West Oxford Primary School

Developing independence, choice and challenge through Rich Tasks in Science
Summary of Content

Rich tasks can form a useful structure for helping to provide “minds on” Science.

There are some excellent ideas and planning here to get you started if you haven’t tried them before or to complement the rich tasks you already do.
What the school says

Rich Tasks were introduced about 5 years ago as part of our Able, Gifted and Talented programme and have been very successful to fully engage the students and allow them to show teachers what they know.

What is a "rich task"? The definition is "A specific activity designed to allow students to demonstrate knowledge through a practical, real-world activity". The beauty of these tasks is that they can take it in any direction and as far as they would like to go, making it ideal for all children and their different learning styles.

Teachers have used Rich Tasks in a variety of contexts including science, but always cross curricular wherever possible.
The Lighthouse Keepers Lunch
Rich Task Planning Y2

Mr. Grinling would like to know how you feel about his stories – can you design and make something that is linked to them? Mr. Grinling will be coming in to judge the best ideas so remember to plan carefully!

Bloom’s links/Higher Order Skills
Synthesis – combine skills from across the curriculum to plan and create a group project based on the Lighthouse Keepers Lunch
Remembering – recall and act upon, known information and skills
Evaluation – compare ideas for group project, make decisions
Analysis – identification of steps in task, organisation of roles & responsibilities
Comprehension – demonstrate understanding of the text

Learning to Learn Skills
Reflection
With help from a teacher, I review my own work and identify what I have done well (learning log)

Relationships
I work with teams when asked.
I listen to other people.

Resilience
I work well when given work that I enjoy
I use the resources I have been given to complete a task.

Resourcefulness
I respond to ideas, tasks and problems.

Risk Taking
I think about risks and try to not let this put me off having a go.
I am prepared to put forward my ideas or answers in a small group.

AFL questions
Beginning work:
How are going to...?
How do you think that...?
Do you think that...?
Is it important to...?
While working:
Did you decide that...?
Where might...?
Have you...?
Can you think of...?
Can you explain how you...?
What did you notice when...?
Why did you decide to...?

Science/DT
Are you ready for a challenge?
Challenges linked to the story might be:
Build a lighthouse with a flashing light
Make a boat that floats
Bridge the gap between the lighthouse and coastline
Make a suitable container for a picnic e.g. to keep things cool/warm
Which material would make a good waterproof coat/hat?
Design something to scare away the seagulls
Design a sandwich filling to stop the seagulls!
Food technology - design a sandwich the seagulls wouldn't like!

Literacy links to run alongside rich task
Plot, character and setting
Speaking and listening
Writing – a week in the life of a lighthouse keeper.
Planning, drafting, organising and improving written work. Proof reading and focus on presentation skills.
Rich Task Planning Class 1 & 2
Based on

The Owl who was afraid of the Dark

Following our visit from the Owl sanctuary decide on an area that you would like to research and choose your own way to record your ideas and findings.

Science
Write a report about owls. What is their habitat? What do they eat? What special abilities do they have? Can you find out about different types of owl? How are they similar / different?
Make a list of animals that come out in the daytime and a list of animals that come out at night.
Plop makes an 'EEEEEEEK' sound for the young lady. Think about the different noises that animals make. How do they use these to communicate with each other?
Use a telescope to look at the stars, like the man in the story. Can you find the names of different constellations in a book?

Bloom's links/Higher Order Skills
Synthesis – combine skills from across the curriculum to plan and create a group or individual project based on The Owl who was afraid of the Dark
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Art/DT
Owl pictures
Collages
Finger puppets
Owl kites

Geography
Owls from around the world
Rich Task Planning Class 2
Based on terms Topic Habitats

Challenge children to create an imaginary animal and a habitat for them to live in and to present their work to the class and curriculum assembly

AFL questions
Beginning work:
How are going to...?
How do you think that...?
Do you think that...?
Is it important to...?
While working:
Did you decide that...?
Where might...?
Have you...?
Can you think of...?
Can you explain how you...?
What did you notice when...?
Why did you decide to...?

Literacy
Create a fact book or poster about your imaginary animal. The fact book should be interesting to someone who doesn’t know about the animal. It could include information about what the organism looks like, where it lives (the habitat, and the locations within it, e.g. pond), How it fits into a food chain (what it eats and is eaten by).
It's name where it lives what it eats what it does for the world what other animals live with it and how they live together

Science
Invent an organism and a habitat for it to live in. Label e.g. what it eats, eaten by, where it lives (over or under ground)
What type of habitat is it best suited to?
Create a food chain
What position will your organism have in a food chain?

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Art/DT
Design and make a 3D mini beast and the habitat in which it lives.
My organism is called a Landbug. It has adapted to a habitat near a pond. It has protection from their predators (deep under the tree) and can get its food from the pond as it likes to eat pond skaters and tadpoles. Hedgehogs and snakes like to eat Landbugs.

