

CRASH LANDING!

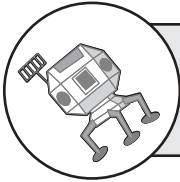
ADAPTED BY SUZANNE CHIPPINDALE

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An Activity for the Whole Family from Project ASTRO™

Astronomical Society of the Pacific,
390 Ashton Ave., San Francisco, CA 94112 ■ www.astrosociety.org/education.html



- **Type of Activity:** Station and facilitated
- **Set-up Time:** 2 minutes

- **Time to do:** 10 minutes for stations, 20 minutes for facilitated debrief

WHAT'S THIS ABOUT?

In this activity we want families to start thinking about the Moon as a real place. There is no right answer to the challenge, although some answers are better than others. The activity helps families to think about the environment on the Moon so they can determine what they would need for survival on the lunar surface. Families pick items from a list provided, those they want to keep to help survive a crash landing on the Moon. Teamwork is essential in this activity since different members of the family may know different things about either the Moon or science. By pooling their knowledge, families are more likely to come up with the best answers.

MATERIALS INCLUDED

- **Crash Landing!** Handouts, pages 3-7

MATERIALS YOU'LL NEED TO GET

- Scissors, 1 per family
- Glue sticks, 1 per family
- Flip chart and markers, blackboard and chalk or whiteboard and dry erase markers

SETTING UP THE ACTIVITY

Make copies of the family activity sheets, put one set per family on each table. Make sure each family has scissors and glue stick at its table.

SUGGESTIONS FOR INTRODUCING THE ACTIVITY

The initial cutting and sorting is done as a station and needs no verbal introduction beyond calling the materials to the attention of the families. The debriefing can be extensive, however.

DOING THE ACTIVITY

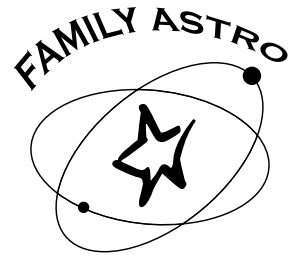
- Open with a group discussion about what people already know about Moon. Parents might remember the Apollo program as a part of their personal history: ask them to share brief accounts of what they remember.
- Read the scenario aloud and ask families to give you the top 5 items that they kept. Record the answers on a flip chart or chalk board at the front of the room.
- Debrief the list asking for each family's justification. Move down the list asking for the second, third, items. At this point, you can use the NASA engineer answers below for comparison, but emphasize that there is no right or wrong answer and that there might be some unorthodox uses for some of the items.

BACKGROUND INFORMATION:

WHAT A NASA ENGINEER MIGHT SAY

ITEM (RANKING)		EXPLANATION
Oxygen (1)	Keep	The most pressing survival requirement
Water (2)	Keep	Replacement of tremendous liquid loss on side of Moon exposed to sunlight
Constellation Map (3)	Keep	Primary means of navigation; stars are visible if you look away from the Sun in the sky
Food (4)	Keep	Efficient means of supplying energy requirements
FM transceiver (5)	Keep	For communication with any rescue ship on line of sight
Rope (6)	Keep	Useful in scaling cliffs or use in case of emergency
First aid kit(7)	Keep	Needles for medicines and vitamins fit special aperture on suit
Raft (8)	Leave	Low priority; but carbon dioxide bottle possible propulsion source
Flares (9)	Leave	Low priority; possible distress signal when rescue ship is sighted
Heater (10)	Leave	Not needed unless on dark side
Compass (11)	Leave	Useless; Moon has no global magnetic field
Matches (12)	Leave	No air on Moon, so matches will not burn

