Topic: Gravity and Pendulums
Balancing Act (Gravity)

http://www.madaboutscience.com.au/store/index.php?main_page=page&id=20

Balance a can on its bottom rim and amaze your friends. Suitable for kids aged 6+

What you will need:
•Two empty 375ml cans
•100mls of water approx

What to do:
1. Pour about 100mls of water secretly into one can.
2. Have someone try to balance the other empty can on its bottom rim. It is impossible.
3. Then amaze them, by easily balancing your 'magic' can on its bottom rim (they don't need to know it has water in it).

How does it work?
It works because the water adds weight to the bottom of the can, changing its centre of gravity and allowing it to balance in impossible ways.

Topic: Gravity and Pendulums
Raw or Boiled Egg? (Gravity)

http://www.sciencekids.co.nz/experiments/eggboiledraw.html

Surprise your friends and family with an easy science experiment that answers an otherwise tricky question. Two eggs look and feel the same but there is a big difference, one is raw and the other hard boiled, find out which is which with this fun experiment.

What you'll need:

•Two eggs, one hard boiled and one raw. Make sure the hard boiled egg has been in the fridge long enough to be the same temperature as the raw egg.

Instructions:

1. Spin the eggs and watch what happens, one egg should spin while the other wobbles.
2. You can also lightly touch each of the eggs while they are spinning, one should stop quickly while the other keeps moving after you have touched it.

What's happening?

The raw egg's centre of gravity changes as the white and yolk move around inside the shell, causing the wobbling motion. Even after you touch the shell it continues moving. This is because of inertia, the same type of force you feel when you change direction or stop suddenly in a car, your body wants to move one way while the car wants to do something different. Inertia causes the raw egg to spin even after you have stopped it, this contrasts with the solid white and yolk of the hard boiled egg, it responds much quicker if you touch it.

This is a good experiment to test a friend or someone in your family with, see if they can figure out how to tell the difference between the eggs (without smashing them of course) before showing them your nifty trick.

Topic: Pendulums and Gravity
Gravity as a pump – Make a siphon

Did you know that you can use the earth's gravity to help you pump water? This is very helpful if you have a flood!

What you will need:

- Approx 350 cm (10 feet) of transparent flexible tubing (2-4 cm in diameter (half inch)
- Kitchen sink
- Large bucket
- Food colouring
- Ladder or stack of books
- Chair

What to do

1. Coil the flexible tube and put it in your kitchen sink.
2. Put the plug in the sink, then start to fill the sink with water.
3. Put one end of the hose to the tap and the other end in the sink. Run the tap to get all the air out of the hose.
4. Put your thumbs over both ends of the hose, put one end in the sink and bring one end to the bucket on the floor.
5. Take your thumbs off and see what happens.
6. Let the water drain out of the sink completely.
7. Now repeat the experiment, this time draining the water from the bucket back into the sink.
8. Now put the bucket on a chair. Will your pump still work?
9. Now put the bucket even higher. e.g. on a ladder or a stack of books. How high does it have to be before the water will drain back into the sink?

Why does it work?

Why does the water drain out of the sink?
The water in the sink wants to come down seeing it is above ground level. This is due to the force of gravity.

Pendulums Experiment 1
Build a pendulum

Follow these steps to build a pendulum:

1. Take a ball (the 'bob'), some string, a ruler, and strong sticky tape.
2. Place the ruler on a desk so that 10 cm (4 inches) of the ruler is on the desk and 20 cm (8 inches) extends over the side. Tape it to the desk.
3. Wrap one end of the string around the ball once. Wrap a piece of tape around the ball, covering the string. Put two pieces of tape where the string hangs off the ball.
4. Tie or tape the other end of the string around the ruler.

Now you are ready to do the experiment.

1. Set the pendulum in motion by pulling it up and letting it go.
2. Predict what will happen.
3. Observe how the pendulum swings back and forth (periods), and time how long it takes to stop. *(Note – one swing back and forth makes one period)*
4. Write your results.
5. Why you think it happened.
6. Now repeat the experiment using different lengths of string.
7. Record any differences in results.

	Prediction	**Results**	**Why do you think this happened?**
Pendulum 1			
Pendulum 2 (longer string)			
Pendulum 3 (shorter string)			

Pendulums Experiment 2
Bobs of different mass

1. Make a pendulum using the same length of string as the last one, but a bob of different mass. (The ball was the 'bob' in the first experiment.) e.g. You could use a marble, a bigger ball, a rock, a pebble
2. Predict what might happen.
3. Set the pendulum in motion and count the number of periods it completes until it stops. Write your results and why you think this happened.
4. Repeat the experiment using different bobs of different mass.

Type of bob	**Prediction**	**Results**	**Why do you think this happened?**

Pendulums Experiment 3
Pendulums can follow different paths

1. Take a pendulum that you have already made.
2. Release pendulum so that it follows a particular path, e.g. straight line, at a different angle or in a circular/oval path.
3. Count the number of periods the pendulum completes in 2 minutes.
4. Record your results.
5. Now repeat the experiment and set the pendulum swinging to follow a different path.
6. Examine your results to see whether the path followed affected the number of periods pendulum made in 2 minutes.
7. Explain why this happened.

Type of path	**Prediction**	**Results**	**Why do you think this happened?**