NUCLEAR
WILD FOREST
SCHOOLS

WILD FOREST

KS2 LEARNING RESOURCES

MUDDY OBSTACLE CHALLENGE

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Council for
Learning Outside the Classroom

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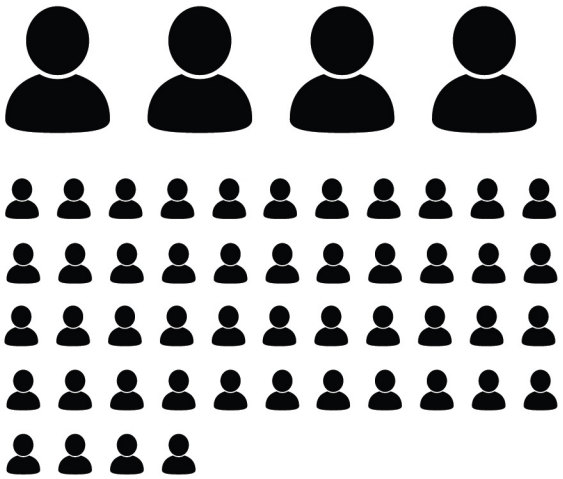
NAME :

MUDDY OBSTACLE CHALLENGE

Let's have a little look at teaming up and estimating times.

1. TEAMWORK PLANNING

If there are 4 adults and 48 children – can we pair adults with equal groups of children?



How many children will be in each group? .....

If an obstacle requires 2 people, how many groups from a class of 48? .....

2. ESTIMATION CHALLENGE

If each obstacle takes a child 2-3 minutes, estimate how long it will take a group of 6 children to complete 10 obstacles. .....

What if 2 children can do the obstacles **simultaneously**? .....

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OK, now let's think about measuring distance and time.

3. MEASURING & ESTIMATING DISTANCES USING GIVEN DATA

The obstacle activity centre has provided the following information:

- The course is **120** metres long
- There are **12 obstacles** along the course

Using this information, answer the questions below:

What is the average distance between each obstacle? .....

If one obstacle section is 15 metres long, how many sections would fit into the course? .....

If a child moves at an average speed of 2 metres per second, how long would it take to complete the course? .....

If an adult moves at 1.5 metres per second, how long would it take them? .....

Extension:

- Convert the times into minutes and seconds .....
- Discuss why children and adults might move at different speeds on a muddy course.

4. OBSTACLE CALCULATION

- Each obstacle takes 5 minutes.
- Each obstacle allows 4 children to participate at a time.

20 children, 12 obstacles → total time? .....

The mud pit is 3m, if you can jump 1m at a time → how many jumps to get across the pit? .....

TEACHER NOTES

1. Teamwork planning

- 4 adults + 48 children → pair 1 adult with 12 children, or rotate in smaller groups
- Obstacle requiring 2 people from 48 children → 48 ÷ 2 = 24 groups

Curriculum Links:
Multiplication & Division: Grouping and sharing
Reasoning: Explain strategies
PSHE: Teamwork and collaboration

2. Estimation Challenge

- Time for 6 children; 6 children x 10 obstacles × 2–3 min = 120-180 min
- Time for 2 children taking obstacle simultaneously: Same calculation then dividing answer by 2 as the time is halved.

Curriculum Links:
Number & Place Value: Estimate and approximate numbers
Measurement: Solve problems involving time

3. Measuring and Estimating Distances (Using Given Data)

- Average distance between obstacles:
- 120 m ÷ 12 = 10 metres
- Number of 15 m sections in the course: 120 ÷ 15 = 8 sections
- Time for a child at 2 m/s: 120 ÷ 2 = 60 seconds (1 minute)
- Time for an adult at 1.5 m/s: 120 ÷ 1.5 = 80 seconds (1 minute 20 seconds)
- Extension discussion points: Mud increases friction, slowing movement. Adults may take longer helping children. Safety and teamwork can affect speed

Curriculum Links:
Maths – Measurement: Measure, estimate, and calculate lengths, time, and speed
Maths – Number: Division and multiplication in real-life contexts
Maths – Reasoning: Explain and justify answers
Science (link): Forces and movement (surface resistance, mud)

4. Obstacle Calculation

- 20 children ÷ 4 = teams of 5. 5 min × 12 obstacles = 60 min. 60 min (1 hour) × 5 teams = total 5 hours.
- Mud pit: 3 ÷ 1 = 3 jumps

Curriculum Links:
Word Problems: Multi-step reasoning
Multiplication & Division
Reasoning: Explain and justify answers

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Let's have a think about our bodies and how they work when we're active.

