

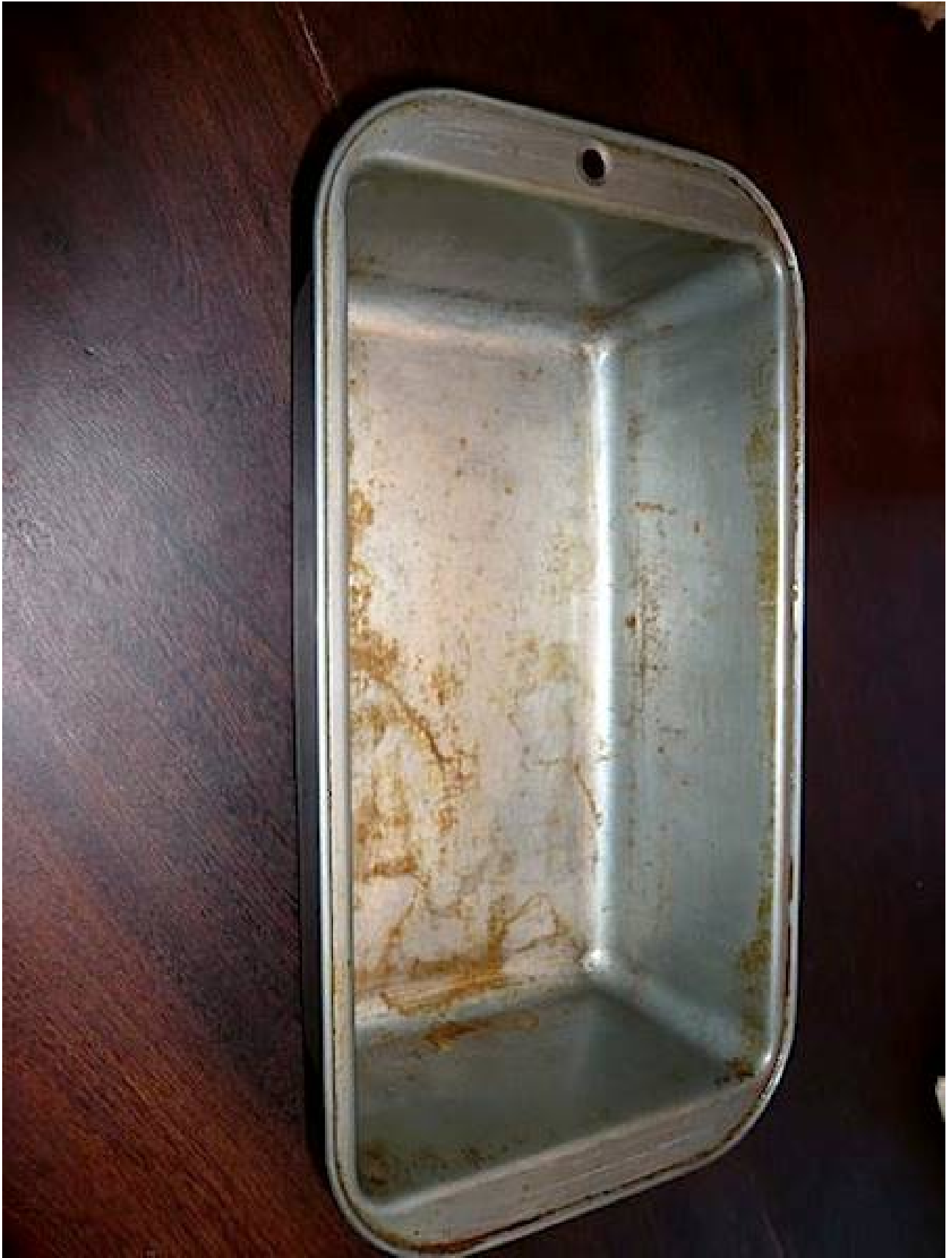
Science - Year 5

Properties and changes of materials – Block 5PCM

Changing Materials Education Pack

Session 4
Resource Pack

Rusty roasting tray



Nails



brass nails



stainless steel nails



iron nails covered with zinc



galvanised iron nails



copper nail



16th century wrought iron nail

Guidance for Rusty Nails Enquiries

Possible enquiries:

1. Try iron nails in air, partly in water (so have contact with air too) and totally submerged in water (could also try totally submerged in boiled water – what will have been removed from the water?)
2. Try iron nails partially submerged (so have contact with water and air) in different liquids, e.g. tap water, boiled water, rainwater, lemon juice, sunflower oil, white malt vinegar, salty water and carbonated water.
3. Try different types of nails, e.g. copper, iron, stainless steel, coated, galvanised, partially submerged in tap water or rainwater.
4. Children could compare the effect of warm water (kept on or by a radiator) to that of cold water (kept in fridge) and of water at room temperature (away from window and radiator).

Hints:

To partially submerge a nail you can place a small piece of sponge in the liquid and lay the nail on top of it.

Nails may need to be blunted for safety.

Check that the iron nails you use are not actually galvanised or coated.

Enquiry questions

Cut out and place in envelopes for allocation

Is water needed to make nails go rusty?

Is air needed to make nails go rusty?

What kinds of nails go rusty?

Do other liquids make nails go rusty?

Which liquid will cause the nails to go rusty the most quickly?

Sticky-note investigations (after Goldsworthy and Feasy, 1997)

Place filled in sticky-notes on the blank boxes to help organise thoughts - the sticky-notes can be moved as the investigation plan progresses

Enquiry question:

VARIABLES

Thing I could change/vary

Thing I could observe or measure

Ensuring my test is fair		
I will change		
I will observe		
I will keep these things the same		

Predicting

The materials that I think will rust first

The materials that I think will not rust or will take a long time

Results and patterns	
Material/conditions	What I observed

Results and patterns	
Material/conditions	What I observed

Observations

Description of pot/ Time observation made	After 1 hour	After 2 hours	After 24 hours	After 48 hours
Nail in air				
Nail partially submerged in water				
Nail totally submerged in water				

Observations

Type of nail/Time observation made	After 1 hour	After 2 hours	After 24 hours	After 48 hours
Iron nail				
Copper nail				
Stainless steel nail				
Brass nail				
Galvanised nail				
Coated nail				

Observations

Type of liquid/Time observation made	After 1 hour	After 2 hours	After 24 hours	After 48 hours
Tap water				
Rainwater				
Boiled water				
Carbonated water				
Lemon juice				
Sunflower oil				
White malt vinegar				
Salty water				

Observations

Temperature of water/Time observation made	After 1 hour	After 2 hours	After 24 hours	After 48 hours
Cold water (kept in fridge)				
Water at room temperature (kept away from windows and radiators)				
Warm water (kept on or by a radiator)				