Shopping List

The following is an abbreviated list of the materials required for the *Life on Mars?* module of activities. Refer to the materials section of each activity for details, such as possible substitutions, suggestions for books and websites, printing recommendations, and other notes. Many of the materials are repurposed items, such as empty, cleaned 2-liter bottles; consider gathering donations from your community.

Ice Breaker Activity: Is it Alive?

For each child:

- ☐ 1 printer label with "living" or "nonliving" listed on it (standard mailing labels)
- ☐ 1 pencil/pen
- ☐ optional: 2–3 markers

For the facilitator:

- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ 1–2 permanent markers
- ☐ an area where the children can move around
- ☐ Post-it® pads (3" × 3" or 4" × 4") or index cards
- ☐ optional: 1 cardboard box (approximately 12"W × 18"L × 12"H)
- ☐ optional: a variety of props and pictures representing characteristics of living things
  - ☐ Fake food, mom and baby stuffed animals/dolls, etc.

  There are many possibilities here, so use your imagination! Use items to represent the children's ideas.

Activity 1: Searching for Life

For each pair of children:

- ☐ 3 clean plastic cups (5–8 oz.), clear if available
- ☐ enough sand to fill all the cups ¼ full
- ☐ 3 teaspoons sugar, evenly divided between the cups
- ☐ 1 teaspoon instant active dry yeast
- ☐ 1 tablet of crushed (as finely as possible) Alka-Seltzer® or comparable fizzing tablets
- ☐ hot water (105°–115°) F to cover the sand in each cup (not hot enough to kill the yeast)
- ☐ 1 pitcher/carafe/other appropriate container for hot water
- ☐ optional: library books related to the topic
- ☐ optional: variety of colorful Post-It® notes

For each child:

- ☐ 1 pencil/pen
- ☐ 1 copy of the *Extreme-O-File: Searching for Life* activity pages

For the facilitator:

- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ flip chart, white board, or blackboard and appropriate writing utensils
- ☐ permanent marker for writing on the cups

- ☐ thermometer
- ☐ container (large mug, cup, or pitcher) of water to fill all the cups to cover the sand
- ☐ optional: article on defining life: www.astrobio.net/exclusive/226/defining-life

Activity 2: Mars by the Book

For the group:

- ☐ markers or colored pencils
- ☐ 1 large piece of poster paper or butcher paper
- ☐ 1 red balloon
- ☐ 1 blue balloon
- ☐ 1 piece of blue string or yarn 25 inches long
- ☐ 1 piece of red string 13 inches long
- ☐ 3-4 packages of sticky dots (small round labels)
- ☐ selection of nonfiction books about Mars
- ☐ 1 copy of the *Earth Fact sheet* (per child)
- ☐ optional: whiteboard or poster paper and markers or chalkboard and chalk to record the children's ideas

For each child:

- ☐ 1 pencil/pen
- ☐ 1–2 pieces of paper

For the facilitator:

- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ 1 copy of the *Earth-Mars Comparison Fact Sheet*
- ☐ 1 black permanent marker (fine tip)

Activity 3: Nurturing Life

For each group of 3–4 children:

- ☐ selection of books about gardening, life in the universe (astrobiology), and extremophiles

For each large group (maximum of 15 per facilitator):

- ☐ 2–3 pitchers or watering cans (watering hose if outside, to be controlled by an adult)
- ☐ 1 set of the NAI Extremophile Trading Cards

Garden Option #1: Outdoors Garden (select one or more of each plant)

- ☐ select a garden plan appropriate for your geographic region
- ☐ purchase plants/seeds appropriate for your geographic region
- ☐ 3–5 hand trowels/shovels

Garden Option #2: Indoor Container Garden

- ☐ select plants/seeds appropriate for your geographic region
- ☐ purchase plants/seeds appropriate for your needs (light conditions, watering, etc.)
- ☐ 2–4, 1 cup-sized measuring cups or 8-oz. plastic cups for scooping dirt/sand/rock
- ☐ 1 (0.5 cubic foot or larger) bag of gravel or pea rock for the bottoms of containers
- ☐ containers (pots or long window containers)
- ☐ soil, enough to fill your containers to approximately ½ inch below the rim
- ☐ for Xeriscaping (optional): use a sandy mix, as described in the "Preparation" section or a "Succulent and Cactus" mix

