

A photograph of a blue track and field track with white lane markings. In the foreground and middle ground, several sets of white relay blocks with brown blades are arranged in a line. To the right, there are yellow triangular markers with the numbers 5, 6, 7, and 8. A white megaphone is attached to one of the relay blocks.

# Training Relays

12-14 weeks

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# First the Science

## TRAINING ENERGY SYSTEMS

Duration of Session Effort	Energy System(s)	Power/Capacity	Training Effect
0 to 0.2 sec.	Nervous	----	Reaction
0 to 0.2 sec. (per leg)	Alactic (Stored muscle ATP)	Power	Initial Thrust
0 to 0.1 sec (speed)	Alactic (CP system)	Power	Single leg thrust at top
1 to 2.0 sec	Alactic (nervous + stored ATP + CP)	Power	Starts
2 to 5.0 sec	Alactic (CP system)	Power	Acceleration
5 to 15 sec	Alactic (CP system)	Power	Maximum speed (flying start)
15 to 30 sec	Alactic (extended CP system)	Capacity	Speed endurance (ability to hold 95%)
30 to 45 sec	Lactic	Power	Ability to produce energy w/ot O <sub>2</sub> or CP
45 to 90 sec	Lactic	Capacity	As above + ability to tolerate lactic acid

# Speed – Speed – Speed!!!

A fast sprinter (1-2-4) who is trained correctly will beat - every time - the strong runner.

Do not make them strong – MAKE THEM FAST!!!

This is track there is nothing difficult about being fast over 100 & 200 meters. And 90% of the time there is nothing difficult about this type of training.

How many HS sprinters run 30+ secs in the 200M? Some but not many. Therefore your top 5 boy sprinters and your top 5 girl sprinters will always run sub 30 in the deuce. In other words they are never in a lactic state which happens for all people between 28-33 seconds.

It's about training short with high intensity with appropriate and sufficient rest not about working hard for the sake of doing work.

Note: If your guys run 30+ make them team manager.

# 4 Pillars of Speed Development Training

It's ALL about Velocity

## Track Work

Coaches Note: 60M intervals or less with a minimum of 5 min rest between each rep and no more than 540 total meters for the entire practice.

## Plyometrics

Low, medium and high impact. For MS & HS stay with low and medium

## Olympic Lifts (+ squats)

NOT weightlifting, NOT power lifting, ONLY Olympic Lifts (+ squats – front & back)

## Rhythm

As Johnnie Cash put it. Get Rhythm!

# Who goes where

Who runs what  $4 \times 1$ ,  $4 \times 2$ ,  $4 \times 4$

1-2 Sprinters:  $4 \times 1$  &  $4 \times 2$

4 Sprinters:  $4 \times 4$

You can have your 400m sprinters do the  $4 \times 2$  getting some extra speed endurance work in

Don't have your 1-2 guys do the  $4 \times 4$  – because lactic power work does nothing for a 23-22 sec HS sprinter and 27-29 sec girl HS sprinter – Physiologically no one starts creating lactic acid until 30 sec as a general rule. And remember the faster they are the faster they cover the ground the farther they stay from a lactic state. So in stead of looking at a 29 sec HS girl and wondering of you should do lactic power work change her velocity turn her into a 27. deuce runner and forget the lactic work.

# Who goes where

Athlete events 4 x 1, 4 x 2, 4 x 4

1-2 Sprinters: 4x1 & 4x2

4 Sprinters: 4x4

Traditional

Fastest runner 2<sup>nd</sup> or 4<sup>th</sup> leg

Slowest runner 3<sup>rd</sup> leg

Who is your best starter?

Who stomps a turn? 1 & 3

Work zones – lengthen & shorten



# Sequence

## 4x1 & 4&2

Standard

**Right** Hand, **Left** Hand, **Right** Hand, **Left** Hand – Blind passing  
4x4 open palm look back or blind (depends on experience)

First leg:

Good starter – able to manage the baton in the blocks

Second leg:

Good velocity needed here, often times your fastest or second fastest runner. Can stretch this zone to 120M in the 4x1. Should be able to take and receive with efficiency. Who is your fastest zoom runner?

Third leg:

True turn runner, take and receive with high efficiency, can be your shortest leg 80M on 4x1.

Forth leg:

Fastest runner or second fastest. How do you choose between the two? Who runs others down the best.

# Common Errors

Not adjusting the zones for the wind-weather

Wind affects steps

Trying to Stretch it out (the zones) dangerously

If you stretch a zone make sure the athletes are experienced and in synch

Not attacking in and out of zone-Attack Drill

Attacking zones is a critical ingredient

Not picking up focal point

Where are you going with the baton – where are you placing it? Then put it there!

