STEM EDUCATORS ACADEMY

ACTIVITY TOOLKIT

HYBRID LEARNING DESIGN CHALLENGES

Plankton
IDIY Weather Station
Water Cycle
Climate Change
Spaghetti Marshmallow
Earthquake Proof Structures
Rube Goldberg Machines
Mineral Structures
Rockin’ Rockets
Camou-flies

STEM FACILITATION

SKILL BUILDER VIDEOS

Participation
Student Voice
Collaborative Teaching
Engineering Design Process
Using Narratives in Design Challenges
Relevance
Questioning and Reflection
Inquiry

Updated October 2020
Materials Lists and Suppliers

For Hybrid Learning Design Challenges

Bulk Orders for Multiple STEM Activities
- Pipe cleaners
- Masking tape (1 roll for each student)
- Construction paper (1 stack for each student)
- Glue stick (1 for each student)
- Coloring tools set (crayon box, color pencil box or marker set for each student)
- Pen/pencil for each student
- 10 inch straws
- Modeling clay or playdoh (a workable ball for each student)
- Balloons
- Index cards
- Scissors (1 per student)
- Ruler or measuring tape
- Thick rubber bands
- String (1 large roll that can be cut into smaller lengths for activities)
- An assortment of fasteners of various sizes (paper clips, binder clips)

Items to Organize Class Activities
- Paper lunch bags or clear plastic baggies

Items Youth May Have at Home
- Small jars (ex. Baby food jar, 1 per student)
- Scrap cardboard (save boxes)
- Heavy plastic plates or reusable plates (2 for each student)
- An assortment of fasteners of various sizes (paper clips, binder clips)

Suppliers
- For Bulk Orders
  - Webstaurantstore
  - ULINE
  - S&S Worldwide
- For STEM-Specific Orders
  - Pitsco
  - Carolina Biological
  - Acorn Naturalists

Items for One-Time Projects
- Spaghetti
- Marshmallows
- Pack of sponges

Additional Resources

Virtual Facilitation: Tips and Tools
Training Slideshows
More Trainings from ExpandED Schools
ORIGINAL DESIGN CHALLENGES BY CONTENT AREA

ELECTRICITY AND MAGNETISM

• **Magnificent Magnets**
  o Student Worksheet: Magnet Strength Test
  o Student Activity Prompts for Stations
• **All Charged Up**
  o Student Worksheet: All Charged Up
  o Student Worksheet: Static Electricity
• **Squishy Circuits**
  o Student Worksheet: Squishy Circuits
• **Wiring a House Design Challenge**

ENGINEERING AND ENERGY TRANSFORMATIONS

• **Yeastie Beasties**
• **Salt Sensation Lab**
  o Student Worksheet: Rock Salt Worksheet
  o Student Worksheet: Heat/Ice Pack Worksheet
• **Blackout Cooler Design Challenge**
  o Station Activity Sign: “Making the Mitts”
• **Solar Oven Design Challenge**

ECOSYSTEMS

• **Finch Beak Race**
  o Student Worksheet: Raw Data
  o Student Worksheet: Data Graph
• **Hunger Game Content Lesson**
• **Hunger Game Design Challenge**
  o Student Worksheet: Game Design
• **Prosthetic Beak Design Challenge**
• **Spider Web Design Challenge**

DIVERSITY OF LIFE

• **Gliding Animal Design Challenge**
  o Student Worksheet: Gliding Animal Design
• **Jitter Critter Challenge**

ENERGY AND MATTER

• **AirZooka Design Challenge**
• **Chem Car Design Challenge**
• **Pom-pompei Volcano Design Challenge**
• **Slime Design Challenge**
ORIGINAL DESIGN CHALLENGES BY CONTENT AREA

GEOLGY
- Edible Earth Contest
- Mineral Madness Content
- Mineral Structures Design Challenge
- Pom-pompeii Volcano Design Challenge
- Spaghetti Marshmallow Design Challenge
  - Student Worksheet: Spaghetti Marshmallow
- Earthquake Bridge Design Challenge

DYNAMIC EQUILIBRIUM: THE HUMAN ANIMAL
- Choreo Graph Design Challenge
- Paralympics Wheelchair Design Challenge
- Rube Goldberg Design Challenge
- Saran Wrap Mannequin Design Challenge
- Zombie Apocalypse Design Challenge

DYNAMIC EQUILIBRIUM: OTHER ORGANISMS
- Battle Bug Design Challenge
- Dogfish Shark Dissection
- Owl Pellets Dissection
- Pet Mobile Design Challenge
- Plant Hydraulics Design Challenge
- Robo Bee Design Challenge

ENERGY, FORCES & MOTION
- Newton's Law Stations
  - Newton's Law Worksheets
- Duct Tape Pirate Ship Design Challenge
- Gliding Plane Design Challenge
  - Student Worksheet: Glider Challenge
- Ski Jump Design Challenge
  - Student Worksheet: Ski Jump Design Challenge
  - Student Reading: Projectile Motion
- Sphero Design Challenge

THE SUN, EARTH & MOON SYSTEMS
- Constellation Creations
- Cosmic Sculptures Design Challenge
- Moon Motions Content Lesson
- Moonlight Laser Maze Design Challenge
- Rockin' Rockets Design Challenge
ORIGINAL DESIGN CHALLENGES BY CONTENT AREA

EVOLUTION, NATURAL SELECTION & ADAPTATIONS
- Camo-Flies
- Creature Feature Design Challenge
- Light Detective Design Challenge
- Fossil Making Design Challenge
  - Station Activity Signs: Fossil Making
- Arms Race Design Challenge

GROWTH, DEVELOPMENT AND REPRODUCTION OF ORGANISMS
  - Student Worksheet: Finding Patient Zero
- Delicious DNA
  - DNA Lab Protocol
  - DNA student worksheet
- Felt Moji Design Challenge
  - Student Worksheet: Phenotype Felting Planning
- Gene Machine Design Challenge
- Man Versus Germ Design Challenge
  - Student Worksheet: Man Vs. Germ