



Main Set Instructions



Stellar VBS captivates kids with rugged moonscapes, colorful constellations, and lunar landers! Group's imaginative design team makes it easier than ever to effortlessly transform your church into a gorgeous galaxy with easy-to-find items like kiddie pools, sleds, and fabric-dyed canvas cloth. (We'll even show you how to use those old CDs that are collecting dust!)

Check out instructions for how to build the following pieces and create a main set that's out-of-this-world!

- Comet
- Lunar Lander
- Moon Tarp
- Rover

NOTE: ALL SIZES AND MEASUREMENTS FOR THE STELLAR MAIN SET ARE UP FOR INDIVIDUAL DISCRETION. THE SIZES GROUP PUBLISHING USED ARE MENTIONED FOR REFERENCE IF YOU WISH TO BUILD A REPLICA, BUT ARE NOT SET IN STONE.

Paint Colors used for Stellar Main Set

One quart of each color will be all you need for the entire Decorating Places build.



Home Depot Colors



Blue Vista

SW1775

Premium Plus Satin



Atomic Tangerine

S-G-320

Premium Plus Satin



Chakra

P100-6

Premium Plus Satin



Black

Premium Interior Flat



White

Premium Interior Flat

Comet

Materials:

- ♦ one 25-ft roll bendable wire (we used 16-gauge galvanized steel wire)
- ♦ 2 rolls iridescent, transparent cellophane gift wrap (26 in x 8 yd)
- ♦ wire cutters
- ♦ transparent tape
- ♦ 2 strings of fairy lights (battery powered)
- ♦ 4-in zip ties (10-12)
- ♦ fishing line



NOTE: ALL SIZES AND MEASUREMENTS FOR THE COMET ARE UP FOR INDIVIDUAL DISCRETION. THE SIZES GROUP PUBLISHING USED ARE MENTIONED FOR REFERENCE IF YOU WISH TO BUILD A REPLICA, BUT ARE NOT SET IN STONE.

Directions:

Step 1: Cut a piece of wire measuring 10 feet.

Step 2: Cut a second piece of wire measuring 8 feet.

Step 3: Fold each length of wire in half and twist it together to create a stronger strand. When this process is complete, you will have a 5-ft twisted strand and a 4-ft twisted strand.

Step 4: To form the head of the comet, create 2 circle shapes from wire with a diameter of about 10 in. Then zip tie them together perpendicularly, creating a sphere shape.

Step 5: The tail of the comet is formed by attaching both long strands of wire (the 4-ft and 5-ft strands) to the head about 4 in apart from each other. The longer piece of wire should be on the bottom, the shorter piece on the top. Twist and turn the wires to join them together. Add zip ties to help secure the places where the wires meet the sphere for extra stability.

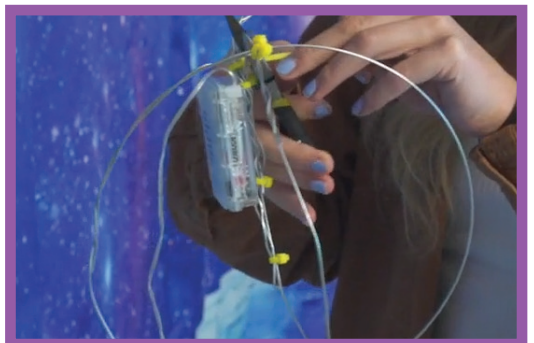
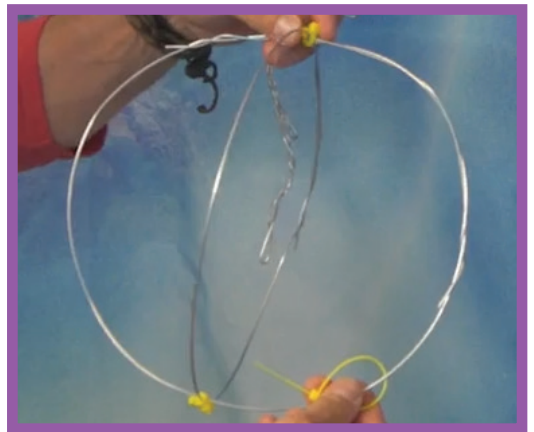
Step 6: Position the long wire pieces to create an arch that continuously gets larger from the sphere to the ends. Our wire ends were about 18 in. - 2 ft. from each other at the end of the tail.

Step 7: To secure the arch, attach separate pieces of wire perpendicular to the long arching tail pieces, resembling a ladder.

Step 8: Attach pieces of fishing line to stable points on the top edge of the head and arch of the comet frame. This will make it easier to suspend the comet in your Stellar set.

Step 9: Use tape or zip ties to secure the battery packs of the string lights to a stable point that is easy to access in the wire frame.

Step 10: Use transparent tape to attach battery-powered fairy lights to the arched wires.

