



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

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SENTENCE B

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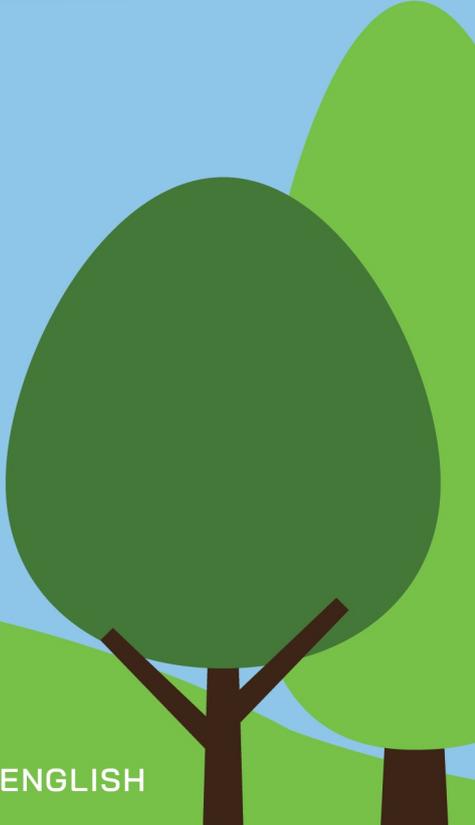
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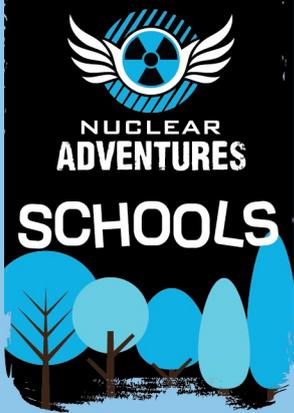
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Now to apply your Technical Writing knowledge to high ropes safety systems.

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 dotted lines, 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.



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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.

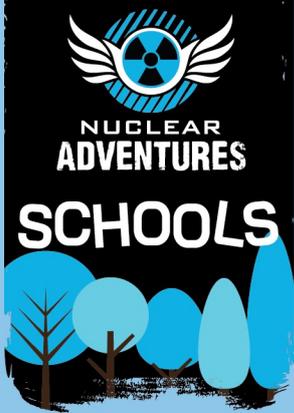
Handwriting practice area with ten horizontal dotted lines for writing.



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**.



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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.

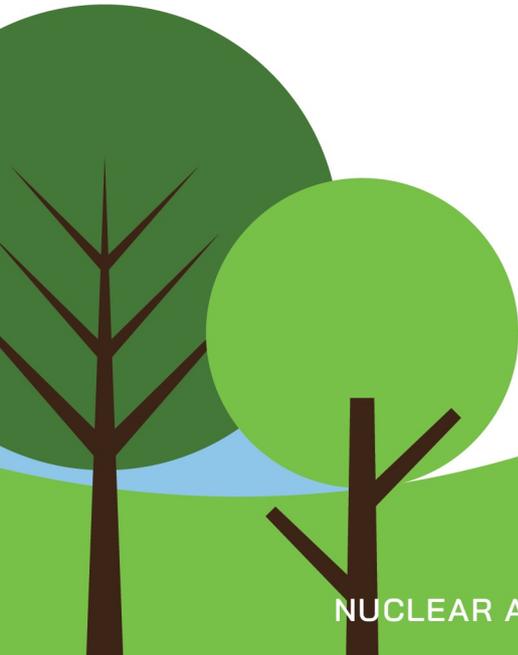
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TEACHER NOTES



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.*

