

How maths transformed high jump

Sports and maths

OLYMPICS MOTTO HIGHER,FASTER,STRONGER

**HIGHJUMP IS AN IMPORTANT SPORT SINCE
THE EARLIER TIMES**

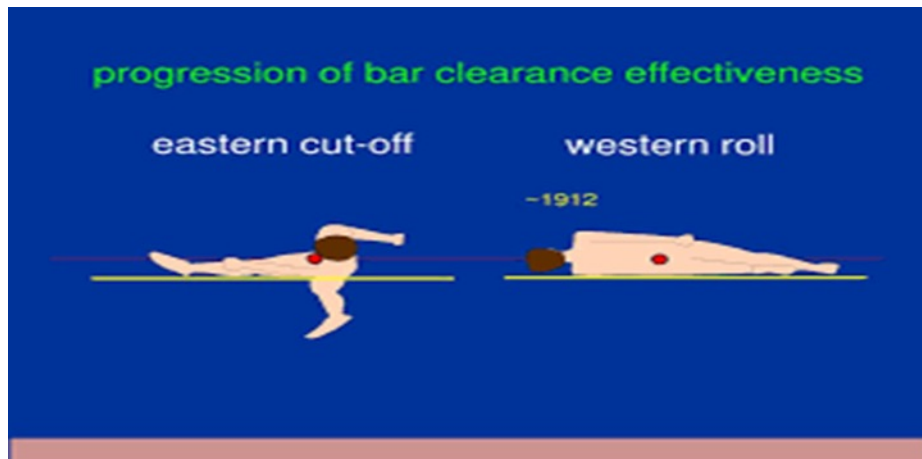
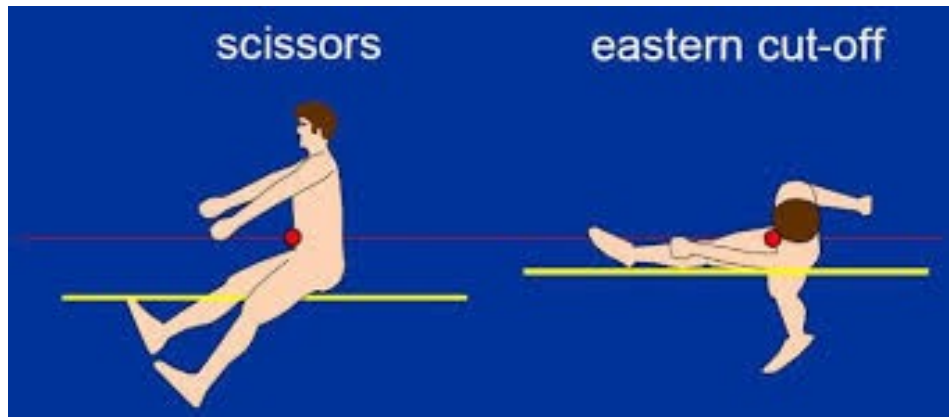
TECHNIQUES OF HIGH JUMP ARE

- 1.SCISSORS
- 2.WESTERN ROLL
- 3.EASTERN ROLL
- 4.STRADDLER
- 5.FOSBURY FLOP

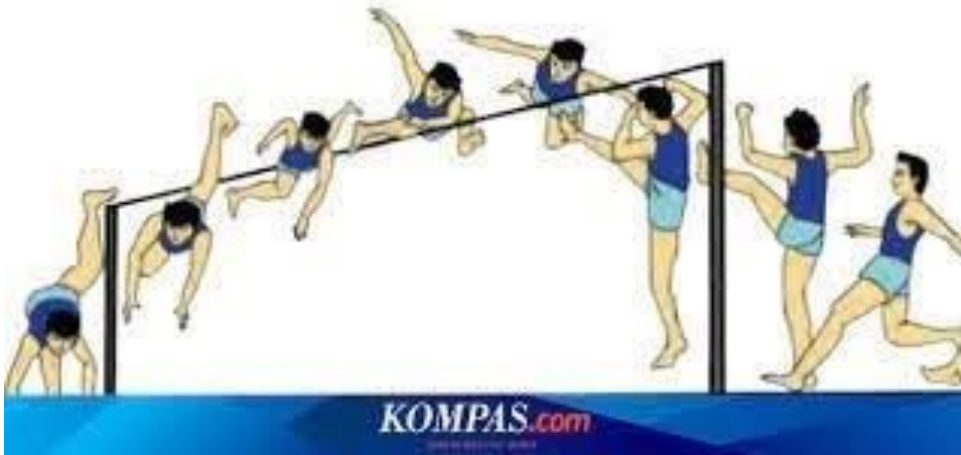


center of gravity at chest
SCISSORS high jump

western roll—center of gravity at the navel of the athlete



Eastern roll --center of gravity above the bar



FOSBURY STUDIED MATH
of CURVES.FOUND HIGH
JUMPERS CUT SHORT
PARABOLA. HE TRIED TO
COMPLETE THE CURVE.