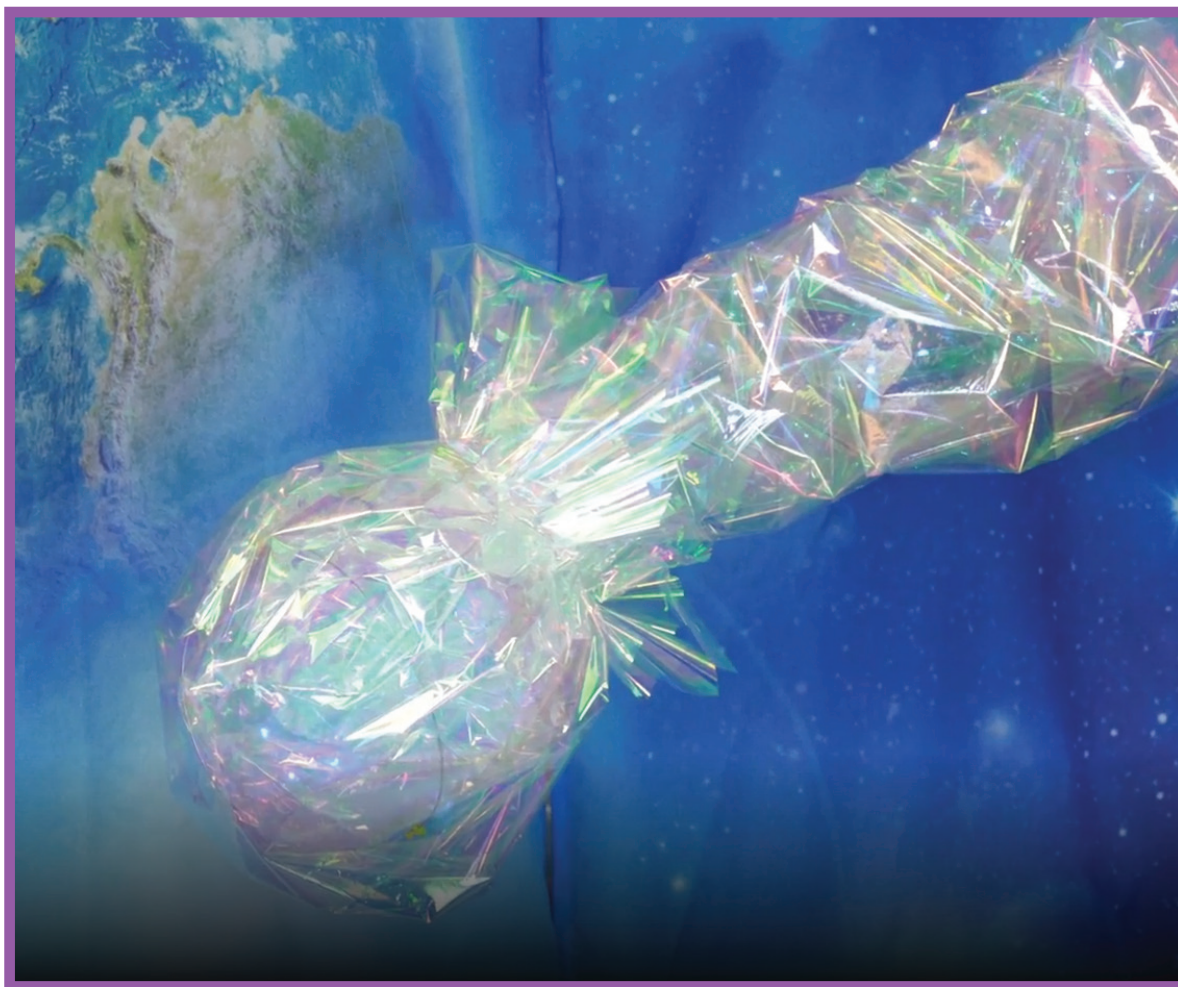


Step 11: With a string of fairy lights inside, crumble up a ball of iridescent wrap. Stuff the ball into the wire comet head. With a large piece of wrap, cover the head of the comet like a lollypop, then tie it off with fishing line at the neck.

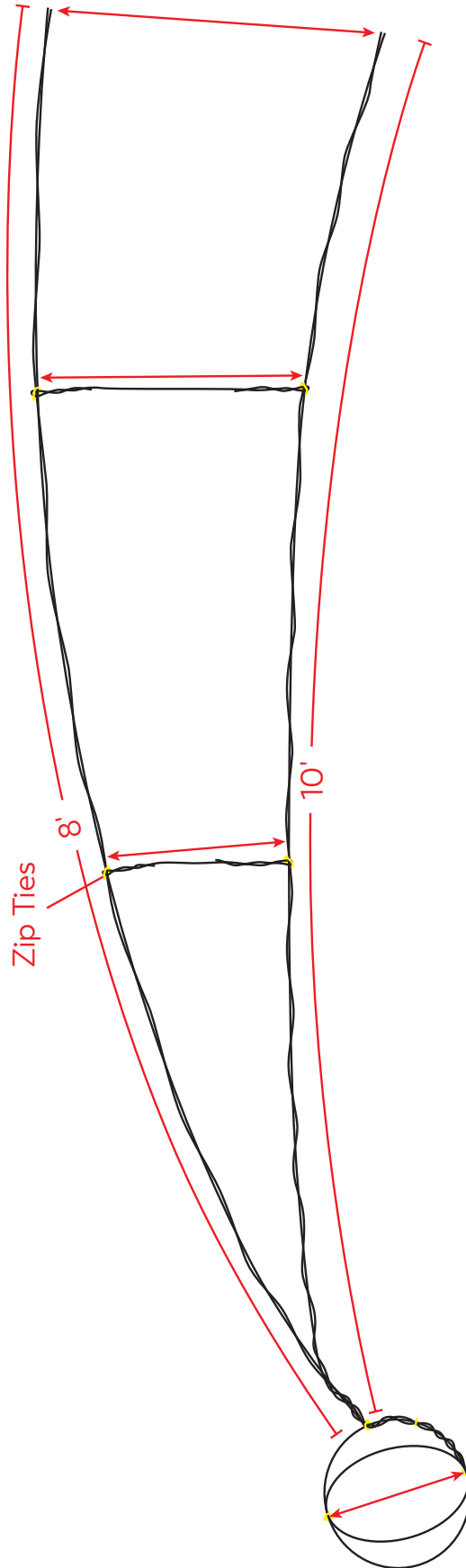
Step 12: Wrap the entire comet—head and tail—in iridescent wrap, then secure with tape as needed. Be sure to secure the wrap to the wire frame in several places.

Step 13: To create a flared look, cut strips of iridescent wrap and tape them on separately.

Step 14: Hang the finished comet by the fishing line to the ceiling.



Comet Specs



Lunar Lander

Materials:

- ♦ Lander Templates, projector, or digital projector
- ♦ 4 PolyWall sheets (4 ft. x 8-ft)
- ♦ permanent marker
- ♦ large cutting mat or surface (We used a 4x8-ft plywood sheet.)
- ♦ masking tape
- ♦ painter's tape
- ♦ utility knife
- ♦ hot Knife
- ♦ saw
- ♦ 4 sheets 2-in Polystyrene foam insulation board (4 ft x 8 ft x 2in)
- ♦ 4x4-ft sheet $\frac{3}{4}$ -in Polystyrene foam insulation board
- ♦ 100 Cool Connectors
- ♦ 1 can black spray paint
- ♦ 1 can metallic silver spray paint
- ♦ 6-ft carpet tube cut into four 16-in long pieces
- ♦ plastic plant saucer (12x4-in)
- ♦ 1 can spray foam insulation
- ♦ can light with a bulb that does not get hot
- ♦ 12-in plastic flowerpot
- ♦ saucer sled or trash can lid (about 26-in round)
- ♦ $\frac{3}{4}$ -in PVC pipe (5½ ft)
- ♦ $\frac{3}{4}$ -in PVC T joint
- ♦ $\frac{3}{4}$ -in PVC 90° coupler (2)
- ♦ hot glue
- ♦ 15x20-in clear vinyl
- ♦ 6 double stick Velcro pieces (about 1-in long)
- ♦ 2 hinges (2-in long)
- ♦ 1 quart purple paint (We used Behr interior satin color: Chakra.)
- ♦ 1 quart black paint
- ♦ 1 quart white paint
- ♦ paintbrush
- ♦ dropcloth
- ♦ Giant Decorating Poster Pack



NOTE: ALL SIZES AND MEASUREMENTS FOR THE LUNAR LANDER ARE UP FOR INDIVIDUAL DISCRETION. THE SIZES GROUP PUBLISHING USED ARE MENTIONED FOR REFERENCE IF YOU WISH TO BUILD A REPLICA, BUT ARE NOT SET IN STONE.

