

LRO (Lunar Reconnaissance Orbiter)



LRO is a NASA mission to the moon within the Lunar Precursor and Robotic Program (LPRP) in preparation for future manned missions to the moon and beyond (Mars). LRO is the first mission of NASA's 'New Vision for Space Exploration', which President Bush announced on January 14, 2004, in sending more robot and human explorers beyond Earth orbit. The LRO requirements call for a mission life of one year in lunar orbit. The objectives of LRO are to:

- Identify potential lunar resources
- Gather detailed maps of the lunar surface
- Collect data on the moon's radiation levels
- Study the moon's polar regions for resources that could be used in future manned missions or robotic sample return missions
- Provide measurements to characterize future robotic explorers, human lunar landing sites and to derive measurements that can be used directly in support of future Lunar Human Exploration Systems.

The LRO and the companion LCROSS spacecraft were launched on June 18, 2009 on an Atlas V 401 launch vehicle from the Air Force Station at Cape Canaveral, FLA.

The probe has made a 3-D map of the Moon's surface at 100-meter resolution and 98.2% coverage (excluding polar areas in deep shadow), including 0.5-meter resolution images of Apollo landing sites. The first images from LRO were published on July 2, 2009, showing a region in the lunar highlands south of Mare Nubium.

Its detailed mapping program is identifying safe landing sites, locating potential resources on the Moon, characterizing the radiation environment, and demonstrating new technologies.

Water discoveries

Even early in LRO's mission, scientists saw strong evidence that water or hydrogen is evident on the moon. During the probe's testing and calibration phase, LRO's neutron detector found there was a spike in hydrogen in craters, hinting there could be water in the shadowed regions, as well as other hydrogen not confined to those areas.

When LCROSS smashed into the moon, LRO watched the impact from its orbital perch 31 miles (50 km) above the moon's surface. The camera caught a plume of material from the surface that showed a "significant amount" of water at LCROSS's crash site.

Later analysis of the crash site revealed it could be wetter than the Sahara desert, suggesting that Cabeus crater could be a spot for a future moon base. Besides water, other possible resources for future moon explorers at that site include ammonia, carbon monoxide, methane, mercury and silver.

In 2012, LRO uncovered what could be a large amount of ice in Shackleton Crater, which is almost exactly on the moon's south pole. Scientists were cautious with the finding, however, as the laser used for the instrument also found reflective areas in other, less shadowed parts of the crater.

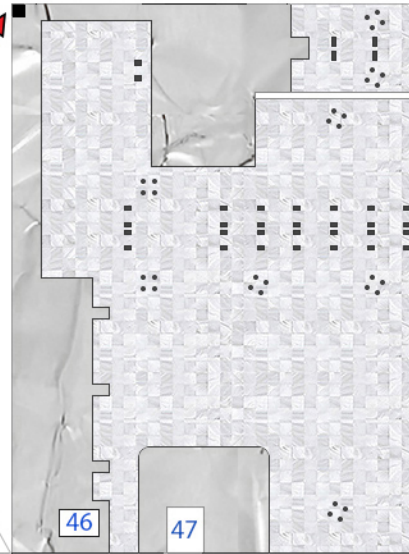
The Lunar Reconnaissance Orbiter, launched in 2009, has enough fuel to operate well into the 2020s and could support future lunar landings, including commercial missions.

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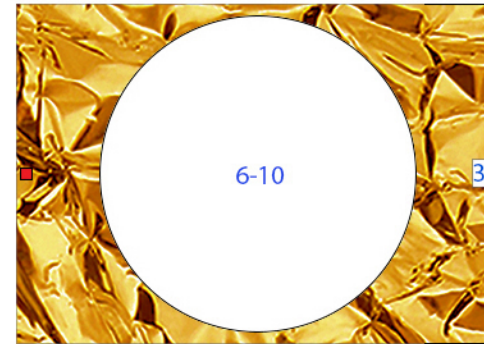
3

Glue inside part 1 at the end with
the BLACK SQUARE

Glue tabs, fold 90 degrees at the
dotted line.



