LONG TERM ATHLETE DEVELOPMENT: The U.S. Ski Team Approach

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LONG TERM ATHLETE DEVELOPMENT:
The U.S. Ski Team Approach

Ted Ligety

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Park City, Utah

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UTEP
ISU Pre-Nats
645
ISU Pre-Nats
69


Völkl
Völkl


KIPP
London 2012
London 2012

Parent, Coaches, Athlete

Stakeholders see this…

…and imagine this!

If they look like Ted, why can't they train like Ted?

Is early specialization a prerequisite for adult expertise?

Early specialization…

- 10 year rule
- 10,000 hours
- Power law of practice
- Deliberate practice

Simon & Chase (1973), "Skill in Chess".

Newell & Rosenbloom, (1981), "Mechanismis of skill acquisition and the law of practice".

Ericsson, et al., (1993), "The role of deliberate practice in the acquisition of expert performance".

All Valid!

1

But… One thing is missing…

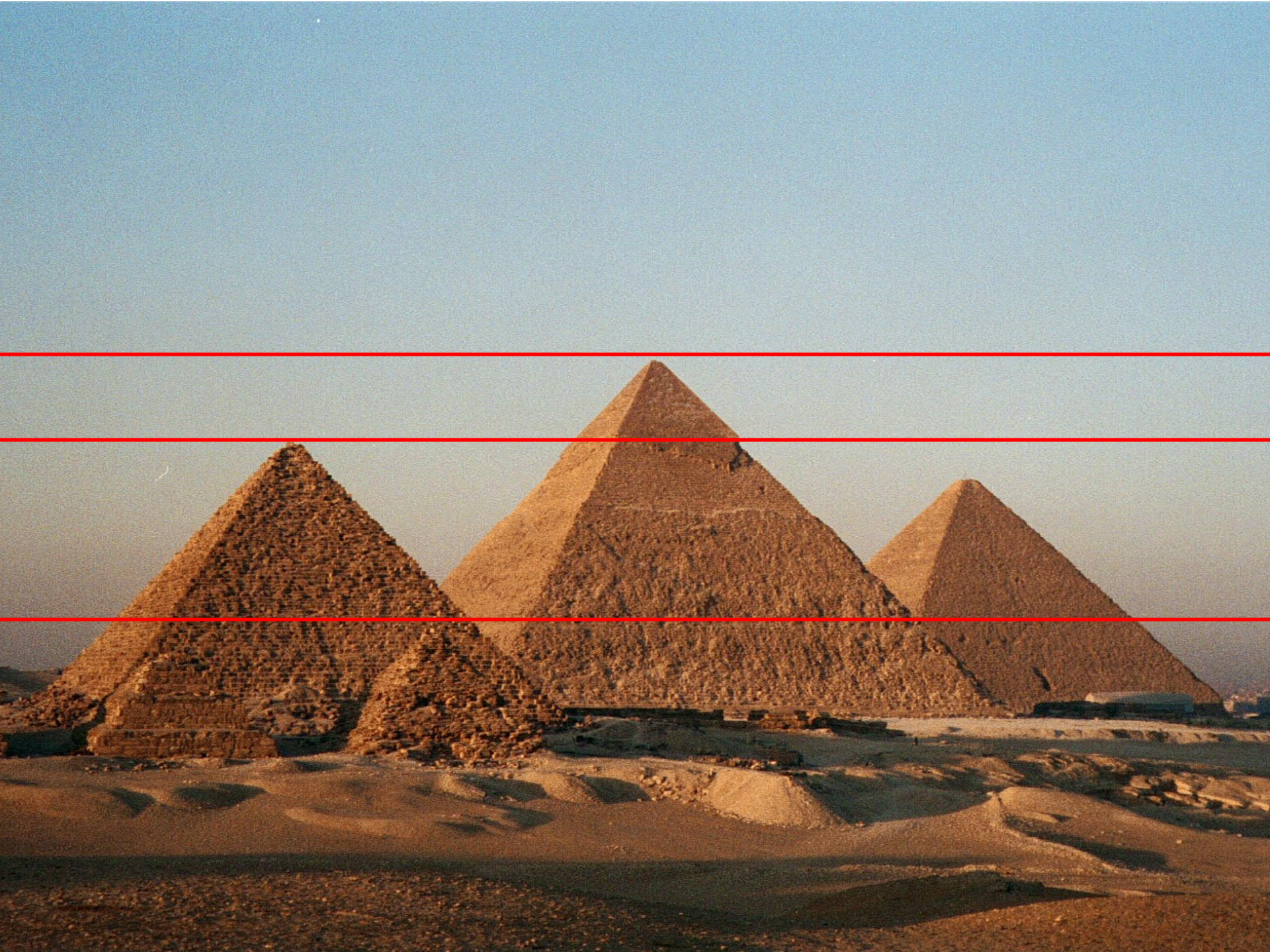
Athlete AGE???

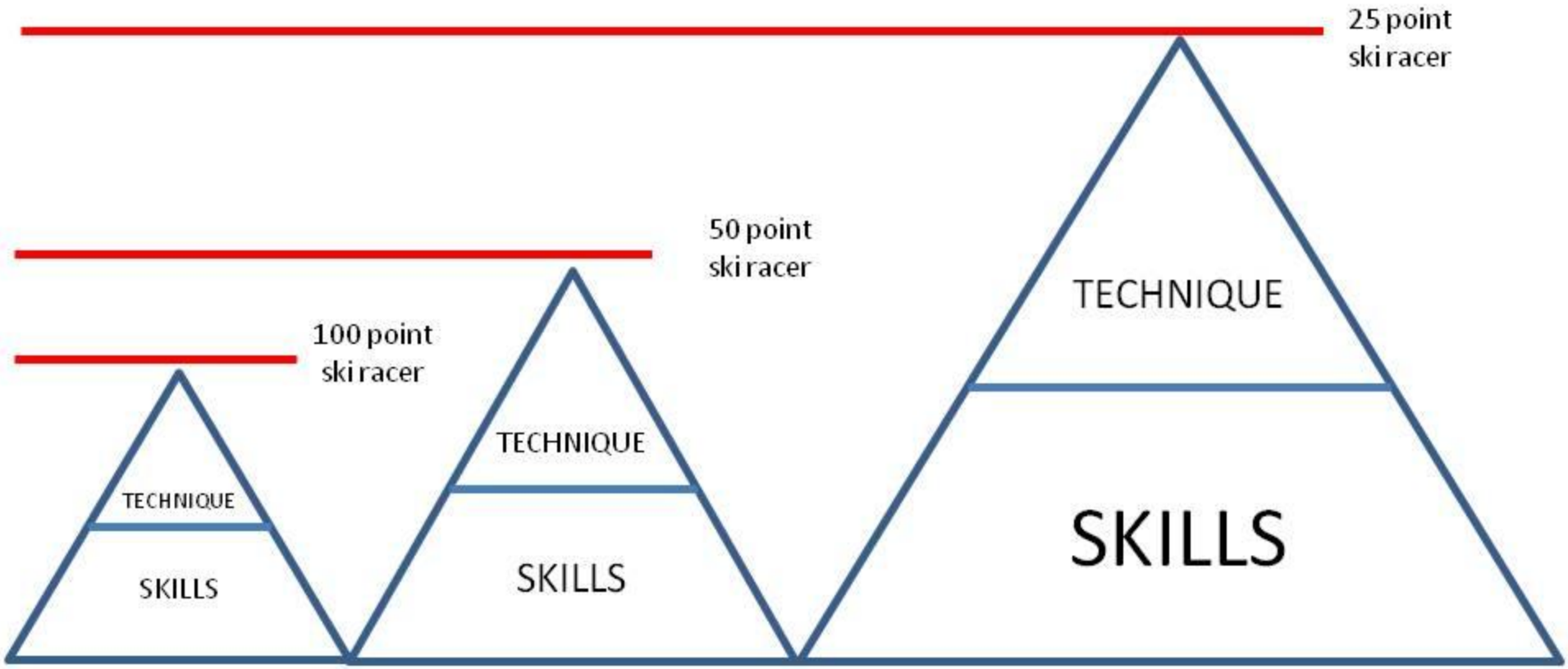
- Chronological age
- Biological age
- Training age