Directions:

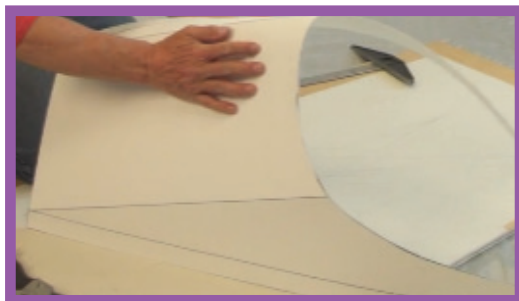
Create the Panels

Step 1: Project the Lunar Lander Template found on pg. 9 onto a PolyWall sheet. Trace the template on the PolyWall with a permanent marker in the following way:

- Panel 1: Trace the full template.
- Panel 2: Trace the outside and top and bottom band of the Lunar Lander body and the exhaust vent.
- Panels 3 and 4: Trace the outside and top and bottom band of the Lunar Lander body.

Step 2: Use a utility knife to cut out each panel. Have a sturdy cutting surface like plywood or a cutting matt under the PolyWall. To cut through the PolyWall, make multiple light cuts along the line, eventually cutting all the way through. This helps to keep the cuts on track and not veer off the cut line.

Step 4: Cut the two exhaust vents. Note the score lines versus cut lines. To score, use your utility knife and a straight edge to make a couple of light incisions on the PolyWall. Pay close attention to what side each line should be scored from. Then bend the PolyWall at the line to create your desired angles. Score the middle two lines from the front of the PolyWall and the outside two lines from the back. This way they'll bend the right direction. (The outside lines exist to create a tab on the exhaust where it'll be connected to the panel.)



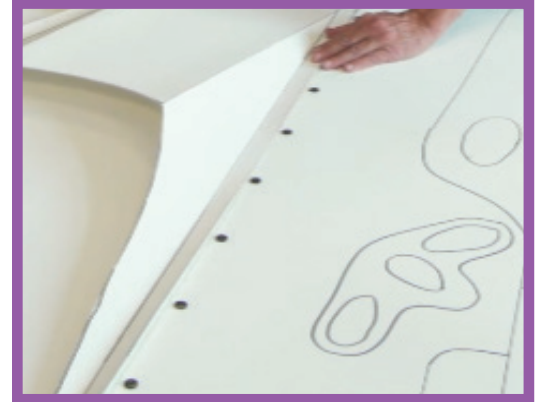
Connect the Panels

Step 1: This process is a lot easier with a friend or two helping. Start with the front panel (the one with the door and window design). Lay a panel on both sides of the front piece, overlapping them underneath by 1 inch.

Step 2: Stick painter's tape on the seams to help hold them in place.

Step 3: Use a $\frac{3}{16}$ drill bit to drill holes every 5 inches down the sides where your panels are overlapping.

Step 4: Use Cool Connectors (we spray painted ours black for a fun look) and push them in from the front all the way down the seams where you drilled your holes.



Attach the Exhaust Vents

Step 1: Lay the three attached panels on the floor. Position the exhaust vents on each side panel.

Step 2: Use masking tape to temporarily hold the exhaust vent in place. Mark 5-in increments down both tabbed edges. When attaching the vent, shape the vent to make it a bit bowed, hold it in place, and drill holes through the vent tabs and panel where you marked. Use Cool Connectors to secure it. Repeat this process for the exhaust vent on the other side.



Attach the Final Panel

Step 1: With the three pieces already attached and lying on the floor, repeat the drilling and connecting process on one of the edges. Connecting all the panels together is a two-person job.

Step 2: Stand the four panels upright, and bend them to where the two edges meet, with a 1-in overlap. With one person inside the lander for support and one person on the outside, clamp the top and bottom edges where the panels meet to temporarily hold the panels together while drilling and until all the Cool Connectors are in place.

Step 3: Drill holes 5 in apart down the seam, and attach with Cool Connectors.

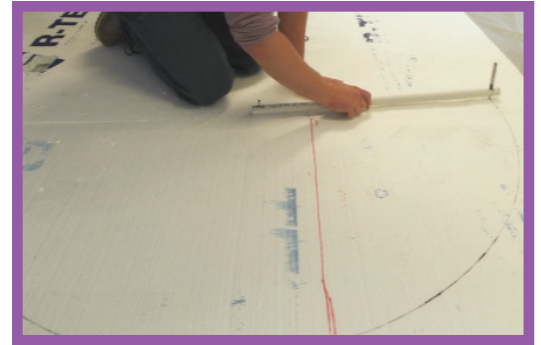
Create a Stable Base

Step 1: Trace 2 circles onto 2-in foam. One should be the circumference of your lander bottom so that the lander will be able to sit on it without overlapping, creating a base. The second circle needs to be slightly smaller to fit directly on top of the first circle, and inside of the lander.

Step 2: Here's the method we used to determine the size circle we needed to cut. Determine the circumference of your lander at the bottom where it sits by using the equation $\pi \cdot D$ (π , 3.14, multiplied by the diameter). Find your diameter by measuring the distance from edge to edge on your lander bottom. If your circumference fits on one foam board piece, great! Ours didn't, so we put two pieces of foam side by side to create a larger piece. We determined the radius (diameter divided by 2) and used a pencil-and-string trick to trace our circle onto the foam.

Step 3: Use a hot knife to cut foam circles. Once both circles are cut, make sure they fit the lander. The lander should comfortably sit on top of the bigger circle, used as a base. The other circle should fit snugly inside the lander to create structure and stability. Having our smaller circle in halves was useful, as we were able to create a gap between them to make sure they fit snugly into the curve of the lander, allowing some room for mistakes in our measuring or cutting.

Step 4: To adhere the foam circles to one another, apply insulating spray foam between the two circles, and place the smaller one directly on top and in the middle of the larger circle. Let these sit and dry for a couple of hours. Note that they are not glued or attached to the panels in any way at this point.



Lander Legs

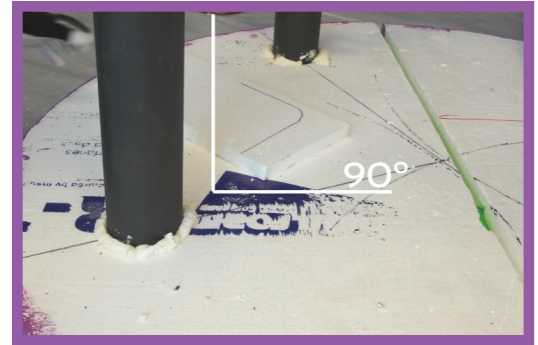
Step 1: Paint a 6-ft length of carpet tube black, and allow to dry. Cut 4 pieces in 16-in lengths. It is important to have straight cuts to ensure the lander sits level.

Step 2: To attach the lander legs, lay foam circles upside down. On top, measure the four carpet tube legs to sit equally apart in a square. Trace around the tubes with a marker to mark their positions, then use the hot knife to carve out the area about 1 in deep and 1 in wide. We used the square tip piece for the hot knife as it had a notch on the end that made the 1-in distance easy to measure.

