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Research Experience for Teachers (RET), Bearden High School

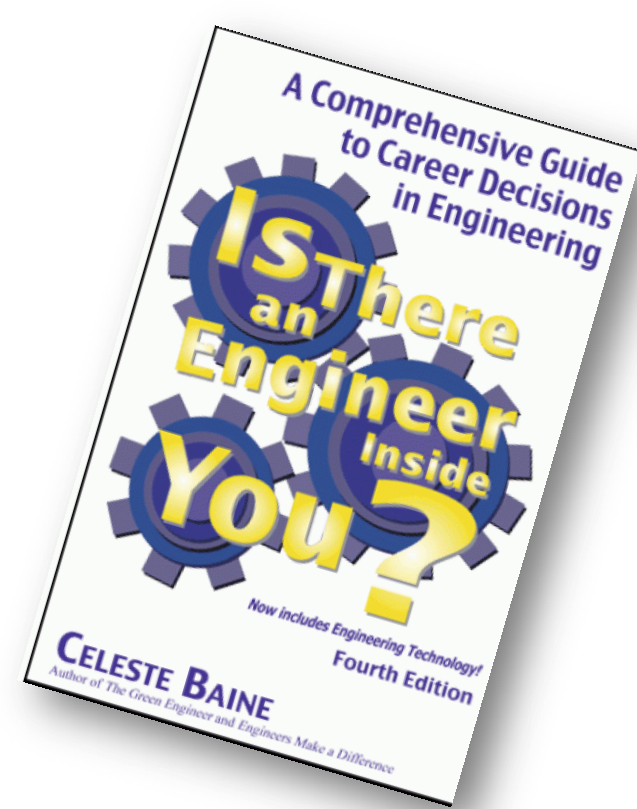
## EXPLORING ENGINEERING

**Overview:** This lesson will be an extension activity in which students are able to explore possible future careers. They will look specifically at engineering but also will be able to answer questions about their own passions and talents.

**Duration:** 90 min (with reading and discussion board)

**Materials:**

- Access to Internet
- Reading Materials
- Organizational Chart
- Guiding Questions
- Discussion Board
- Pencil/Pen
- Highlighter (if possible)



### Resources

*Is There an Engineer in You?* by Celeste Baine (Chapter 1 + Cover Art):

[http://www.engineeringedu.com/store/index.php?route=product/product&product\\_id=414&search=celeste+baine](http://www.engineeringedu.com/store/index.php?route=product/product&product_id=414&search=celeste+baine)

Engineering Your Future

<http://futuresinengineering.org/index.php>

27 Questions to Find Your Passion

<http://liveyourlegend.net/>

## REGRESSION MODELS OF COAL PRODUCTION

**Overview:** Students will use regression models to examine the future of the coal industry and the power grid overall.

**Duration:** 90 min (with reading and discussion board)

**Materials:**

- Access to Internet
- Reading materials
- Worksheet
- Graphing calculator (TI-84)
- Pencils/Pens
- Highlighters (if possible)



### Resources

Coal Picture Taken From:

<http://kvnf.org/post/bowie-announces-further-layoffs-coal-mine-near-paonia>

Everything You Need to Know About the Coal Industry Crisis

<http://fusion.net/story/256156/coal-industry-in-crisis/>

Everything You Need to Know About the EPA's Proposed Rule on Coal Plants

[https://www.washingtonpost.com/national/health-science/epa-will-propose-a-rule-to-cut-emissions-from-existing-coal-plants-by-up-to-30-percent/2014/06/02/f37f0a10-e81d-11e3-afc6-a1dd9407abcf\\_story.html](https://www.washingtonpost.com/national/health-science/epa-will-propose-a-rule-to-cut-emissions-from-existing-coal-plants-by-up-to-30-percent/2014/06/02/f37f0a10-e81d-11e3-afc6-a1dd9407abcf_story.html)