1. HOW DOES YOUR BODY MOVE?

- Draw a simple diagram of your body and label the major muscles and bones you use when climbing, jumping, running, or crawling through mud.
- In small groups, discuss which muscles you think work hardest in different obstacles (e.g., arms for climbing, legs for running, core for balance).
- Try some stretches and simple exercises to feel the muscles working.

2. HEART RATE INVESTIGATION

- Find your pulse on your wrist or neck.
- How many beats you feel in 10 seconds? . . . . . .
- Multiply this number by 6 to get your beats per minute . . . . . x 6 = ... BPM

Perform 10 jumping jacks or a 30-second sprint

- Count your pulse again, how many beats you feel in 10 seconds now? . . . . . .
- Multiply this number by 6 . . . . . x 6 = ... BPM

?

Compare your results and discuss with your friends: Why does your heart beat faster? How does exercise affect your body?

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OK, now let's have a look at balance, the wonderful world of mud, and what kind of things we can use for fuel.

3. THE SCIENCE OF BALANCE AND COORDINATION

Set up a simple obstacle course in the classroom or playground. Include balancing on a line, hopping and crawling.

Experiment with moving slowly vs quickly.

? How does your balance change?

Which part of your body helps you stay steady? ?

? Discuss why balance is important for completing obstacles safely.

4. MUD AND THE ENVIRONMENT

- Look at pictures of muddy terrains and think about how mud is formed.
- Discuss what plants, animals and insects might live in or around muddy areas.
- Create a simple food chain showing a mud-dwelling ecosystem.

5. HEALTHY CHOICES FOR ACTIVITIES

Discuss with your friends what foods give you energy for physical activity and why water is important for staying hydrated.

Plan a "pre-activity snack" that would fuel your trip to the obstacle centre and draw or write it below.

TEACHER NOTES

1. How Does Your Body Move?
Suggested Answers / Discussion Points:
Muscles used in activities:
Climbing: biceps, forearms, shoulders, core
Running: quadriceps, hamstrings, calves
Crawling: core, shoulders, triceps
Bones supporting movement: femur, tibia, humerus, spine
- Discuss how muscles work in pairs (agonist/antagonist) to allow movement.
- Encourage students to identify which muscles "feel tired" after different exercises.

Additional Tips:
Teachers can demonstrate stretches and identify which muscles are being stretched. Emphasize safety and correct form during demonstrations.
Curriculum Links:
Science – Animals, including humans: Identify and name the main parts of the human circulatory and muscular system, and explain their functions.
PE: Use running, jumping, throwing, and catching in isolation and in combination.

2. Heart Rate Investigation
Expected Observations:
- Resting heart rate: generally 60–100 bpm (KS2 students often slightly higher)
- After exercise: heart rate increases noticeably (often 100–140 bpm depending on effort)

Discussion points:
Heart pumps more blood to deliver oxygen to muscles.
Breathing rate increases to supply oxygen and remove carbon dioxide.
Teacher Notes:
- Remind students to measure their pulse carefully using fingers on the wrist or neck.
- Encourage students to record results accurately and compare them in a table.

Curriculum Links:
Science – Animals, including humans: Describe the changes in the human body during exercise, including pulse rate and breathing rate.
Maths: Collect and interpret data using tables and charts.

3. The Science of Balance and Coordination
Discussion Points / Notes:
Balance is affected by: core strength, coordination, focus, speed of movement
Forces involved: gravity pulls the body down, muscles provide counterforce
Observations may include: wobbling when moving fast or improved stability when moving slowly.
Teachers can demonstrate how leaning, bending knees, or widening stance improves balance.
Tips:
- Ensure obstacles are safe and risk-assessed.
- Emphasize practicing control before speed.

Curriculum Links:
Science – Forces: Explore how different forces (push, pull, gravity) affect movement.
PE: Develop balance, agility, and coordination in activities.