Step 3: Spray foam insulation into your carved circles, then push the carpet tubes inside. Use a right angle to make sure the tube is standing up straight. Repeat this process for the other three legs, and allow to dry. Lay a large, flat surface, like an extra foam sheet, on top of the legs to make sure they're all level. If needed, place something heavy on top of the flat surface, like paint cans, to hold the legs in place while they dry.

Step 4: Paint the 4 plastic plant saucers silver, and allow to dry.

Step 5: To create feet for the lander legs, cut a 4-in hole in the center of each plant saucer. Do this by tracing around the carpet tube with a marker. Cut out the circle with a utility knife. Push a saucer onto each leg.



Center Thruster

Step 1: Spray paint a large plastic planter silver. Once dry, dust a coat of black spray paint on the open edge of the pot to create a "charred" effect. Let dry.

Step 2: Drill a hole big enough for an electrical cord to pass through the base of the flowerpot. Mount a can light in the base of the pot.

Step 3: To attach the thruster to the bottom of the Lander base, repeat the process used to attach the legs (trace around planter, carve out with hot knife, spray foam insulation, then push in the thruster/planter).

OPTIONAL: Attach color-changing LED string lights to the bottom of your lander in a circle around the legs to create a cool glowing effect. You can attach these by staples or makeshift staple pins made from wire.



Control Panel

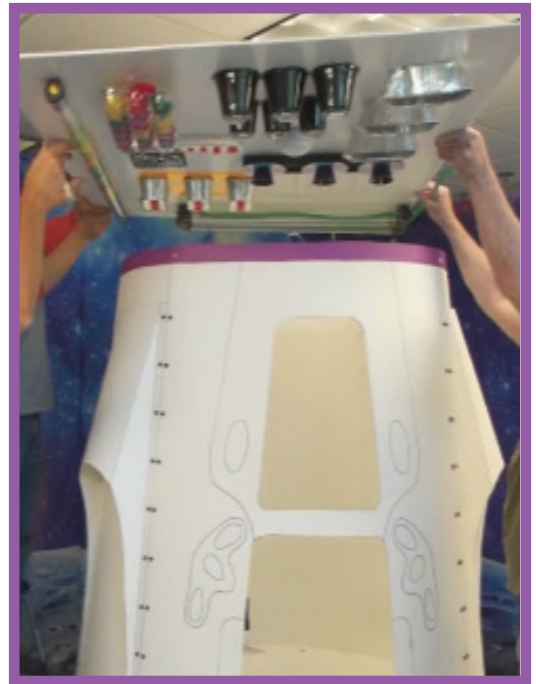
Step 1: Create a control or gizmo panel using foam core or cardboard as the backing and recycled materials for buttons and widgets. We used materials such as string lights, tin bread pans, ping-pong balls, plastic egg cartons, and LED light protective covers. For detailed instructions, go to group.com/vbsTools and see Gizmo Panel.

Step 2: Place the control panel inside the lander. To help it stand, we cut an easel back out of scrap foam core.

PRO TIP: Don't have time to create a control panel? Use a Space Station Plastic Backdrop taped to foam core or cardboard to create an easy control panel alternative.

Step 3: Drill a hole in the foam base of the lander to allow a power strip to be placed inside. This is a great way to add more lights to the control panel and the underside of the lander.

PRO TIP: Cut a small door in the back panel of your lander for easy access to the power strip.



Attach the Lander Door

Step 1: First back the door with a piece of foam. (We used $\frac{3}{4}$ -in foam.) Trace the door shape with a marker onto the foam. Use a hot knife to cut the foam, and attach the foam to the back of the door panel using insulating spray foam. Allow to dry.

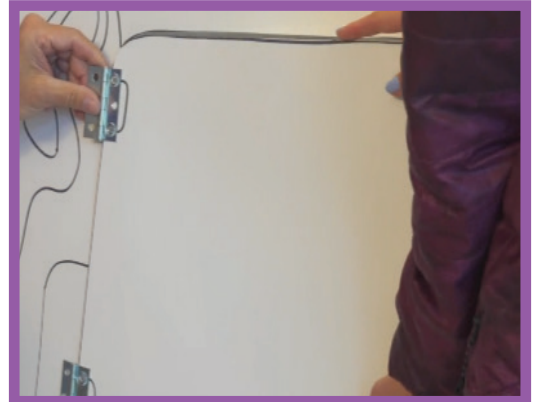
Step 2: Once dry, attach one of the door sides with two small hinges. Then attach the hinges to the lander. Cool Connectors work great as the attachment pieces on the hinges.



Create the Lander Top

Step 1: To create the lander top, cut a foam circle out of 2-in foam to fit the top circumference of your lander so that it sits flush with the edges.

Step 2: Rest the foam lander top on top of the control panel and screw the edge of the PolyWall lander panels into the foam piece in four different spots from the outside in. This adds even more structure and stability and allows a platform to place the hatch later on.



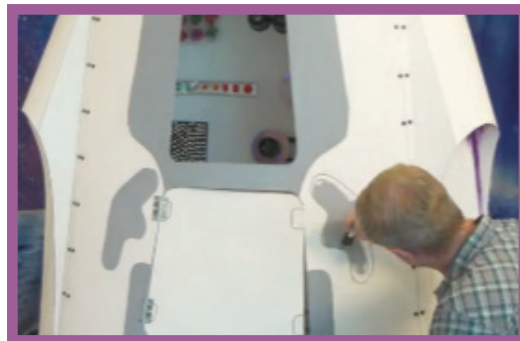
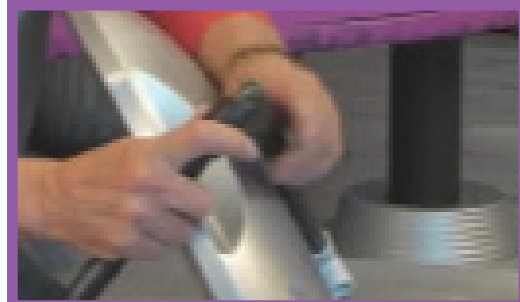
Top Hatch and Window

Step 1: To make the hatch, spray paint a saucer-shaped snow sled or trash can lid silver/metallic. Allow to dry.

Step 2: Hot glue a PVC T joint to the middle of the back of the sled.

Step 3: Cut two 14-in PVC pieces to fit from the T joint to the edges of the sled. Two 90° fittings with 18-in pieces are the standing legs. The “openness” of the hatch is adjustable and can be changed by twisting the 90° joints to different angles.

Step 4: To fill the window, cut a piece of clear vinyl to fit the shape, giving an extra 1-in allowance. Stick double-sided Velcro to the edges of the window from the inside of the lander. Attach vinyl window to the Velcro.



