What is race walking all about?

Background

Walking races have always been a part of athletic competition. Elite walkers have been able to achieve some remarkable times for the distance events, often completing their 20 km and 50km walking races in times that would beat most runners!

Recent controversy surrounding walkers has stemmed from the disqualification of athletes for 'lifting' or incorrect technique. A well known example was Jane Saville's disqualification as she led into the Sydney Olympic Stadium.

Definition of walking: '…at any time at least one foot has contact with the ground and the supporting leg must be straightened (i.e. not bent at the knee) from the moment of the first impact of the foot with the ground until the supporting leg passes below the body.'

Above left: Race walkers demonstrating the correct technique. Foot contact maintained with the ground and supporting leg straight.

Above right: The same walkers are demonstrating incorrect technique because there has been a loss of contact with the ground. Race walkers are entitled to three cautions before being disqualified. It is alleged that most walkers 'lift' at various stages of a race especially when under stress.

What you need

- Clothing and shoes suitable for walking
- stopwatch
- pedometer

What to do

1. Try the race walking technique with all the extra hip swivelling.
2. Calculate your kilometre per hour speed by walking a measured track and using a stopwatch.

Try, think and explain

1. Find out who are currently Australia's best male and female walkers.
2. Find out what sort of training they do each week. Why do walkers need to run sometimes in training?
3. Conduct a survey of students to find out what they think are the characteristics of the best walking shoes.
4. Energy expenditure of race walkers is said to sometimes exceed runners. Find out how many calories are expended by an average sized person for each kilometre walked.

Useful websites

Definition of a calorie:
http://www.answers.com/topic/calorie

http://walking.about.com/od/racewalk/

Changing styles in high jump

Background

The high jump has seen at least three radical changes in technique leading to greatly improved results. The standing vertical jump was once part of the Olympic Games along with the standing long jump. Both these jumps are good indicators of the maximum power able to be generated by our largest muscles. The standing high jump is now used as a key indicator in the AFL Draft camp.*

Above: The Fosbury Flop was introduced to the Olympics in Mexico City in 1968.

What you need

- A suitable wall for marking your vertical jump.
- Powdered chalk

What to do

To determine your best vertical jump, find a suitable wall outside on a level surface. Students may dip their fingers in powdered chalk or water to mark the highest point on the wall.

1. Students can flex their legs but are not permitted to have a walk up start before jumping. Students record their best three efforts.
2. Results are tabulated.
3. Results can be correlated with individual's height.
4. Results can be compared with the power take off involved in a standing broad jump.

Above: The straddle or western roll was the most popular jumping style for nearly 60 years.

Above: The scissors jump is the original jumping style and probably the safest way to jump when there are no mats because you land on your feet.

Useful website

For a discussion of the whole evolution of the high jump

http://en.wikipedia.org/wiki/High_jump

* The best standing vertical jump at the 2005 AFL Draft camp was 72 cm. The record vertical jump was created by Trent Croad, Hawthorn, in 1997 with a jump of 83 cm.

Foot profiles

Background

We all have different types of feet. Finding out what your foot type is can help you avoid all kinds of problems, especially before you buy expensive sporting footwear. The most common foot type is on the left in the graphic below.

A flat foot has a very low arch and has most contact with the ground. The high arched foot has a very narrow contact with the ground. When running, each foot type has a unique way of rolling inwards at the point of take off.

The flat foot has the most roll or pronation, followed by the normal arch. The least roll comes from the high arched foot. Consequently, any flat footed runner benefits from reducing the roll of the foot with a straight-lasted shoe. The high arched foot benefits from footwear that provides more roll and has more of a curve in the sole.

normal footprint flat footprint high arched footprint

What you need

- A wet footprint

What to do

1. Identify the kind of foot type you have.
2. Investigate what sorts of shoes are best for your foot type.
3. Investigate how much rolling you do when you run by examining the wear pattern on the sole of your shoes.

Useful website

According to the Runner's World website 'A pronator's outer soles wear down along the inside of the ball of the foot and they tend to have flat feet (and low arch).

The supinator's outer soles wear down along the outer edge and their feet tend to have high arches.'

http://www.runnersworld.ltd.uk/shoefinder.html

Training for elite sports

Background

Strength training is often carried out in expensive gymnasiums. However, strength training can be completed without expensive equipment or technology and has the advantage of being able to be completed at a more convenient time and place.

What you need

- Access to a modern gymnasium to analyse the available equipment

What to do

1. Fill in the table below to establish the likely benefits of using a gymnasium.
2. Record the low technology alternative to gym equipment.

Equipment	Specific Benefits	Low tech alternative
Small barbells	Increase in arm strength	Chin-ups
Bench press		Push-ups
Exercise bike		
Medicine ball		
Speedball		
Punching bag		
Treadmill		

Try, think and explain

1. Devise a circuit of low technology activities which can provide some basic strength training for all the body.

Useful website

http://exercise.about.com/cs/exerciseworkouts/l/bl_beg_circuit.htm

Swimming

Background

Learning to swim freestyle is an important survival skill which too many people never master. Many good swimmers teach themselves but most need feedback. Visualisation is a useful strategy for teaching the complex coordination of breathing in quickly and out completely with the correct head roll and arm stroke. Looking at videotape or clear photographic images can assist the learner to develop correct technique.