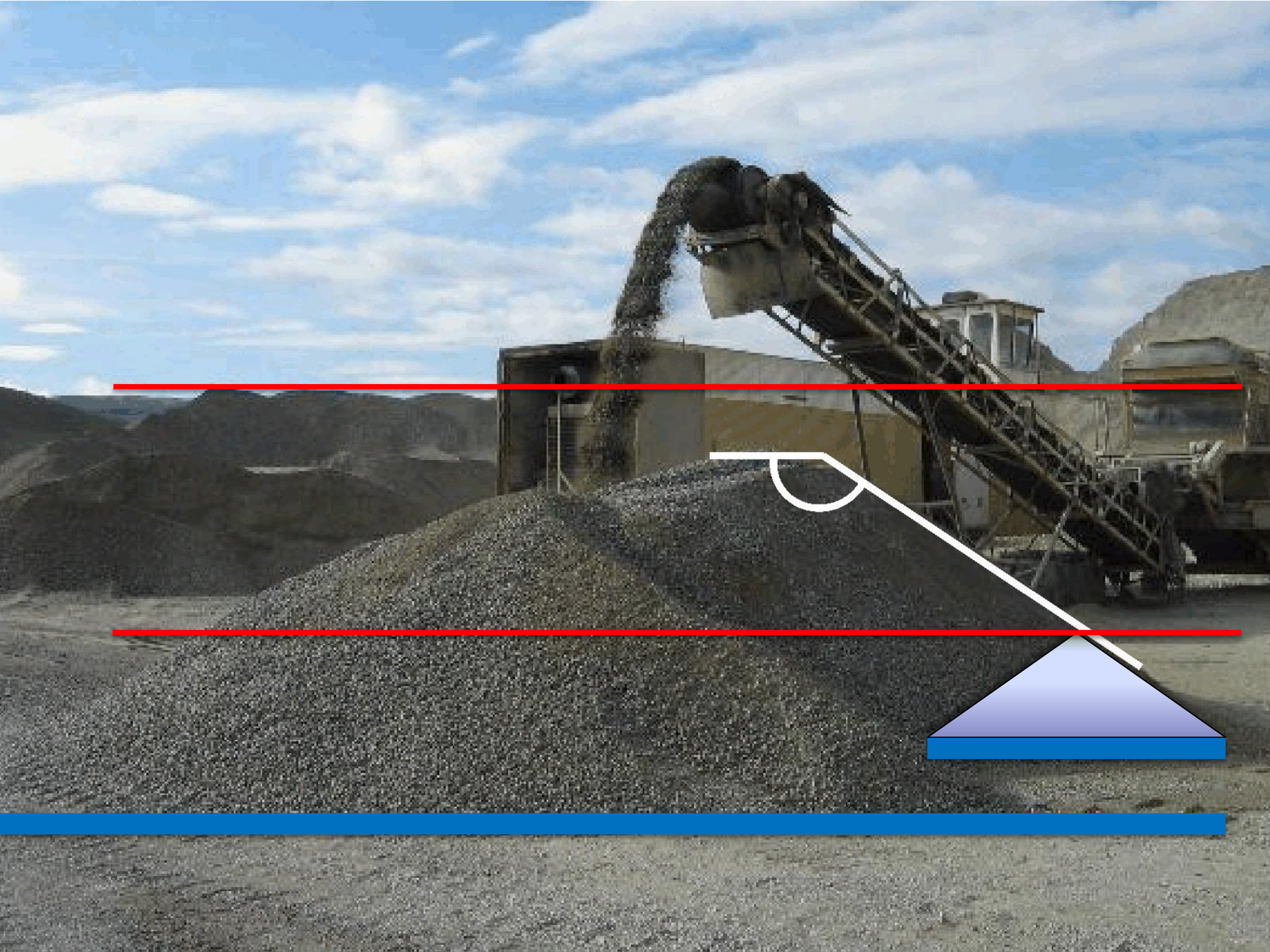
“Training AGE” is dependent on…

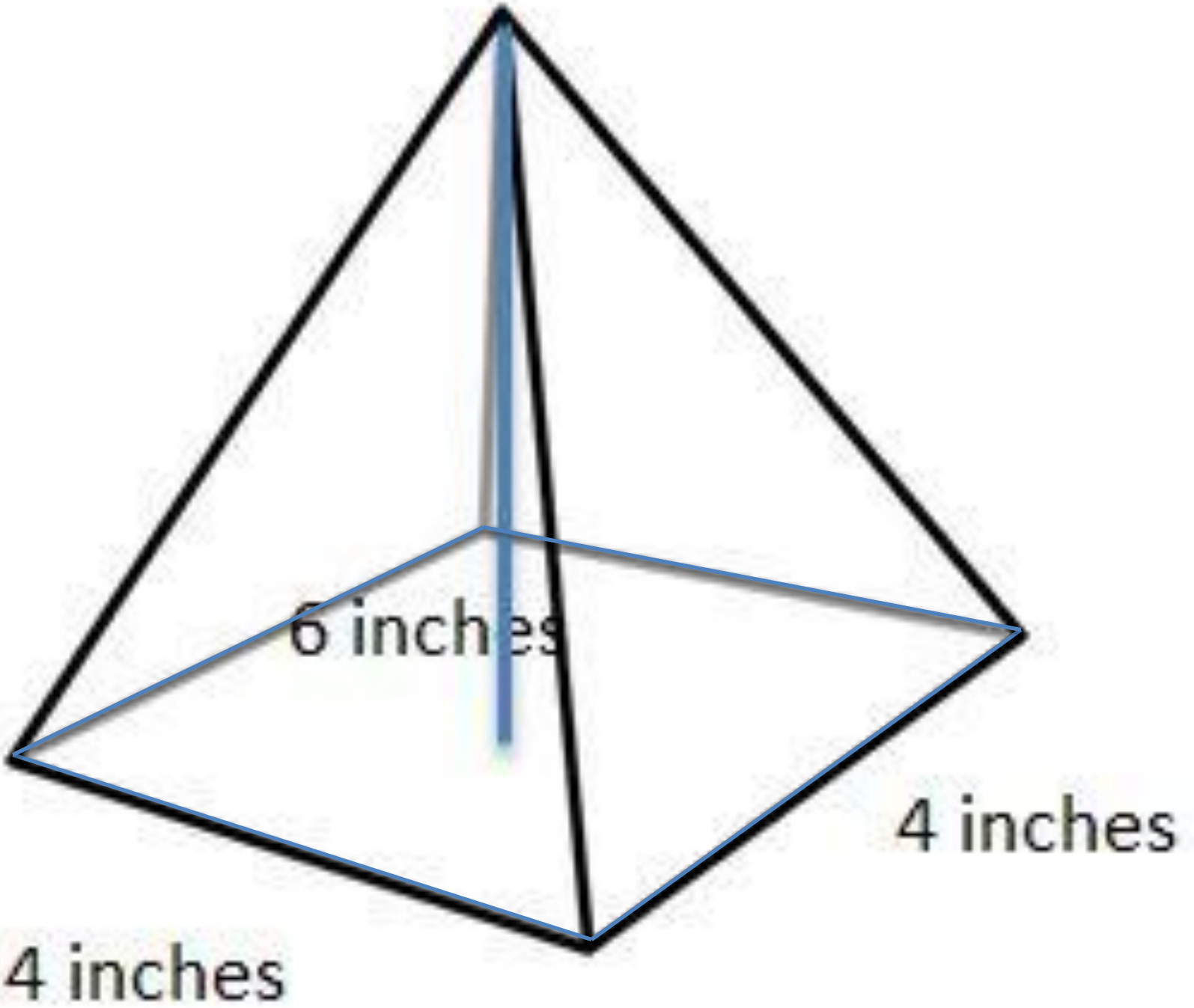
- Volume
- Intensity
- Density

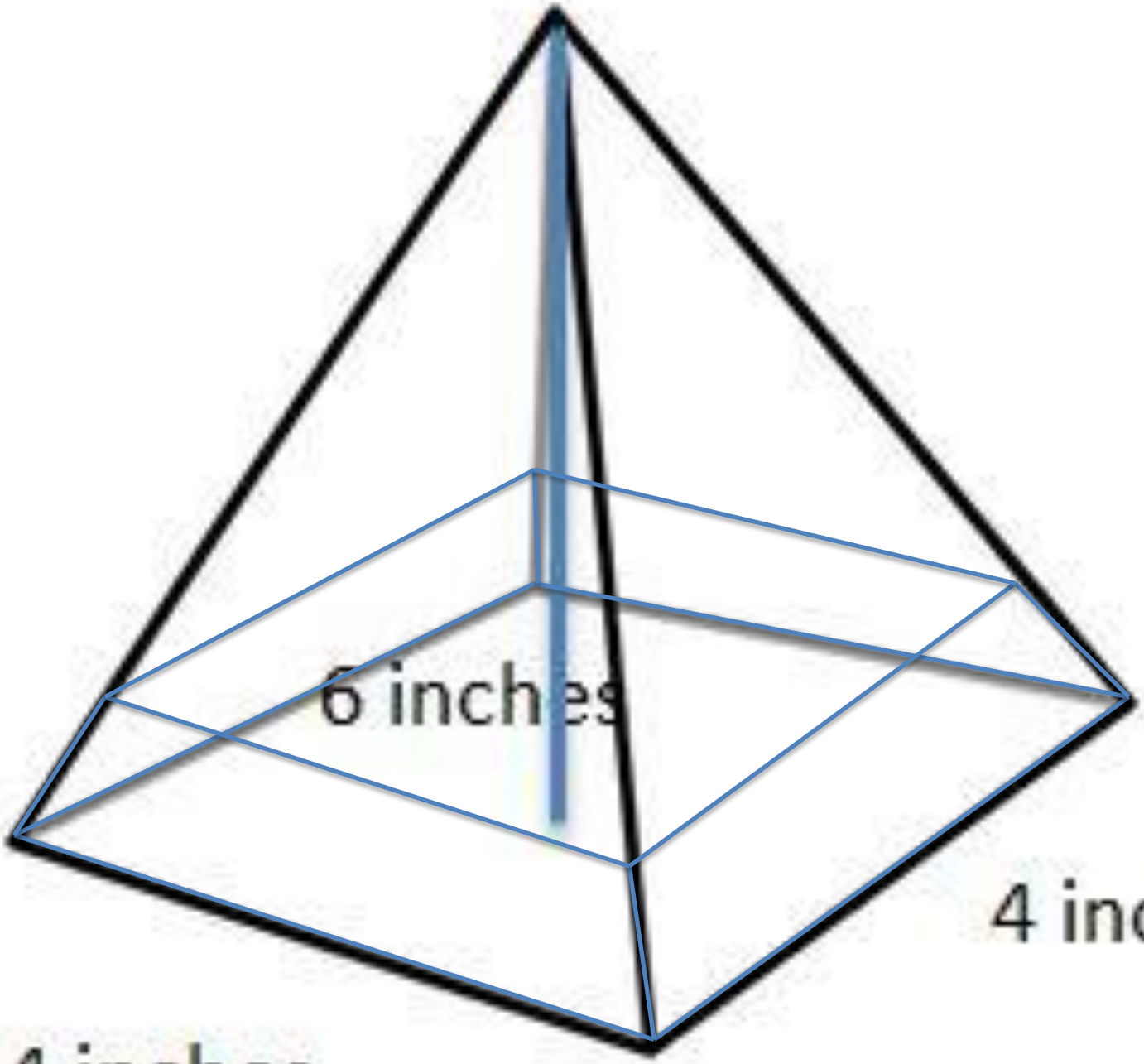
WYSIWYG

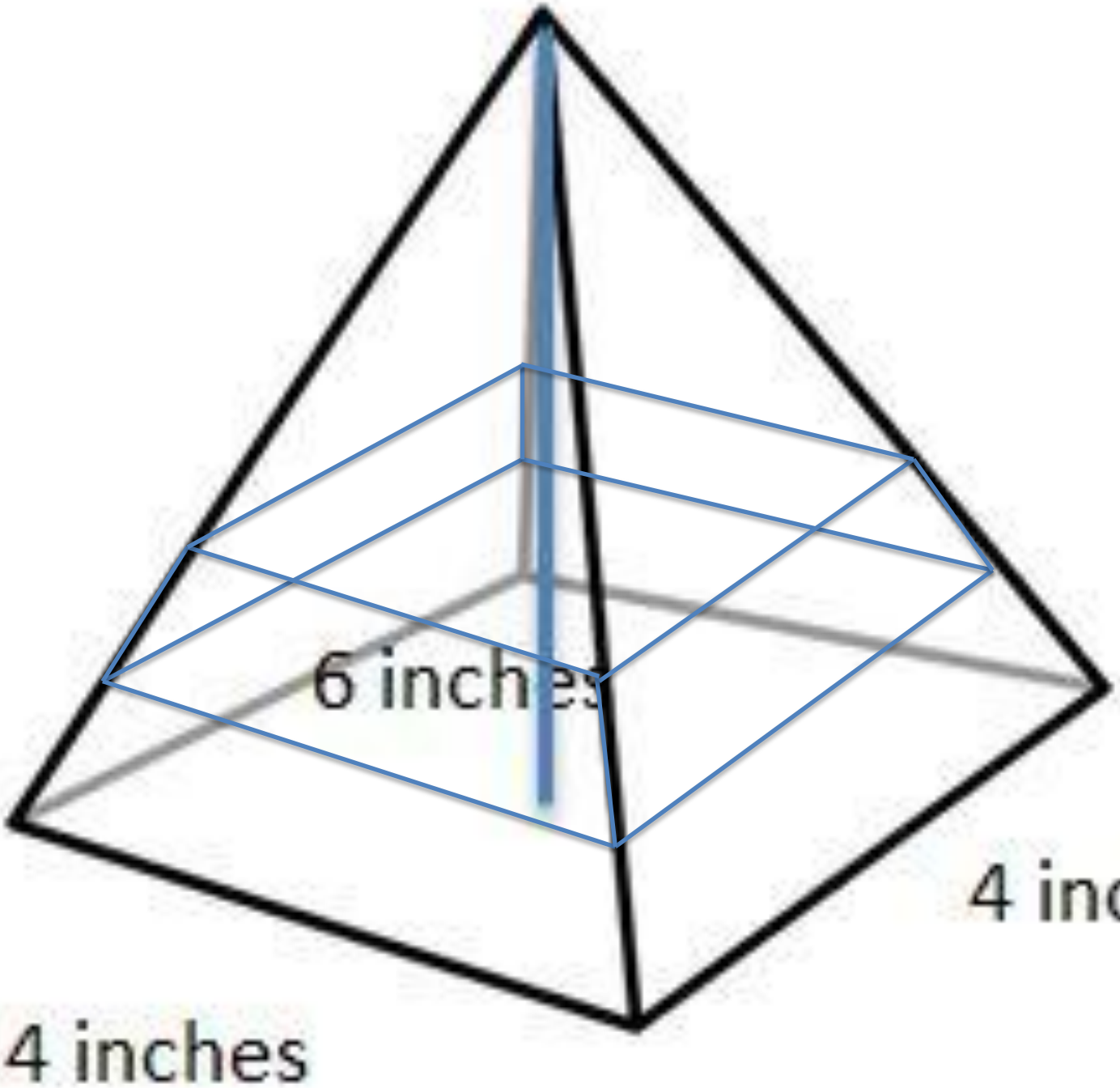



25 point
ski racer
50 point
ski racer
100 point
ski racer
TECHNIQUE
SKILLS
TECHNIQUE
SKILLS
TECHNIQUE
SKILLS