Richard Douglas Fosbury was
an American high jumper,
who is considered one of the
most influential athletes in
the history of track and field.
He won a gold medal at the
1968 Olympics,
revolutionizing the high jump
event with a "back-first"
technique now known as the
Fosbury flop



WHAT HAPPENS IN HIGH JUMP? A MAN GOES UP WITH A VELOCITY.
REACHES A HIGH POINT WHERE VELOCITY IS ZERO.
THEN FALLS TO GROUND.
THAT MEANS AT HIGHEST POINT

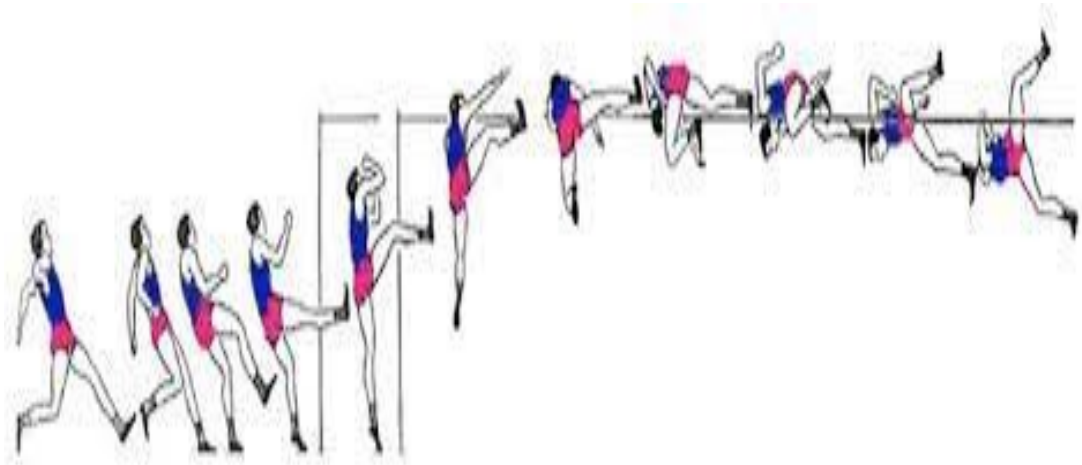
KINETIC ENERGY = POTENTIAL ENERGY AT THAT POINT.

$$\frac{1}{2} M \cdot v^2 = m_g \cdot h$$

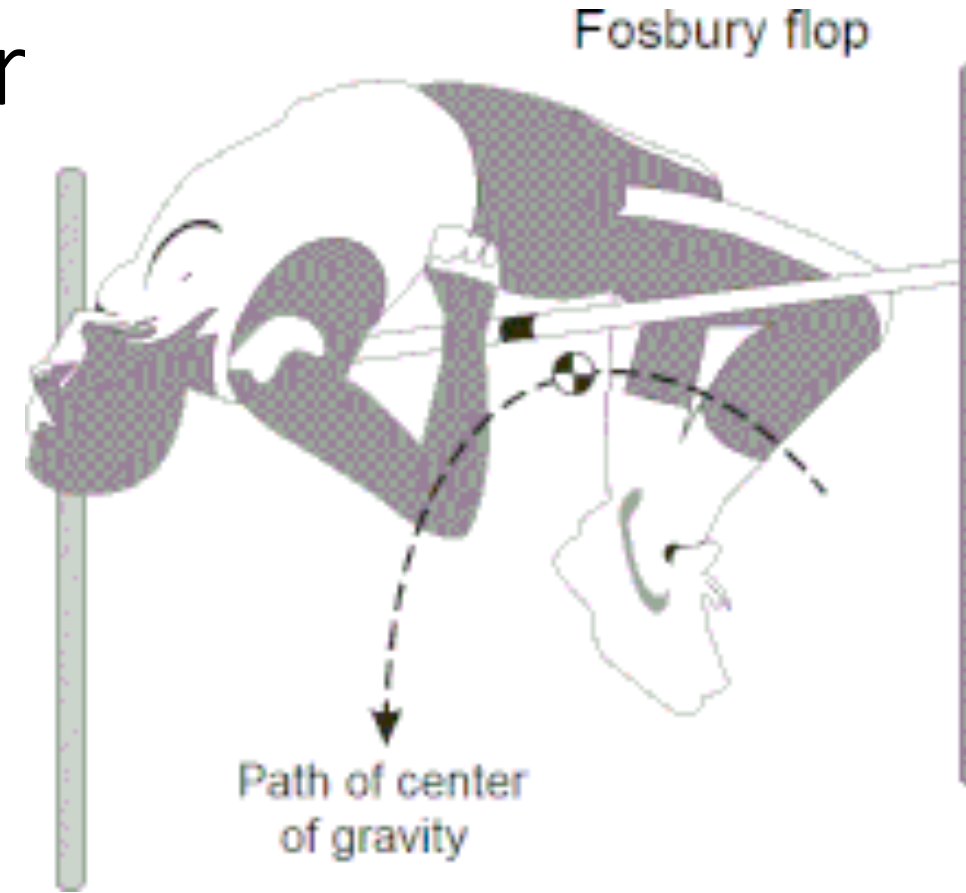
$$v^2 = 2M_g \cdot h \quad \text{therefore} \quad v^2 \propto h$$

Since $v=d/t$ running distance and time
has to be adjusted to get required h

FOSBURY FLOP making a parabola –center of gravity at focus below the bar



Instead of making high point as zero kinetic energy, he completed a parabolic curve by bending torso backwards.