Painting Details

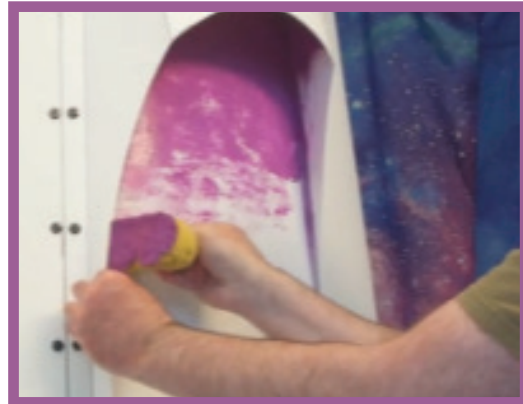
Step 1: Purchase premixed gray paint or create gray by mixing white and black. Paint in the lines of the front panel around the door and window.

Step 2: Dry-brush black all around the lander to make it appear as “dinged up.” To dry-brush, dip a small amount of paint onto a foam brush, then dab all the wet paint off onto a paper towel. With the little excess left on the brush, smudge it onto the lander surface.

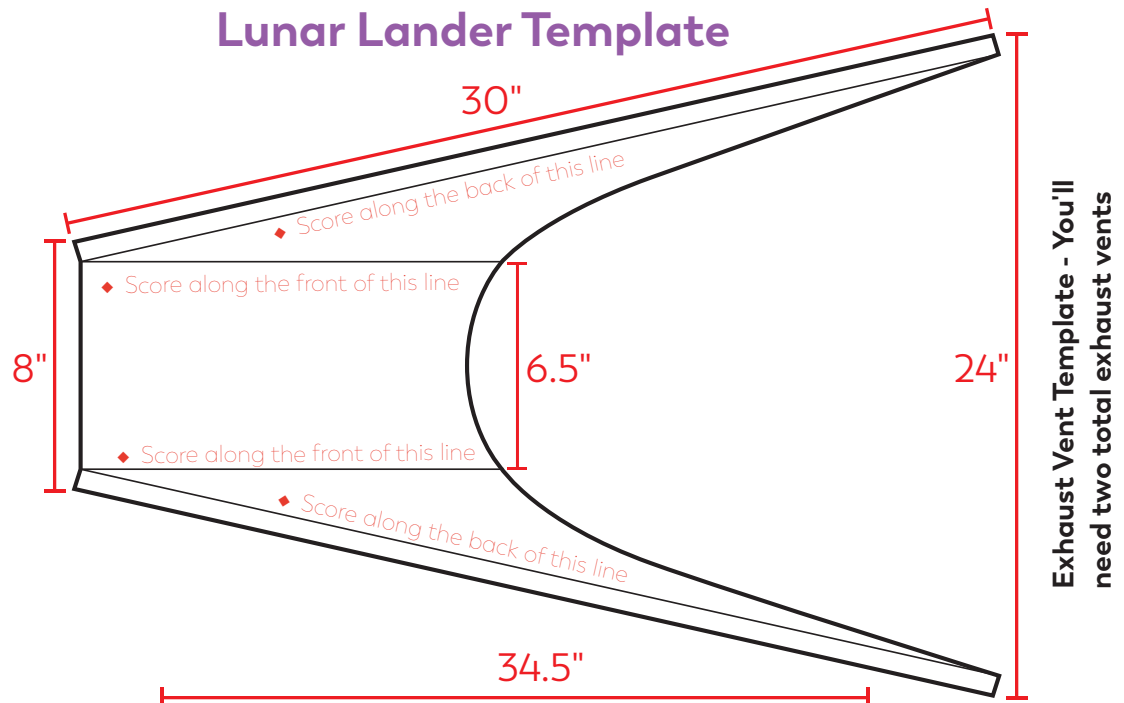
Step 3: Under the exhaust pipes, use a paint and drag method to create a “fire blasted” look. To do this, paint on a color and drag your brush down through it. For extra “drag,” spritz the paint with a water from a spray bottle, then use a paper towel to drag the paint down farther. To help give the area contrast, add some black to the top section and blend it into the main color used.

Step 4: Outline the lines from the original projection with a thick layer of black. Paint or permanent marker will work.

Step 5: Lander accents can be found in the Giant Decorating Poster Pack, or you may paint in the outlines created when tracing the template. Use spray adhesive to attach the poster pack cutouts to the lander. We attached accents to a piece of foam core, cut them out, and adhered them to the lander.



