STRANMILLIS UNIVERSITY COLLEGE
A College of Queen's University Belfast

TAPS-NI
Progression in Science Skills

Topic: Titanic	Primary 6/7 Age 9-11 years	Activity title: Titanic pulleys
Science skill focus Doing: using equipment/techniques to measure accurately	**Curriculum link: Movement and Energy** The causes and effect of energy, forces and movement (ME1)	

Progression Focus
- Can children choose appropriate equipment and techniques to measure accurately?
- Can children use their results to make and test predictions?

Activity *Today we are engineers.* *(Reference: Titanic Science by Jim McDaid, 2014)*
Key question: many heavy materials were needed to build Titanic, how were they lifted?

Ask the children to find out how much force is needed to lift different sized tins/objects. (Tie string around and lift by hooking with a forcemeter). A range of forcemeters could be provided for children to choose from. Note the importance of measuring accurately in Newtons and recording clearly, so can see how much difference a pulley makes next.

Use a pulley to help lift the can (place string over pulley wheel or cotton reel). Can you feel a difference? Use the forcemeter to measure - how much does it reduce the force? Use test results to predict for other cans/objects.
(Using 2 pulley wheels should halve the force needed to lift).

Adapting the activity
Support: provide pictures of how to set up the pulley.

Extension: include more pulley wheels.

Other ideas: What is used now to lift heavy weights? Investigate hydraulics and pneumatics.

Questions to support discussion
- Why did you choose that forcemeter?
- How accurate do you think your measurements are?
- How does the force required to lift the tins change when you use the pulley(s)?
- Can you predict the force when an extra tin/pulley is added?
- What difference does adding further pulleys make to the force required to lift the tin(s)?

Pupil learning indicators
Not fully achieved: Pupils explore the pulleys but are not systematic in their approach or accurate in their measurements (e.g. choose a forcemeter which is not sensitive enough).

Achieved: Pupils use a pulley system to lift a weight and have a structured approach to measuring. They measure the reduced force carefully in Newtons and can predict the force needed to lift with/out pulleys.

Exceeded: Pupils recognise the link between pulleys and force required to lift a weight. They investigate adding extra pulleys to their system and can predict force required for different pulley systems.