

FREE

STEM

Critical Thinking
WARM UPS

Created by Meredith Anderson

STEM warm-ups

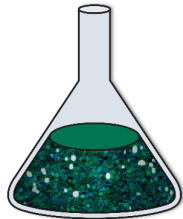
Thank you for downloading these critical thinking warm-ups. You will need a few basic items to complete these cards:

- plain paper
- index cards
- toothpicks
- hole punch
- cubes, such as dice (optional)

These warm-ups are meant to provoke creative thinking and reasoning. For many of them, there is no “right” answer. This is also true in many STEM (science, technology, engineering, mathematics) careers - several correct answers can provide a solution to a problem. You may elect to have your students try these independently at a STEM center or as a whole class activity. They can be done in any order, and address each aspect of STEM (denoted by the icon on the card).

-Meredith Anderson

Observe a person or animal for one minute. Record at least 3 observations.



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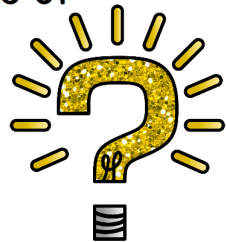
Find three different sources for a definition of the word

technology



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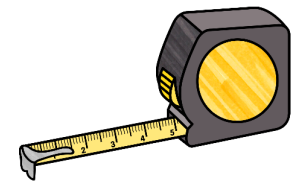
- 1) Find and measure a rectangular piece of paper. Calculate the area.
- 2) Alter another piece of paper so that it is $\frac{1}{2}$ the area of the paper in step 1 but keeps the same shape.
- 3) Now alter a different piece of paper so that it is $\frac{1}{2}$ the area of the paper in step 1, but a different shape.



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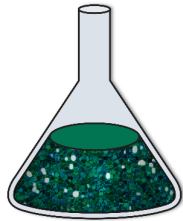
Using 5 toothpicks, make the following shapes:

- 1) a pentagon
- 2) two triangles
- 3) a letter of the alphabet



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Greg and Alice get to choose a treat every week at the candy store. Greg chooses either M&Ms or a chocolate bar every week for three months. Alice picks Skittles every week. This week, the candy store is out of Skittles. Do you think Alice is more likely to choose a chocolate bar or Smarties? Why?



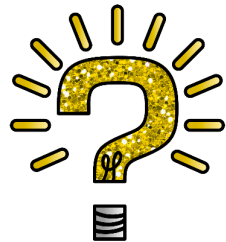
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The mouse on a desktop computer is not working. Think of at least two reasons why it might not be working, and at least one way to try and fix it.



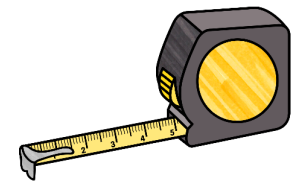
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Fold a piece of paper in half and then in half again. Punch three holes in the paper. *Before unfolding* the paper, draw a diagram of where you think the holes will be.



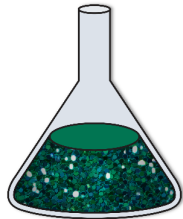
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Show at least *7 different ways* to mathematically arrive at the number 10. Two at most may use addition.



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Design an experiment to find out if you can dissolve more salt or sugar in water. What supplies would you need? How would you run the experiment?



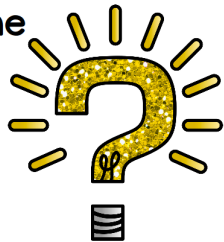
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What new technologies do you think will be available in 5 years? What about in 25 years? What tasks will these technologies make easier?



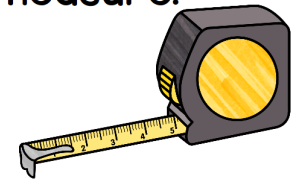
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Think about how you could alter the shape of an index card to make it useful for different tasks. How could you change the shape to use it as a megaphone? What if you wanted to make an airplane with it? What are some other uses you can imagine?



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Sketch a 2D drawing of the room you are in right now. (from above, looking down). Include the dimensions of the width and length, or give your best estimate if you are unable to measure. Include at least two pieces of furniture.



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Imagine you have a balloon filled with a gas. You don't know what the gas is. What are some things you could do to try and find out what gas is inside the balloon?



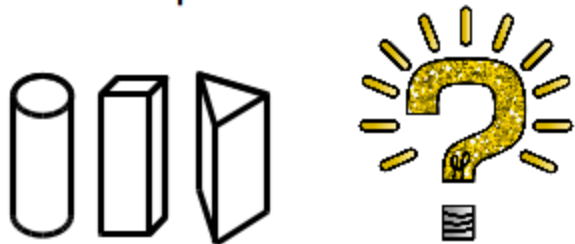
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Elliot took a photo of his delicious dessert with his cell phone. Think of as many ways as possible he could share that photo with his friend in another country.



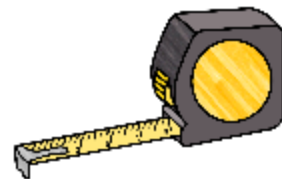
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Take three index cards and fold them so that the columns have a circular, square, and triangular cross-section. Use tape to secure them. Which do you predict will be strongest? Why? Test them out by placing books on top of the columns.



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Imagine you have 5 identical cubes. How many different ways can you think of arranging them?



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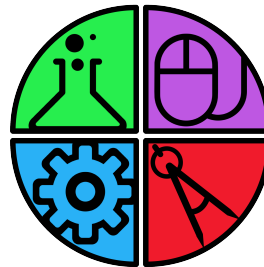
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I ♥ STEM

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