



NUCLEAR
WILD FOREST
SCHOOLS

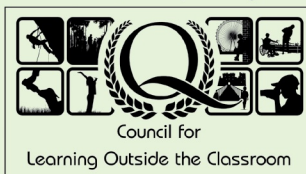
WILD FOREST

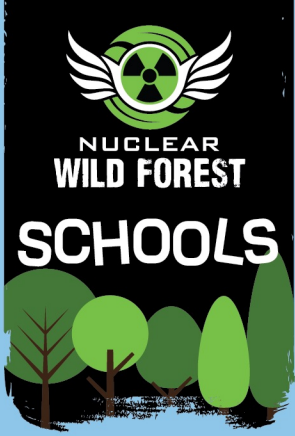
KS3 LEARNING RESOURCES

MUDDY OBSTACLE CHALLENGE



LOtC Quality Badge





NAME :

MUDDY OBSTACLE CHALLENGE

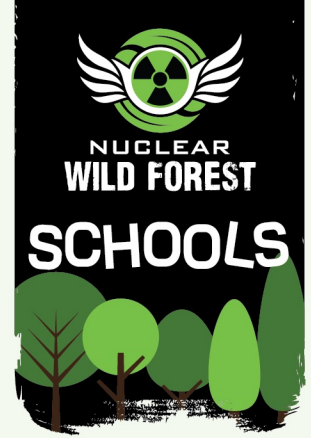
Have a think about what changes when you add forces to mud.

3: THE MUDDY RESISTANCE

Moving through water or thick mud is much harder than running on grass.

The Task:

Draw a force diagram (*arrows*) of a person wading through a waist-deep mud pit. Label the forces acting against them (*Drag/Air Resistance/Water Resistance*) and the force moving them forward (*Thrust*). Why does "viscosity" make this harder?



TEACHER NOTES

ACTIVITY 1: FRICTION VS. TRACTION

Expected Answer: Football boots with studs.
Scientific Explanation: Studs provide high traction by increasing the surface area's "grip" into the soft mud. Flat trainers have low friction on wet surfaces because a layer of liquid (mud/water) acts as a lubricant, reducing contact between the shoe and the ramp. Studs penetrate this layer to reach the solid surface or "lock" into the mud.

Curriculum Link: Physics: Forces – Opposing forces and friction.

ACTIVITY 3: FUELLING THE MACHINE

- Complex Carbohydrates: Oats, brown pasta, wholemeal bread, sweet potatoes. (These provide slow-release energy).
- Proteins: Chicken, eggs, beans, nuts, fish. (These are for muscle repair and growth).
- The Process: * Glucose (from carbs) + Oxygen (inhaled) → Carbon Dioxide + Water + Energy (ATP).

Students should mention that during intense exercise, the heart rate increases to pump this oxygenated blood to the working muscles faster.

Curriculum Link: Biology: Bioenergetics – The need for energy for life processes; the process of aerobic respiration.

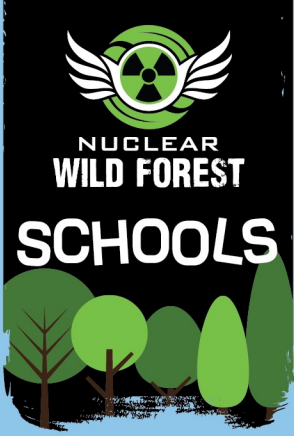
ACTIVITY 3: THE MUDDY RESISTANCE FORCE

Diagram Requirements: Students should draw a central figure with four arrows.

- Forward arrow: Thrust (applied force from muscles).
- Backward arrow: Drag / Water Resistance / Friction.
- Upward arrow: Upthrust (if in deep water/mud) or Normal Contact Force.
- Downward arrow: Weight (Gravity).

Viscosity: Students should note that mud is more viscous (thicker) than water, meaning it resists flow more strongly, requiring more Thrust to overcome the Drag.

Curriculum Link: Physics: Forces – Forces as pushes or pulls; forces being needed to cause objects to stop or start moving.



NAME :

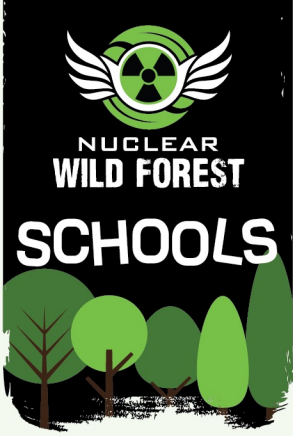
MUDDY OBSTACLE CHALLENGE

Here we'll create a word bank to dip into.

1: SENSORY WORD BANK

To write a great recount after the trip, you need "juicy" vocabulary. Avoid the word "muddy."

The Task: Create a table with five columns: Sight, Sound, Touch, Smell, Taste. Fill each column with three ambitious adjectives or onomatopoeic words (e.g., squelch, viscous, pungent, grit) that describe the obstacle course environment.