Adam

My animal is a Red Winged Fly. It lives in trees, preferably near water where it lays its eggs. Young Red Winged Fly’s are yellow and their wings are black but turn red as they grow. The Red Winged Fly is an herbivore and lives off rotting bark from trees. It is eaten by spiders, which happens a lot when their many wings get caught in the spider’s web!

Emily
The flying Blue Stripe Bug is a carnivore, it eats worms and small insects like woodlice. It uses its sharp pincers to dig for food. It sleeps in the branches of apple trees. The Flying Blue Stripe Bug can grow to almost 15cm long and is eaten by birds of prey.

Joshua

This is the Ten Eye Pinch Bug, it doesn’t have any eyes at the front but has 5 on each side of its body. It moves like a crab, stops and spins round before moving on. It doesn’t eat meat so it’s an herbivore. The Ten Eye Pinch Bug loves to eat leaves especially green leaves from small bushes which is why it makes its habitat under hedgerows. The Ten Eye Pinch Bug is eaten by foxes and badgers.

Abbie
SOS World!
(Mantle of the Expert Rich task)
The Great Energy Debate

Year 5

Many resources, esp. films, available from Oxfam’s ‘Climate Chaos’ education pack:
http://www.oxfam.org.uk/education/resources/climate_chaos/

We are ‘SUCCESS’ (Sustainability & Climate Change Energy Solutions).

2 weeks from now, we are going to present our thoughts and solutions to climate change to a visiting expert from Oxfam.
1. We need to:
- *understand* climate change causes (e.g. fossil fuel burning [L10 science practical], methane from animals...)
- *understand* climate change effects - on communities, locations, environments (e.g. drought, lake water levels, melting ice caps, extreme weather events...) [HGS L2]
- *become experts* on the science behind mainstream long-term energy solutions and post our presentations on the VLE for others to learn from [Sci L16]
- *use* some of the less mainstream, ‘wacky’, energy solutions to *inspire* our own ideas for sustainable/ renewable energy solutions (Higher order - ‘Creation’)

2. We will *write* speeches to debate, in class, the relative merits/ impacts of these energy solutions (Higher order - ‘Evaluation’)

3. We will choose a focus location to *compile a case study* of what we have learned (e.g. Australian farming decline/ 3 Gorges Dam, China/ Severn barrage proposal/ Lake Naivasha/ Inuit community...) [HGS L11]

4. We will present/ discuss/ debate with a visiting expert.

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**Cath Burningham from Oxfam came into school. She was really impressed with the children's projects and the level of their knowledge. One child’s project was on 'Overpopulation' which she particularly liked. The children had a really good discussion with her about climate change, endangered species and Oxfam's relief work. Another trip to Oxfam has been arranged for Term 4.**
Scientific Understanding!
L1. to ask questions that can be answered by different types of investigative activity and decide the best approach to use.
L2. to make and record accurate measurements and detailed observations, presenting them appropriately, and analyse, interpret and apply them.
L3. to explore and explain how significant innovations and inventions have come about and how they have changed the way people live and use ideas from other cultures and times to inform their own experiments, investigations and designs.
L8. to investigate the properties and behaviour of light and sound in order to describe and explain familiar effects.

Art and Design
L5. To investigate, explore and record information.

Scenario 1: (3 sessions) Pupils are given the job of ‘photographers’ in the great escape team. The ‘scrounger’ was unable to get a camera, but managed to find a design for a pinhole camera – but it has no measurements. There are a number of possible variables that could be altered to find the best pinhole camera design. (Length, distance from pinhole to screen, size of pinhole, diameter of camera, colour of card used). Pupils split into investigative teams (3 per team) – each testing to find the best measurement(s) for their chosen variable(s). Pupils have 3 sessions to build and test a range of pinhole cameras (or create a design with adjustable variable – e.g. a telescopic camera to study the impact of camera length). They must then create a poster presentation to share with the rest of the squad their findings. Pupils must make very accurate measurements to the nearest mm (and convert between decimal units of length). Pupils must create a graph (bar/line/chart) so their findings can be clearly understood.

Extra Challenge – Pupils must be able to completely clear their space and appear to be writing ‘a song to rouse the troops’ within five minutes if they are told the prison commandant is making an inspection. They must think carefully about teamwork and working practice to achieve this.

Scenario 2: (2 sessions) The camera is a success, and it has been used to plan an escape route. Unfortunately, it crosses a (sometimes) floodlit area with guards. Pupils are given a range of materials and measuring devices (including dataloggers that are light sensitive) and asked to select the best material for a camouflage suit for a midnight escape. Pupils must create averages for the reflective properties for a range of materials, and use this information to draw and design their midnight camouflage suit. This work will also link to studying the period of the blackout in Britain.

