



EduTrend Contents

W4C · INDIVIDUAL SPORTS · MIDDLE SCHOOL

Sprint Start Science

Improve reaction, drive and acceleration

Ages 11–14

Level: Intermediate

60 minutes

Groups of 4 · up to 30

Activity 03

Inside: activity at a glance · step-by-step session plan · facilitator notes · 3 student worksheets · assessment checklist

ACTIVITY 03 · AT A GLANCE

Sprint Start Science

Students measure reaction time with a ruler drop test, learn the crouch start commands and positions, and time 10-metre and 30-metre splits. They compare standing and crouch starts and explain how pushing backwards drives the body forwards.

Learning outcomes

By the end of the session students can:

- measure and compare reaction times;
- perform a crouch start with correct positions;
- measure acceleration using split times;
- explain the forces involved in a sprint start.

KEY WORDS

reaction time · crouch start · on your marks · set · drive phase · acceleration · force · split time

CURRICULUM LINKS

PE: athletics. Science: forces and Newton's laws. Maths: calculating speed.

1**WARM UP**

Raise, mobilise,
prepare

2**LEARN**

Technique focus

3**PRACTISE**

Drills and
repetition

4**MEASURE**

Time, distance,
score

5**REFLECT**

What improved?

6**COOL DOWN**

Recover and
review

Equipment

- 30-centimetre rulers for the drop test
- Cones at 0, 10 and 30 metres
- Stopwatches or phone timers
- Starting blocks if available
- Worksheets 1, 2 and 3

Before the session

- Mark a straight with cones.
- Prepare the ruler drop conversion table.
- Check the surface.
- Assign timers, starters and runners.

SAFETY

Warm up thoroughly including strides. Run in lanes; stop well before walls. Only sprint on a dry, safe surface.

ACTIVITY 03 · SESSION PLAN

Step by step

Use two timers per split and average the results: it shows students why measurement needs care.

Time	What happens	Say or ask
0–10 min Warm-up	Jog, drills and three build-up strides.	<i>"Why do sprinters do drills?"</i>
10–20 min Reaction	Ruler drop test: record best of three.	<i>"What affects reaction time?"</i>
20–30 min Crouch start	Learn on your marks, set, go positions.	<i>"Where are your hips at set?"</i>
30–50 min Timing	Time 10 m and 30 m splits from standing and crouch starts.	<i>"Which start was faster to 10 m?"</i>
50–60 min Explain	Calculate average speeds and explain the science.	<i>"How does pushing back make you go forward?"</i>

CHALLENGE CARD (print or copy onto the board)

Measure your reaction time and 10-metre split from a standing and a crouch start, and explain which is faster and why.

ACTIVITY 03 · FACILITATOR NOTES

The sport science in brief

A sprint start has commands: on your marks, set, then the gun. At set the hips rise slightly above the shoulders, loading the legs. Sprinters push hard backwards against the blocks or ground; by Newton's third law the ground pushes them forwards, accelerating the body.

Reaction time is the delay between the signal and the first movement. In elite athletics, a reaction under 0.100 seconds after the gun is treated as a false start, because humans are not believed to react faster than that. Speed equals distance divided by time, so split times show how quickly athletes accelerate.

Common ideas to listen for

- "Standing up quickly is the best start." Staying low in the drive phase increases acceleration.
- "Reaction time is fixed." Focus and practice can improve it.
- "One timing is enough." Averaging reduces measurement errors.

Adapting the activity

Support

Use a standing start and a single 20-metre timing.

Stretch

Plot a speed-time graph from 0, 10, 20 and 30 metre splits.

WORKSHEET 1

Reaction test

Name: _____

Class: _____ Date: _____

Record ruler drop results.

Results

Attempt	Distance caught (cm)	Reaction time (s)
1		
2		
3		
Best		

WORKSHEET 2

Start comparison

Record split times.

Splits

Start type	10 m time (s)	30 m time (s)	Average speed (m/s)
Standing			
Crouch			

WORKSHEET 3

Science explanation

Explain the start.

Why the faster start was faster

Forces during the start

FOR THE TEACHER

Assessment checklist

Use during the session. One sheet covers up to eight students; copy as needed.

Student	Measures accurately	Performs crouch start	Explains forces

Suggested codes: W = working towards · E = expected · G = greater depth

ABOUT THIS ACTIVITY

Sprint Start Science is a sample activity from the EduTrend Contents W4C Individual Sports programme (middle school, level: intermediate). Every activity in the programme follows the same format: a practical challenge, a clear session plan, facilitator notes and ready-to-print worksheets, so that teachers, club leaders and parents can run it without extra preparation.

Full 15-, 20- and 32-week programmes are available from EduStore at edutrend.org.

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