TEACHER NOTES

Activity 1: Sensory Word Bank

Curriculum Link: English: Writing – Vocabulary, grammar and structural features; choosing vocabulary for effect.

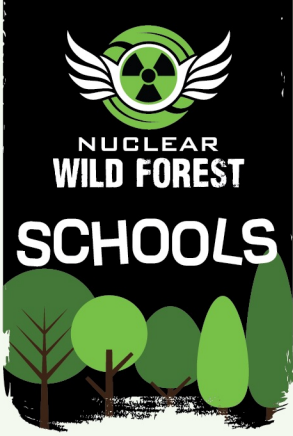
Activity 2: The Captain's Speech

Curriculum Link: English: Writing – Writing for a wide range of purposes and audiences; using rhetorical devices.

Activity 3: The Survival Manual

Curriculum Link: English: Writing – Using Standard English confidently; organising writing into clear sentences and paragraphs.

Teacher Tip: Encourage students to use the word bank to create Extended Metaphors (e.g., "The mud pit was a hungry beast, swallowing my boots whole"). This aligns with the KS3 curriculum goal of using figurative language to "enhance effects."



MUDDY WORD BANK

1. THE TEXTURES OF MUD (ADJECTIVES)

Viscous: Thick, sticky, and semi-fluid (like treacle).

Gelatinous: Having a jelly-like consistency.

Gritty: Containing small particles of sand or stone.

Saturated: Completely soaked through; holding as much water as possible.

Adhesive: Acting like glue; sticking to everything it touches.

Pliable: Easily bent or shaped (used for thick, clay-like mud).

2. THE SOUNDS OF THE COURSE (ONOMATOPOEIA & VERBS)

Squelch: The sound of a boot being pulled out of deep muck.

Slop: The sound of liquid mud hitting a surface.

Suck: The vacuum-like sound of the mud gripping your legs.

Splatter: To splash small drops of mud everywhere.

Gurgle: The sound of air bubbles escaping from a swampy pit.

3. THE PHYSICAL STRUGGLE (DYNAMIC VERBS)

Heave: To lift or pull with a massive effort.

Flail: To wave or swing your arms wildly (usually while losing balance!).

Scramble: To move hurriedly or clumsily over rough ground.

Trudge: To walk slowly and with heavy steps.

Haul: To pull yourself up using a rope or ledge.

4. THE SENSORY ATMOSPHERE (SMELL & SIGHT)

Pungent: A sharp, strong, or "earthy" smell.

Stagnant: Water or mud that has been sitting still and smells "off."

Murky: Dark and dirty; not clear.

Opaque: Not able to be seen through (unlike clear water).



NUCLEAR
ADVENTURES
SCHOOLS

NUCLEAR ADVENTURES

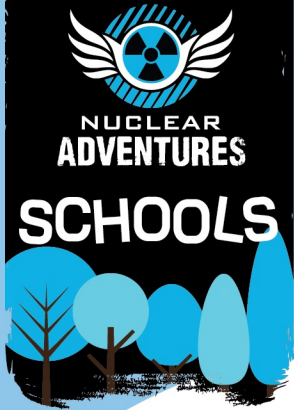
KS3 LEARNING RESOURCES

HIGH ROPES CHALLENGE



LOtC Quality Badge





NAME :



HIGH ROPES CHALLENGE

High ropes courses can bring out some intense emotions.
Let's explore what that could look like.

1: THE VIEW FROM ABOVE

Perspective is everything. How you describe the ground depends on how you feel about heights.

- The Task: Write two contrasting sentences describing the ground below from the top of the course.

Sentence A: Use metaphor to make the ground seem welcoming.

Sentence B: Use personification to make the ground seem threatening.

SENTENCE A

.....

.....

.....

.....

.....

.....

.....

.....

SENTENCE B

.....

.....

.....

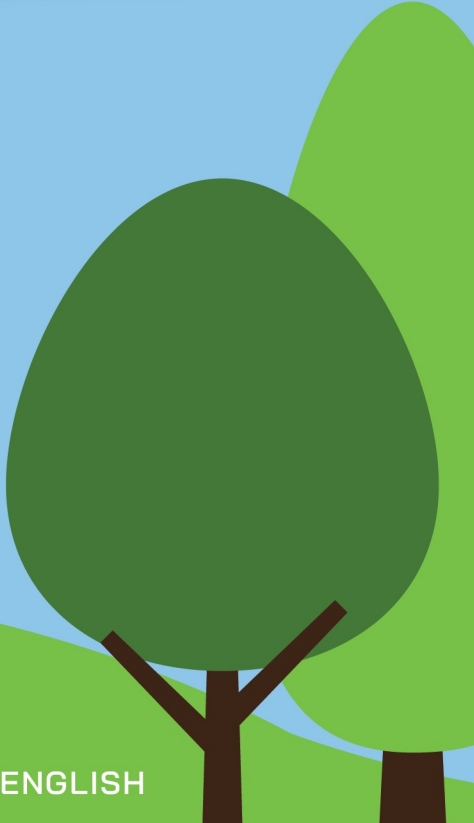
.....