Extra Challenge - Pupils should think about the consequences of the squad not being able to see each other – can they create a solution so that the enemy cannot see them, but they can see each other? Final designs are shared with the squad – pupils vote to select their favourite design.
As a team, year 6 investigated a range of variables to create the best pinhole camera…

Then, we built real pinhole cameras from our findings and investigated the effect of increasing exposure on our images.
Some of our images
Scientific Understanding!
L1. to ask questions that can be answered by different types of investigative activity and decide the best approach to use.
L2. to make and record accurate measurements and detailed observations, presenting them appropriately, and analyse, interpret and apply them.
L3. to explore and explain how significant innovations and inventions have come about and how they have changed the way people live and use ideas from other cultures and times to inform their own experiments, investigations and designs.
L8. to investigate the properties and behaviour of light and sound in order to describe and explain familiar effects.
Art and Design
L5. To investigate, explore and record information.

Historical and Social Understanding.
L1. how societies have been organised and governed in different ways and at different times, including in the present.
L7. to consider how people can live and work together to benefit their communities.

Mathematics
L6. to use proportional reasoning to compare numbers and quantities and solve problems.
L17. to convert between units within the metric system.
L23. to solve practical problems involving 3D objects.

Literacy
L2. to select relevant ideas and use appropriate vocabulary to engage and maintain the interest of listeners.
L5 /L6. to sustain different roles, deal with disagreement and vary contributions in group discussion.

Scenario 1: ‘How might the Tudors have prevented mould?’ Pupils discuss 'What makes mould grow on bread?' Discuss the possible environmental factors that might make mould grow on bread – include how does the mould get to the bread as well as temperature, humidity, light level – include pupil ideas. Pupils must create a specific answerable question and design an experiment to answer this question over a three week period. They must also record their results (photography) – and come to conclusions as to the best way to keep bread in Tudor times!

Scenario 2: Reversible and irreversible reactions. Opening question – ‘Can you see a white cat on a completely black night with no moonlight?’ – pre assessment. Pupils attempt to answer the question – in poor Tudor homes, did they recycle candles. i.e. can you catch the wax and remake the candle from the remains. Can we recycle candles - What do you think (yes or no)? How might you prove your idea? What equipment will you need? What experiment will you carry out? What CONTROLS will you use? What do you think your results will show?
Pupils design and carry out experiments in an attempt to catch smoke / wax gas on the surface of tin foil. The aim is to prove that burning of candles is an irreversible reaction. One challenge here is to describe or quantify mould growth in discussion of results.

Scenario 3: The end of a Tudor era – King James 1st, the Jacobean era and Guy Fawkes. Pupils look at explosions – how to create the most explosive effect of coke and mentos! Also look at the possibility of Shakespearean ‘stage explosion’ – how can we control the size of a coke and mentos explosion? Pupils discuss possible variables, design experiments – and then test them!

Learning to Learn Skills
Reflection
I communicate my learning in different ways for different audiences.
Relationships
I team up with others to work towards goals we agree through discussion.
I adapt my behaviour to suit different roles and situations.
Risk Taking
I am prepared to put forward my ideas or answers even if they are not the same ideas as other people.

Learning to Learn Skills
Resilience
I keep going with an activity for the pleasure it provides, not the reward.
I keep focused, sustaining my attention, resisting distraction.
Resourcefulness
I plan the steps and strategies for an activity.
I apply imaginative thinking to achieve an objective.
Some children’s comments of Rich Tasks

I really like Rich Tasks because it’s like having science week more often.
Y5

Working in a group to come up with our own investigation is the best bit!
Y4

I like seeing what others have done with the same question
Y6

I like making a poster showing what we have done then sharing it in assembly
Y3

I enjoyed sharing what we have done in assembly
Y2

I like Rich Tasks because it’s like having science week more often.
Y5

Rich Tasks are good because you get the freedom to investigate a question in a way that you want to do it and take a risk.
Y6

It would be good to do a rich task more often
Y5

Rich tasks are good but more science lessons would be great.
Y4

I liked finding out about owls
Y1
The impact for our school was ..... 

Children right from the Nursery to Y6 are able to be in control of their own learning, they are the ones coming up with the questions and the teachers are there to help, guide and support wherever appropriate. Children have become more confident, resilient, resourceful and are now more willing to take a risk. Over the last 6 years we have made the final of Science Oxford Big Science event, however, two years ago we won and last year we were runners up.
I wanted to ensure that science played a major part in all rich tasks planning for 2012-13 (and beyond) and to question the children on their experiences and assess the impact it had on their learning.
What we will do next

- Ensure Rich Tasks are taking place on a regular basis
- Support new staff with the implementation of Rich Tasks
- Complete new pupil voice for 2014-15
- Staff meeting to discuss new ways to build on our success
- To ensure Rich Tasks take account of the new science curriculum 2014