Outdoor Science Day

Friday 22nd June 2018

Timetable and Plans

Morning Activities Overview:

	Process	Teacher / Where	Overview of activities	Learning Objectives
1		**Mr. Napper**	**Bursting Bags** • Children to compare different combinations of two reagents to determine which make for the most efficacious reaction • Children to generally understand that the reaction produces carbon dioxide and why this is an important gas for living things	• I can make predictions about a simple experiment and test my ideas • I can determine the optimal quantities of reagents to create the strongest reaction • I can describe what I have found from my simple experiment
2		**Mrs. Morrell** **+ Miss Brookes**	**Sunlight Imagery** • Children to collect natural objects; discuss why they are of interest. • Children arrange natural items on photosensitive paper; leave to expose in the sunlight. Rinse paper in water to fix image. • Discuss the effectiveness of the technique, can chn evaluate their image / those of their peers? Can they tell which objects were placed on the paper by examining the silhouettes?	• I can gather natural items which interest me, describing my choices • I can create an image using photosensitive paper • I can evaluate sunlight images and describe which items have been used
3		**Miss Horne**	**Kite Designs** • Children to explore which shape of kite is easiest to fly; are kites easier to fly with or without a tail? How high can we manage to make our kites fly?! • Do kites with a low or high surface area fly better? Explain concept. • How is wind exploited by a kite? Discuss the forces involved which enable a kite to fly (*KS2 chn have already covered forces this year and last year*)	• I can evaluate the features of a kite which enable it to fly • I can discuss the opposing forces which act upon a kite and which force must be strongest to enable the kite to remain airborne
4		**Miss Fitzsimons**	**Spud Guns** • Chn to use copper pipes to create a simple spun gun. When pressure is applied, watch as the potato piece pops out. How far can the potato travel? How well can we aim our spun guns? • Chn to compare pipe diameters to see if this variable affects the effectiveness of the spud gun	• I understand that air is made up of matter which can be compressed • I know that friction holds the potato pieces in place, and this can be overcome when pressure is applied

Collaborative Groupings:

Class	**Mr. Napper** Station 1	**Mrs. Morrell** Station 2	**Miss Horne** Station 3	**Miss Fitzsimons** Station 4
1	William Nelson Sophie Rowlandson Noah Crawshaw Imogen Rowlandson-Benson Freya Barton	Harriett Goodrum Deon Nyamai Daniel Olerenshaw Archie Goodrum	George Gribble Jake Airey Layla Grundy Zac Walton	Lottie Grimshaw Zara Wilson Charlie Anderson Billy Joe Coward McSkimming Eleanor Tegg
2	Alfie Chapman Zachary Rowlandson-Benson Katelyn Wadlow Maddison Wadow	Alice Baddeley Lily Edmondson Nisha Gregson Holly Lloyd Grace Wheatman	Dylan Benson Nyla Bushell-McKenny Ava Porter Harry McDevitt Oscar Rowlandson	Mikey Anderson David Appleton Louis Bennett James McClure
3	Niamh Nelson Mya Barton Dylan Crawshaw Lucie Rowlandson	Debra Nyamai Daniel Baddeley Ben Foster Lily Lloyd	Charlie Gribble Casey Evans Samuel Rowlandson Ellis Darwick Reuben Darwick	Eva Bernas Jacob Burrow Joseph Grimshaw Klayton Wilson
4	Emma Nelson Evie Rowlandson Paige Bingley Nate Wilkinson	Evie Crowe Ellery Acraman Kian Nickson Daniel Palmer-Armstrong	Jake Gibbons Archie Gribble Jake Wilson	Aidan Wilson Matthew McClure Oliver Pearson Jake Rowlandson
Total	17	17	17	17

Timetable:

Time	
09:05 – 09:20	Celebration Assembly
09:20 – 09:30	Introduction; Children to Groups
09:30 – 10:00	Session 1
10:00 – 10:30	Session 2
10:30 – 10:50	*Break*
10:50 – 11:20	Session 3
11:20 – 11:50	Session 4