4. Mud and the Environment
Suggested Answers / Discussion Points:
How mud forms: mix of water and soil, often after rain
Living things in mud: worms, insects, small amphibians, plants like reeds
Simple food chain example: Mud → Worm → Bird → Fox
Encourage discussion about the importance of muddy habitats for biodiversity.
Teacher Tips:
- Show pictures of real muddy environments to spark curiosity.
- Discuss how humans impact muddy habitats and how we can protect them.

Curriculum Links:
Science – Living things and their habitats: Describe the life cycles and habitats of different plants and animals.
Geography/Science: Understand how soil and mud are formed and their role in the environment.

5. Healthy Choices for Activities
Suggested Answers / Discussion Points:
Energy foods: fruit, vegetables, whole grains, protein (nuts, eggs)
Hydration: water is essential; sugary drinks less effective for sustained energy
Discuss importance of pre-activity snack timing (30–60 minutes before exercise)
Link to safety: warm-up, appropriate clothing, and protective gear
Teacher Tips:
- Encourage students to think about portion sizes and variety.
- Discuss how different foods fuel different types of activities.

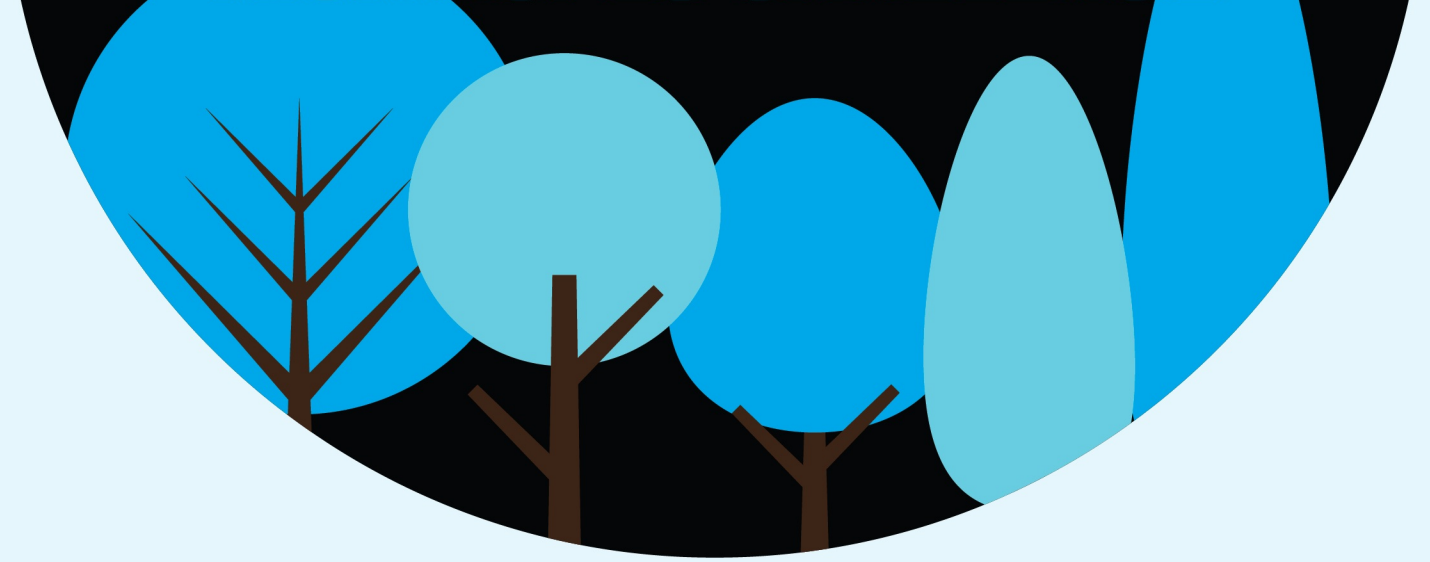
Reward creativity and accurate recording rather than "perfect" scientific answers.
Curriculum Links:
Science – Animals, including humans: Identify the importance of diet, exercise, and hygiene for maintaining a healthy body.
PSHE: Recognise ways to maintain physical health and well-being.

NUCLEAR ADVENTURES SCHOOLS

NUCLEAR ADVENTURES

KS2 LEARNING RESOURCES

HIGH ROPES CHALLENGE



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HIGH ROPES CHALLENGE

Let's have a think about high ropes and what wonderful words we can use to describe the thrill!

