

Parker Solar Probe



Parker Solar Probe: Humanity's First Visit to a Star

NASA's historic Parker Solar Probe mission will revolutionize our understanding of the Sun, where changing conditions can propagate out into the solar system, affecting Earth and other worlds. Parker Solar Probe will be the first spacecraft to travel through the Sun's atmosphere, closer to the surface than any spacecraft before it, facing brutal heat and radiation conditions — and ultimately providing humanity with the closest-ever observations of a star.

Flying into the outermost part of the Sun's atmosphere, known as the corona, for the first time, Parker Solar Probe will employ a combination of in situ measurements and imaging to revolutionize our understanding of the corona and expand our knowledge of the origin and evolution of the solar wind. It will also make critical contributions to our ability to forecast changes in Earth's space environment that affect life and technology on Earth.

The primary science goals for the mission are to trace how energy and heat move through the solar corona and to explore what accelerates the solar wind as well as solar energetic particles. Scientists have sought these answers for more than 60 years, but the investigation requires sending a probe right through the 2,500 degrees Fahrenheit heat of the corona. Today, this is finally possible with cutting-edge thermal engineering advances that can protect the mission on its dangerous journey. Parker Solar Probe will carry four instrument suites designed to study magnetic fields, plasma and energetic particles, and image the solar wind.

Parker Solar Probe will perform its scientific investigations in a hazardous region of intense heat and solar radiation. The spacecraft will fly close enough to the Sun to enter the highly magnetized corona, crossing the regions where solar energetic particles are accelerated.

Such a probe is finally possible today through cutting-edge thermal engineering advances that can protect the spacecraft on its dangerous journey. The spacecraft and instruments will be protected from the Sun's heat by a 4.5-inch-thick (11.43-centimeter-thick) carbon-composite shield, which will need to withstand radiation equivalent to ~500 times the Sun's radiation here on Earth. This shield is so effective that the instruments which lie in the umbra (shadow) are able to operate at a comfortable 85 degrees Fahrenheit (29 degrees Celsius). Only the electric field antennas and a small plasma detector will brave direct illumination from the Sun.

The corona is also where the solar material is heated to millions of degrees and where the most extreme events on the Sun occur, such as solar flares and coronal mass ejections, accelerating particles to a fraction of the speed of light. These explosions create space weather events that can pummel Earth with high energy particles, endangering astronauts, interfering with GPS and communications satellites and, at their worst, disrupting our power grid. This will be the first time that solar scientists can see the objects of their study up close and personal. The corona is also many times hotter than the surface of the Sun (up to 200 times hotter).

The mission is named for Eugene Parker, the physicist who first theorized the existence of the solar wind in 1958. It's the first NASA mission to be named for a living researcher.

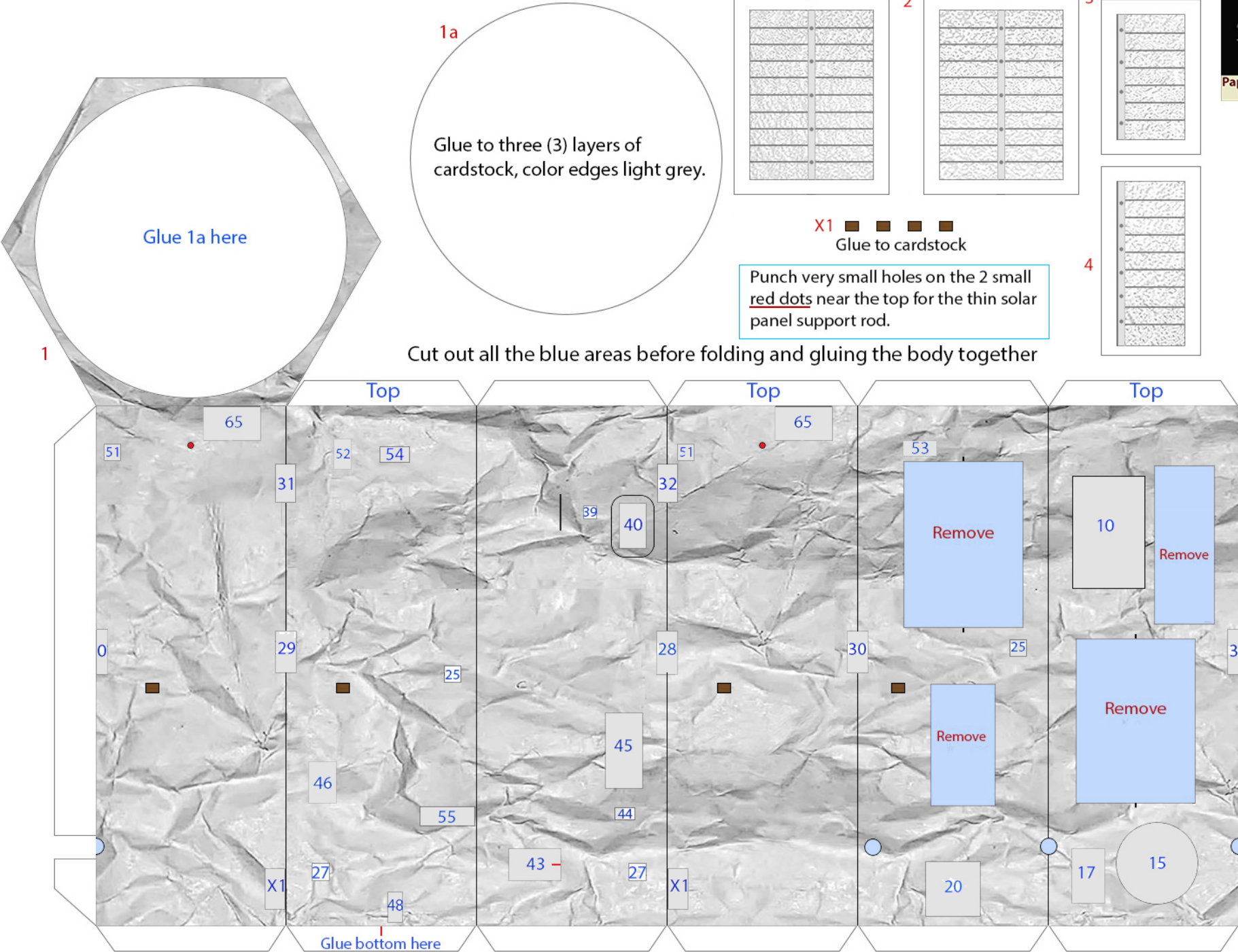
In the mid-1950s, Eugene Parker proposed a number of concepts about how stars—including our Sun—give off energy. He called this cascade of energy the solar wind, and he described an entire complex system of plasmas, magnetic fields, and energetic particles that make up this phenomenon. Professor Parker also theorized an explanation for the superheated solar corona, which is (counterintuitively) hotter than the surface of the Sun itself: nanoflares, which in enough abundance could cause this heating.