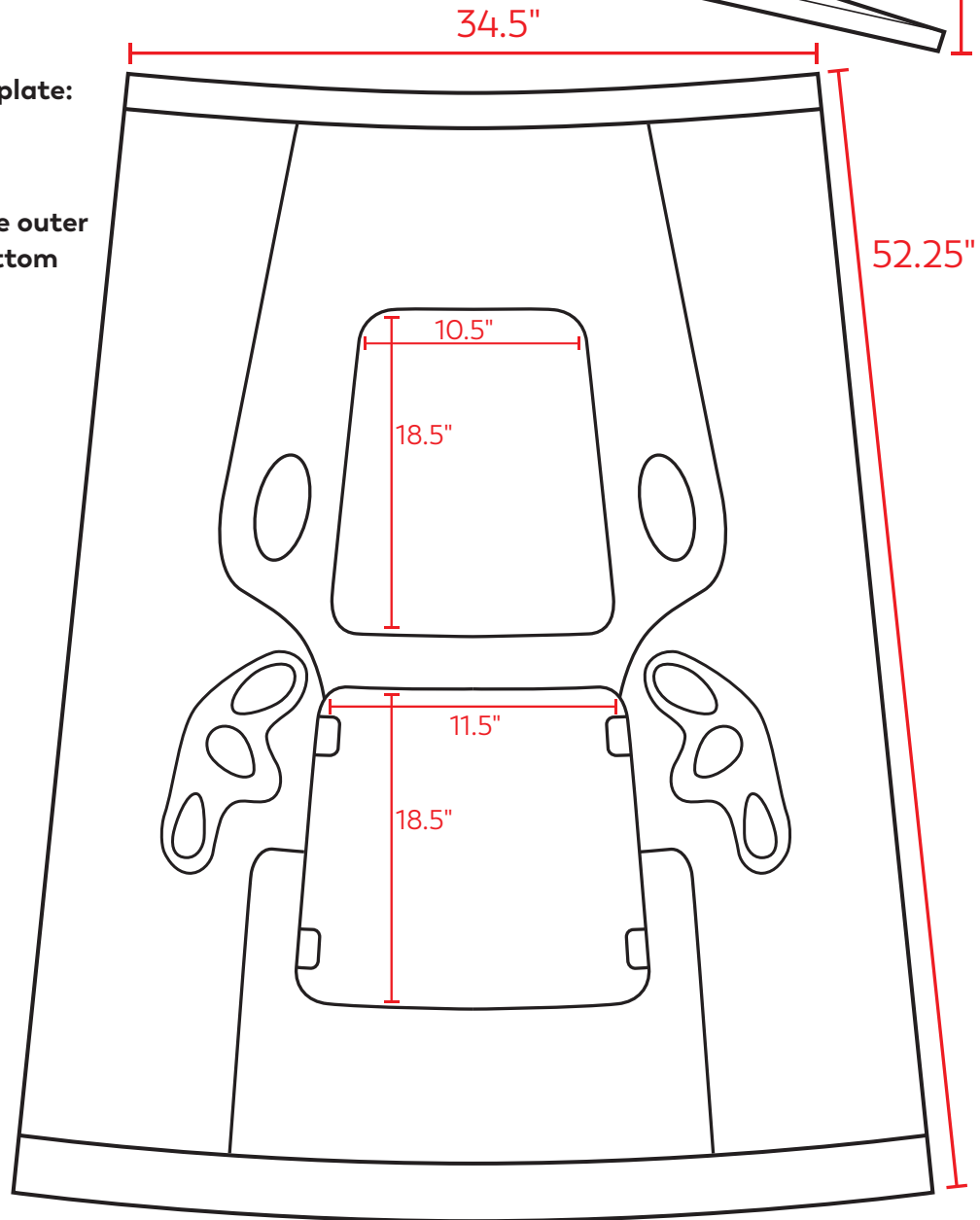
Lunar Lander Template



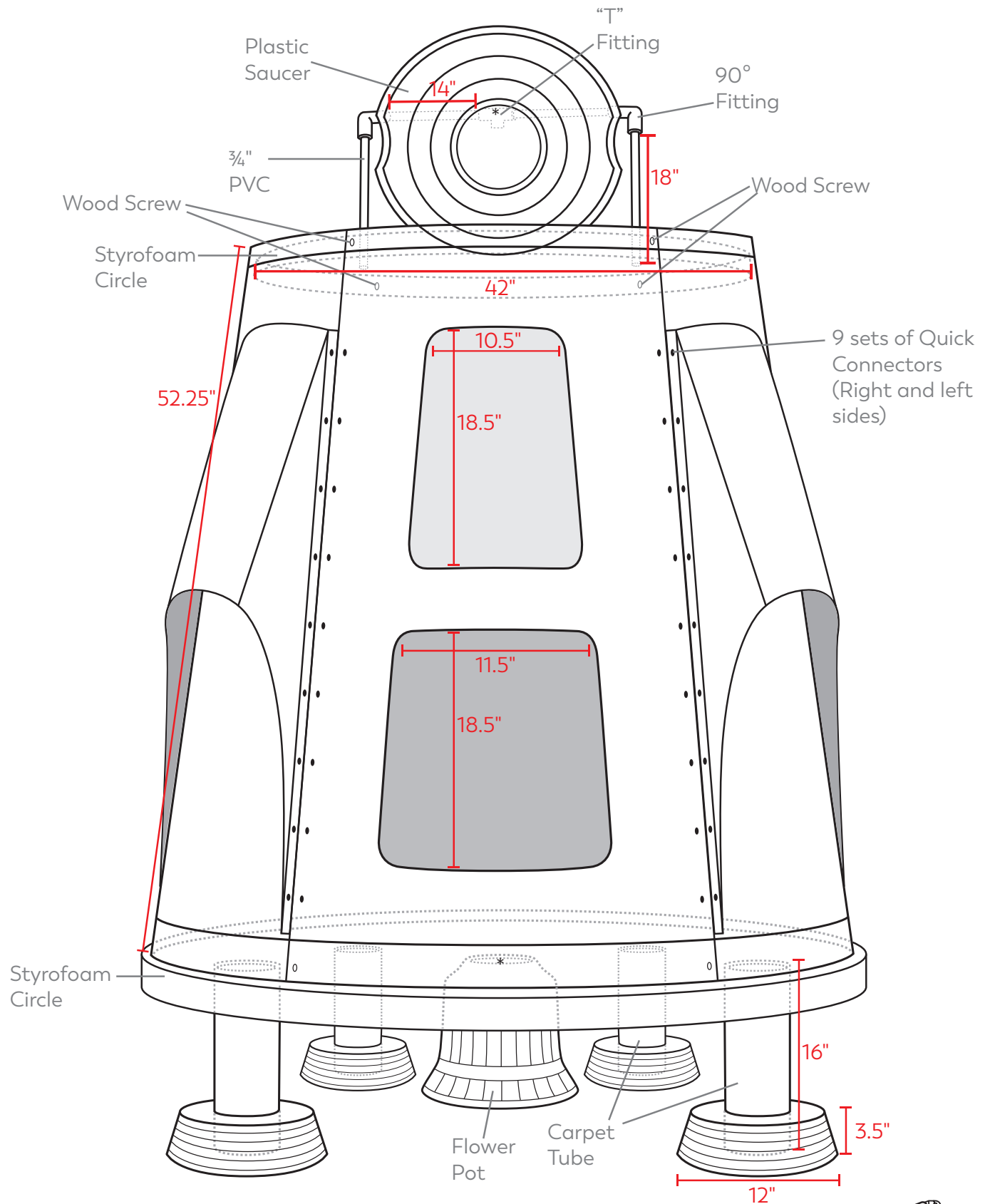
Exhaust Vent Template - You'll need two total exhaust vents

Lunar Lander Panel Template: You'll need:

- ♦ 1 full panel
- ♦ 3 Panels with just the outer lines and top and bottom bands.