What you need

- A videotape of people swimming the various styles
- Access to a website with the World swimming records

What to do

1. Look at swimming records.
   Which swimming style is fastest? Why?
2. Can you think of three reasons why the 'crawl' is faster than any other stroke?

Try, think and explain

1. Why is the overarm style known as the 'Australian Crawl'?
2. Why is bilateral breathing a more effective way of swimming 'crawl' style than breathing in on the one side?
3. How does the freestyle swimmer breathe in without lifting their head out of the water?

Left: The image of a freestyle swimmer used in the swimming interactive in Sportsworks.

Useful websites

All swimming world records:
http://www.hickoksports.com/history/wswimrec.shtml

All Olympic sports:
http://www.olympic.org/uk/utilities/reports/level2_uk.asp?HEAD2=11&HEAD1=5

Freestyle swimming questions answered:
http://www.answers.com/topic/front-crawl-1

Videos of swimmers in action:
http://coachesinfo.com/category/swimming/323/

Reaction time

Background

Human reaction times vary considerably from individual to individual and may also vary within a 24 hour time period. The handheld stopwatch has been replaced by electronic timing to avoid the discrepancies of human reaction time. In fact the starting blocks of sprinters have a gauge to determine if a runner has reacted faster than 0.1 seconds after the starter's pistol has been fired. If a sprinter reacts faster than 0.1 seconds, they are deemed to have 'broken' because it is believed no human can react faster than 1/10th of a second.

What you need

- Copies of the Reaction Timer strip from the next page.
- A stopwatch

What to do

1. Test individual reaction times. The person being tested has to use their thumb and index finger to grab the Reaction Timer strip as it is dropped.
2. Ensure fair testing. Tester should not warn the testee of the drop. The card has to be level with the upper part of the thumb and index fingers. Use different testers for each individual.
3. Read the results from the Reaction Timer strip and graph them.

Try, think and explain

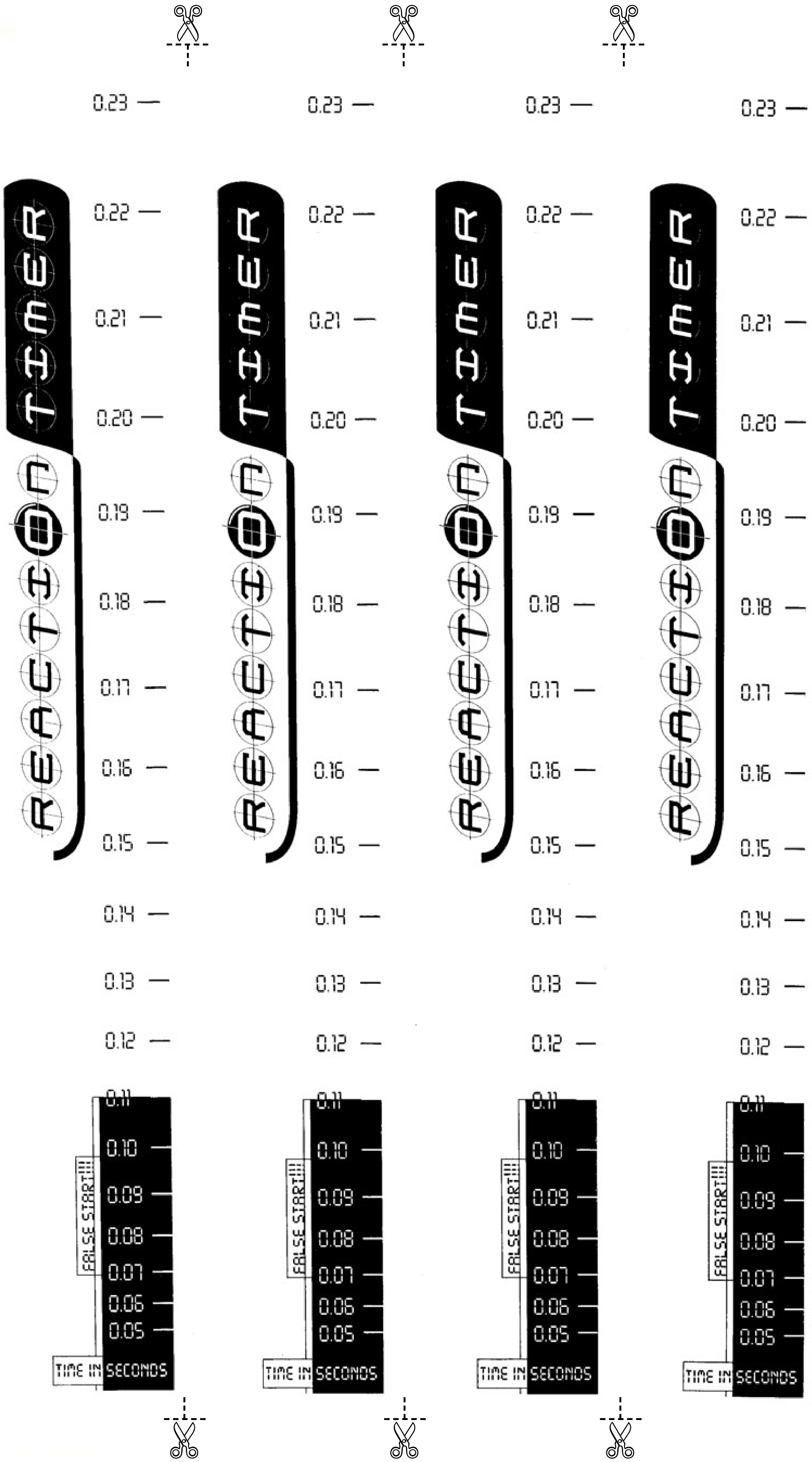
1. What variation was there in individuals when tested at different times of a day?
2. Using a stopwatch, what is the shortest interval between successive presses of the start /stop button?