6 inches
4 inches
4 inches


6 inches
4 inches
4 inches


6 inches
4 inches
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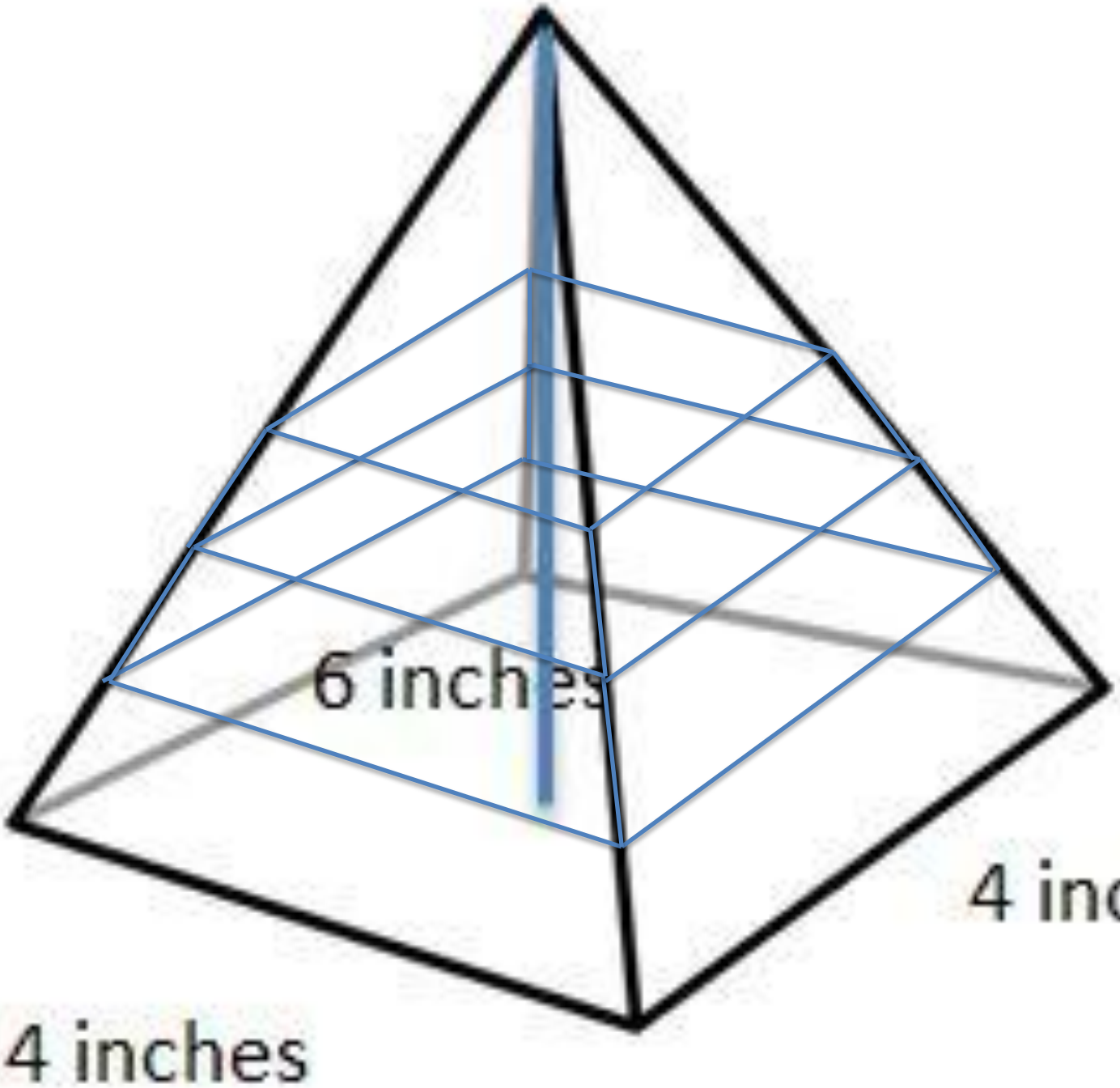
6 inches
4 inches