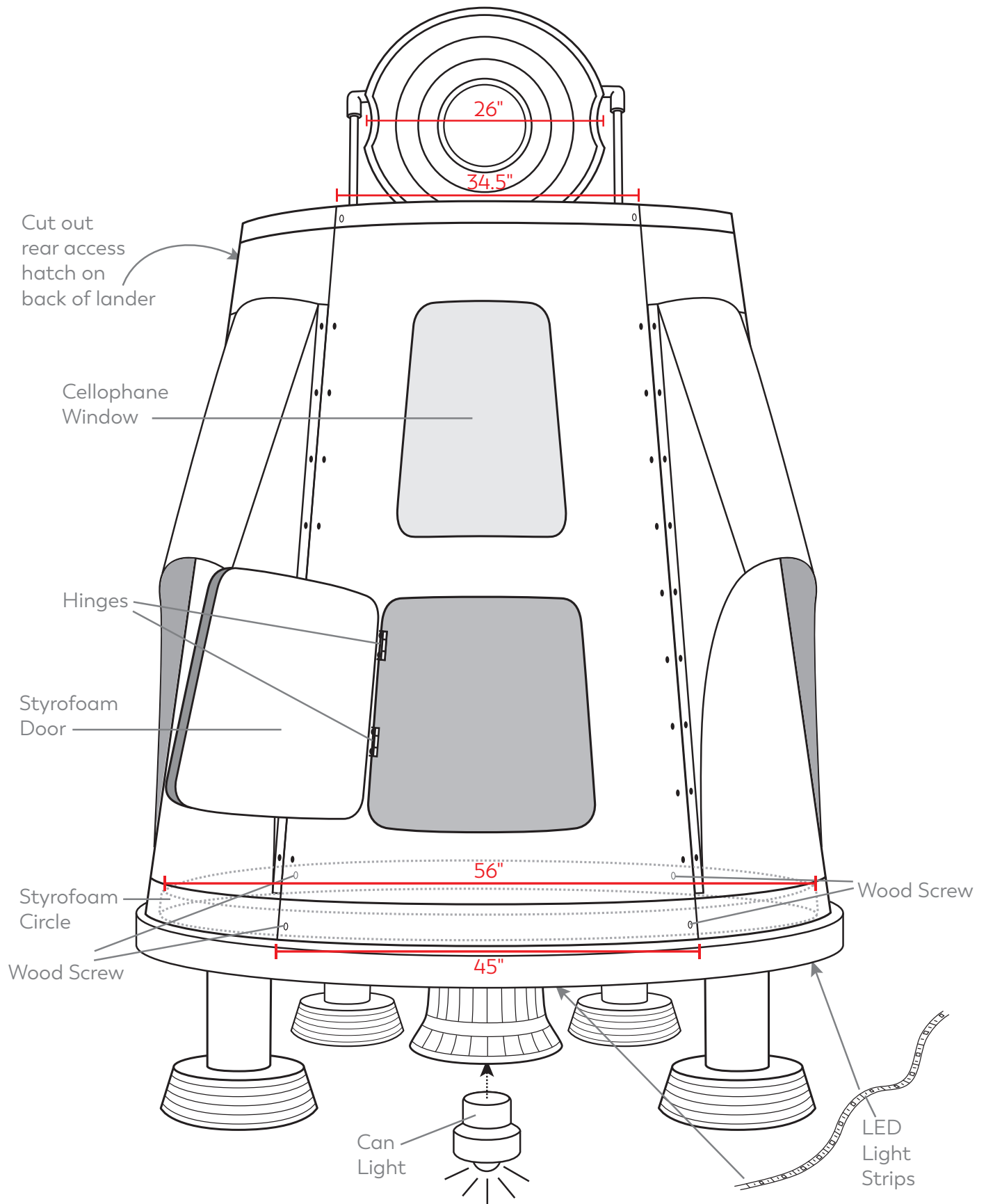


Lunar Lander Specs



*Hot glue

Lunar Lander Specs



Moon Tarps

Materials:

- ♦ Canvas drop cloth
- ♦ Black fabric dye
- ♦ Optional: Black Paint and White Paint
- ♦ Optional: Paint Brush and/or Paint Sponge.

Directions:

PRO TIP: Prewash drop clothes. The canvas dyes a darker color and holds the color if they are prewashed prior to dyeing them.

Step 1: Follow the manufactures directions for the dye you purchase. We dyed some drop clothes in large buckets and some in a washing machine. Both techniques worked, the least messy and easiest method was using a washing machine.

Step 2: Place your moon tarp on old kiddie pools and boxes to create dimension.

Optional: Once you place your tarp on your set you can use black and white paint to create added dimension and shadows in the craters. Use a paint brush and/or sponge to accomplish this. Add darker paint to the inside of the craters and lighter paint to the rims.



Rover

Materials:

- ◆ ¾-in PVC (6 ft)
- ◆ 1-in PVC (6 ft)
- ◆ ¾-in PVC joint fittings (six 90°, four 45°, two T's)
- ◆ 1-in PVC joints (two 90°, five 45°, four T's)
- ◆ miter saw
- ◆ drill
- ◆ silver metallic spray paint
- ◆ cardboard box (21½x17x6-in)
- ◆ 6-in plastic flowerpot
- ◆ Space Station Plastic Backdrop
- ◆ paint (1 quart each of Blue Vista, Atomic Tangerine, black, white)
- ◆ paintbrush
- ◆ sponge
- ◆ 20x30-in foam core or cardboard
- ◆ 3 LED puck lights
- ◆ 6 foam round cake forms (4x 7.8-in)
- ◆ hot knife
- ◆ regular school glue
- ◆ 6 wood screws (3-in long)
- ◆ 6 small disposable portion cups (condiment to-go cups)
- ◆ 1 can spray adhesive
- ◆ insulating spray foam
- ◆ at least 18 CDs or DVDs (you may want a few extra as you get used to cutting them)
- ◆ basic furnace filter (20x25x1-in)
- ◆ 5-in piece of cardboard tube (carpet tube)
- ◆ black spray paint
- ◆ packing tape
- ◆ black duct tape
- ◆ scissors
- ◆ 2 paint stirring sticks
- ◆ 8 zip ties (7-in)
- ◆ optional: old phone cord and 6 zip ties (4-in long)



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Directions:

Paint and Cut

Step 1: Spray paint all the PVC pieces silver, and paint all PVC joints a contrasting bright color (we used Atomic Tangerine).

PRO TIP: Paint your PVC before cutting it.

Step 2: Cut PVC pipe into the following lengths. We used a circular saw.

$\frac{3}{4}$ -in PVC diameter lengths:

- o six 2½-in pieces
- o four 6-in pieces
- o four 6½-in pieces
- o two 4½-in pieces

1-in PVC diameter lengths:

- o one 13½-in piece
- o two 10-in pieces
- o four 6½-in pieces
- o one 4-in pieces
- o two 2½-in pieces

Tires and Axels

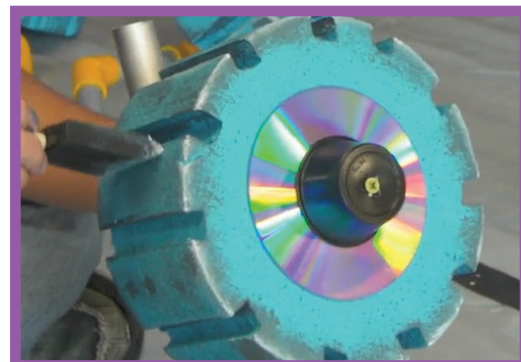
Step 1: Foam cake rounds from a local craft store work great for tires. For DIY tires, glue (using foam insulating spray) pieces of foam together to create a 4-inch-thick piece. Cut 6 total foam circles.

Step 2: Carve tire tread on the foam circles with a hot knife.

PRO TIP: Sand the edges of your tires to soften and round them out.

Step 3: Paint tires. (We used Blue Vista for the tires and spray painted to-go portion cups black.) Allow to dry. Then add gray paint (we mixed black and white together) to the outer edges of foam tires and white highlights for detail.

Step 4: In the back center of each tire, hollow out a $\frac{3}{4}$ -in circle about 1-in deep using a hot knife. Spray insulating spray foam into the carved-out hole, then place a 2½-in length of $\frac{3}{4}$ -in PVC



in the hole. Repeat on each tire. Allow to dry.

Step 5: Glue a DVD to the center front of each tire.

Center a painted-to-go cup rim-down over the hole in the DVD, then screw through the cup and into the wheel using a 3-in wood screw.

Step 6: Use the diagram to attach the PVC pieces and joints together.

Step 7: Attach tires to the newly formed PVC structure.