ANOTHER POINT TO BE NOTED.

EARLIER SAND PIT WAS AVAILABLE FOR THE ATHLET TO LAND AFTER THE JUMP.

BY 1965 PLASTIC/RUBBER FOAM BEDS WERE USED.

THIS ABSORBED MORE KINETIC ENERGY WITHOUT INJURING THE ATHLET



THE TECHNIQUE DEVELOPED BY FLOSSBURRY WAS NOT ACCEPTED EASILY. HE HAD TO DEVELOP HIS TECHNIQUE AFTER LOT OF STRUGGLES AND PAIN. POP GROUP **AVICII** COMPOSED A SONG ON HARD STRUGGLE OF FLOSSBURY CALLED **BROKEN ARROWS**.

LURICS OF THE SONG GO LIKE THIS.....

Cause it's not too late, it's not too late

I, I see the hope in your heart

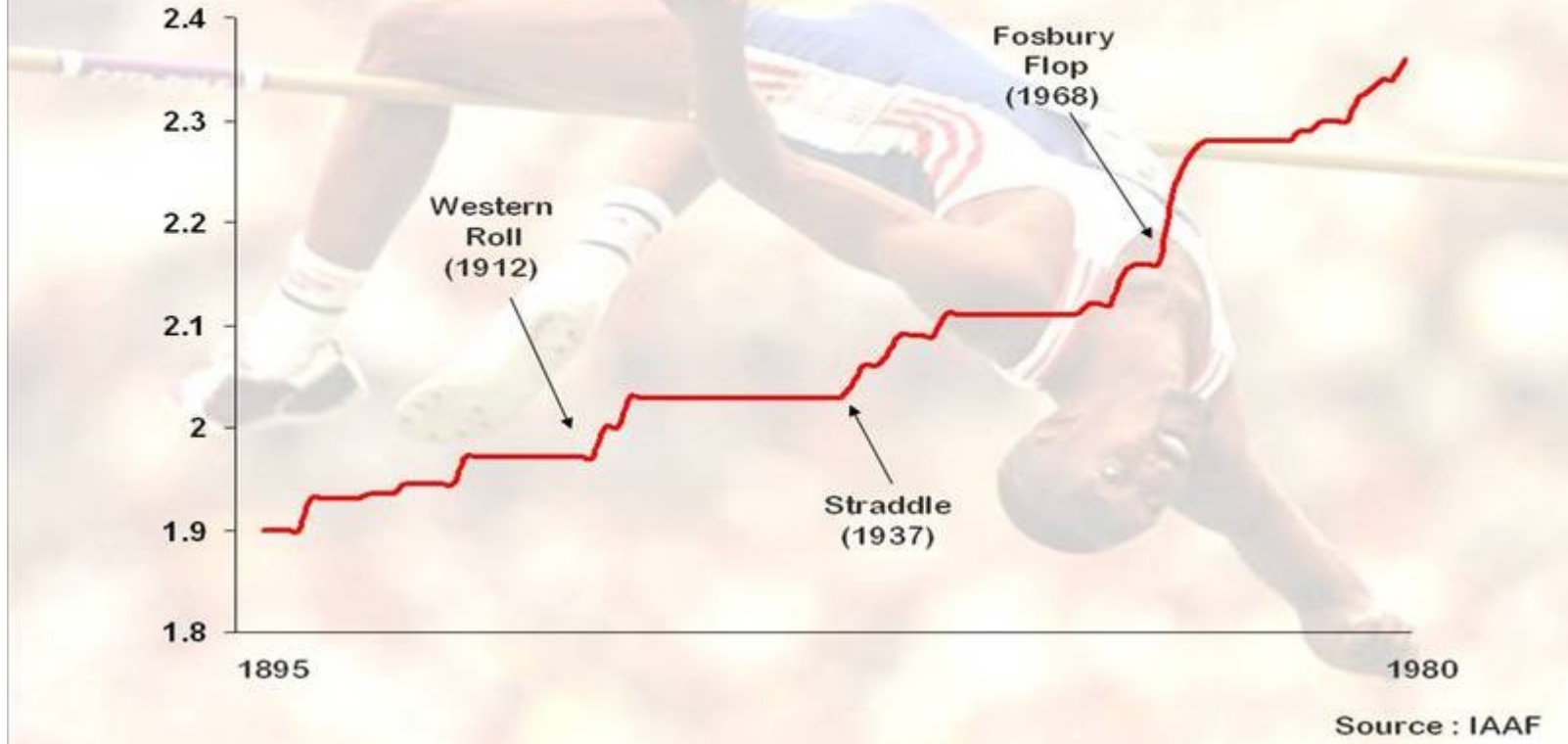
And sometimes you lose and sometimes you're shooting

Broken arrows in the dark

But I, I see the hope in your heart



World High Jump records (men's) 1895 - 1980



SINCE FOSSBURY FLOP TEQNIQUE HIGH JUMP
RECORDS WENT UPWARDS