More than half a century later, the Parker Solar Probe mission will finally be able to find proof for Parker's groundbreaking theories and ideas, which have informed scientists about solar physics and magnetic fields around stellar bodies. Much of his pioneering work, which has been proven by subsequent spacecraft, defined a great deal of what we know about the how the Sun–Earth system interacts.

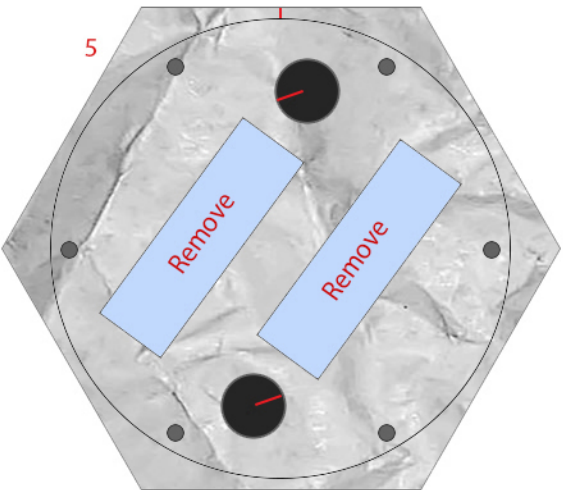
Parker Solar Probe was launched on August 12, 2018 onboard a Delta IV Heavy / Star-48BV rocket.



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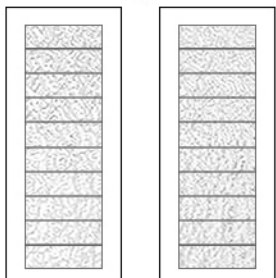


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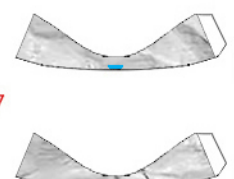
Remove

Remove

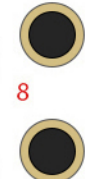
Bottom



6



7



8



9

Color back light grey or silver



22

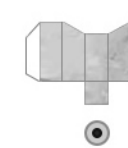


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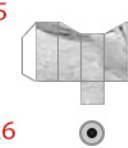


24

Roll to tight rods



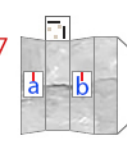
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26

After rolling -gluing to tight rods, cut the end at this angle

Glue to cardstock, then glue to the angled ends of the rods.



27



27a



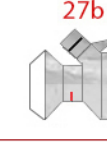
27b



28



28a

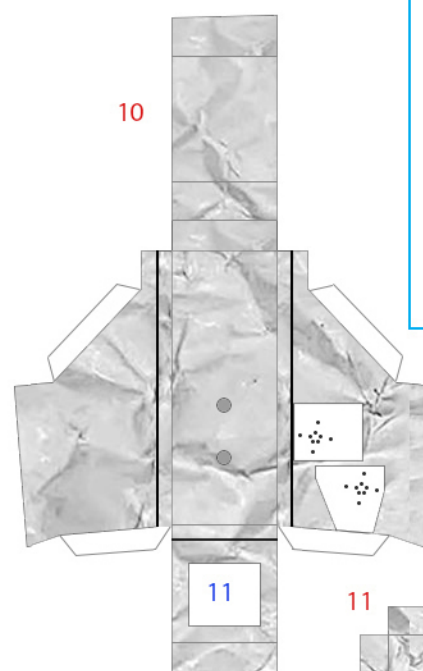


28b

Glue to two (2) layers of cardstock

Spare





10



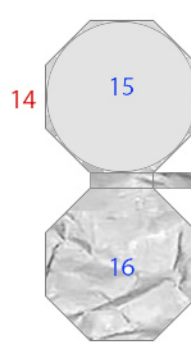
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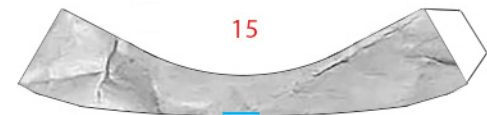
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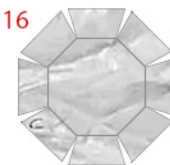
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14



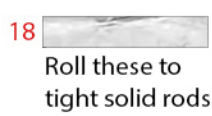
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16



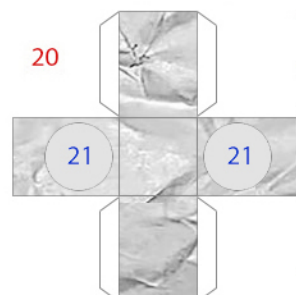
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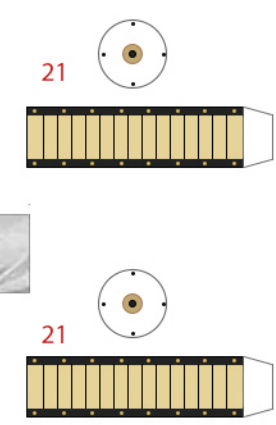
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19



