary</th>
<th>Accomplished</th>
<th>Developing</th>
<th>Beginning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematical Discovery</strong></td>
<td>25</td>
<td>15</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Mathematical Discovery clearly explained and demonstrated.</td>
<td>Mathematical Discovery explained but was not demonstrated</td>
<td>Some evidence of Mathematical Discovery</td>
<td>No evidence of Mathematical Discovery.</td>
</tr>
<tr>
<td><strong>Grammar</strong></td>
<td>All words correctly written and spelled</td>
<td>One or two grammatical or spelling errors.</td>
<td>Many grammatical errors and several words misspelled</td>
<td>Difficult to understand due to grammar and spelling</td>
</tr>
<tr>
<td><strong>Evidence of Teamwork</strong></td>
<td>All members actively participating and working well together</td>
<td>Most members actively participating and working well together</td>
<td>Most members participating but not working well together</td>
<td>Only a couple of members working together and the group does not work well together.</td>
</tr>
<tr>
<td><strong>Early College Honor Level</strong></td>
<td>Discovery of terms were communicated and presented in a very effective and creative manner</td>
<td>Discovery of terms were communicated and reasonably clear to understand.</td>
<td>Discovery of terms were presented but it was difficult to comprehend the meaning of terms</td>
<td>Presentation unorganized and communicated very little about terms</td>
</tr>
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</table>

**Group Grade _____/100 = _____ % = _____**
Research Assignment:

What can you believe from the Internet to help you make a summary about quadratic functions?

I encourage you to use:
- Key vocabulary to include:
  - Quadratic function
  - Discriminant
  - Complex number
  - BEST FITTING QUADRATIC

I will then put you in groups and you will use your individual research from the terms to help prepare your group lesson for the class to share with your class.

Zero of a function

Square root

Factoring

Polynomial

Please cite your sources.