For each child:

- ☐ 1 pencil/pen
- ☐ 1 pair of scissors
- ☐ 1 set of the Explore: Life on Mars? Trading Cards and Scientist Spotlight pages

Garden Option #3: Take-Home Garden (per child)

- ☐ select and purchase seeds/plants
- ☐ optional: rooting hormone powder or gel (available at most garden centers or department stores with garden centers)

**Note: This is needed only if you plan to use jade or other plant cuttings.*

- ☐ ½ cup to ¾ cup of gravel or pea rock for the bottoms of containers
- ☐ 1 clean, empty 1-liter or 20-oz. plastic bottles (no lids/caps)
- ☐ 2 cups of soil
- ☐ ½ cup of water
- ☐ duct tape (in fun colors, if possible), approximately 4–6 inches per child
- ☐ 1 plant care label/card, including plant name, lighting, temperature, and watering/feeding requirements
- ☐ optional: copy of the *Extreme-O-File: Nurturing Life* activity pages

For the facilitator:

- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ 1 large poster (22" × 28" or larger)
- ☐ 3 packs of washable markers (a variety of colors)
- ☐ an outdoor garden area approximately 4' × 4' or larger

OR

- ☐ an indoor area near a window (that is sunny for at least half of each day and at least 3' long or longer)
- ☐ an area indoors where the children can move around and interact with each other
- ☐ 1 whiteboard or poster paper
- ☐ 3–5 Markers
- ☐ 3–5 Post-It® pads (or colored paper)
- ☐ NASA online video clips
- ☐ Optional (highly recommended): computer, projector, and access to the Internet
- ☐ optional: extra copies of the *Extreme-O-File* activity pages, Trading Cards, and/or resource pages for this activity (for the extension poster)

Activity 4a: Mars from Above — Mars Match

For each Earth/Mars Team of 3–4 children:

- ☐ 1 set of Mars Cards (cut)
- ☐ 1 set of full page print outs of Earth Image Placemats, printed on cardstock if available
- ☐ optional: sheet protectors for the images or lamination pages

For each child:

- ☐ 1 pencil or pen
- ☐ optional: clipboard
- ☐ optional: 1 set of *Extreme-O-Files: Mars from Above* activity pages

For the facilitator:

- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ 1 flashlight
- ☐ 1 empty soup bowl
- ☐ 1 copy of the *Mars Match Image Descriptions*

Activity 4b: Mars from Above — Caring Channels

For each station (serving ~10 children):

- ☐ About 10 pounds of clean playground sand
- ☐ 4–5 rocks (2" diameter or less)
- ☐ 4–6 (2-liter) bottles, without lids, filled with water
- ☐ access to water to refill the bottles as needed
- ☐ 2 plastic wallpaper trays or other long narrow plastic container such as plastic window planter boxes
- ☐ 4 standard bricks (foam floral/craft bricks if desired)
- ☐ 2 (5-gallon or larger) trash cans or buckets
- ☐ 2 large trash bags to line the buckets or trash cans
- ☐ 1 set of full-page Earth Image Placemats (stream channel images only)
- ☐ 1 set of Mars Cards (channel images only)
- ☐ Optional (recommended): 5 pounds of pesticide- free diatomaceous earth
  *Note: Aids in creating well-defined channels
- ☐ optional: 1–2, 24-oz. bottles of craft stand, any color (readily available at hobby or department stores)

For each child:

- ☐ 1 pencil or pen
- ☐ optional: 1 set of *Extreme-O-File: Mars from Above* activity pages
- ☐ optional: clipboard
- ☐ optional: 1 set of *Life on Mars? Trading Cards*

For the facilitator:

- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ scissors or other tool to poke holes though thin plastic trays