20

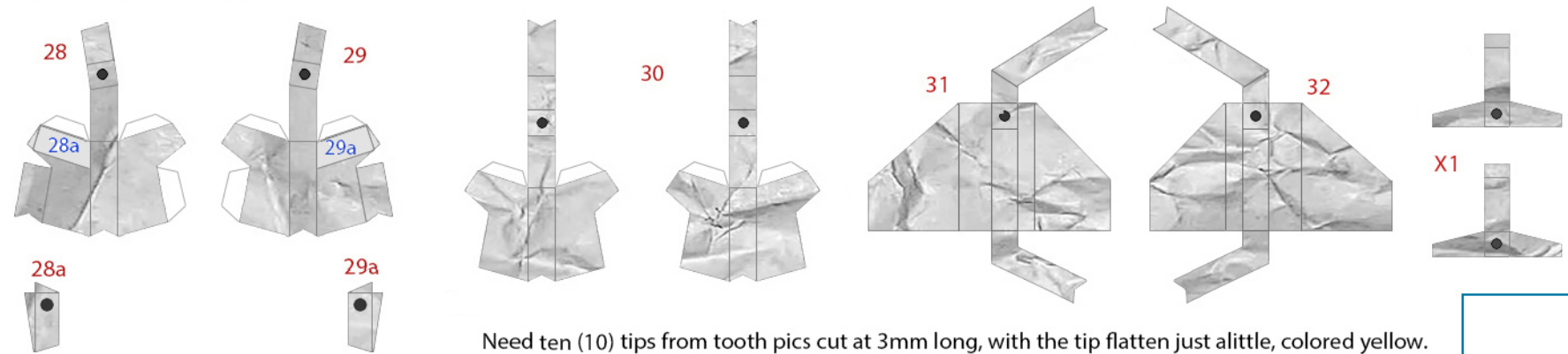


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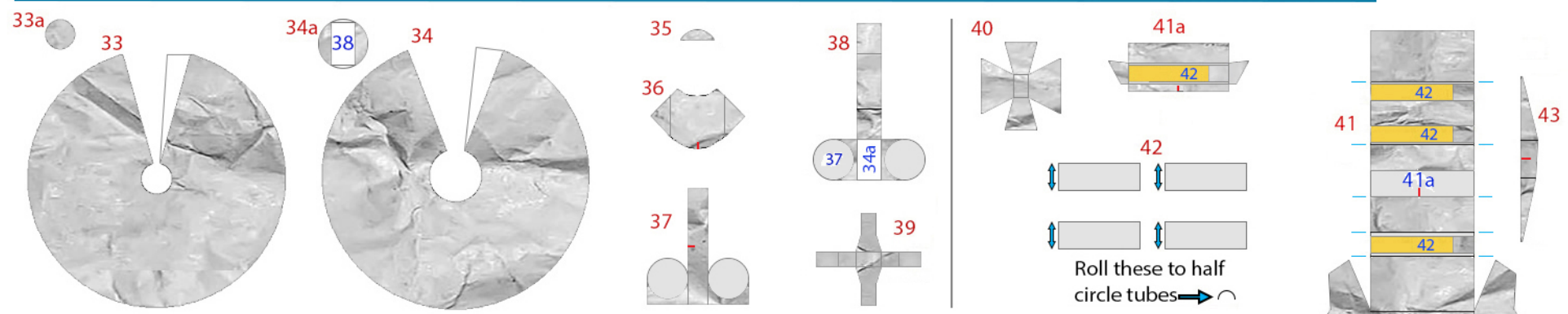
Roll these to tight solid rods

Need four (4) pcs of Acrylic rods or similar material this is around 1.5 mm in diameter cut at the same length as the line below, colored brown.

