

# PictureSTEM K-5 Module Overview

| Grade | Unit Title                 | Engineering Design Challenge  | Science Connections   | Mathematics Connections  | Stage of Development   |
|-------|----------------------------|---|---|--|--|
| K     | Designing Baskets          | Students design a basket made from woven paper to carry the wet and dry rocks they find                                   | <ul style="list-style-type: none"> <li>• Sorting by properties</li> <li>• Nature vs. human-made</li> </ul>  | <ul style="list-style-type: none"> <li>• Patterns</li> <li>• Counting</li> </ul>   | Completed, small pilot next fall                                       |
| 1     | Designing hamster habitats | Students design a habitat trail for their hamsters that meet their hamsters' basic needs                                  | <ul style="list-style-type: none"> <li>• Animals, basic needs, animal habitats</li> <li>• Designed and natural systems</li> </ul>                                 | <ul style="list-style-type: none"> <li>• Characteristics of basic shapes and use those to compose and decompose objects,</li> <li>• Making numbers 0 - 20</li> </ul>                 | Completed, multiple classroom pilot                                    |
| 2     | Toy Box Organizer          | Students design an organization system for their messy toy box  | <ul style="list-style-type: none"> <li>• Physical properties and characteristics (color, size, shape, weight, texture, flexibility, strength)</li> </ul>          | <ul style="list-style-type: none"> <li>• Standard units of measurement</li> <li>• Understand length as a measurable attribute;</li> <li>• use tools to measure length</li> </ul>     | Finishing initial development, small pilot next year                   |
| 3     | <b>UNDER DEVELOPMENT</b>   |   |   |  |  |
| 4     | Countdown Clock            | Students design the layout of the circuit for one of the numbers in their countdown clock                                 | <ul style="list-style-type: none"> <li>• Energy</li> <li>• Electricity</li> <li>• Circuits</li> <li>• Compare insulators and conductors of electricity</li> </ul> | <ul style="list-style-type: none"> <li>• Modeling</li> <li>• Cost component</li> <li>• Polygons</li> <li>• Collect/organize data</li> </ul>  | Initial Development  |
| 5     | Nature Inspired Design     | Students design and test a prototype for finding or gathering water that is inspired by the adaptations of desert animals | <ul style="list-style-type: none"> <li>• Animal/plant structures that provide advantages</li> <li>• Natural systems</li> </ul>                                    | <ul style="list-style-type: none"> <li>• Algebraic Thinking and Recognizing Patterns</li> <li>• Interpret multiplication as scaling</li> <li>• Geometry &amp; Measurement</li> </ul> | Completed small pilots with teachers,, small classroom pilot next year |

## Designing a Toy Box

(Second Grade PictureSTEM Unit)

### Engineering Design Challenge -

Parents have been complaining about kids’ messy toys and how hard it is to bring toys with them because to get the toys out, they have to dump out the entire box. So a toy company wants to build a new and improved toy box. But they need your help – what could they do to help keep the toys organized when they are in the box?

| Science Connections   | Technology & Engineering Connections                                   | Mathematics Connections   |
|---|--|---|
| Physical characteristics (color, size, shape, weight, texture, flexibility, strength) | Importance of materials, engineering design and nature vs. human- made | Standard units of measurement<br>Understand length as a measurable attribute; use tools to measure length |

| Second Grade Unit Overview  |  |  |   |  |  |
|-----------------------------|--|--|---|--|--|
|                             | Day 1 – Non-standard units                                       | Day 2 – Standard vs. Non-standard                                | Day 3 – Physical properties   | Day 4 – Testing Materials  | Day 5 – Designing a toy box  |
| Literacy Activities         | Book: <i>How Big is a Foot?</i><br><br>Strategy: Story Structure | Book: <i>Measuring Penny</i><br><br>Strategy: Compare & Contrast | Book: <i>Living Color</i><br><br>Strategy: Identifying Details  | Book: Leo Cockroach<br><br>Strategy: Sequencing to lead to summarizing | Book: <i>Too Many Toys</i><br><br>Strategy: Summarizing narrative text |
| STEM integration activities | Treasure Hunt MEA  | Design your own “standard”                                       | Sort materials by physical properties and then describe objects in terms of their physical properties (Mystery bag) | Testing materials?<br>Planning and initial design                      | Create, test and redesign your toy organizer                           |

### Picture Books:

**Day 1:** Myller, Rolf. ( 1991). *How Big is a Foot?* New York, NY: Yearling

**Day 2:** Leedy, Loreen. (1997). *Measuring Penny*. New York, NY: Henry Holt

**Day 3:** Jenkins, Steve ( 2007). *Living Color*. Boston, MA: Houghton Mifflin

**Day 4:** O’Malley, Kevin. (1999). *Leo Cockroach...Toy Tester*. New York: Walker & Company

**Day 5:** Shannon, David. (2008). *Too Many Toys*. New York: Scholastic

1. What is the problem?

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2. How are we going to solve it?

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3. Circle the materials you want to use and tell why?

|  |  |
|--|--|
| <p><b>Aluminum Foil</b></p>         |  |
| <p><b>Tissue Paper</b></p>        |  |
| <p><b>Construction Paper</b></p>  |  |
| <p><b>Pipe Cleaners</b></p>       |  |
| <p><b>String</b></p>              |  |
| <p><b>Craft Sticks</b></p>        |  |
| <p><b>Foam Sheets</b></p>         |  |








**4. How will you use them? Draw an idea in the space below. (Plan #1)**

A large, empty rectangular box with a thin black border, intended for drawing an idea. The box is currently blank.

**5. Let's work together! Come up with a plan for your group.**

A large, empty rectangular box with a thin black border, intended for students to write their group plan. It occupies most of the page below the instruction.

**5. Materials**

| What materials do you need?  | How much? |
|--|-----------|
| Aluminum foil       |           |
| Tissue paper        |           |
| Construction paper  |           |
| Pipe cleaners      |           |
| String            |           |
| Craft Sticks      |           |
| Foam Sheets       |           |