Activity 4c: Mars from Above — Viewing Volcanos

For each station (serving 4–6 children):

- ☐ 2–3 rolls of Scotch® tape
- ☐ 1 small bottle of white vinegar
- ☐ 1, 1-cup measuring cup
- ☐ 1 tablespoon (for measuring vinegar)
- ☐ 1 small box of baking soda (16 oz.)
- ☐ 4 plastic spoons (for measuring/scooping baking soda)
- ☐ 1 roll of paper towels
- ☐ 1 plastic tablecloth (to cover and protect the table)
- ☐ 1 garbage can (lined)
- ☐ 1 set of full-page *Earth Image Placemats* (volcano images only) from Mars Match activity
- ☐ 1 set of *Mars Cards* (volcano images only) from the Mars Match activity
- ☐ optional: laminating pages or page protectors for the volcano images

For each child:

- ☐ 1 pencil/pen

Materials for a volcano:

- ☐ 1 heavy-duty paper plate
- ☐ 1 piece of aluminum foil approximately 18" long
- ☐ 1 small paper cup (4 oz. or smaller)
- ☐ optional: 1 cookie sheet or other shallow pan
- ☐ optional: 1 set of *Extreme-O-File: Mars from Above* activity pages
- ☐ optional: clipboard

For an audience of 15–20 to share:

- ☐ 1 (8½" × 11") *Be Creative…Be an Engineer!* poster
- ☐ A selection of adhesives:
  - ☐ 3 or more rolls of masking tape
  - ☐ 3 packages of putty adhesive, such as Sticky Tack
  - ☐ 1 (½" size, 200 count) roll of Glue Dots®

For the facilitator:

- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ 1 empty soup bowl
- ☐ 1 flashlight

Activity 5: Protecting Life — The Martian Challenge

For the group:

- ☐ A selection of **nonfiction** books about extremophiles and life in the universe

For each child:

- ☐ 1 pen or pencil
- ☐ scissors
- ☐ tape and/or glue
- ☐ Optional (recommended): *NAI Extremophile Trading Cards*
- ☐ optional: 1 copy of *Extreme-O-File: Protecting Life* activity pages
- ☐ optional: 1 copy of *Life on Mars? Extremophile Trading Cards* and *Scientist Spotlight* pages

- ☐ optional: 1 hair dryer

Activity Part 1:
- ☐ 3 UV beads
- ☐ 2 non-UV beads
- ☐ 2 pipe cleaners
- ☐ various craft items for constructing a creature, such as Styrofoam balls, felt, foil, pipe cleaners, small milk cartons, empty small water bottles, colored card stock, old CDs, pompoms, and colored yarn

Activity Part 2:
- ☐ 1 Mars creature (should have been made during Part 1 of this activity)
- ☐ various materials that will "protect" the Mars creature from ultraviolet radiation [for example, construction paper of different colors (green or blue offers the best protection), foil, plastic wrap (of various colors), paper sunglasses (may be obtained from an optometrist), sunscreen (try different SPFs), masking tape, paper, cloth, etc.]; you may even wish to include containers of water for the children to experiment

For the facilitator:
- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ an outdoor area where the children can spread out a little, preferably with both shady and sunny areas
- ☐ an area indoors where the children can move around and interact with each other

Activity 6: Mars Engineering

For each team of 4–6 children:
- ☐ 2 copies of the engineering design process (The Works or Design Squad are good options)
- ☐ 3 rolls of duct tape (variety of colors and metallic)
- ☐ 1 roll of masking tape
- ☐ 1 roll of Scotch® tape
- ☐ 2–3 pairs of scissors
- ☐ 4–6 markers (permanent, in a variety of colors)
- ☐ 1 bottle of glue
- ☐ 1 roll of aluminum foil
- ☐ 3, 2–3-inch-diameter rocks (any type that is easily available)