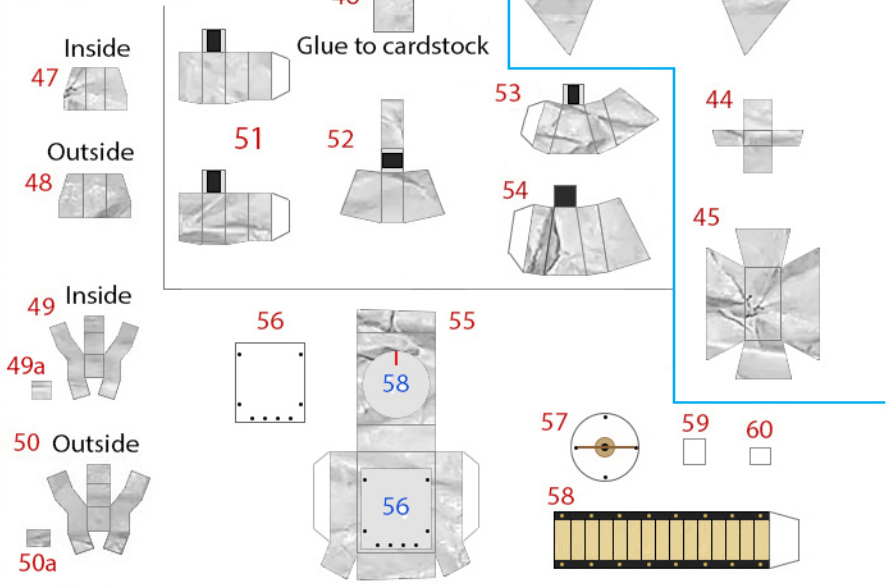
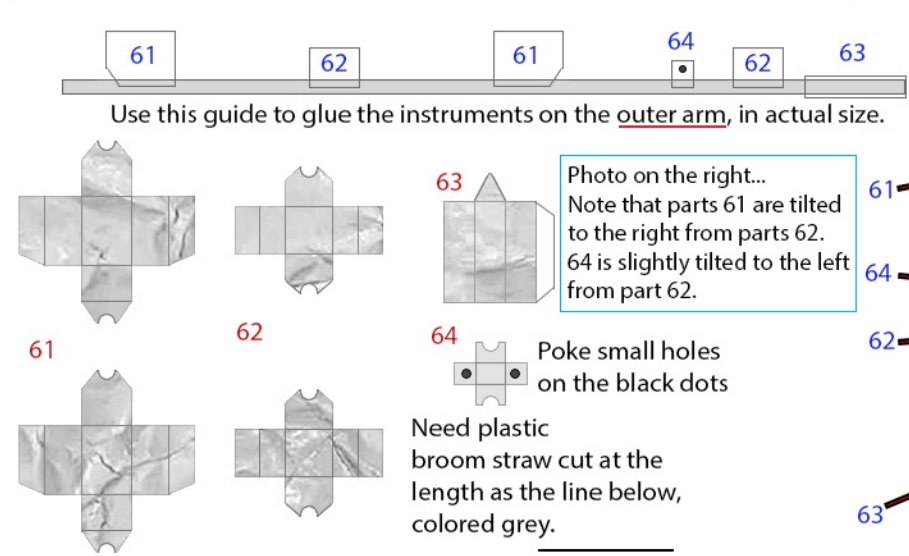
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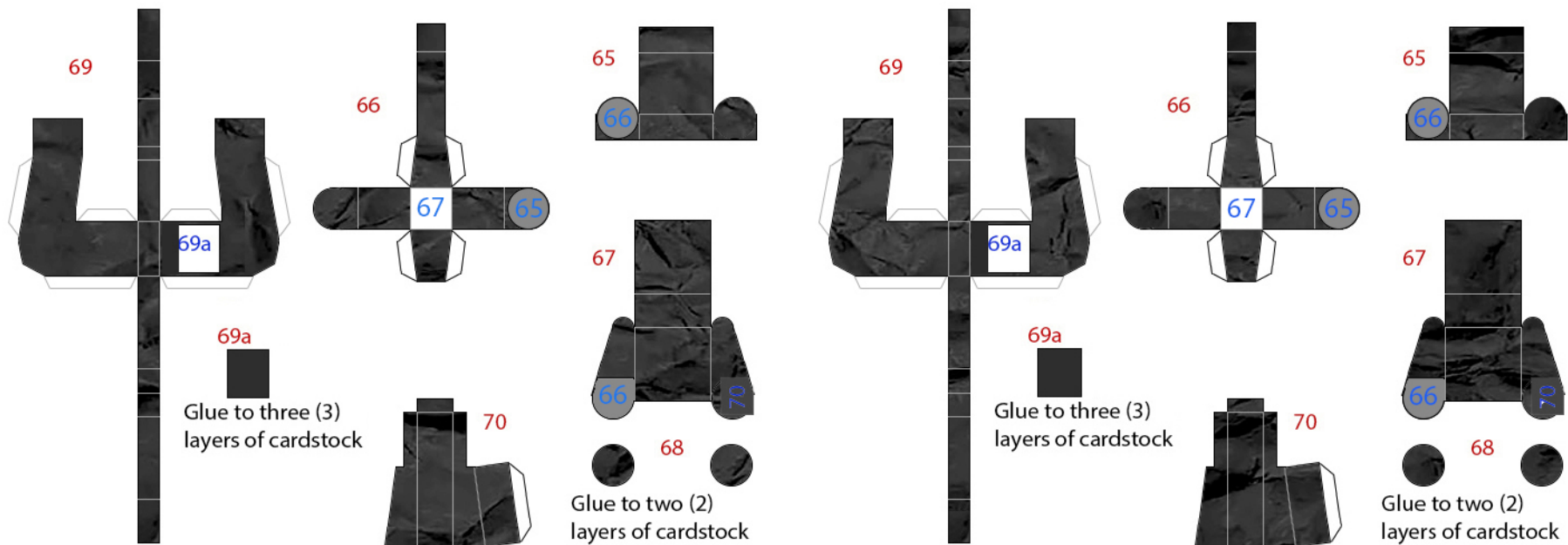
Need ten (10) tips from tooth pics cut at 3mm long, with the tip flatten just a little, colored yellow. Glue to the black dots on the parts above after cutting and gluing together.



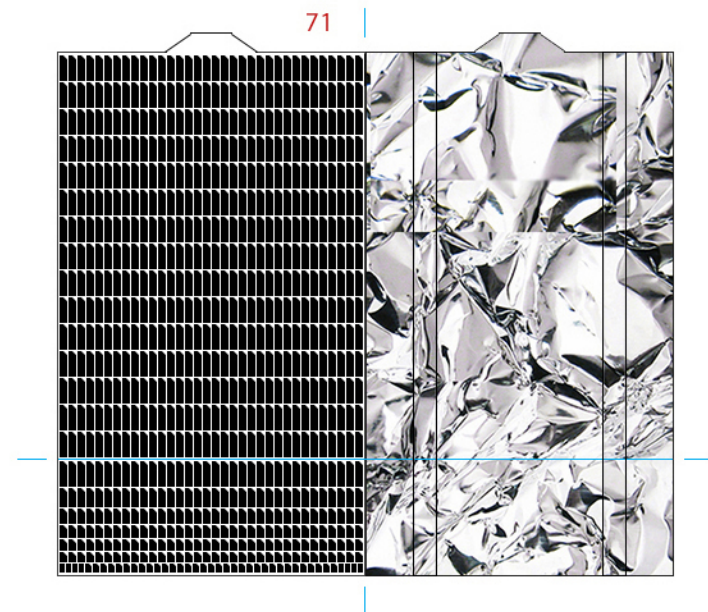
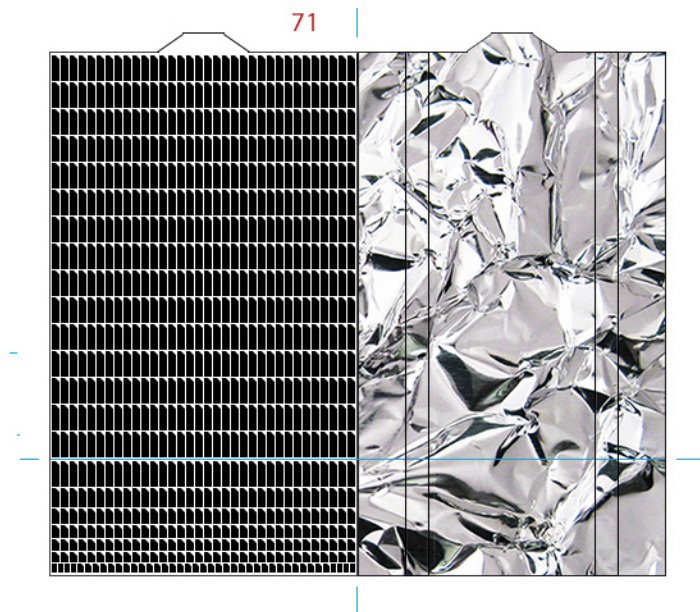
Need two (2) wooden dowels around 1/16 (or 2 mm) diameter, cut at the same length as the line below.



