

Course: Physics  
Unit: Work, Power, and Energy  
Project: Barbie Bungee

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

**GOAL:** Students will be able to determine how many rubber bands are needed to serve as Barbie's Bungee cord so she gets closest to the ground using data extrapolation. Also they will determine the spring constant of Barbie's Bungee cord using conservation of energy calculations.

**ROLE:** Bungee Cord operator

**AUDIENCE:** Barbie and friends

**SITUATION:**

**Scenario**

*Barbie wants to go bungee jumping. To experience the greatest thrill she tells the operator that she wants to get as close to the ground as possible for her jump.*

*As the Bungee Cord operator you only get one chance to get Barbie's thrill jump correct. You will have to determine the length of the bungee cord being used by Barbie to give her the best jump. After she makes her jump, you will need to report what the spring constant was of the bungee cord so that it can be used for other Barbies from around the world who also seek such a thrill.*

**Performance:** After completing this problem, students will be able to:

M.AE.112 Solve systems of linear equations exactly and approximately.

P.E.45 I can use the conservation of energy to solve problems.

P.G.67 I can convert units within the metric system of measurement and between the metric and English systems of measurement.

**Product:**

Students will create individual whiteboard screencasts using [www.screencast-o-matic.com](http://www.screencast-o-matic.com) to present their findings. See rubric on the back of this page for specific screencast video requirements.

**Whiteboard Screencast videos are due Friday February 17, 2012 by the end of the school day.**

**Screen-cast Procedure:**

**To present your whiteboard you will create a 'screen-cast' video that displays a photo of your whiteboard while you explain your problem solving method and solution. You will create your screen-cast using the following website:**  
<http://www.screencast-o-matic.com/>.

**Step 1** - go to <http://www.screencast-o-matic.com/> **Step 2** - watch the short video titled 'A very quick demo', this video will show you how to create and save your screen-cast. **Step 3** - After practicing, record your screen-cast and save it to your computer. Save your video as 'First Last Name Period Barbie' -include a space between your first and last names. **Step 4** - Upload your video into your E.L. Haynes Google Docs. In your ELH email, click on documents, then upload, then files. Select your video and click, start upload in the dialogue box that appears (leave both boxes checked within the dialogue box). **Step 5** - After uploading your video (it may take a few minutes before it available for view) share it your physics teacher.

*For additional help, see the instructional video on your physics class website.*

	<b>Exceeds the Standard - 4</b>	<b>Meets the Standard - 3</b>	<b>Approaches the Standard - 2</b>	<b>Does not meet - 1</b>
Whiteboard (Standard WHA.1)	<ul style="list-style-type: none"> <li>•Includes all '3' items and</li> <li>•Organization of whiteboard improves aids &amp; improves explanation</li> </ul>	<ul style="list-style-type: none"> <li>•Includes all items listed above</li> <li>•Writing is neat &amp; easy to read</li> </ul>	<ul style="list-style-type: none"> <li>• missing 1 of items listed above</li> <li>•Writing is neat &amp; easy to read</li> </ul>	<ul style="list-style-type: none"> <li>• missing 2 or more items listed above</li> </ul>
Video (Standard WHA.1)	<ul style="list-style-type: none"> <li>•Includes all '3' items and</li> <li>•Quality &amp; clarity of video demonstrates high level of effort and/or practice prior to recording</li> </ul>	<ul style="list-style-type: none"> <li>•Video length <math>\leq</math> 5 minuets</li> <li>•Appropriate volume level</li> <li>•All whiteboard items explained</li> <li>•Showing of slow mo bungee drop video</li> <li>•Showing of Excel graph of bungee data</li> </ul>	<ul style="list-style-type: none"> <li>•Video length <math>\leq</math> 5 minuets</li> <li>•Acceptable volume level</li> <li>•1 item (whiteboard, slow mo video, excel graph) is not explained/missing</li> </ul>	<ul style="list-style-type: none"> <li>•Video length <math>\geq</math> 5 minuets</li> <li>•Volume level is too loud or too much background noise to be heard clearly</li> <li>•1 item (whiteboard, slow mo video, excel graph) is not explained/missing</li> </ul>
Graphical Analysis (Standard M.AE.112)	<ul style="list-style-type: none"> <li>•Includes all '3' items and</li> <li>•solution includes all <b>correct</b> units</li> <li>•Supporting details and/or examples that increase the viewer's ability to understand the video</li> </ul>	Includes: <ul style="list-style-type: none"> <li>• Description of graph</li> <li>• What the trend line means</li> <li>• Conclusion from the trend line</li> </ul>	Missing an item from '3' that makes it unclear if the <i>graphical analysis</i> of the problem is understood	Missing multiple items from '3' that makes it clear that the <i>graphical analysis</i> of the problem is <b>not</b> understood
Energy Conservation Explanation (Standard P.E.45)	<ul style="list-style-type: none"> <li>•Includes all '3' items and</li> <li>•solution includes all <b>correct</b> units</li> <li>•Supporting details and/or examples that increase the viewer's ability to understand the video</li> </ul>	Includes: <ul style="list-style-type: none"> <li>• What the problem is asking for (with correct units)</li> <li>• What is know</li> <li>• Description of each variable</li> <li>• How/why the chosen formula used</li> <li>• How values were substituted</li> </ul>	Missing an item from '3' that makes it unclear if the <i>physics</i> of the problem is understood	Missing multiple items from '3' that makes it clear that the <i>physics</i> of the problem is <b>not</b> understood
Unit Conversion Explanation (Standard P.G.67)	Includes all '3' items and student explains the reason for the proper unit conversions	<ul style="list-style-type: none"> <li>•All values have <b>logical</b> units</li> <li>•How units cancel out</li> </ul>	•Missing an item from 3 that makes it unclear that student understands unit conversions	Missing 2 items from 3 that makes it unclear that student understands unit conversions