Christina School District Learning Choice Board

for grades 9-10 Math and Science - Optional - Challenge board

3- Challenge-level

**Grade 9: Math**

- **Evaluate the following:**
  - Vocabulary:
    - Quadratic Model
  - Quadratic Regression

  **Example 1:**
  Consider the function \( f(x) = 2x^2 - 3x - 2 \).
  a. Find the x- and y-intercepts of the graph.
  b. Tell whether the parabola has a maximum or minimum point and find its coordinates.

  **Grade 10:**
  Please solve the follow CHALLENGE-level question:

**Grade 9: Math**

- **Evaluate the following:**

  **Example 2:**
  A ball is thrown upward from a height of 15 m with initial velocity of 20 m/s. The equation for its height in meters above the ground is \( h(t) = -5t^2 + 20t + 15 \), where \( t \) is in seconds.
  a. Find the time when the ball hits the ground.
  b. How high is the ball 2 seconds after it is released?
  c. When will the ball hit the ground?

  **Example 3:**
  The table below shows the trend in number of cigarettes smoked by students in grades 9 through 12 during 15 days in 1998 and 2000. The data is used to model the development of the National Teenage Smoking Survey (NFSS) and to determine if the trend is decreasing.

<table>
<thead>
<tr>
<th>Year</th>
<th>9th Grade</th>
<th>10th Grade</th>
<th>11th Grade</th>
<th>12th Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>124</td>
<td>158</td>
<td>145</td>
<td>126</td>
</tr>
<tr>
<td>1999</td>
<td>123</td>
<td>153</td>
<td>146</td>
<td>127</td>
</tr>
<tr>
<td>2000</td>
<td>122</td>
<td>152</td>
<td>145</td>
<td>126</td>
</tr>
<tr>
<td>2001</td>
<td>121</td>
<td>151</td>
<td>144</td>
<td>125</td>
</tr>
</tbody>
</table>

a. Construct a scatterplot for these data.
b. Find the quadratic regression model for these data.

**Grade 10:**
Please solve the follow CHALLENGE-level question:

**Grade 9: Math**

- **Evaluate the following:**

  a. Use the quadratic model to predict the number of cigarettes smoked by students in grade 10 in 2002.
  b. Why is extrapolation inappropriate?

**Grade 10:**
Please solve the follow CHALLENGE-level question:

**Grade 9: Math**

- **Evaluate the following:**

  a. Convert the quadratic equation \( f(x) = -5x^2 + 20x + 15 \) to standard form.
  b. What are the roots of this equation?
  c. Write the equation of a line that passes through the vertex of the parabola.
  
  **Grade 10:**
  Please solve the follow CHALLENGE-level question:
Science

Grade 9/10
What does a meteorologist do? What does a person have to do to become a meteorologist? Research to find out! Use the information you receive to create an advertisement for a local college to promote becoming a meteorologist.

Science

Grade 9/10
Create a brochure for the scientific method. Describe each step and reasons why the scientific method is important. Include pictures to support your responses.

Science

Grade 9/10
Create a storyboard that shows a virtual set of lab safety rules and the importance of following the rules.

Science

Grade 9/10
Watch the YouTube video on These Are The Elements
https://youtu.be/5QdNdrhsQm4

You are an author of children’s books. Write a reference book on the elements of the Periodic Table. Choose 10 elements and include a fact sheet on each element. Be sure to include the following about the...
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<table>
<thead>
<tr>
<th>Physical Activity</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Stair Steps.</strong> Do you have stairs in your home or on your stoop? Take time to do step-ups. Step up, step down, and repeat. COUNT as many reps as you can, and you will find you can do more over time.</td>
<td><strong>Planks.</strong> Planking is a wonderful way to strengthen your core, arms, and shoulders. With your stomach facing the floor, plant your hands on the ground should-width apart, ground your toes into the floor, and lift your body into a straight line. Try holding/ COUNTING for 30 seconds and increase as you can.</td>
<td><strong>Burpees.</strong> Burpees are a great way to get a full-body exercise. Start with your feet shoulder-width apart, bend at your hips and knees to go into a squat position. Place your hands on the floor in front of you and kick your feet back into a plank position. Drop down to the floor in a push-up, and press back up into the plank position. Kick your feet inward and press your body up into a jump.</td>
<td><strong>Jumping Jacks.</strong> Jumping Jacks are a great full-body activity. Start with the amount that works best for you and work your way up.</td>
</tr>
</tbody>
</table>

- Links are case sensitive, please type exactly how they appear.