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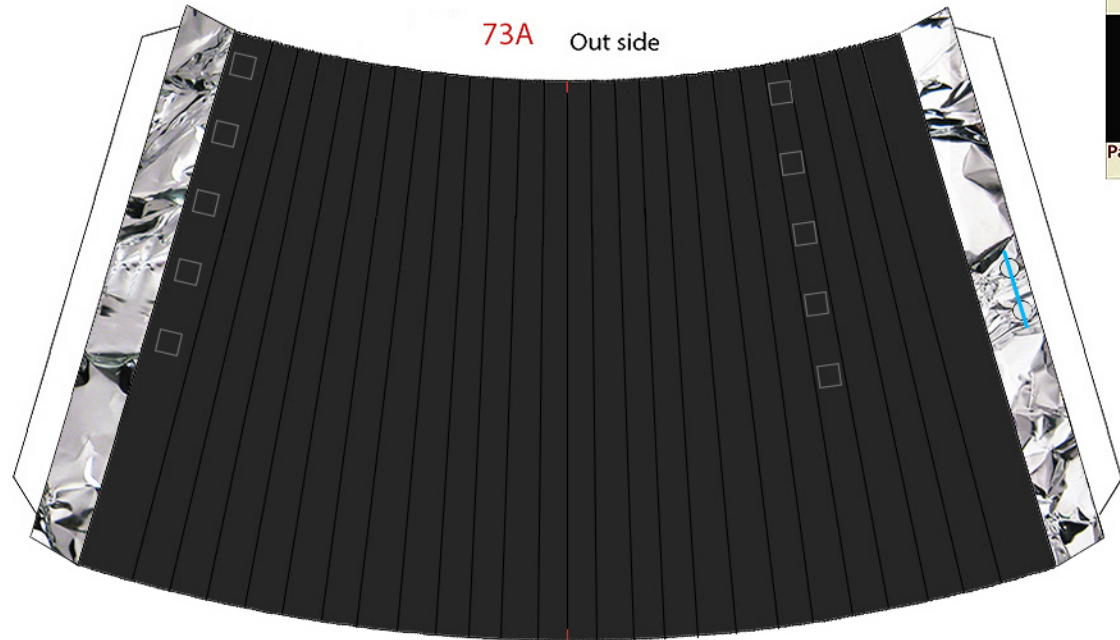
For better solar panel support, cut a thin music wire or other stiff wire the same length as the line below.
Insert through the top of the body of the satellite (part 1) using the small holes you poked into the small red dots.



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Glue to two (2) layers of cardstock



NOTE: if you plan to use parts 80 on page 8, cut a slit along the blue line on the sides of the part above.
If you plan to use tooth pics, use the two circles.



Glue to cardstock



Glue to cardstock



spare

X

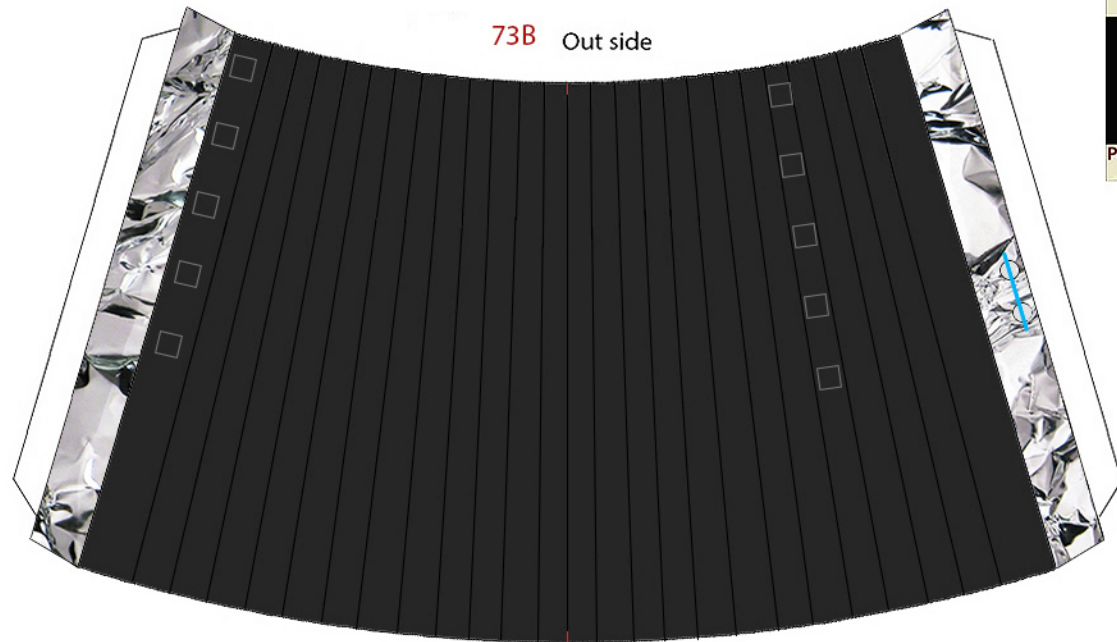
Glue these to cardstock

Cut six (6) plastic broom straws the same length as the line below.