Body

Step 1: Wrap a 21½x17x6-in cardboard box with Space Station Plastic Backdrop (found at group.com), using spray adhesive to attach the plastic to the surface of the box.

Step 2: The 21½-in box flaps will be positioned to remain partly open at an angle to hold the solar panels on. To keep the angle, cut the edges of the 17-in box flaps symmetrically on both sides. (The angle of the box needs to allow the arms of the rover to be angled and glued to the bottom of the inside of the box.) Tape the bottom of the box closed, and secure the side flaps.

Step 3: Cut a slit in the plastic backdrop in the middle of the 21½x6-in panel sides. This way you can access the cardboard box and glue directly to it. Take apart completed tire and axel structure. Hot glue the middle “T” joint directly to the box; do this on both sides. Allow to dry. Reassemble wheel, and fit it on the T.

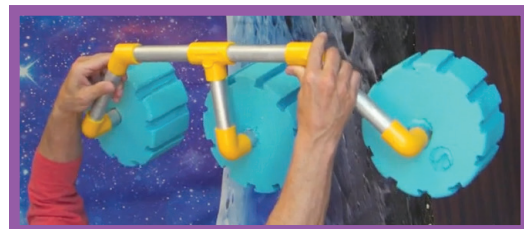
Step 4: To help hold the wheel assembly on, hot glue a paint stirring stick to the inside of the box directly behind the T. Once the wheel assembly is attached to the side of the box, drill holes to allow zip ties to go around the PVC, through the box, and around the paint stick. See diagram.



Radar

Step 1: Spray paint a paper bowl from a discount store silver. Hot glue a 2½-in length PVC to the middle of the bowl. (We used a scrap piece of PVC.) On top of the PVC piece, hot glue a bright-colored ball. You could use a foam, plastic, or ping-pong ball—whatever you have handy.

Step 2: Attach the radar with hot glue to an arm made out of 10-in, 4-in, and 2½-in PVC pieces connected with one T joint and two 45° couplers, as seen in the diagram.



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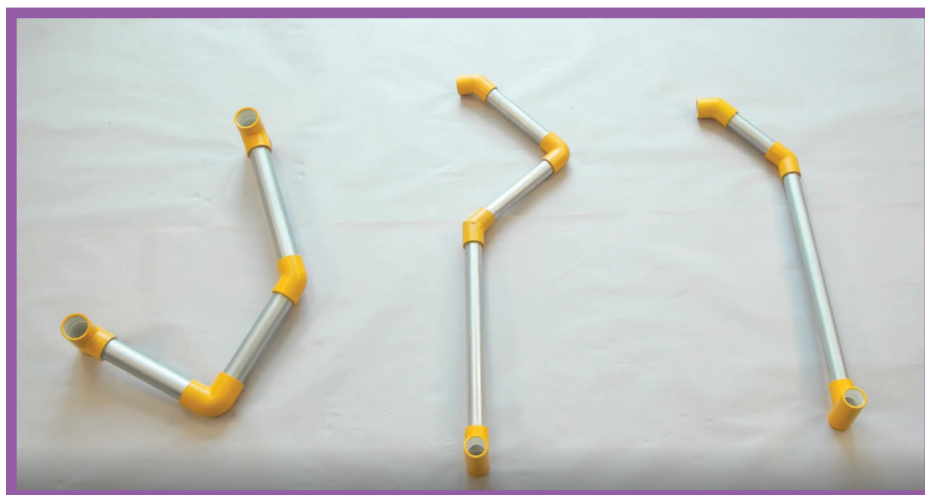
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Scoop Arm

Step 1: Cut a 5-in carpet tube piece, slit it open down the middle, and then on the direct opposite side, score it so it will bend open. Paint the cardboard tube a bright contrasting color. Cut foam or cardboard “teeth” and attach with spray adhesive to open edges of the slit.

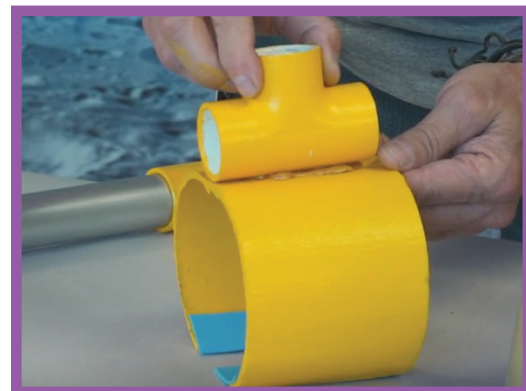
Step 2: Connect the scooper with hot glue to an arm made from one 10-in and two 6-in PVC pieces connected by two T joints, one 45°, and one 90° coupler.



Video Head

Step 1: Spray paint a 6-in flowerpot silver. Cut a circle from foam core to fit snugly into the flowerpot. Attach three LED puck lights to the foam core.

Step 2: Hot glue the video head to a 1-in PVC “T” fitting. The arm it attaches to is made from one 13½-in and two 6½-in PVC pieces connected with one 90° and two 45° couplers. See diagram.



Body (continued)

Step 5: Hot glue each arm to the bottom inside of the box, through the opening left by the angled flaps.

PRO TIP: Wait to attach all the “heads” to their correlating arms until the armature is glued into the box. This way there’s not weight pulling the arms down while the glue dries. The PVC joints make it easy to build each arm and adjust the angles to give the rover the look you want and then remove the “heads” while the glue dries.

Step 6: Create foam core brackets that have holes the PVC snugly passes through. These create needed stability. Once you know the placement of each arm, glue brackets where needed inside the cardboard body.

Step 7: For added detail, attach old spiral phone cords or plastic tubing to the arms with small zip ties.

Step 8: We used a dry-brush technique to add shading and highlights to the tires, PVC joints, and scooper.

Solar Panels

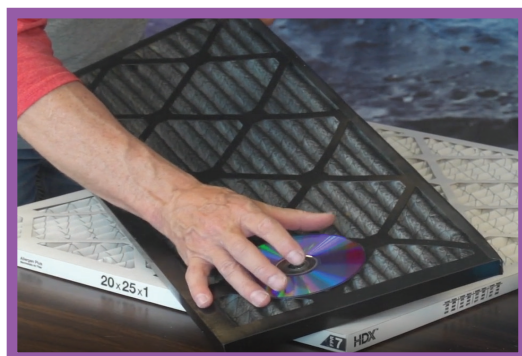
Step 1: Cut an air filter, size 20x25x1-in, in half with large scissors. Spray paint it black, but don’t worry about completely covering the mesh part. A “smudged” look makes for a neat effect.

Step 2: Cover the cut side of the filter edge with black tape.

Step 3: Place CDs in warm water for about 5 minutes. After soaking, the CDs will easily cut with kitchen scissors. Cut 10 CD halves and 4 quarters, and leave 6 CDs whole.

Step 4: Use hot glue to attach the CDs, reflective side up, to the painted filter.

Step 5: Attach a solar panel to each of the 21½-in box flaps.



Rover Specs

