Science – Year 5/6B Summer 2

Revision Block B

Sensational Science

Session 3

Resource Pack

Experiment clusters

Cluster 1

Upside down water investigation

Equipment:

- A Styrofoam cup of water, full to the brim
- 1 piece of card, larger than the cup rim

Guidance:

1. Complete this experiment outside where it doesn't matter if the floor gets wet!
2. Fill your cup until it is completely full.
3. Carefully place your piece of card on top of the cup ensuring there is good contact across the cup rim.
4. Gently turn the cup upside down, while keeping an upward pressure on the card.
5. What happens? Why do you think this is so?

http://www.fizzicseducation.com.au/Free+experiments/force+and+movement/Upside+down+water+cup.html

Blowing balloons apart investigation

Equipment:

- 2 balloons (blown up)
- 2 x 20 cm length strings
- 1 rod or stick
- 2 identical stacks of books

Guidance:

1. Create 2 pillars of books, and put the stick across the two pillars.
2. Attach a separate string to each balloon and tie the strings to the stick, so that the balloons hang freely from it.
3. Ensure the balloons are the same height then blow between the balloons and see if you can blow them apart.
4. Why don't you think you can do it?

http://www.fizzicseducation.com.au/Free+experiments/force+and+movement/bernoulli+balloons.html

Cluster 2

Broom balance investigation

Equipment:

- A broom

Guidance:

1. Spread your hands out as far apart as you can along the broom and balance the broom on just one finger from each hand.
2. Slowly slide your fingers together at the same speed (the finger close to the broom head won't move much in comparison to the other one).
3. When your fingers meet you will have found the broom's centre of gravity – now try and balance the entire broom using just one finger at that point.
4. Repeat for a range of other irregular shaped objects, e.g. rounders bat, tennis racket, hockey sticks.
5. Can you always find the centre of gravity? Is it always in the middle of the object?

http://www.fizzicseducation.com.au/Free+experiments/force+and+movement/broom+balance.html

Suspended bottle investigation

Equipment:

- A small soft drinks or water bottle (the smaller the better)
- Uncooked Rice
- A pencil or chopstick

Guidance:

1. Complete this investigation over a large bowl/tray in case the rice falls!
2. Fill your bottle with uncooked rice then push the pencil straight down into the bottle.
3. Try lifting the bottle using just the pencil – it won't work!
4. Now try pushing the pencil in and out at least 30-40 times and try lifting the bottle again, just using the pencil.
5. Why do you think this now works?

http://www.fizzicseducation.com.au/Free+experiments/force+and+movement/suspended+bottle.html

Cluster 3

Swipe the stack investigation

Equipment:

- Stack of coins – £1 coins work best
- A dinner knife

Guidance:

1. Stack the coins into an even and straight tower.
2. Use a dinner knife to try and swipe a coin out from the bottom of the tower.
3. See how many coins you can remove before the tower falls down.
4. What do you think keeps the stack standing?

https://www.stevespanglerscience.com/lab/experiments/coin-tower/

Inseparable books investigation

Equipment:

- 2 A4 notebooks

Guidance:

1. Place the two notebooks on a flat surface and alternate pages from each notebook placing one over the last, continuing until the notebooks are entirely intertwined.
2. Have one person hold one notebooks just inside the binding and another hold the other and both pull as hard as you can.
3. Why can't you separate them?

https://www.stevespanglerscience.com/lab/experiments/inseparable-books/

Science labels: *Which force/s are you exploring?*

Air pressure
Gravity
Friction
Gravity & friction

Air pressure
Gravity
Friction
Gravity & friction

Air pressure
Gravity
Friction
Gravity & friction

The science behind the investigation cards: *select the correct explanation*

Air exerts a pressure, but inside the cup there was no air, so the weight inside the cup was only coming from the water. However the air below the card was pushing up into it. This upwards air pressure is much greater than the pressure from the water pushing towards the ground. This is how air locks work.
All objects have a centre of gravity. This point differs from object to object. The centre of gravity is where the mass of the object is equally balanced.
Newton's first law of motion states that an object in motion (or at rest) tends to stay in motion (or at rest). This means that when things are balanced in a stack they tend to want to stay that way, where they are. When you attempt to remove something from the bottom of a pile you are applying an outside force that should cause the pile of objects to fall. However, the friction between the bottom item and the pile above it and stack above it keeps them together. To overcome this friction, a fast-moving action with plenty of force will remove the bottom item without the friction managing to topple the tower over – it instead drops into the same spot it was in before.
Moving air has less pressure than still air. (The mathematician Bernoulli discovered this.) In your investigation when you tried to blow the balloons apart it created an area of low pressure between them. The faster the air moved between the balloons, the lower the air pressure in that space. The high pressure that surrounds the balloons pushed the balloons together as a result.
The greater the contact between two surfaces, the greater the friction will be. As you push the pencil in and out of the rice you are pushing air out of the container. The more the rice compacts as a result of this, the more rice makes contact with your pencil. Over time this increases the friction between the rice and the pencil. Eventually the friction is so great that you can lift the rice-filled jar into the air as the frictional forces are greater than the force of gravity.
Friction opposes motion when two surfaces are in contact. While the amount of friction between sheets of paper is fairly small when you multiply that friction by hundreds of surfaces (like the many pages of interwoven notebooks) the result is an amount of friction that is huge!