4

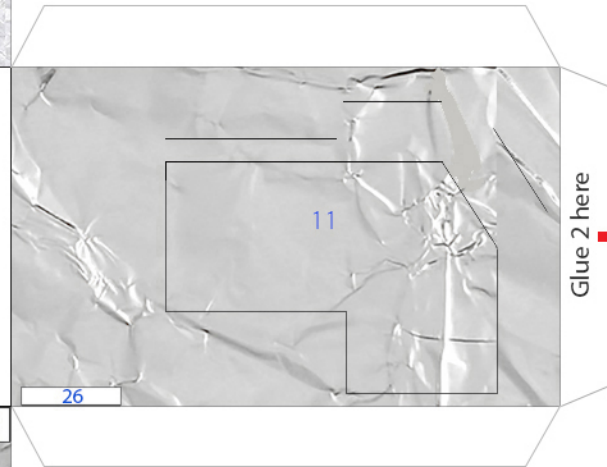


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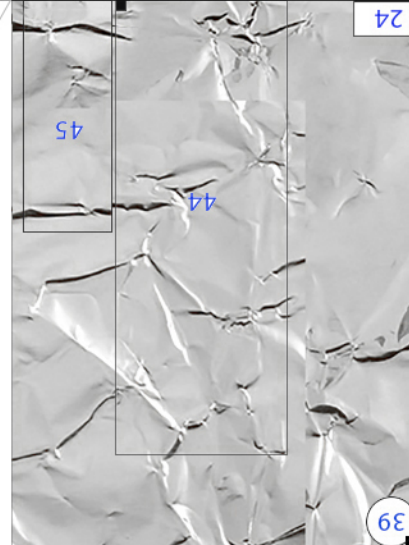
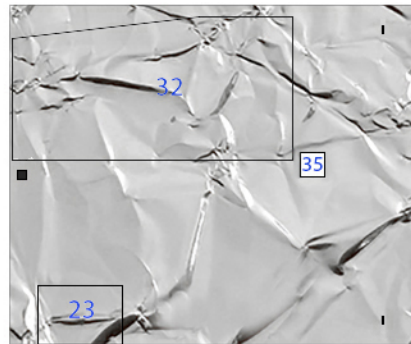


Glue to four (4)
layers of cardstock

1



2

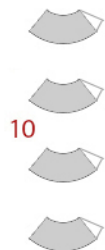
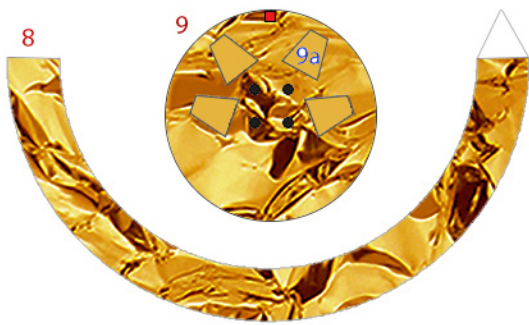
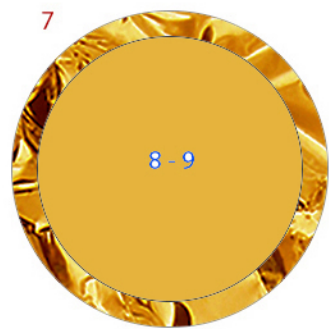


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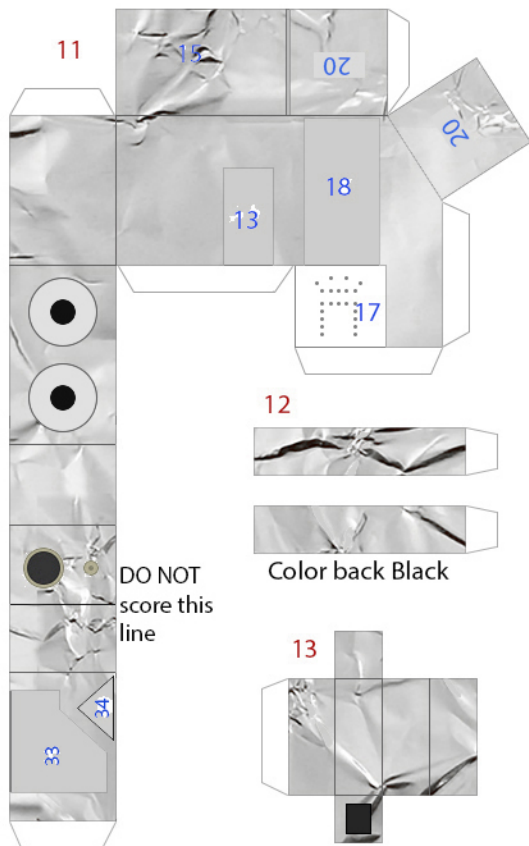
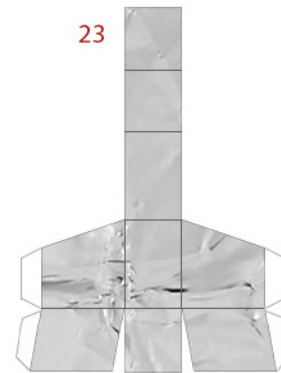
Glue inside part 1 at the end with
the BLACK SQUARE

Glue tabs, fold 90 degrees at the
dotted line.