Not covering up after handoff

Close the hand once you have!

Adjusting on the run-Apollo 11 baton! Adjust the baton with your thigh. BAD!

Enough said

Visual perception difficulties (major overlooked problem)

Gauging incoming velocity and placement in the zone

Moving hands

When receiving hold that hand still

Kids not re-warming up

Athletes need to warm-up after their open events for the relay other zones will be off

Over practicing

If you train hand-offs you are training a speed day. So do hand-offs for a speed workout. Don't do speed or speed endurance then a hand off day. Don't do hand-offs day before a meet, because you just cooked the nervous system and it does not have time to recover.





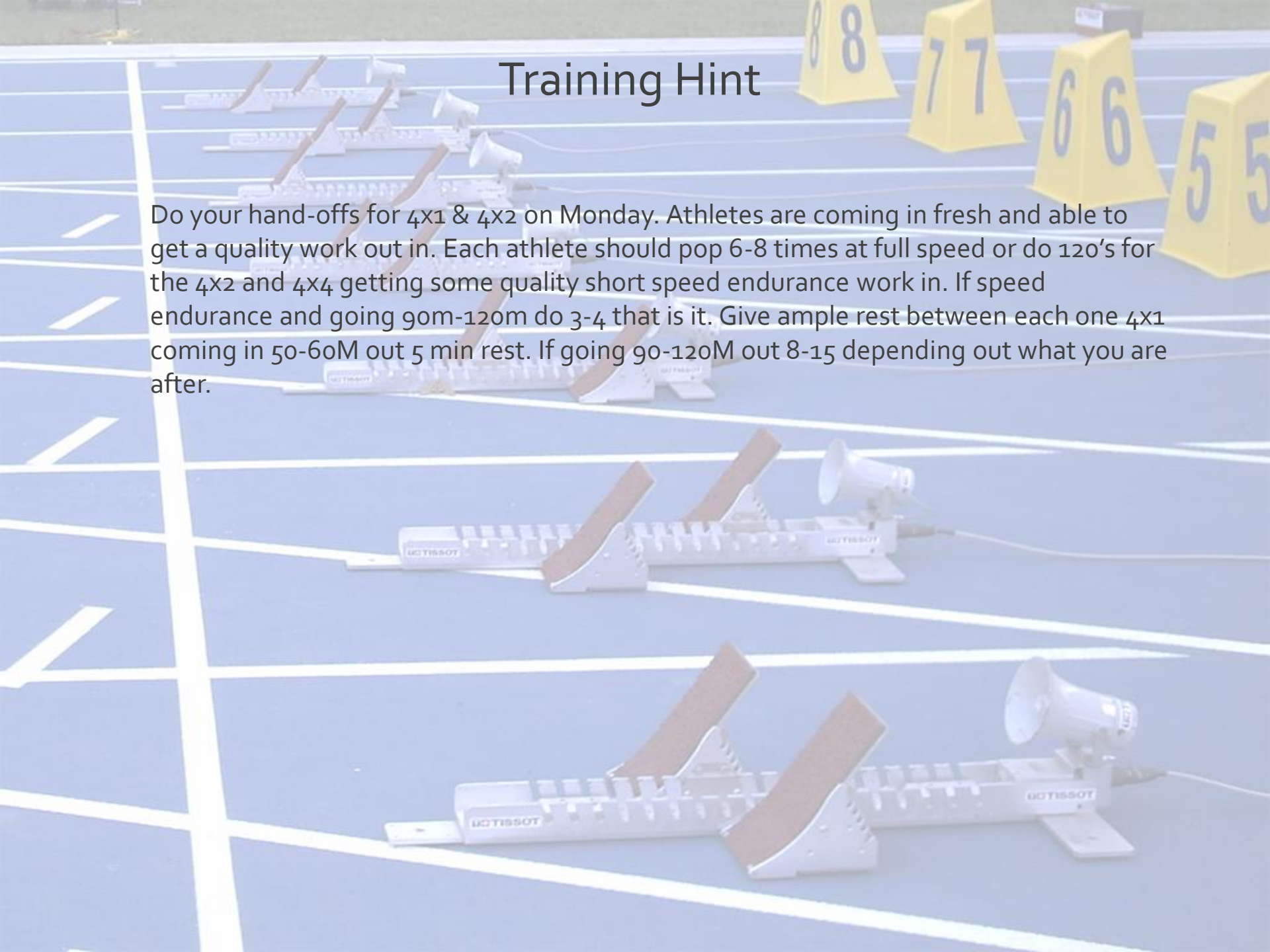
Part 5: What to workout – How to workout & Sample workouts

It's Knowing How to Mix the Ingredients  
It's about Volume and Sequence



## Training Hint

Do your hand-offs for 4x1 & 4x2 on Monday. Athletes are coming in fresh and able to get a quality work out in. Each athlete should pop 6-8 times at full speed or do 120's for the 4x2 and 4x4 getting some quality short speed endurance work in. If speed endurance and going 90m-120m do 3-4 that is it. Give ample rest between each one 4x1 coming in 50-60M out 5 min rest. If going 90-120M out 8-15 depending out what you are after.