ACTIVITY 1: ADVENTURE VOCABULARY CHALLENGE

Look at pictures of high ropes courses (your teacher will show you or you can use a picture online). Work in pairs to think of exciting words that describe:

- How it might feel to climb up high (e.g., "tingly," "breathtaking")
- What you might see from above (e.g., "panoramic," "towering")
- The sounds you might hear (e.g., "rustling," "creaking")

Create a "**High Ropes Word Bank**" to use in your writing.

Extra Challenge: Try to think of at least 10 words for each category!

HIGH ROPES WORD BANK

How does it feel?

HIGH ROPES WORD BANK

What do you hear?

HIGH ROPES WORD BANK

What do you see?

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Thrilling activities like high ropes can really help your imagination run wild. How creative can you be?

ACTIVITY 2:
ADVENTURE STORY STARTER

Use this story starter to inspire your own adventure:

"I looked down from the top of the ropes course and my heart raced. I could hear the wind whistling in my ears, and I knew one wrong step could...."

Continue the story, describing how your character feels, what challenges they face and what happens next on the course

Extra Challenge: Include at least five adjectives from the high ropes word bank you created!

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Lets pretend we're high ropes helpers!

ACTIVITY 3: WRITE A SAFETY POSTER

Imagine you are a high ropes instructor. You need to make a safety poster for new climbers.

On a piece of paper, include:

- A **title** (e.g., "Stay Safe on the Ropes!")
- 3–5 important **safety tips**
- A **warning or advice** sentence
- **Pictures** to make your poster eye-catching.

Tip: Use strong verbs and clear instructions, e.g., "Hold on tightly," "Wear your harness correctly."

ACTIVITY 4: HIGH ROPES NEWSPAPER ARTICLE

Imagine a friend or classmate has just completed the high ropes course.

Write a newspaper article including:

- A **headline**
- A short **introduction** (who, what, when, where)
- **Quotes** from participants ("I felt like I could fly!")
- A **closing paragraph** describing the excitement of the day

Tip: Remember, newspaper writing is in the <u>past tense</u>.

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Hopefully you had an amazing time at Nuclear Adventures, how about you write a review about your adventure?

ACTIVITY 5:
ROPES CENTRE REVIEW
(OPTIONAL ACTIVITY)

Think about your trip. Write a short review of the high ropes centre after you visit.

Include:

- What were you most excited about
- What you thought was the most challenging
- Your overall rating (1–5 stars)

Extra Challenge: Use connectives like “because,” “although,” “however.”

TEACHER NOTES

Activity 1: Adventure Vocabulary Challenge
Curriculum Links:
Vocabulary, Grammar, and Punctuation: Develop adventurous and precise word choices (National Curriculum: English – KS2, Years 3–6).
Writing – Composition: Plan writing by discussing and collecting ideas.

Activity 2: Adventure Story Starter
Curriculum Links:
Writing – Composition: Draft and write narratives, creating settings, characters, and plots.
Vocabulary, Grammar, and Punctuation: Use adventurous adjectives, expanded noun phrases, and descriptive language.

Activity 3: Write a Safety Poster
Curriculum Links:
Writing – Purpose and Audience: Write for different purposes (instructions, persuasion).
Spelling, Punctuation, and Grammar (SPaG): Use imperative verbs and clear sentence structures.

Activity 4: High Ropes Newspaper Article
Curriculum Links:
Writing – Composition: Write non-fiction texts including reports, recounts, and newspapers.
SPaG: Use past tense consistently, use direct speech with inverted commas, and organise writing into paragraphs.

Activity 5: Ropes Centre Review (Optional Fun Activity)
Curriculum Links:
Writing – Composition: Express ideas and opinions clearly for a specific purpose.
SPaG: Use conjunctions and connectives to link ideas.

✅ Teacher Notes:
These activities can be done as homework or in class over 1–2 sessions.
They prepare children for writing tasks linked to experiences, imagination, and reporting.
Encourage sharing work in class to build confidence and excitement for the trip.

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Let's have a look at different forces and think about how we can see them in action in everyday life.

1. FRICTION INVESTIGATIONS

When you move across ropes, wood, or climbing walls, friction helps stop you slipping.

Investigation 1

Rub your hands together quickly.
What do you notice?