The data used in this activity can be found at: [www.nma.org/pdf/c\\_production\\_state\\_rank.pdf](http://www.nma.org/pdf/c_production_state_rank.pdf)

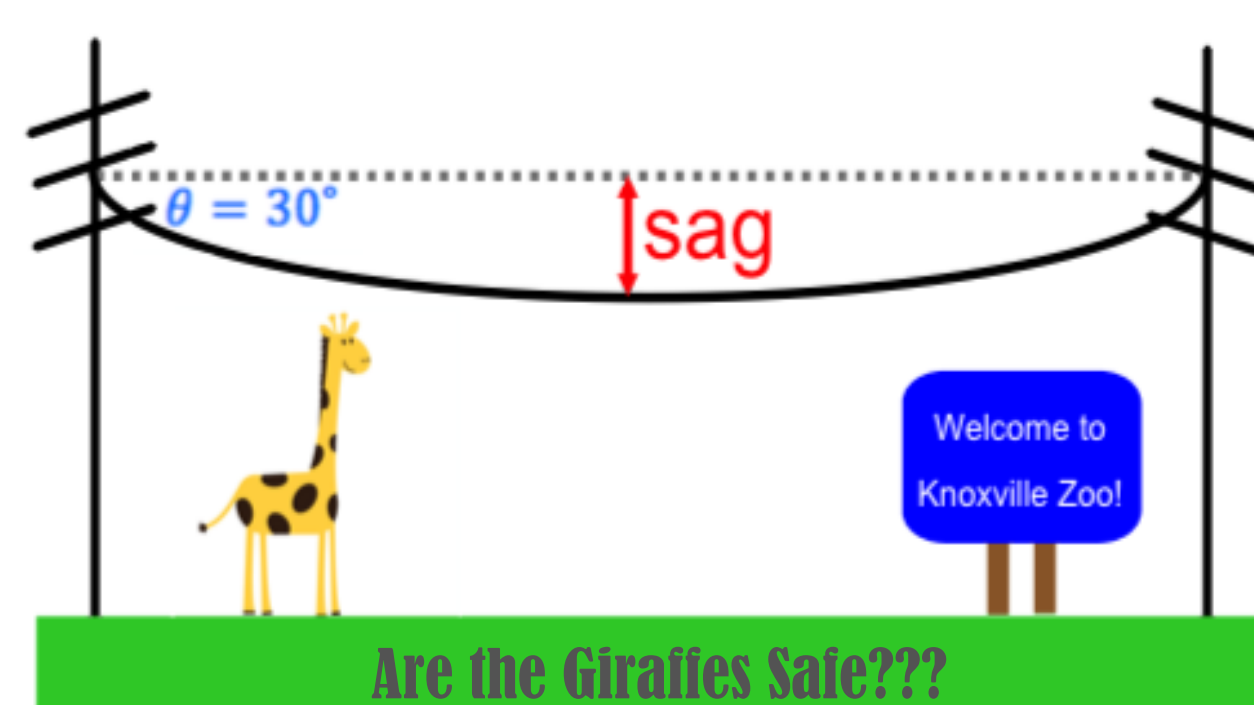
## SAGGING POWER LINES

**Overview:** Students will use arc length, sector area, and segment area formulas to determine whether sagging power lines are a danger to the giraffes at the Knoxville Zoo.

**Duration:** 90 min (with discussion board)

**Materials:**

- Internet Access (if possible)
- Worksheet
- Pencil
- Calculator



### Resources

Conductor Sag Demonstration

<https://www.youtube.com/watch?v=LPN1NZBz810>

Why Do Power Lines Sag on Hot Days?

<http://www.atcllc.com/blog/why-do-power-lines-sag-on-hot-days/>

How Does an Engineer Determine the Amount of Slack That Should Exist Between Power Lines?

<https://www.quora.com/How-does-an-engineer-determine-the-amount-of-slack-that-should-exist-between-power-lines>

Visualizing the Grid

<http://www.npr.org/2009/04/24/110997398/visualizing-the-u-s-electric-grid>