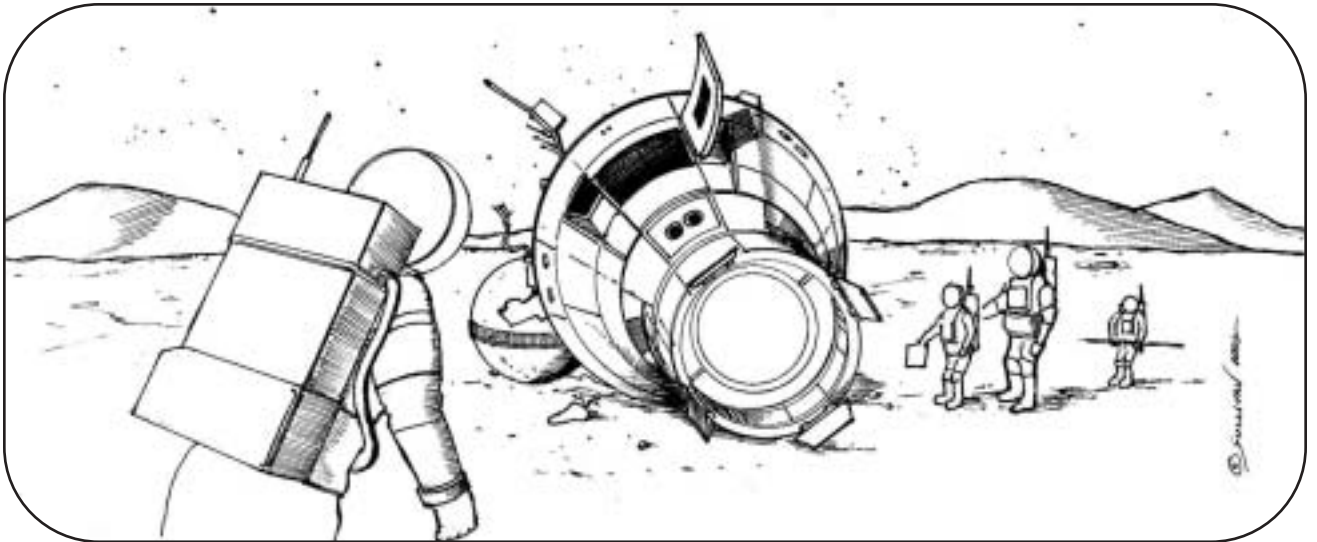
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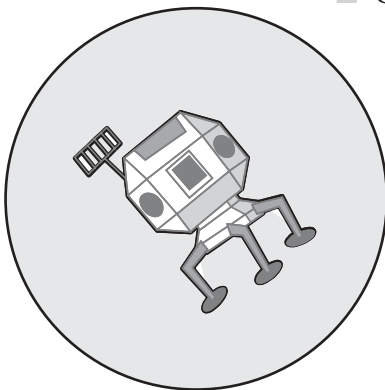
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Imagine a time in the future when there are lunar bases. People are living and working on Moon, exploring and learning about it, and doing other kinds of research that can't be done on Earth.

On a routine journey from Earth to a lunar base, there is an accident. Something has gone wrong and you crash land on the Moon's surface, sixty miles from the nearest base. It is daylight on the Moon and will be for the next few days. In the Moon's lower gravity, that is not too far to walk, but you are limited in what you can carry. What should you take with you?

Your Mission



- Cut out the list of attached items.
- Sort them into 2 groups: items you would take with you and things you would leave.
- Put the ones you would take with you in order of usefulness, from essential-for-survival to not-so-important.
- Once you've come to an agreement within your group, use the glue stick to attach your items to each sheet.

Crash Landing!

List of recovered items to cut out

Box of Matches



These might be useful to make a signal fire or camp fire in case of a crash on Earth, but would they be useful on the Moon?

Two 100 Pound Tanks of Oxygen



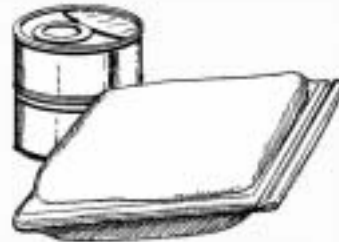
These tanks would weigh 100 pounds on Earth, but in the Moon's lighter gravity, they would weigh less than 17 pounds each.

Magnetic Compass



True North on Earth varies from magnetic North by as much as 23 degrees. How well could you navigate on the Moon with this?

Food Concentrate



Astronaut food is notoriously bad, but light weight and compact. Just add water and that bowl of mush could taste like a pot roast.

Self-Igniting Signal Flare



This flare could work underwater or in the vacuum of space.

Solar-Powered FM Transceiver



This radio transmitter and receiver requires only sunlight to function properly.

Crash Landing!

List of recovered items to cut out

50 Feet of Nylon Rope



Nylon rope is tough and light weight.

Moon Constellation Map



Navigating by the stars on the Moon would be very much the same as navigating by the stars on Earth.

Portable Heating Unit



This unit is designed to work on its own batteries with no external power source.

5 Gallons of Water



Water is essential to life and to reconstituting dehydrated food

First Aid Kit with Hypodermic Needles



Hypodermic needles fit special openings in the standard issue space suit.

Self-inflating Life Raft that uses a Carbon Dioxide Canister



This raft is standard issue on shuttles that land on Earth, in case of an emergency water landing.

Crash Landing!

Items to keep (Not necessarily 6; keep as many or as few as you would find useful.)

Crash Landing!

Items to leave (Not necessarily 6; leave as many or as few as you would not find useful.)