- ○ They get warmer
- ○ They feel smoother
- ○ They make a noise

Investigation 2

Slide a book along different surfaces (e.g., table, carpet, jumper, tarmac ground, grass, etc).

Which surface has the most friction?

2. WARM-UP TASK: WHAT IS A FORCE?

A force is a push or a pull.

Complete these sentences:

- When you climb a rope, you ..... on the rope to get yourself up.
- When you jump off a platform, ... pulls you back down to the ground.

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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.

3. GRAVITY EXPLORATION

Gravity is the force that pulls objects towards the Earth.

Gravity investigation

Hold two objects (e.g., a pencil and a book).

Drop them at the same time.

Predict which will land first?

Why?.....

.....

.....

Result:.....

Why?.....

.....

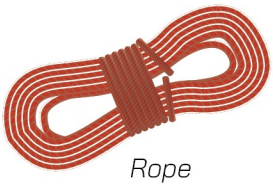
.....

4. SAFETY SCIENCE

At the high ropes centre, equipment uses forces to keep you safe.

Match the item to its job:

A. Helps you grip the ropes using friction.



Rope

B. Holds your body securely and spreads the force.

Gloves

C. Connects you to the safety system.

Harness

5. VOCABULARY BOX

Match each word to its definition:

- GRAVITY - FRICTION - FORCE - AIR RESISTANCE

- ..... - A push or pull.
- ..... - A force that pulls things towards Earth.
- ..... - A force that slows objects moving through air.
- ..... - A force between two surfaces that slows movement.

6 AIR RESISTANCE CHALLENGE

When you zip-line or jump, the air pushes against you.

Paper Drop Test

Drop a flat sheet of paper.

Scrunch it into a ball and drop it again.

Questions:

Which one falls faster?

_____

Why?

_____

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7. DESIGN CHALLENGE

- Draw a high ropes course you might enjoy.
- Include at least three features (e.g., ladder, rope bridge, zip line).
- Label where the forces act (gravity, friction, air resistance, pushes/pulls).

TEACHER NOTES

Science Focus: Forces – Gravity, Friction & Air Resistance
Curriculum Link:
Pupils should identify the effects of air resistance, water resistance and friction that act between moving surfaces (Years 5 & 6 – Forces).

1. Friction Investigation
Rub your hands together quickly - ☒ They get warmer
Why? Friction between your hands creates heat.
Friction Challenge
Which surface has the most friction? DEPENDS ON MATERIALS AT HAND
Curriculum Link:
Identify the effects of friction acting between moving surfaces.
Take measurements, using a range of scientific equipment (Working Scientifically).

2. Warm-Up Task: What Is a Force?
A force is a push or a pull.
When you climb a rope, you PULL on the rope to get yourself up.
When you jump off a platform, GRAVITY pulls you back down to the ground.
Curriculum Link:
Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.

3. Gravity Exploration
Gravity is the force that pulls objects towards the Earth.
Why? GRAVITY PULLS ALL OBJECTS DOWNWARDS, THOUGH AIR RESISTANCE AFFECTS SOME OBJECTS MORE THAN OTHERS.
Curriculum Link:
Recognise that gravity acts on objects and pulls them towards the ground.
Plan different types of scientific enquiries to answer questions (Working Scientifically).

4. Safety Science
Answers:
- Harness: B
- Rope: C
- Gloves: A

Curriculum Link:
Recognise that some mechanisms (including pulleys) allow a smaller force to have a greater effect.
Apply knowledge of forces to real-world safety systems.

5. Vocabulary Box - Match each word to its definition:
Answers
Force - A. A push or pull
Gravity - B. A force that pulls things towards Earth
Air Resistance - C. A force that slows objects moving through air
Friction - D. A force between two surfaces that slows movement
Curriculum Link:
Use scientific vocabulary to describe and explain forces.
Develop accuracy in spelling scientific terms (English cross-curricular).

6. Air Resistance Challenge
Paper Drop Test
Which one falls faster? SCRUNCHED PAPER
Why? LESS SURFACE AREA USING AIR RESISTANCE TO SLOW IT DOWN
Curriculum Link:
Identify the effects of air resistance on a moving object.
Report and present findings from enquiries, including oral and written explanations (Working Scientifically).

7. Design Challenge
Curriculum Link:
Identify ways forces act at different points on a structure.
Use labelled diagrams to communicate scientific ideas (Working Scientifically).