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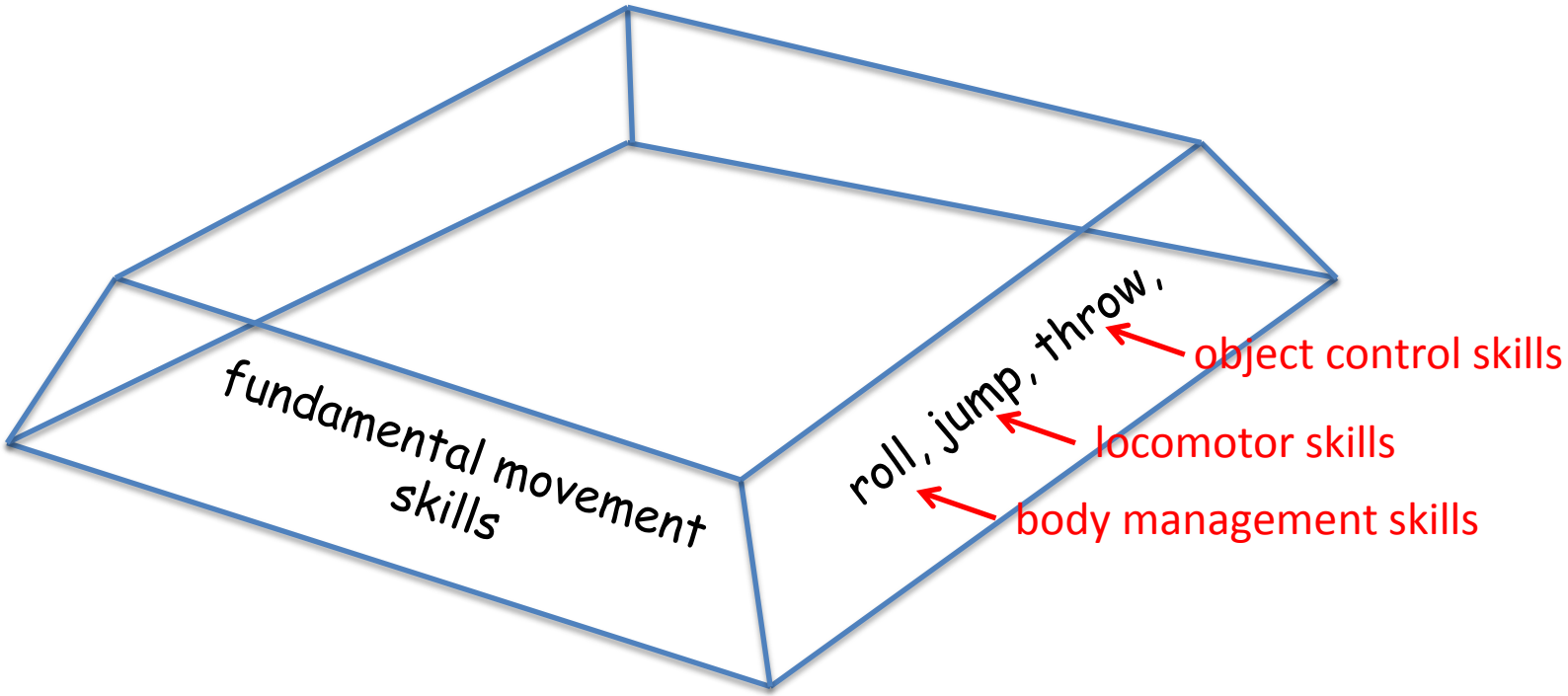
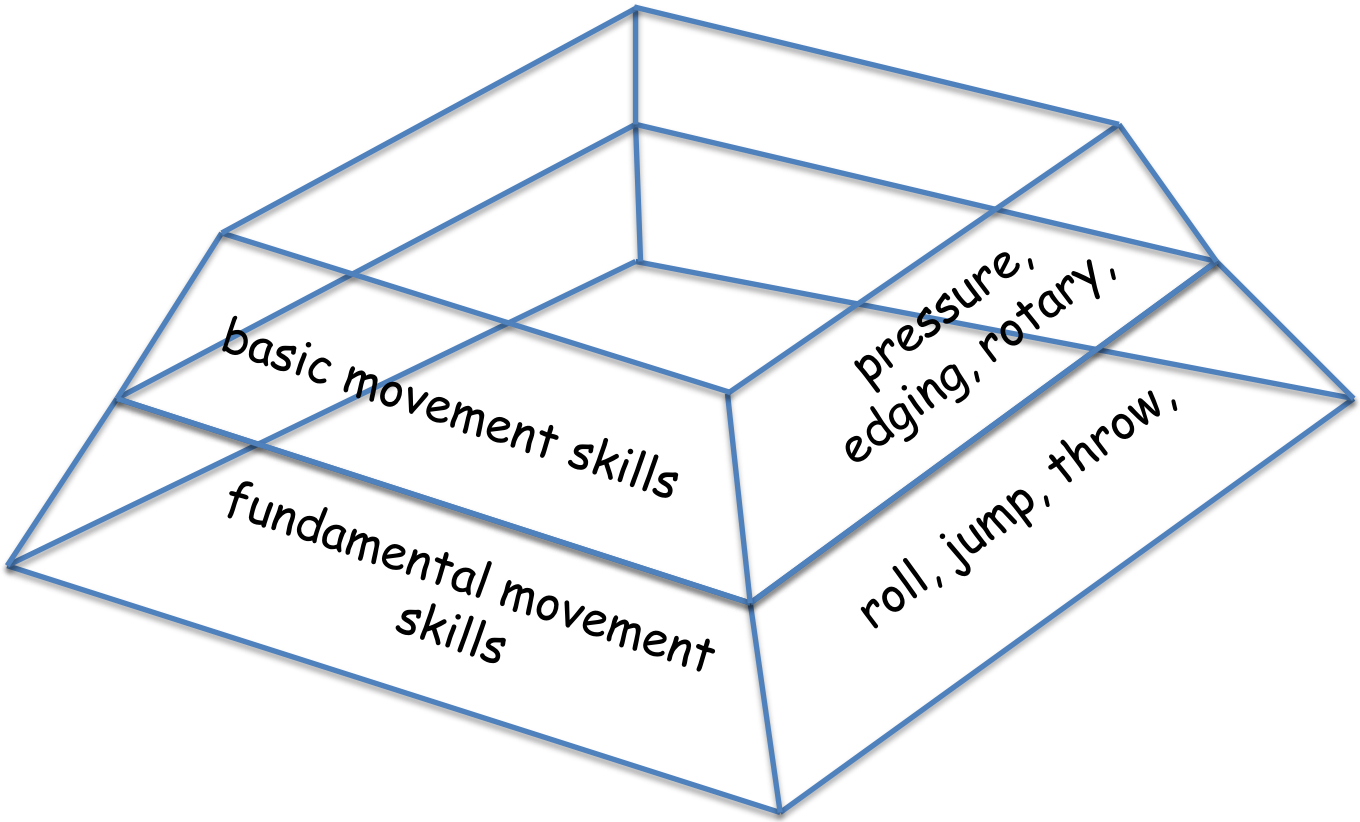
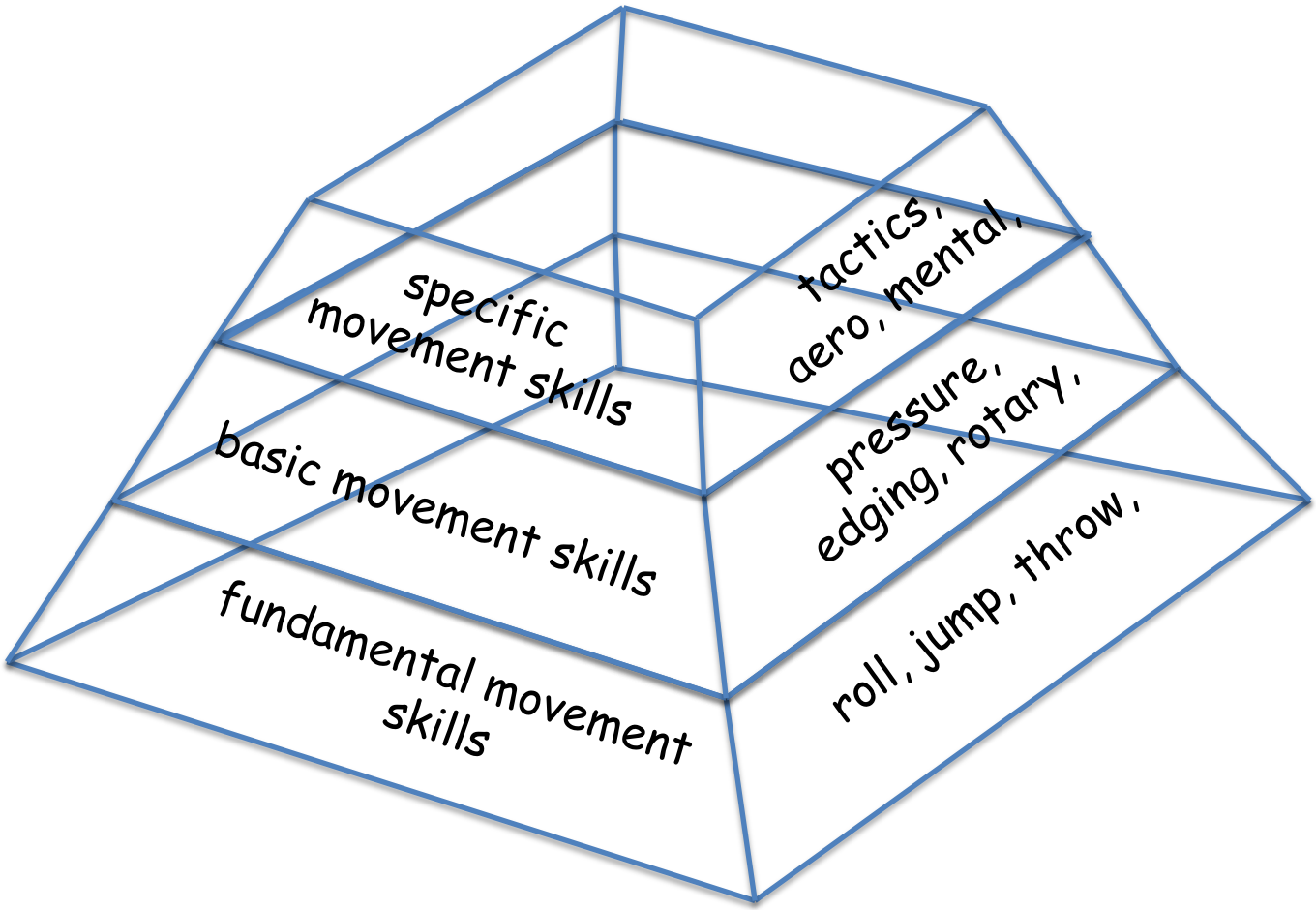
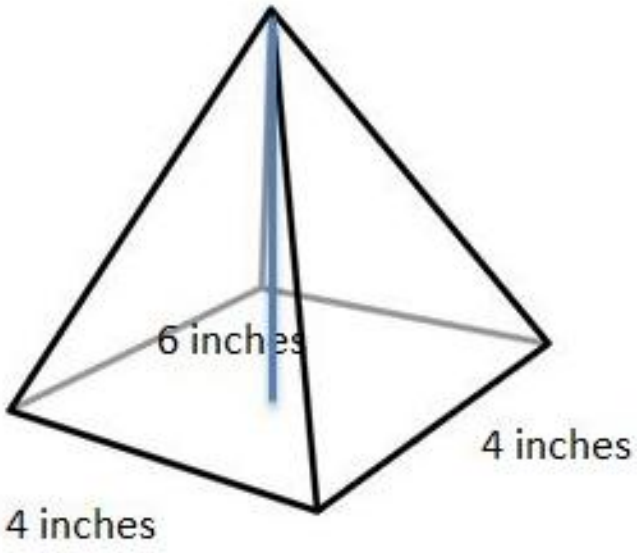

