Rockets often have booster engines to give them enough thrust to break through the Earth's atmosphere and send them into Space.

In this activity, you are a rocket scientist who must make a rocket with a double power pack that will fire off one after the other. Sounds complicated? Not really, it's all a matter of balloon power!

You have
- Fishing wire or similar thin smooth string
- Clothes pegs or paper clips
- Polystyrene cups
- Straws
- Masking tape
- Long balloons
- Scissors
- Balloon pump

Activity
1. Thread two straws onto the wire - this will be the track for the rocket. Attach the wire to two posts about 10 metres apart, try to make sure it is above head height to avoid accidents.

2. Blow a long balloon up, secure the opening with a clothes peg and attach it to one of the straws. Release the peg. The balloon should whiz along the wire. Now try with two balloons.

3. Cut a ring from the polystyrene cup and place it over the inflated balloon attached to the first straw. Attach another inflated balloon to the second straw and trap the opening under the ring from the cup. Release the first balloon - as it deflates it will release the opening of the second balloon causing it to add power to the rocket, giving a booster effect. (Tip: Make sure the balloons are pointing in the same direction!)

4. Can you think of a way to make three balloons go together?

5. You can also try attaching the balloons together and releasing them at the same time. Does this go further than the booster rocket?

6. Try experimenting with different shapes of balloons.

Useful Questions
- What caused the balloon to move when it was released?
- Did all of the air come out of the balloon?
- What pushed the air out of the balloon?
- Why do rockets often discard some of their power packs?
Investigate!

- Rockets need a great force initially to break out of the Earth's atmosphere - which force is drawing them back?
- Can you find out what rockets usually use as fuel?
- Why is it important that this fuel is as compact as possible?
- How can you make this experiment a fair test?
- What is the force that stops your rocket?
- Can you think of anyway to reduce this force to make your rocket go further?

Research Opportunities
- How does the USA Space Shuttle differ from more traditional space craft?
- What do you think happens to pieces of rocket that have been discarded?
- Can you find any pictures of the earth from space? What is the main colour that you can see? Why?
- You are a Space Captain on a mission to Mars - write a letter welcoming your crew aboard and letting them know what to expect on the journey and what will happen when they get there.
- Imagine that you are cast away on a deserted planet which can support life—what do you think you would need to survive?
- Can you make another balloon powered vehicle?

Useful Websites
These sites will help you discover more about balloon power:
http://www.energyquest.ca.gov/projects/air-power.html
http://www.pbs.org/saf/1403/teaching/teaching.htm
http://www.cs.cmu.edu/~rapidproto/students.03/pmwilson/balloon_rocket/