**What are phenomena?**

**Part I**

In this part of the activity, you will explore various phenomena on the website [ngssphenomena.com](http://www.ngssphenomena.com/) *(created by Connecticut educator TJ McKenna)*. The objective is to identify 3-4 phenomena that are interesting to you, describe what happens, what questions arise from observing it, and identify what makes them phenomena. An example has been done in the first row for you.

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| **Name of Phenomenon** | **Description of the phenomenon** | **What questions arise from observing this?** | **What science ideas could potentially be connected to this phenomenon?** | **Why might it be an instructionally productive phenomenon?** |
| *Floating M’s* | *When M&M’s are placed in warm water, the candy coating dissolves and colors the water while the “M’s” do not dissolve and float to the surface.* | *Why do M&M’s float?*  *Why does the candy coating color the water?*  *What makes the “M” come off the candy?* | *Diffusion*  *States of matter* | *Raises questions (ex. “Why does that happen?”*  *Observable* |
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| **Name of the phenomenon** | **Description of the phenomenon** | **What questions arise from observing this?** | **What science ideas could potentially be connected to this phenomenon?** | **Why might it be an instructionally productive phenomenon?** |
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**Part II**

Next, you will share with your partner or table group the various phenomena you explored. Describe what is interesting about it, what caught your attention, why it happens (if you can explain it), some questions that may arise from it, and what makes it a phenomenon.

In the space below, compile a list of “criteria” your group identifies as being common among ALL phenomena. For example, if you all come to consensus that phenomena are observable, you should place that into the box below. If there is disagreement, be sure to discuss why you disagree and ask clarifying questions. Additionally, discuss and respond to the question at the bottom of the page **as a group**.

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| **Common Attributes / Characteristics of Phenomena** | |
| *ex. Phenomena are observable.* |  |
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Are all phenomena instructionally productive? In other words, can all phenomena be used in all science classrooms for the purpose of driving instruction? Why or why not?

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**Part III**

Now that you have spent time individually, and in small groups, exploring and discussing various phenomena and characteristics of them, we will engage in a large group discussion that incorporates the ideas you have been sharing in your groups. We want to come to consensus about characteristics and attributes of phenomena that will be helpful later on when we begin brainstorming candidate phenomena useful in driving science instruction. As ideas are shared that you/your group did not previously discuss, add them to your list on page 3. Feel free to use the space below for additional notes, ideas or thoughts pertaining to the selection of phenomena to drive science instruction.

**Part IV**

As we have explored what phenomena are and why we use them to drive science instruction, we have identified some key characteristics that will assist us in selecting phenomena that are both compelling for students to want to figure out and help them construct understanding of core science ideas over time.

As we think about what phenomena may be most instructionally productive for the performance expectations (PEs) focusing the unit, we want to make sure the phenomena we have selected to anchor and drive the unit are eliciting student questions that, through pursuit of those, will get kids to figure out pieces of the DCI along the way culminating with an evidence-based explanation or model of how or why something happens in the world. Some of those criteria are:

* Exploring the phenomenon elicits student questions that help us to construct understanding of core science ideas.
  + The elements of the phenomenon that we are expecting students to explain are connected directly to DCI’s.
* The phenomenon has layers of complexity.
  + No single activity or lesson will achieve a PE simply by explaining a phenomenon. There are things we have to figure out about it in a sequence over time in order to explain why/how it happens in that circumstance, and others.
* Phenomena make us wonder “why” but do not have to change color or blow up.
  + Your phenomenon for erosion does not have to be the Grand Canyon. Phenomena can be everyday things we take for granted or never thoughtfully considered why they happen the way they do (like breathing hard after exercise or smelling cookies baking inside before you open the door).
* Phenomena are accessible for all students in the class.
  + Considering grade level, demographics, past experiences, and geographic location, selection of phenomena should intentional so it is accessible for all students.

As you explore your bundled PE’s and the DCI’s associated with them, brainstorm candidate phenomena that will help students to build specific elements of the DCI over time. Use what you have learned, the criteria from above and the table below to guide your thinking. An example pertaining to the corn storyline has been done for you as an example.

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| **Name of Phenomenon** | **Description of Phenomenon** | **What student questions does experiencing or exploring this phenomenon elicit?** | **What science ideas did we figure out? How is that connected to the DCI we want students to construct? *(exposed through unpacking)*** |
| *Harvest Corn* | *When placed in different conditions (water, soil, dark/light, etc.), the harvest corn changes.* | *What is the corn made of?*  *Why are different parts growing in different directions?*  *What happens if we plant the kernels and the cob?* | *The corn has internal parts (cob) and external parts (kernels). These parts have different functions (LS1.A).*  *Kernels are the seeds of the* |
| Record Player |  |  |  |
| Optical Illusions | When you observe 3 different optical illusions (spinning circles, checkerboard, Marilyn/ Einstein), your perception does not match reality. | How can an image appear to move when it is not actually moving?  How do optical illusions trick my eyes?  How do I see? | After investigating with the light box, we figure out:  The path that light takes travels in straight lines.  There are 4 necessary components of vision, an eye, an object, a light source, and a straight path between the eye and the object.  *Which is leading us to… in following lessons.*  Sense receptors (eye) respond to inputs (energy) transmitting them as signals that travel along nerve cells to the brain. |

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| **Name of Phenomenon** | **Description of Phenomenon** | **What student questions does experiencing or exploring this phenomenon elicit?** | **What science ideas and/or DCI’s will students understand by pursuing these questions?** |
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