

Lesson Update and CRT Addendum

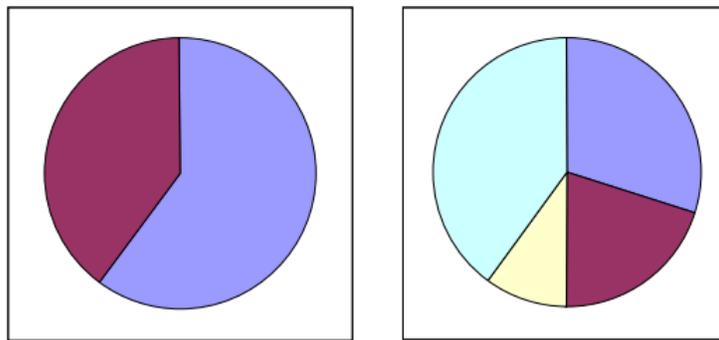
Lesson/Activity Title: Solar Storm Energy and Pie Graphs

ID: 15-769

Subject: Science, Mathematics

Grade:

Summary: The pie charts below show approximately how various forms of energy are involved in a solar flare. Flares occur when stored magnetic energy is suddenly released. The chart on the left shows how much of this magnetic energy is available for creating a flare (purple) and how much is lost (blue). The chart on the right shows how much of the available magnetic flare energy goes into four different phenomena: Light green represents forms of radiation such as visible light and x-rays. Blue represents (kinetic) energy in ejected clouds of gas called Coronal Mass Ejections. Purple represents flare energy that goes into heating local gases to millions of degrees Centigrade, and white is the portion of the flare energy that is lost to working against gravity.



Review and Recommendations

ALIGNMENT TO STANDARDS

NGSS

ESS 1.A, HS-ESS1-2, HS-ESS1-3

Common Core State Standards in Mathematics

7.NS, 7.RP

INSTRUCTIONAL SUPPORT

Materials for Lesson

No materials needed

CULTURAL RESPONSIVE TEACHING (CRT) RECOMMENDATIONS

5E Lesson/Description

1. Engage

The teacher need to utilize students' prior knowledge such as experience working with magnets. Videos on Coronal Mass Ejections can be used to engage and build students interest in the lesson.

2. Explore

The lesson is too brief of an activity..... It is part of a larger activity on solar storms. A variety of challenges could be introduced with these activities such as

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| | discussions of the implications of solar storms to us on earth. |
| 3. Explain | New terminology offers a lot of opportunities to work on vocabulary building skills, but all of this is lacking in the lesson. For example, none of the following terms were defined: centigrade, CME< solar flares, magnetic energy, kinetic energy, ejected clouds, flare energy, etc. Understanding these terms will help students have a deeper understanding on what they working on and also build new science vocabularies. |
| 4. Expand/Enhance | Again, this lesson needs to discuss meanings of vocabulary such as coronal mass ejections, magnetic energy, etc. An additional activity this lesson can adopt, is to discuss the contributions of women and minorities in space science, such as Mae Jemison, an African American woman who is a chemical engineer, physician an astronaut. |
| 5. Evaluate | The lesson does not showcase any formative or summative assessment. Students only have to answer 5 set of questions. Apply the principles of Herr, N.; Tippens, M.; Rivas, M.; Vandergon, V., d'Alessio, M., & Reveles, J. (2015 expected). Continuous Formative Assessment (CFA) - A cloud-based pedagogy for evaluating student understanding to optimize STEM teaching and learning. In Chao, L., <i>Cloud-Based STEM Education for Improved Learning Outcomes to be published by IGI Global</i> , Hershey, PA: IGI-Global Publishing. |

Additional Resources:

Apply the principle of Herr, N., Rivas, M., Chang, T., Tippens, M., Vandergon, V., d'Alessio, M., & Nguyen-Graff, D. (2015). Continuous formative assessment (CFA) during blended and online instruction using cloud-based collaborative documents. In Koç, S., Wachira, P., & Liu, X. (Eds.), *Assessment in Online and Blended Learning Environments*. Charlotte, NC: Information Age Publishing.