fundamental movement skills
roll, jump, throw,
object control skills
locomotor skills
body management skills


basic movement skills
fundamental movement skills
pressure, edging, rotary,
roll, jump, throw,


specific movement skills
basic movement skills
fundamental movement skills
tactics, aero, mental,
pressure, edging, rotary,
roll, jump, throw,

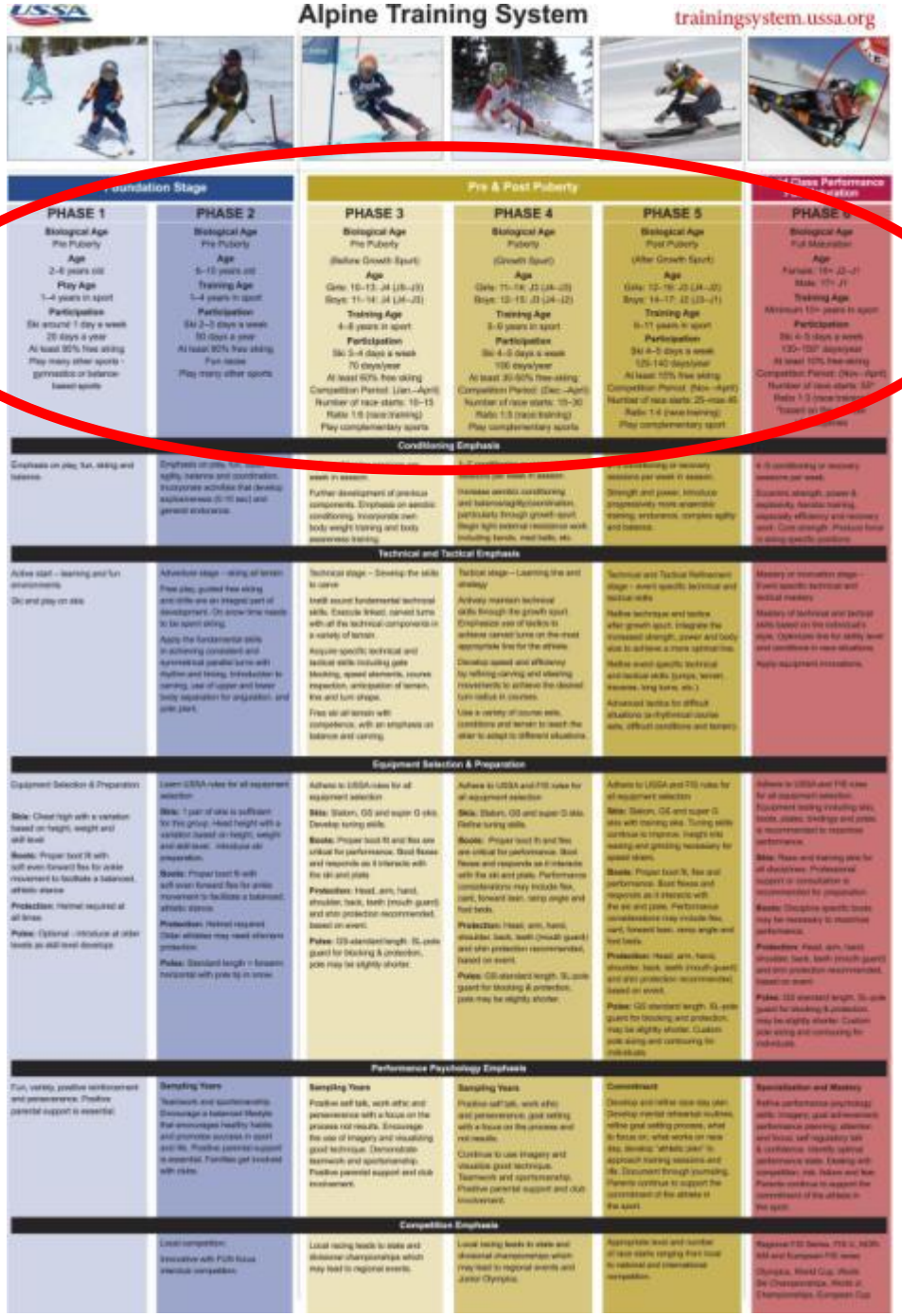
Pyramid can/should be based on…



- motor control
- aerobic
- anaerobic
  - –strength
  - –power
  - –speed


blood volume
stroke volume
cardiac output
capillary volume
capillary density
mitochondral volume
mitochondral density
oxidative enzyme
VISA
ATOMIC
WORLDCUP


Fundamental Movements
Basic S
ements
Roll
Jump
Throw
Edge
Rotary
Pressure
Mental
Aero
Tactics
PIPELINE
Life of the athlete


Alpine Training System
trainingsystem.ussa.org
Foundation Stage
Pre & Post Puberty
PHASE 1
PHASE 2
PHASE 3
PHASE 4
PHASE 5
PHASE 6
Conditioning Emphasis
Technical and Tactical Emphasis
Equipment Selection & Preparation
Performance Psychology Emphasis
Competition Emphasis