# Sample Workouts

## Speed Work

8 x 30M hills – rest 5 min between each rep

Standing start 2x30-2x40-2x50-2x60 - rest 5 min between each rep

Block Starts. 3x20M – 3x30M – 3x40M 5-6 min rest between each start

Max velocity work. 7x30M Flying starts with 5 min rest between each.

Speed workout for mid season while speed endurance is being worked.

3x60M – rest 4-5 min between each

Rest 6 min

3x60M – rest 4-5 min between each

Rest 6 min

3x60M – rest 4-5 min between each

Why mid-season? So they can maintain their velocity over 9 reps

# Sample Workouts

## Speed Endurance

180M-150M-120M – rest 15 min between each rep

2x180M & 2x150M rest 8-10 min between each rep

3x90M & 3x120M rest 12 min between each rep

3x60M – rest 5 min between each  
Rest 6 min

3x60M – rest 30 sec between each  
Rest 6 min

3x60M – rest 5 min between each

2x250M rest 21 min between each rep

# Sample Training Week

For MS & HS

Note: Collegiate is different based on length of season, staging, and meet peaks

MS & HS a balanced diet:

Monday – Speed (why? Because you can't do speed after blasting a workout the day before. You need to be fresh!!)

Tuesday – Tempo (why? Because you can't pop the nervous system after cooking it the day before it needs 48 hrs recovery)

Wednesday – Extended Dynamic drills ONLY – no running no weights no plyos, *very* light day before competition

Thursday – Meet Day – This is all out like Monday. Speed day (1-2, 4x1) or Speed Endurance day (2-4, 4x4)

Friday – Tempo (why? See Tuesday note)

If Meet is on Friday then

Monday – Speed (why? Because you can't do speed after blasting a workout the day before. You need to be fresh!!)

Tuesday – Light Tempo (why? Because you can't pop the nervous system after cooking the day before it needs 48 hrs recovery)

Wednesday – Speed Endurance (why? Rested and can go again but do not be greedy here with volume go for quality you are 48 hrs from competition).