Parker Solar Probe



Glue to the back side of part 72 from the previous page



NOTE: if you plan to use parts 80 on page 8, cut a slit along the blue line on the sides of the part above. If you plan to use tooth pics, use the two circles.



Glue to cardstock



Glue to cardstock



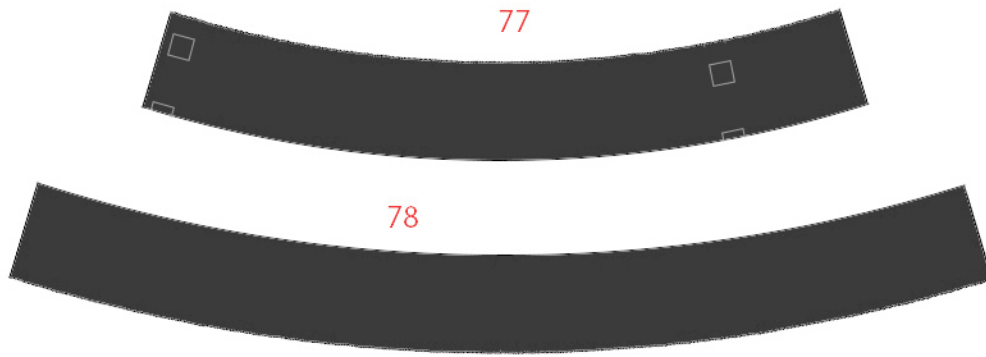
spare

X

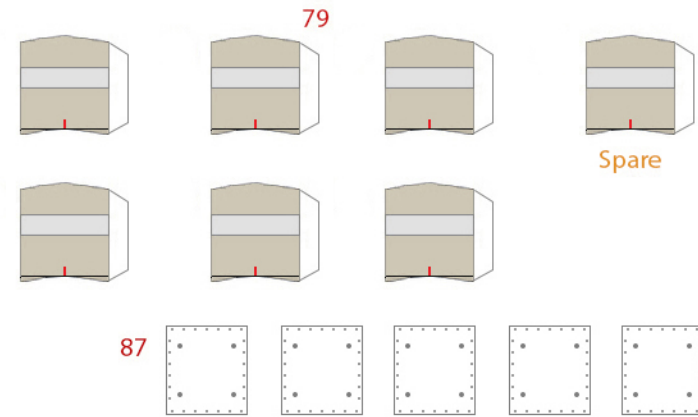
Glue these to cardstock

Cut six (6) plastic broom straws the same length as the line below.

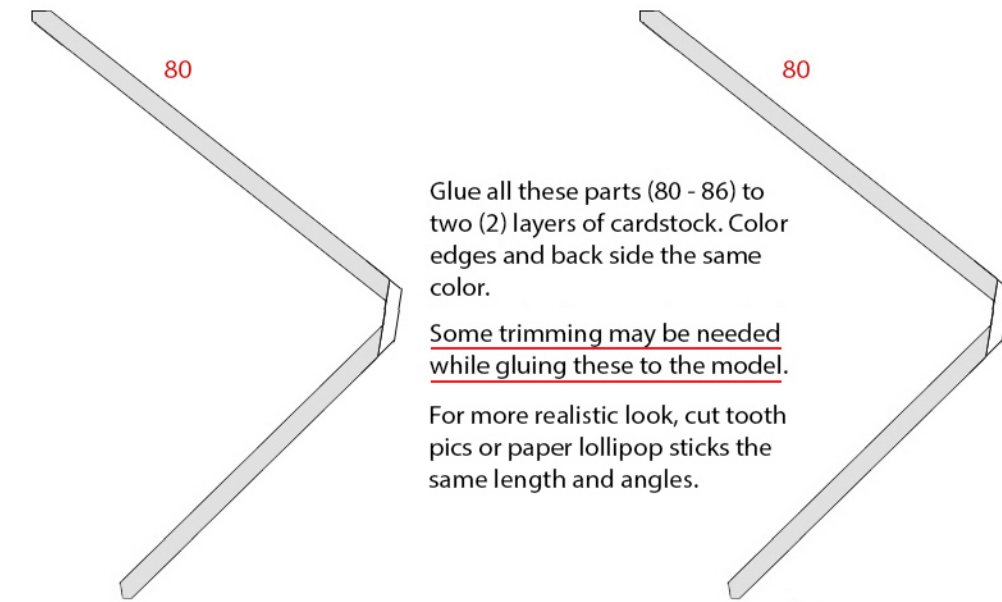
Parker Solar Probe



Glue these to the out side of 73B



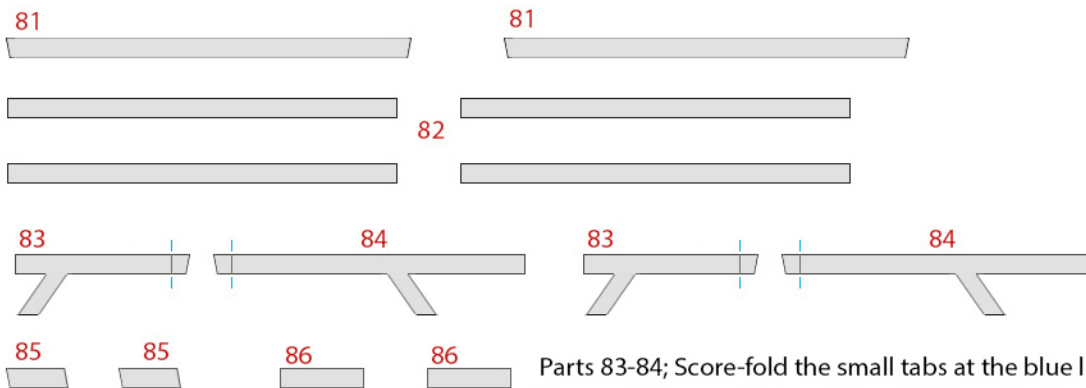
Spare



Glue all these parts (80 - 86) to two (2) layers of cardstock. Color edges and back side the same color.