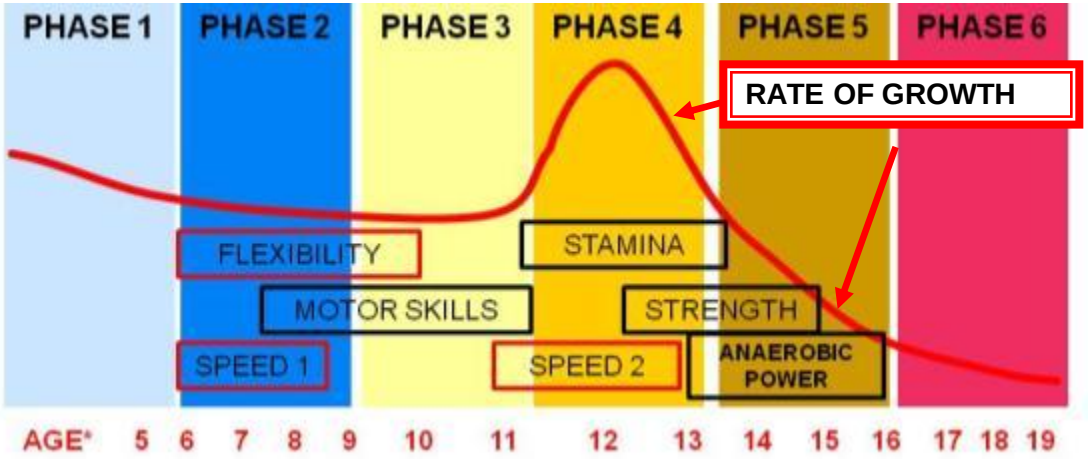
What Should We Help Them Focus On?

Foundation Stage		Pre & Post Puberty			World Class Performance Full Maturation
PHASE 1	**PHASE 2**	**PHASE 3**	**PHASE 4**	**PHASE 5**	**PHASE 6**
Biological Age Pre Puberty **Age** 2–6 years old **Play Age** 1–4 years in sport **Participation** Ski around 1 day a week 20 days a year At least 95% free skiing Play many other sports - gymnastics or balance-based sports	**Biological Age** Pre Puberty **Age** 6–10 years old **Training Age** 1–4 years in sport **Participation** Ski 2–3 days a week 50 days a year At least 90% free skiing Fun races Play many other sports	**Biological Age** Pre Puberty (Before Growth Spurt) **Age** Girls: 10–13: J4 (J5–J3) Boys: 11–14: J4 (J4–J3) **Training Age** 4–8 years in sport **Participation** Ski 3–4 days a week 70 days/year At least 60% free skiing Competition Period: (Jan.–April) Number of race starts: 10–15 Ratio 1:6 (race:training) Play complementary sports	**Biological Age** Puberty (Growth Spurt) **Age** Girls: 11–14: J3 (J4–J3) Boys: 12–15: J3 (J4–J2) **Training Age** 5–9 years in sport **Participation** Ski 4–5 days a week 100 days/year At least 30-50% free-skiing Competition Period: (Dec.–April) Number of race starts: 15–30 Ratio 1:5 (race:training) Play complementary sports	**Biological Age** Post Puberty (After Growth Spurt) **Age** Girls: 12–16: J3 (J4–J2) Boys: 14–17: J2 (J3–J1) **Training Age** 6–11 years in sport **Participation** Ski 4–5 days a week 120-140 days/year At least 15% free skiing Competition Period: (Nov.–April) Number of race starts: 25–max 45 Ratio 1:4 (race:training) Play complementary sport	**Biological Age** Full Maturation **Age** Female: 16+ J2–J1 Male: 17+ J1 **Training Age** Minimum 10+ years in sport **Participation** Ski 4–5 days a week 130–150* days/year At least 10% free-skiing Competition Period: (Nov.–April) Number of race starts: 55* Ratio 1:3 (race:training) *based on the number of disciplines

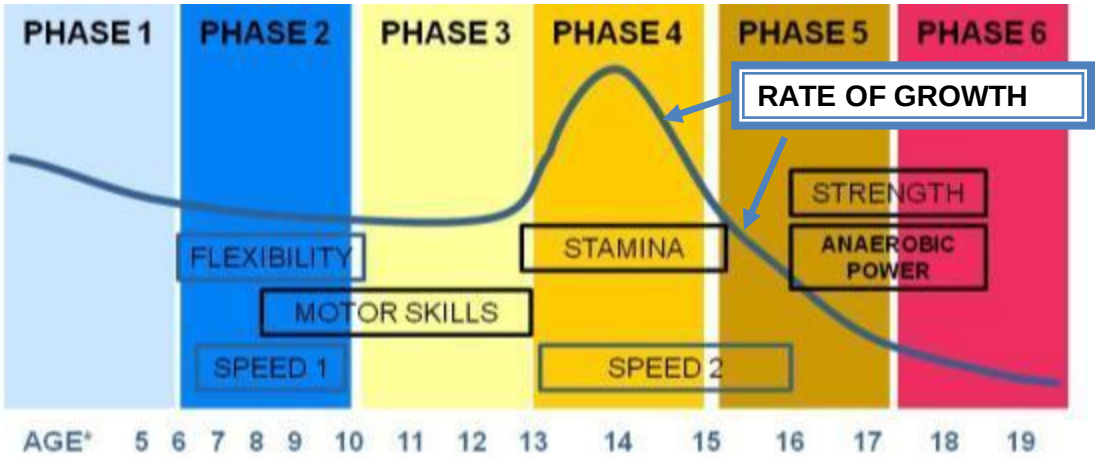
Fundamental Skills/Technique → **Transition to competition** → **Competition skills**

Passion, effort, fun → **Attitude, effort, fun** → **Dedication, effort, fun**

Sensitivity Windows



Sensitivity windows for girls relating to rate of growth, developmental phase, and chronological age (adapted from Balyi & Way, 2005)



Sensitivity windows for boys relating to rate of growth, developmental phase, and chronological age (adapted from Balyi & Way, 2005)

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on Stage	Pre & Post Puberty			World Class Performance Full Maturation
PHASE 2	**PHASE 3**	**PHASE 4**	**PHASE 5**	**PHASE 6**
FUNdamentals	**Learn to Train**	**Train to Train**		**Train to Compete**
Age 6–10 years old	(Before Growth Spurt) **Age**	(Growth Spurt) **Age**	(After Growth Spurt) **Age**	**Age** Female: 16+ J2–J1
Sampling		**Specializing**		**Investment**
Participation Ski 2–3 days a week 50 days a year At least 90% free skiing Fun races Play many other sports	**Training Age** 4–8 years in sport **Participation** Ski 3–4 days a week 70 days/year At least 60% free skiing Competition Period: (Jan.–April) Number of race starts: 10–15 Ratio 1:6 (race:training) Play complementary sports	**Training Age** 5–9 years in sport **Participation** Ski 4–5 days a week 100 days/year At least 30-50% free-skiing Competition Period: (Dec.–April) Number of race starts: 15–30 Ratio 1:5 (race:training) Play complementary sports	**Training Age** 6–11 years in sport **Participation** Ski 4–5 days a week 120-140 days/year At least 15% free skiing Competition Period: (Nov.–April) Number of race starts: 25–max 45 Ratio 1:4 (race:training) Play complementary sport	Minimum 10+ years in sport **Participation** Ski 4–5 days a week 130–150* days/year At least 10% free-skiing Competition Period: (Nov.–April) Number of race starts: 55* Ratio 1:3 (race:training) *based on the number of disciplines


COOKBOOK

Negative consequences of early specialization:

- lack of sport choices
- depression
- eating disorders
- chronic fatigue
- one-dimensional self concept
- overuse injuries
- chronic injuries
- obsession with winning
- imbalanced lifestyle
- increased pressure from parents
- burnout
- underperform later in life
- loss of control over their life
- dropout from sport

The “doing well early” paradox

Early Maturers

- Are usually larger than their peers.
- As a result of being “bigger” they perform better at many sports.
- They end up not training as hard and eventually fall back.

Late Maturers

- Are usually smaller.
- Do not have “amazing” performances.
- Since they are late maturers they will end up with longer “sensitivity windows”, where learning is maximized.

How can we keep “late maturers in the sport?


US
SKI TEAM
SkillsQuest

Designed to:

- ✓ Promote skills
- ✓ Teach skills
- ✓ Measure skills
- ✓ Track skills
- ✓ Reward for skills attained.