Thursday – Extended Dynamic drills – no running, no weights, no plyometrics

Friday – Meet Day

## ***SPRINT PROJECTIONS***

<i><b>30 BLOCK</b></i>	<i><b>30 FLY</b></i>	<i><b>60 BLOCK</b></i>	<i><b>150 STAND</b></i>	<i><b>100 METERS</b></i>	<i><b>200 METERS</b></i>
<i>3.58-3.61</i>	<i>2.48-2.51</i>	<i>6.22-6.27</i>	<i>14.87-14.97</i>	<i>10.09-10.16</i>	<i>20.17-20.32</i>
<i>3.62-3.65</i>	<i>2.52-2.55</i>	<i>6.28-6.33</i>	<i>14.98-15.08</i>	<i>10.17-10.24</i>	<i>20.33-20.48</i>
<i>3.66-3.69</i>	<i>2.56-2.59</i>	<i>6.34-6.39</i>	<i>15.09-15.19</i>	<i>10.25-10.32</i>	<i>20.49-20.64</i>
<i>3.70-3.73</i>	<i>2.60-2.63</i>	<i>6.40-6.45</i>	<i>15.20-15.30</i>	<i>10.33-10.40</i>	<i>20.65-20.80</i>
<i>3.74-3.77</i>	<i>2.64-2.67</i>	<i>6.45-6.51</i>	<i>15.31-15.42</i>	<i>10.41-10.48</i>	<i>20.81-20.96</i>
<i>3.78-3.81</i>	<i>2.68-2.71</i>	<i>6.52-6.57</i>	<i>15.43-15.54</i>	<i>10.49-10.56</i>	<i>20.97-21.12</i>
<i>3.82-3.85</i>	<i>2.72-2.75</i>	<i>6.58-6.63</i>	<i>15.55-15.66</i>	<i>10.57-10.64</i>	<i>21.13-21.28</i>
<i>3.86-3.89</i>	<i>2.76-2.79</i>	<i>6.64-6.69</i>	<i>15.67-15.79</i>	<i>10.65-10.72</i>	<i>21.29-21.44</i>
<i>3.90-3.93</i>	<i>2.80-2.83</i>	<i>6.70-6.75</i>	<i>15.80-15.92</i>	<i>10.73-10.80</i>	<i>21.45-21.61</i>
<i>3.94-3.98</i>	<i>2.84-3.88</i>	<i>6.76-6.81</i>	<i>15.93-16.06</i>	<i>10.81-10.90</i>	<i>21.62-21.88</i>
<i>3.99-4.03</i>	<i>2.89-2.93</i>	<i>6.82-6.87</i>	<i>16.07-16.20</i>	<i>10.91-11.00</i>	<i>21.89-22.09</i>
<i>4.04-4.08</i>	<i>2.94-2.98</i>	<i>6.88-6.93</i>	<i>16.21-16.35</i>	<i>11.01-11.09</i>	<i>22.10-22.30</i>
<i>4.09-4.13</i>	<i>2.99-3.03</i>	<i>6.94-6.99</i>	<i>16.36-16.51</i>	<i>11.10-11.19</i>	<i>22.31-22.50</i>
<i>4.14-4.18</i>	<i>3.04-3.08</i>	<i>7.00-7.05</i>	<i>16.52-16.68</i>	<i>11.20-11.29</i>	<i>22.51-22.72</i>
<i>4.19-4.24</i>	<i>3.09-3.14</i>	<i>7.06-7.12</i>	<i>16.69-16.86</i>	<i>11.30-11.40</i>	<i>22.73-22.95</i>
<i>4.25-4.30</i>	<i>3.15-3.20</i>	<i>7.13-7.19</i>	<i>16.87-17.03</i>	<i>11.41-11.51</i>	<i>22.96-23.19</i>
<i>4.31-4.36</i>	<i>3.21-3.26</i>	<i>7.20-7.26</i>	<i>17.04-17.25</i>	<i>11.52-11.62</i>	<i>23.20-23.43</i>
<i>4.37-4.42</i>	<i>3.27-3.32</i>	<i>7.27-7.33</i>	<i>17.26-17.46</i>	<i>11.63-11.73</i>	<i>23.44-23.69</i>
<i>4.43-4.48</i>	<i>3.33-3.38</i>	<i>7.34-7.40</i>	<i>17.47-17.67</i>	<i>11.74-11.85</i>	<i>23.70-23.95</i>
<i>4.49-4.54</i>	<i>3.39-3.44</i>	<i>7.41-7.50</i>	<i>17.68-17.88</i>	<i>11.86-12.01</i>	<i>23.96-24.27</i>
<i>4.55-4.60</i>	<i>3.45-3.50</i>	<i>7.51-7.60</i>	<i>17.89-18.09</i>	<i>12.02-12.17</i>	<i>24.28-24.64</i>
<i>4.61-4.70</i>	<i>3.51-3.60</i>	<i>7.61-7.70</i>	<i>18.10-18.30</i>	<i>12.18-12.33</i>	<i>24.65-24.98</i>
<i>4.71-4.80</i>	<i>3.61-3.70</i>	<i>7.71-7.80</i>	<i>18.31-18.55</i>	<i>12.34-12.49</i>	<i>24.99-25.30</i>
<i>4.81-4.90</i>	<i>3.71-3.80</i>	<i>7.81-7.90</i>	<i>18.56-18.81</i>	<i>12.50-12.65</i>	<i>25.31-25.65</i>
<i>4.91-5.00</i>	<i>3.81-3.90</i>	<i>7.91-8.00</i>	<i>18.82-19.12</i>	<i>12.66-12.85</i>	<i>25.66-25.99</i>
<i>5.00-5.01</i>	<i>3.90-4.00</i>	<i>8.00-8.10</i>	<i>19.20-19.60</i>	<i>12.90-13.10</i>	<i>26.00-26.50</i>
<i>5.10-5.20</i>	<i>4.00-4.10</i>	<i>8.10-8.20</i>	<i>19.60-20.00</i>	<i>13.10-13.30</i>	<i>26.50-27.00</i>
<i>5.20-5.30</i>	<i>4.10-4.20</i>	<i>8.20-8.30</i>	<i>20.00-20.40</i>	<i>13.30-13.60</i>	<i>27.00-27.50</i>
<i>5.30-5.50</i>	<i>4.20-4.40</i>	<i>8.30-8.40</i>	<i>20.40-20.80</i>	<i>13.60-13.90</i>	<i>27.50-28.80</i>