Morning Lesson Plan – Mr. Napper

Lesson	Bursting Bags
Learning Objectives	• I can make predictions about a simple experiment and test my ideas • I can determine the optimal quantities of reagents to create the strongest reaction • I can describe what I have found from my simple experiment
Resources	Food bags; bicarbonate of soda; vinegar; toilet roll; proportion cards; whiteboard pens; measuring cylinders
Keywords	Reaction; reagents; experiment; prediction; result; proportion; quantity; bicarbonate of soda; vinegar; acid; carbon dioxide; gas; expand; burst; explode
Key Questions	What will happen when the reagents are sealed together inside the bag? What is the name of the gas which is released by the reaction? Which quantity of reagents gives the strongest reaction? Is our experiment a fair test?
Introduction	Who has heard of bicarbonate of soda before? What is it? What do people use it for? Today we are going to use it to create a simple chemical reaction; when vinegar is added, the acid present causes the bicarb to start to fizz. Do we know which gas is released? Carbon dioxide; this is the gas which plants absorb to convert into food (which in turn releases oxygen as a waste product). For our experiment, we are going to see how ferocious a reaction we can make using bicarbonate of soda and vinegar. Will the reaction be strong enough to burst one of our food bags?!
Main Activities	Split chn into 4 groups of 4 or 5. Each group to be given a proportion card. We are going to find the optimal quantities of reagents to produce the most carbon dioxide. Into their food bag, chn are to add: • 2 tablespoons bicarb / 100ml vinegar • 1 tablespoon bicard / 100ml vinegar • 2 tablespoons bicarb / 200ml vinegar • 1 tablespoon bicarb / 200ml vinegar Pour vinegar into bag first directly from measuring cylinder. Place tablespoons of bicarb onto square of toilet tissue. Drop into bag and seal. Observe to see which combination of reagents produced the most gas / the more rapid reaction.
Plenary	Which combination caused the bag to burst?! Do we think it is important to have more vinegar or more bicarbonate of soda to produce carbon dioxide? Children to put all used bags into bin bag before moving on to the next task. Remind chn to wash hands thoroughly before lunch.

Morning Lesson Plan – Mrs. Morrell

Lesson	Sunlight Imagery
Learning Objectives	• I can gather natural items which interest me, describing my choices • I can create an image using photosensitive paper • I can evaluate sunlight images and describe which items have been used
Resources	Photosensitive paper sheets; natural items; water tray; washing line; clothes pegs; magnetic letters
Keywords	Sunlight; shadow; block; opaque; item; image; fix; photosensitivity; chemical layer; reaction
Key Questions	Which natural items do we like to collect? How can we capture an image of them with just a piece of paper? Can you describe your items? Can we tell which items others have used just by looking at their sheets?
Introduction	Where do we get most of our light from? The sun! Why is the sun's energy so important to living things? Discuss ideas, e.g. plants capture sunlight to make food; the sun's warmth ensures we have liquid water on Earth; the sun gives us light which helps us to see etc… Today we are going to investigate how the sun's energy can be used to create pieces of art! Introduce chn to light sensitive paper. This special paper is coated with a chemical which darkens as it is exposed to sunlight. If an object is placed on top, its shadow will prevent this process from happening so an imprint of the object will be left behind!
Main Activities	Inform chn that flat items will cover the paper and leave a strong outline, but 3D items will make an interesting effect on the final image, e.g. a twig will make more of a 3D appearing image as it makes shadows of differing strengths. Chn explore the woodland area for a few minutes to collect natural items which they want to place on top of their piece of photosensitive paper. Write names on paper quickly; as soon as it is exposed to light, it will start to react! Place items on top and leave in the sunlight for at least 30 minutes. If windy, may need to use objects so that they weigh down the paper effectively. Younger children may want to use magnetic letters to spell out their name on their paper. After allotted time, chn to dip their paper in the water tray briefly. The image should darken instantly to reveal the silhouettes. This also stops any further reaction with the sunlight from taking place. Hang images up to dry on the washing line.
Plenary	Can children determine which items were used to make the sunlight images? Which objects make a clear outline? Which made a more 'ghostly' image?! (*Due to time; this will probably need doing in the afternoon*.)