Useful website

www.sciencenetlinks.com/lessons.cfm?BenchmarkID=6&DocID=68

Sportsworks

School-based Activities



Reaction time (Part II)

Many ball sports involve hitting or catching a ball. You have to make quick decisions about the motion of a ball and decide what to do. To improve your hitting and catching skills you need to practise.

In the first experiment you will examine how quickly your brain can process information, decide what to do and carry out an action. A ruler is dropped. The information is received by the eyes, sent to the brain and processed. The brain decides what to do and sends a signal to the fingers that close and catch the ruler. The time taken for all this to happen can be estimated by referring to a table that shows how long it takes the ruler to fall certain distances.

What you need

- A ruler with centimetre divisions

What to do

1. Work with a partner or in groups of three.
2. The person being tested holds out their right hand with the thumb and index finger about 1 centimetre apart.
3. Their partner holds the ruler just above the gap between the thumb and index finger. They then drop the ruler; the person being tested catches the ruler.
4. Record the number of centimetres that the ruler has dropped before being caught.
5. Refer to the following table. Estimate and record the time taken to react.
6. Repeat the experiment 4 times.
7. Repeat steps 1 to 5 with the left hand.
8. Try the experiment when the catcher is being distracted in some way.
9. Take turns being tested.

Useful website

www.exploratorium.edu/baseball/reactiontime.html

Distances fallen and times taken

Distance (cm)	Time (sec)	Distance (cm)	Time (sec)	Distance (cm)	Time (sec)
1	0.04	11	0.15	21	0.20
2	0.06	12	0.15	22	0.21
3	0.08	13	0.16	23	0.21
4	0.09	14	0.17	24	0.22
5	0.10	15	0.17	25	0.22
6	0.11	16	0.18	26	0.23
7	0.12	17	0.18	27	0.23
8	0.13	18	0.19	28	0.24
9	0.13	19	0.19	29	0.24
10	0.14	20	0.20	30	0.24

Results

Trial	Right hand time (sec)	Left hand time (sec)	Right hand distracted (sec)
1			
2			
3			
4			
5			
Average			

Try, think and explain

1. Did your reaction times improve with practice?
2. How were you distracted in the last part of the experiment?
3. What effect did distractions have on your results?
4. What effect does practising a skill have on your performance?

Peripheral vision

Peripheral vision is when you can see things beside you when you are looking straight ahead. It is important in contact sports like football and fighting sports like karate.

How good is your peripheral vision? Do you respond better to movement, colours or shape recognition?

What you need

- Large sheet of newspaper
- Black marker
- Red, blue, yellow and green coloured card
- Large protractor

What to do

1. Work in groups of three. One person is tested, the second person moves around the test case and the third person records the results.
2. Cut the card into different shapes, for example circle, triangle, square, rectangle. Each shape should be about 15 cm across.
3. Draw a large semicircle on the sheet of newspaper. Write large letters (for example A, B, C) on the coloured shapes.
4. The person being tested stands at the centre of the semicircle and looks straight ahead. The moving person stands behind the test person and holds the card level with the tested person's eyes but at the side. They then move forward keeping the shape above the semicircle line.
5. The test person says when they can see movement, colour, and shape and read the letter. (Remember to keep looking straight ahead!)
6. The position of the card can be marked on the semicircle and the results recorded in the results table.

Results

Record the person's name and age. List the order they notice the letter (L), colour (C), movement (M) and shape (S). Also record the angle from straight ahead of each if instructed to do so by the teacher.

Name	Age	Sex	First	Second	Third	Fourth

Try, think and explain

1. Does everybody in the group / class notice things with their peripheral vision in the same order?
2. Are the results the same for both sides of your body?
3. Try the test on younger and older people. Are the results affected by the age of the person?