.....

.....

.....

.....





NAME :

HIGH ROPES CHALLENGE

Now to apply your Technical Writing knowledge to high ropes safety systems.

3: THE "FLOW" OF THE COURSE

Theme: Instructional Precision for a Continuous Belay System

In a continuous belay system, you are "locked on" from start to finish. However, moving your safety trolley through the metal plates (brackets) at each tree requires a specific technique so you don't get stuck.

The Task: Write a "Troubleshooting Guide" for a fellow student who is struggling to move their metal trolley through a support bracket.

The Constraint: You must use sequencing connectives (e.g., Initially, Simultaneously, Subsequently) and spatial prepositions (e.g., aligned with, through, across) to ensure the instructions are 100% clear.

A large sheet of white paper with horizontal lines and a dotted midline, pinned to the background with two red pushpins at the top corners. The paper is tilted slightly to the right and is intended for the student to write their troubleshooting guide.



TEACHER NOTES

WORKSHEET 2: THE LANGUAGE OF THE LEDGE

Theme: Descriptive Writing (Perspective) and Technical Instructions

Activity 1: The View from Above

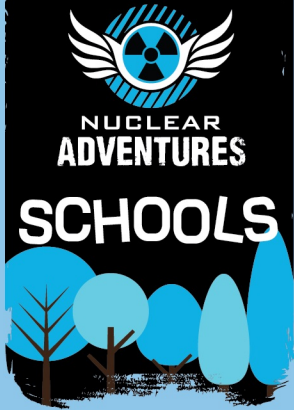
Curriculum Link: English: Writing – Using figurative language; choosing vocabulary for effect.

Activity 2: Internal Monologue

Curriculum Link: English: Writing – Writing for a wide range of purposes; using punctuation for effect.

Activity 3: The "Flow" of the Course (Technical Writing)

Curriculum Link: English: Writing – Organizing writing into clear sentences and paragraphs; using Standard English.



NAME :



HIGH ROPES CHALLENGE

OK, time to look at some of the safety equipment we'll come across at Nuclear Adventures and the forces we'll experience while on the high ropes course.

1: POTENTIAL VS. KINETIC ENERGY

As you climb higher up the wooden stacks to the starting platform, you are doing work against gravity.

- The Task: Explain what happens to your Gravitational Potential Energy (GPE) as you climb higher. When you step off a platform to zip-line, what happens to that energy? Use the term Law of Conservation of Energy in your answer.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....



2: THE TENSION TASK

When you are suspended on a zipwire, several forces are acting to keep you safe, "balanced" and moving.

- The Task: Look at the photo on the left. Draw the four force arrows acting on the climber. Label the force pulling them **down**, the force in the safety rope pulling them **up**, and the two **movement forces**.



NAME :



HIGH ROPES CHALLENGE

Let's have a think about how the trolley attached to your harness works.

3: THE SCIENCE OF THE SHUTTLE

The safety trolley (shuttle) that follows you along the wire isn't just a piece of metal; it's a machine designed to reduce friction. Inside the trolley are steel ball bearings.

- The Task: **Explain** how the ball bearings inside the trolley help you move smoothly across the wire. In your answer, compare sliding friction (like dragging a box) to rolling friction (like a wheel). Why is one more efficient than the other for a high ropes course?
- The Science: **Draw** a simple cross-section diagram of a ball bearing. Use arrows to show the direction of the "load" (your weight) and the "rotation" of the bearings.

.....

.....

.....

.....

.....



TEACHER NOTES



Activity 1: Potential vs. Kinetic Energy

Expected answer: Climbing increases GPE ($GPE=mgh$). Stepping off converts GPE into Kinetic Energy. Energy isn't "lost," it just changes form (Conservation of Energy).

Curriculum Link: *Physics: Energy – Energy changes and transfers; GPE and Kinetic Energy.*

Activity 2: The Tension Task

Expected answer: Upward: Tension (in the rope/harness). Downward: Weight (Gravity). Lateral: Friction (from the wire) and Air resistance/drag.

Curriculum Link: *Physics: Forces – Balanced and unbalanced forces; forces as vectors.*

Activity 3: The Science of the Shuttle

Expected answer: Ball bearings replace sliding friction with rolling friction.

Scientific Explanation: Sliding friction occurs when two surfaces rub directly against each other, creating heat and resistance. Rolling friction is much lower because the surface area in contact at any one time is tiny. The ball bearings allow the "inner race" (attached to the wire) and "outer race" (attached to your lanyard) to move independently with minimal energy loss.

Curriculum Link: *Physics: Forces – Opposing forces and friction; the effects of lubricants and bearings in reducing friction.*