Materials for building a model rover: A variety of building materials
- ☐ *Miscellaneous craft and everyday items*: Straws, pencil top erasers, beads of various sizes, foil cupcake holders, screens, wooden miniatures, aluminum foil, plastic wrap (of all colors), old CDs, pipe cleaners, toothpicks, wire, wire cutters, Legos, construction paper (variety of colors, black), tinsel, ribbon, fabric, gauze, wood dowels/skewers, rubber bands, shiny streamers, etc.
- ☐ *For rover wheels*: Wooden spools, large buttons, bottle caps, plastic cups (sturdy), empty (clean) Play-Doh® containers, old CDs, etc.
- ☐ *For rover body*: Pint-sized milk containers, coffee cans, soup cans (tape any sharp edges), paper or Styrofoam cups, empty DVD cases, black plastic or biodegradable seedling (plant) trays, empty egg cartons, cereal boxes, 2-liter soda bottles, different-sized Styrofoam blocks, other empty plastic or cardboard containers/boxes, etc.
- ☐ *Other:* Use your imagination and best judgment for providing safe, fun, and readily available materials!

For each child:
- ☐ 1 pencil

- ☐ 1 copy of the *Curiosity Tools Schematic*, preferably in color
- ☐ optional: *Extreme-O-File: Mars Engineering* activity pages

For the facilitator:

- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ an area indoors where the children can move around and interact with each other
- ☐ butcher paper/disposable table cloth to cover tables
- ☐ optional: hot glue guns with glue sticks

Activity 7: Mars Imaginings — The Story

For the group:

- ☐ 1 whiteboard, large sheet of butcher paper, or poster paper
- ☐ Markers or chalkboard and chalk to record the children's ideas
- ☐ computer/TV/projector to show brief sci-fi video clips
- ☐ staplers (one per 4–6 children)
- ☐ selection of **science fiction** books about Mars
- ☐ optional: selection of **nonfiction** books about Mars
- ☐ optional: video camera to record the group movie trailer

For each child:

- ☐ 1 pencil/pen
- ☐ 1 *Zine template* and folding instructions
- ☐ art supplies, such as colored pencils, crayons, and markers
- ☐ optional (Extension): 1 release form for the parent or guardian to sign (if the "movie trailer" is to be filmed)
- ☐ optional: copies of the *Extreme-O-File: The Story* activity pages
- ☐ optional: 1 set of the *Life on Mars? Trading Cards*

For the facilitator:

- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ 2–3 markers or chalkboard and chalk to record the children's ideas
- ☐ 1 computer/TV/projector to show brief sci-fi video clips
- ☐ connection to the Internet

Activity 8: Live Tonight — The Planets!

For each group of approximately 20 visitors to share:

- ☐ 1 telescope operated by an amateur astronomer
- ☐ 1 or more small stepstools for children to stand on to reach high telescope eyepieces
- ☐ optional: 1 pair of binoculars
- ☐ optional: 1 camera tripod and binocular adapter
- ☐ tables set up indoors or outside, in a well-lit area and out of the path of traffic
- ☐ art supplies such as colored pencils, crayons, and markers
- ☐ books about Mars, space exploration, life in the solar system, extremophiles

For each child:

- ☐ 1 pencil/pen

- ☐ 1 sheet of paper
- ☐ optional: 1 Mars Lithograph (NASA educational product number LG-2009-09-569-HQ)
- ☐ optional: sky map of the current night (monthly sky charts showing the current positions of the planets relative to constellations are available free from a variety of websites)
- ☐ optional: materials to complete the *Searching for Life* soil experiment

For the facilitator:

- ☐ *Brief Facilitation Outline* page
- ☐ background information
- ☐ 1 copy of *Appendix A: Throw a Star Party!*
- ☐ flashlights for staff, preferably with red plastic wrap or red paper taped over the light
- ☐ optional: access to electricity for telescopes and a well-marked extension cord, secured so that it won't be a hazard in the dark
- ☐ glow sticks to mark cords
- ☐ access to drinking water
- ☐ access to bathrooms
- ☐ optional: *Explore: Life on Mars?* activity projects (stories, rovers, garden, etc.) to share with the community