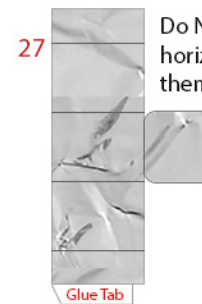
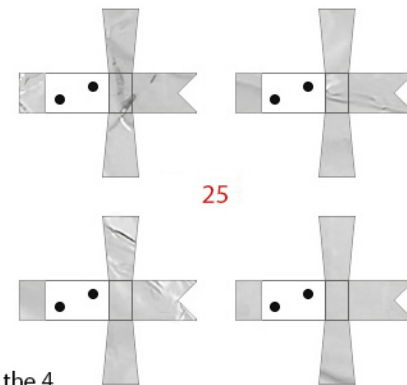
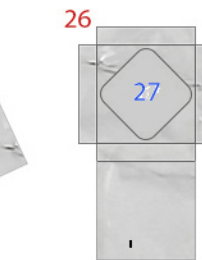
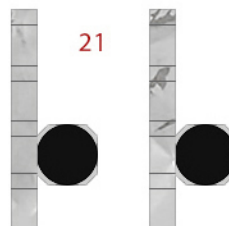
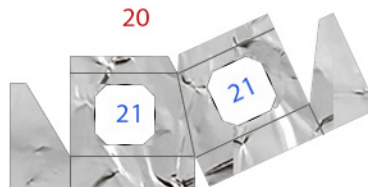
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Color back light
grey or silver



Fold these two with
graphics inside.



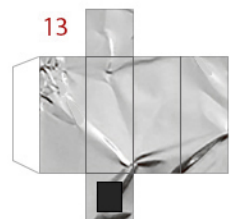
Do Not score the 4 horizontal lines, curve them around a tooth pic.



Color back silver



Color back Black



Color back
Black



Color back Black



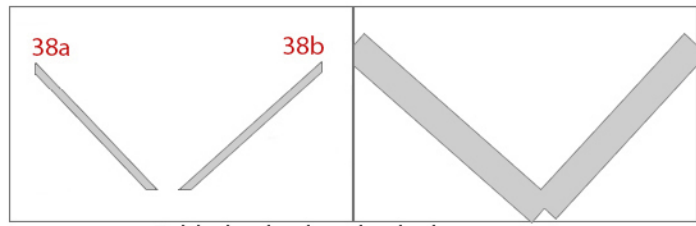
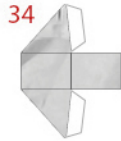
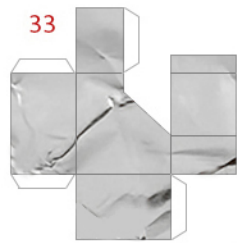
Glue to cardstock, color back side light grey or silver.



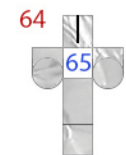
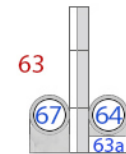
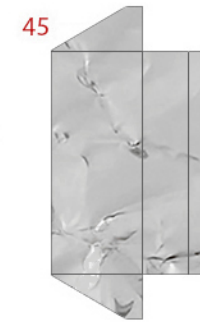
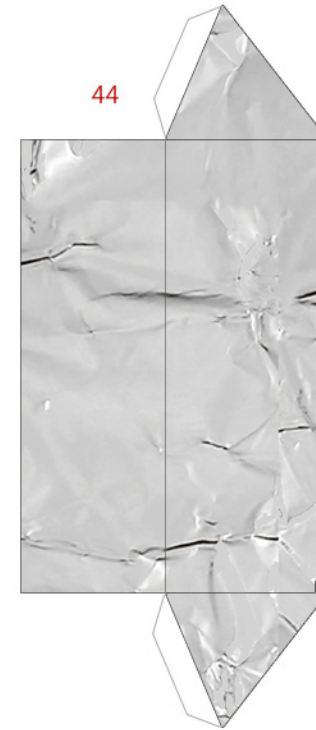
*Spare



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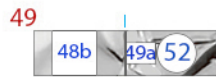
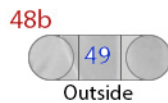
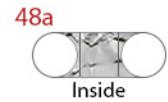
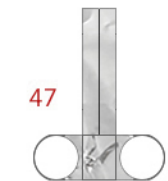
Fold-glue back-to-back, then cut out these two struts.



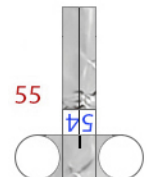
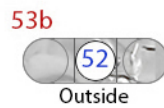
Score-fold at the dark lines only



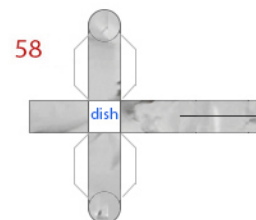
Fold-Glue back-to-back, then cut out the triangle



Fold - glue in half, back-to-back



Fold-glue back-to-back



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Glue the front and back panels
back-to-back