Some trimming may be needed while gluing these to the model.

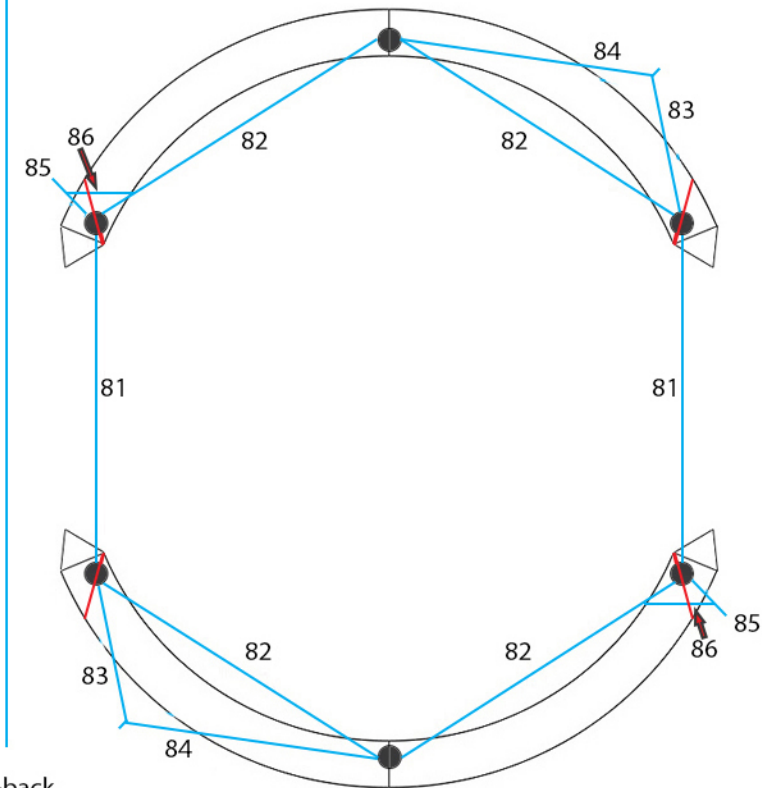
For more realistic look, cut tooth pics or paper lollipop sticks the same length and angles.



Parts 83-84; Score-fold the small tabs at the blue lines
Glue only the small tab on 83 and 84 together back-to-back.

Parts Placement guide

Use this guide to glue the top rail parts onto the top of the radiators. Glue them on the circles on top, match the seems on 79 to the red line that is angled into the center of the radiators and the red line on bottom of 79 to the other end of the red line on top.



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Internal support ring part 1

Internal support ring part 2

Glue these two together, then roll into a large ring.