Morning Lesson Plan – Miss Horne

Lesson	Kite Designs
Learning Objectives	• I can evaluate the features of a kite which enable it to fly • I can discuss the opposing forces which act upon a kite and which force must be strongest to enable the kite to remain airborne
Resources	Plastic bags; string; bamboo canes; Sellotape *Prepare kites beforehand to maximise flying time on the morning.*
Keywords	Kite; string; length; design; function; force; wind; air resistance; gravity; strength; overcome; balance; surface area
Key Questions	How do kites work / fly? What do we need to maximise to ensure
Introduction	Outline **safety expectations**: we are going to be flying kites, some of which may be quite heavy. We need to ensure that we are all spaced out on the field safely to minimise the risk of our kite coming down and crashing into somebody. What do we need to do to get a kite airborne? We need to get it to catch the air! How can we do this? Listen to shared ideas. The best kites have a high surface area but a low mass to help them to lift. The heavier the kite, the more likely it is that gravity will win in the balance of the forces! Today we are going to test how kites fly, both with and without a tail. Which do we think will fly better?
Main Activities	Chn to try and fly their kites, first without a tail. Can we launch them successfully? How do they fly? Does running with the kite help to keep it airborne? Bring kites back down to the ground; attach tail. Does the kite fly better with its tail? What effect does it have? **EYFS/KS1 chn**: if struggling to fly regular kite, can they fly the low mass cassier bag versions?
Plenary	It needs to be a little bit windy. Wind causes lift. Lift pushes the kite upwards. Gravity pushes the kite downwards. Your kite will only fly it the upward force, lift, is greater than the downward force, gravity. Did the added tails help or hinder our kites? What did we observe?

Morning Lesson Plan – Miss Fitzsimons

Lesson	Spud Guns
Learning Objectives	• I understand that air is made up of matter which can be compressed • I know that friction holds the potato pieces in place, and this can be overcome when pressure is applied • I can compare and evaluate the effectiveness of different copper pipes used to make the spud guns
Resources	Large potatoes; lengths of copper pipe; dowels or bamboo canes; laminated targets; tape measures
Keywords	Air; gas; matter; compress; pressure; friction; force; release; velocity
Key Questions	Which force keeps the potato pieces lodged inside the pipe? (Friction) What happens to the air inside the tube as the dowel is applied? (It is compressed) What causes the potato to launch out of the pipe? (Air pressure exceeds frictional resistance)
Introduction	Start with **safety expectations**. No-one will attempt to fire their spud gun when chn are in front of the line. Spud guns **must not** be fired when aimed at people or any other living animals. Only cross the line when told it is safe to do so by an **adult**.
Main Activities	Chn to use provided resources to create spud gun, following the steps: • Place a large potato on a table and hold it with one hand. With the other hand, push one end of the pipe all the way through the potato. • Do the same at the other end of the pipe. • Line the pipe up an aim at your target - make sure there are no people or animals in the way! • Poke the end piece of potato with the dowel. • Can spud guns be used to hit the target mounted on the wall?! Chn to compare the different diameters of copper piping provided; which are easier to use? Why / how do they perform differently? e.g. distance potato fired, ease of inserting pipes into potato etc…
Plenary	Ensure all chn understand the process as to how the spud gun functions: • Plugging both ends of the spud gun creates an airtight seal, trapping air inside the pipe. • When you push one piece of potato along the pipe, the air between the two potato pieces becomes compressed. This increases the air pressure. • When the force of the air pressure on the front potato is large enough, it will overcome the friction that keeps the potato in place. • Your potato fires out of the tube! Which pipes performed better than others? Was there even a difference observed?