

Big Idea: Use recycled materials, and some new, to construct a device to communicate with light over a distance.

Learning Standards: 1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-PS4-4)

MP.5 Use appropriate tools strategically. (1-PS4-4)

1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4)

1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. (1-PS4-4) Use tools and materials provided to design a device that solves a specific problem.

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)

W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1)

Types of problem solving needed: Declarative knowledge, which will need to be explicitly taught during the project, will be the design and construction of circuit. Students will need to know about positive and negative charge on batteries and diodes on lights used. Procedural knowledge can be inferred for most of the project except where the paper circuits are concerned.

Objectives and ancillary concepts/content: SWBAT identify positive and negative charge of batteries and the charges provide current to power the light. SWBAT write about the outcome and describe problem solving process appropriate for grade level. SWBAT use information gathered through shared research to make decisions about the possible solutions to the problem.

Possible activities: Popsicle flashlights, paper circuits, glow sticks, dance pad mania, and penny battery

My Choice: I am choosing to do the glow stick challenge because of the greater number of possibilities for creative use of materials. The popsicle flashlight is a design that is fairly rigid in its construction and does not offer a great deal of deviation from the listed materials. I am going to change the use of string lights to mini led's if I am unable to find string lights in the dollar spot at Target which can be taken apart form my use. All of my Christmas lights are still working and solar powered, so I don't want to cut them up. I would be interesting to see if we can incorporate solar powered lights. We'll see what I find at Dollar Tree.

<https://pbskids.org/designsquad/build/glow-sticks/>