SkillsQuest is broken down into “Phases”

Skill	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Pressure	Pole jumpers	Pole jumpers in tuck	Straight run in wave track	Linked turns in wave track	Camel jump in wave track
Edging	Outside ski turns	One ski skiing	One ski skiing with lane changes	One ski skiing without poles	One ski skiing hourglass
Rotary	Straight run to side slip with edge set	Pivot slips	Sideslip to straight run to sideslip	Hop turns	Vertical brush quickness course
Balance	Freeski with pole usage	Freeski – lane changes	Freeski – hourglass	Freeski – varied terrain and snow conditions	Freeski – moguls in “V” shaped corridor

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on Stage	Pre & Post Puberty			World Class Performance Full Maturation
PHASE 2	**PHASE 3**	**PHASE 4**	**PHASE 5**	**PHASE 6**
Biological Age Pre Puberty **Age** 6–10 years old **Training Age** 1–4 years in sport **Participation** Ski 2–3 days a week 50 days a year At least 90% free skiing Fun races Play many other sports	**Biological Age** Pre Puberty (Before Growth Spurt) **Age** Girls: 10–13: J4 (J5–J3) Boys: 11–14: J4 (J4–J3) **Training Age** 4–8 years in sport **Participation** Ski 3–4 days a week 70 days/year At least 60% free skiing Competition Period: (Jan.–April) Number of race starts: 10–15 Ratio 1:6 (race:training) Play complementary sports	**Biological Age** Puberty (Growth Spurt) **Age** Girls: 11–14: J3 (J4–J3) Boys: 12–15: J3 (J4–J2) **Training Age** 5–9 years in sport **Participation** Ski 4–5 days a week 100 days/year At least 30-50% free-skiing Competition Period: (Dec.–April) Number of race starts: 15–30 Ratio 1:5 (race:training) Play complementary sports	**Biological Age** Post Puberty (After Growth Spurt) **Age** Girls: 12–16: J3 (J4–J2) Boys: 14–17: J2 (J3–J1) **Training Age** 6–11 years in sport **Participation** Ski 4–5 days a week 120-140 days/year At least 15% free skiing Competition Period: (Nov.–April) Number of race starts: 25–max 45 Ratio 1:4 (race:training) Play complementary sport	**Biological Age** Full Maturation **Age** Female: 16+ J2–J1 Male: 17+ J1 **Training Age** Minimum 10+ years in sport **Participation** Ski 4–5 days a week 130–150* days/year At least 10% free-skiing Competition Period: (Nov.–April) Number of race starts: 55* Ratio 1:3 (race:training) *based on the number of disciplines

Each Phase has four tests

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Edging	Outside ski turns	One ski skiing	One ski skiing with lane changes	One ski skiing without poles	One ski skiing hourglass
Rotary	Straight run to side slip with edge set	Pivot slips	Sideslip to straight run to sideslip	Hop turns	Vertical brush quickness course
Balance	Freeski with pole usage	Freeski – lane changes	Freeski – hourglass	Freeski – varied terrain and snow conditions	Freeski – moguls in "V" shaped corridor


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Relative Age Effect

January

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

March

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

July

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

September

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

October

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

November

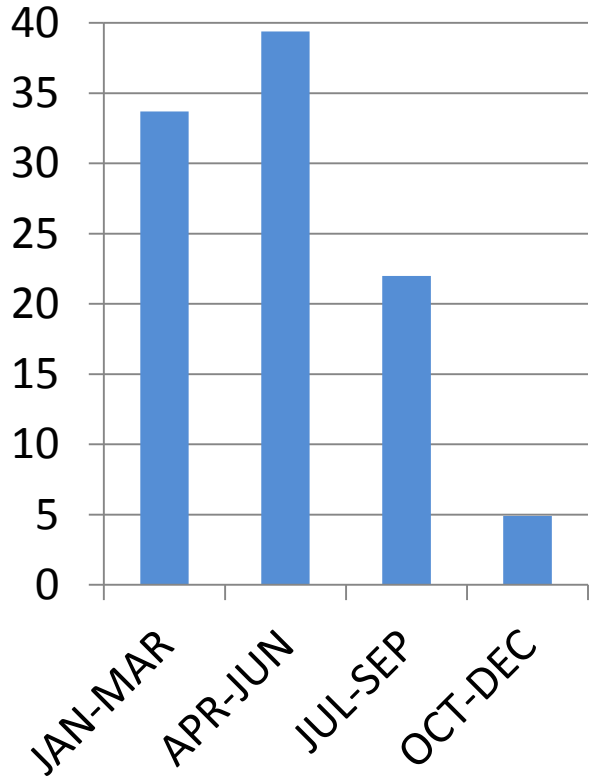
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

December

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

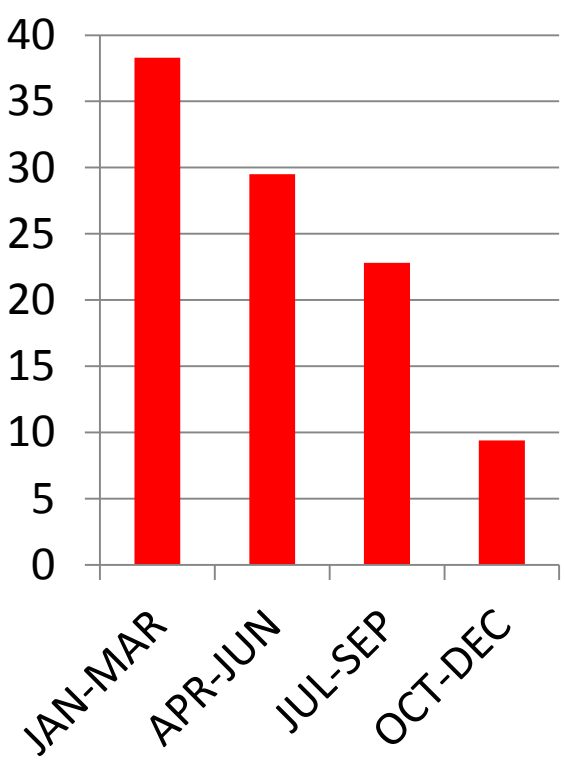
Analysis of Birth Month Relationship to Results At Different Levels in Alpine Skiing