Top

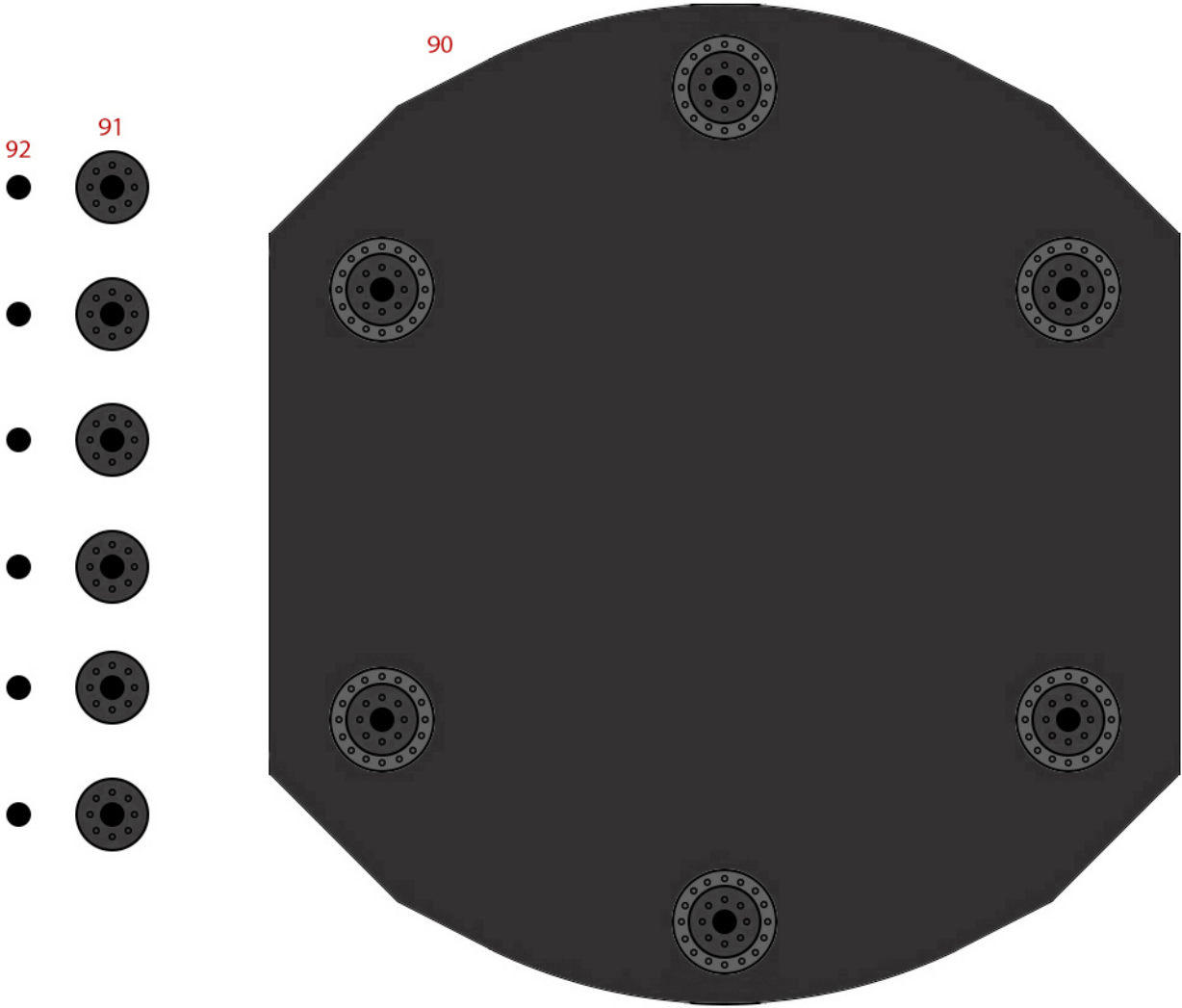
88

89

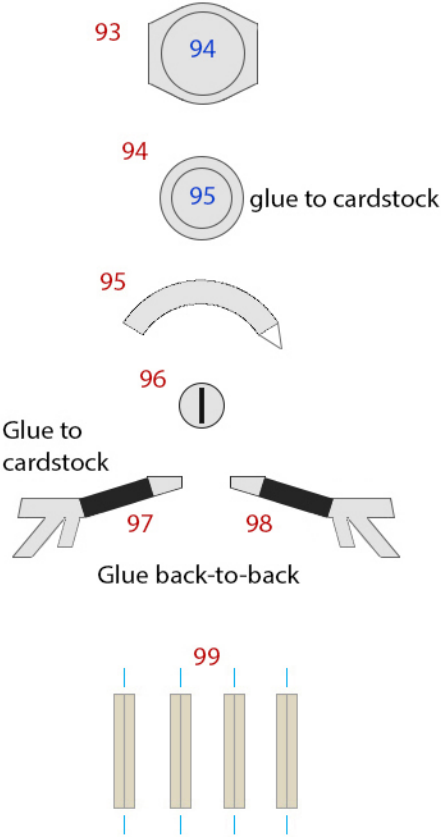
Internal support ring

Bottom

Glue cardstock to the back side for strength.



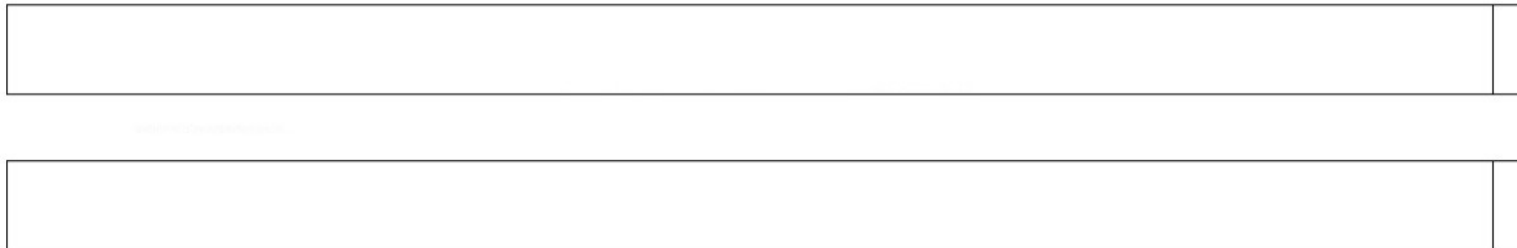
Cut a piece of plastic broom straw or similar material the same length as the line below.



Cut four (4) long plastic broom straws the same length as the line below, colored light grey or silver

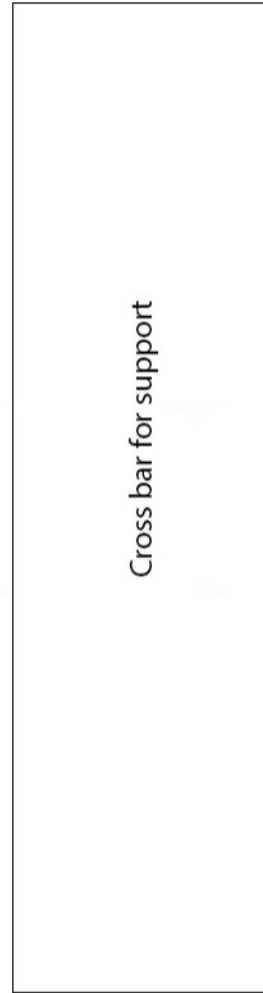
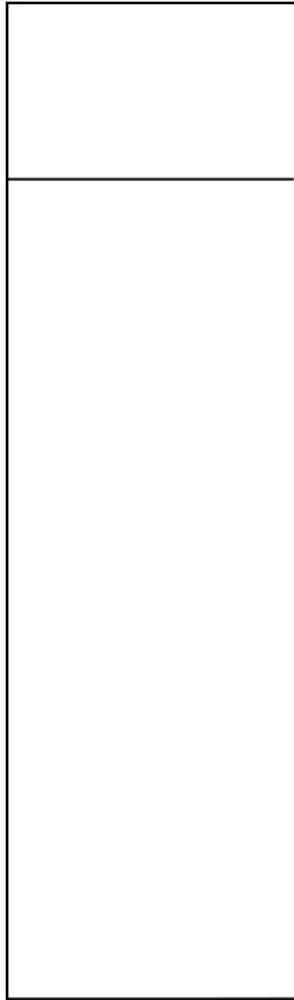


Print at the same scale you printed the model



Roll each strip to a ring, glue both side-by-side under the stand for support

Print at the same scale you printed the model



Glue all four to two layers of cardstock

