

GRADE LEVEL: 8th Grade
GLCEs: 8th Grade

STRAND: Algebra

LESSON TITLE: Golf and the Great Parabola

LEARNING OBJECTIVES:

Students will use a quadratic function to find the maximum point (the vertex of a downward facing parabola), describe its axis of symmetry, and give calculated and general information about the parabola created.

MATERIALS: *Golfing Graphing* handout, graphing utility (optional)

BACKGROUND: Students will need to be familiar with terminology of quadratics; such as, maximum/minimum, vertex, axis of symmetry, parabola.

INSTRUCTIONAL PLAN:

Golfing Graphing is intended to be used as a supplement after parabolas have been introduced. It could be used as a homework assignment or as a work-through activity for a class or small group.

QUESTIONS FOR STUDENTS:

All questions for students are found on the worksheet *Golfing Graphing*.

ASSESSMENT OPTIONS (constructed response)

Suppose your friend was absent the day of school that parabolas were introduced. How would you explain parabolas to her/him?

EXTENSIONS: Think of a real world situation that would require a positive “*a*” for a quadratic function. Come up with three questions/tasks for your absent friend to answer.

MICHIGAN GLCEs:

A.RP.08.01: Identify and represent linear functions, quadratic functions, and other simple functions including inverse functions ($y=k/x$), cubics ($y=ax^3$) roots, ($y=\sqrt{x}$), and exponentials ($y=a^x$, $a>0$), using tables, graphs, and equations.

A.PA.08.02: For basic functions, e.g., simple quadratics, direct and indirect variation, and population growth, describe how changes in one variable affect the other.

ASSESSMENT OPTIONS (constructed response)

Suppose your friend was absent the day of school that parabolas were introduced. How would you explain parabolas to her/him?

Answers will vary but should include the following:

Standard form for a quadratic is $y = ax^2 + bx + c$.

When “ a ” is greater than 0; the parabola opens up and has a minimum point.

When “ a ” is less than 0; the parabola opens down and has a maximum point.

The coefficient “ b ” shifts the parabola to the left or to the right.

The constant “ c ” is the y-intercept.

The maximum or minimum point of a quadratic is called the vertex.

.

EXTENSIONS: Think of a real world situation that would require a positive “ a ” for a quadratic function. Come up with three questions/tasks for your absent friend to answer.

The situation could be:

A trapeze artist is going to swing from one platform to another. Both platforms are 80 feet high and span 24 feet. To dazzle the audience, engineers have set up the trapeze to sweep close to the ground. The path of the parabola can be found using the following equation:

$$y = \frac{1}{2}x^2 - 12x + 80$$

Let x = distance between the platforms.

Let y = height of the trapeze.

1. Label and number the graph
2. Graph the function
3. Find the vertex