J4 JO medalists



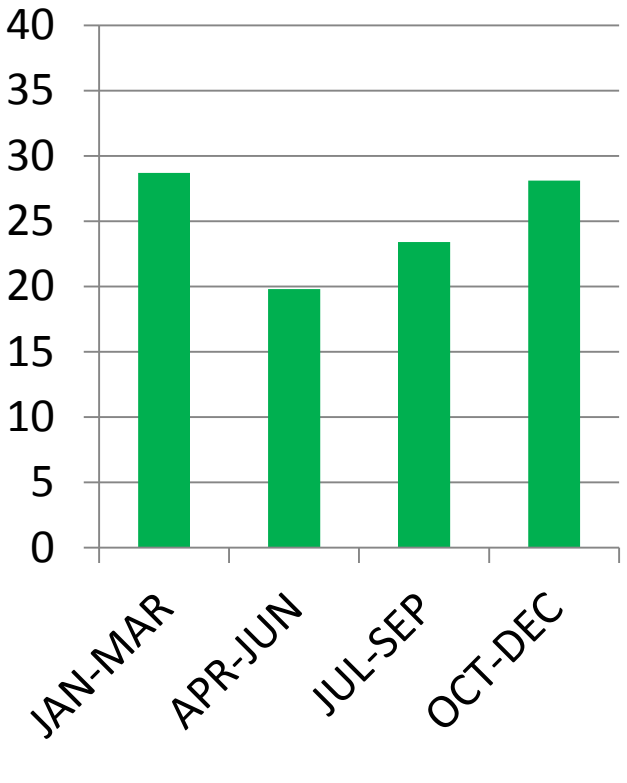
BORN 1ST HALF OF YEAR: 73%

J3 JO medalists



BORN 1ST HALF OF YEAR: 68%

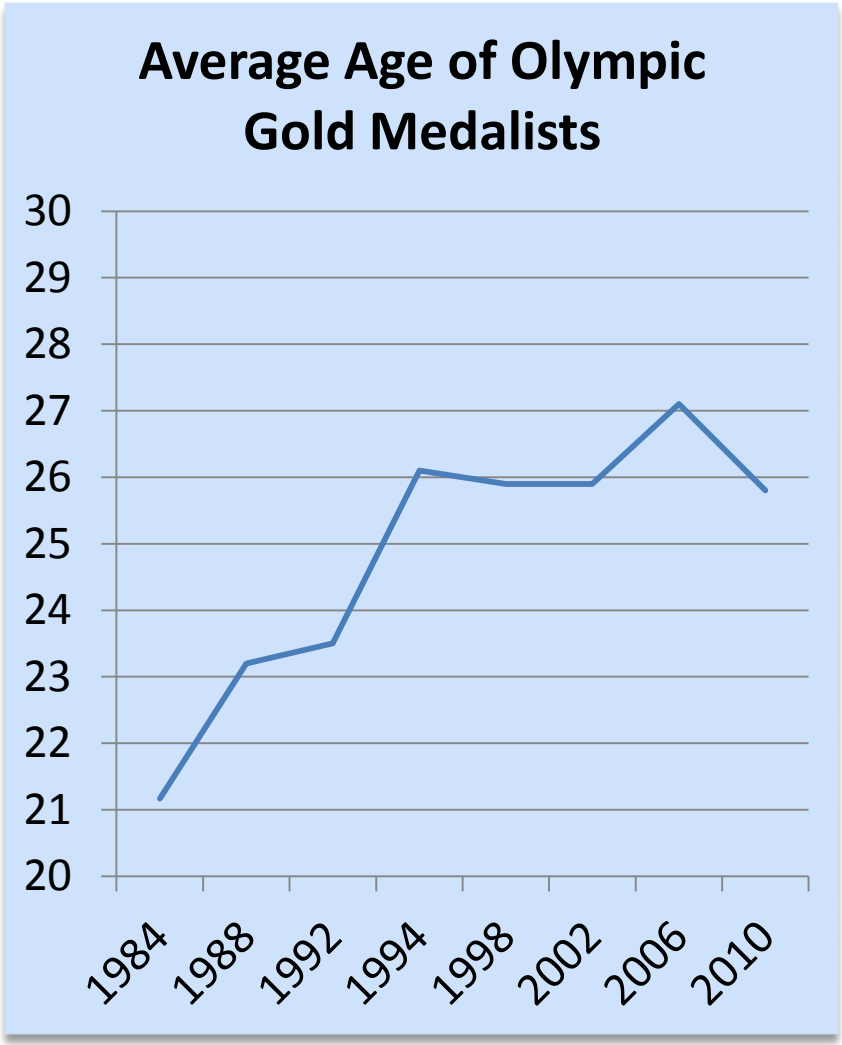
World Cup Top 30

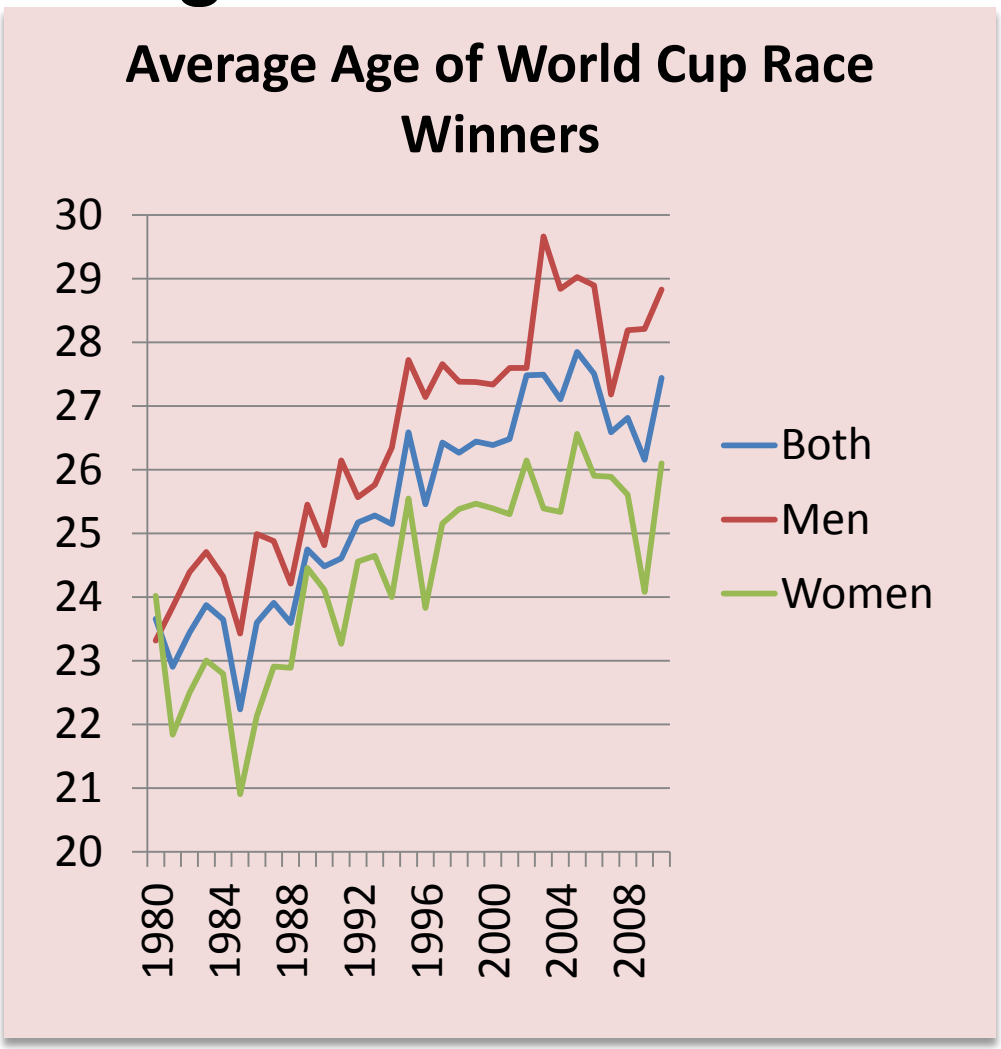


BORN 1ST HALF OF YEAR: 48%

2010 ALPINE OLYMPIC GOLD MEDALISTS BORN 1ST HALF OF YEAR: 0%

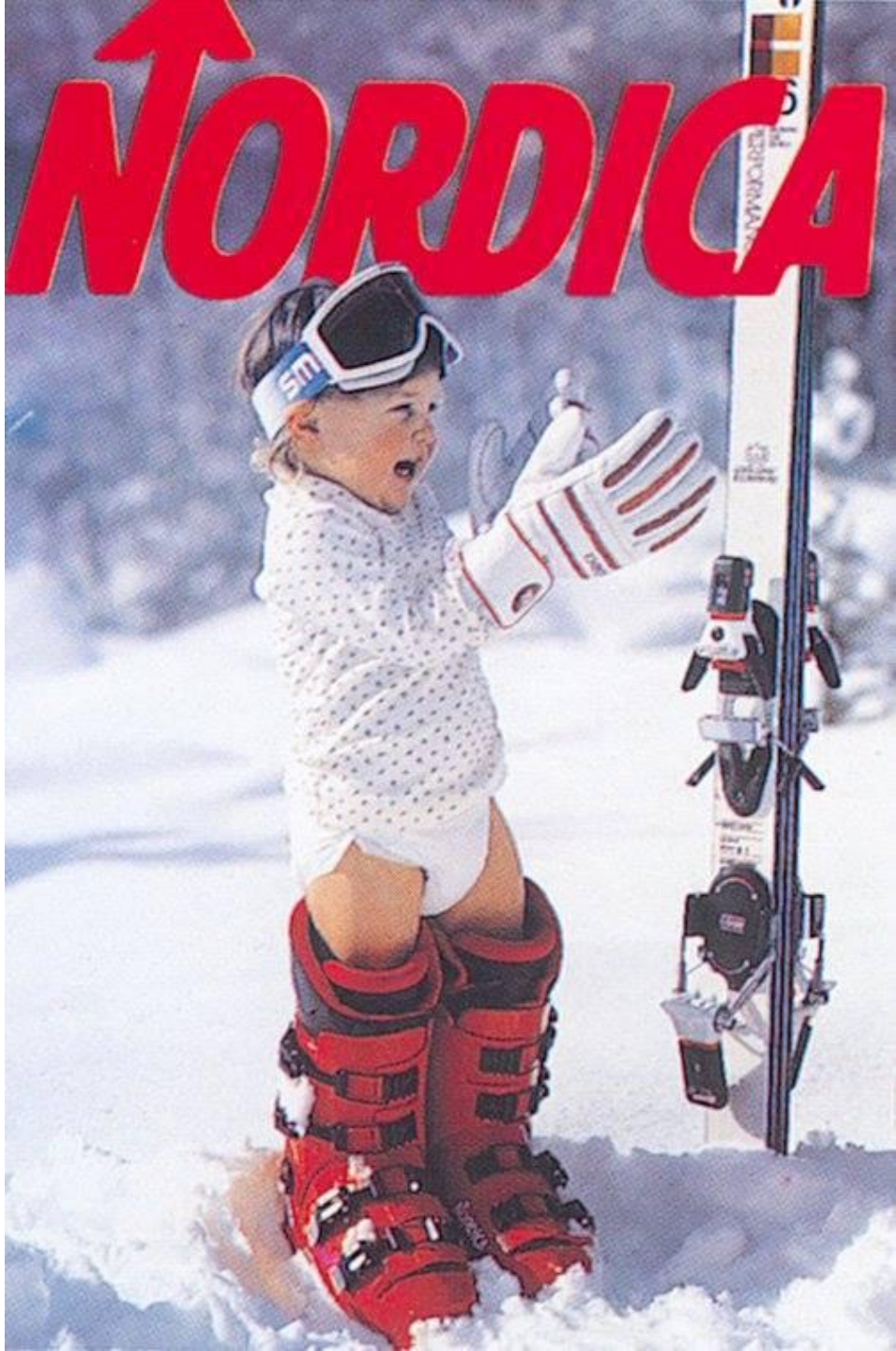
Ages For Elite Performance In Alpine Ski Racing





U.S. Ski Team Tenents of LTAD

Children are not simply miniature adults. They need a program that is geared to their developmental needs that will prepare them for the demands of their sport when they are an adult.

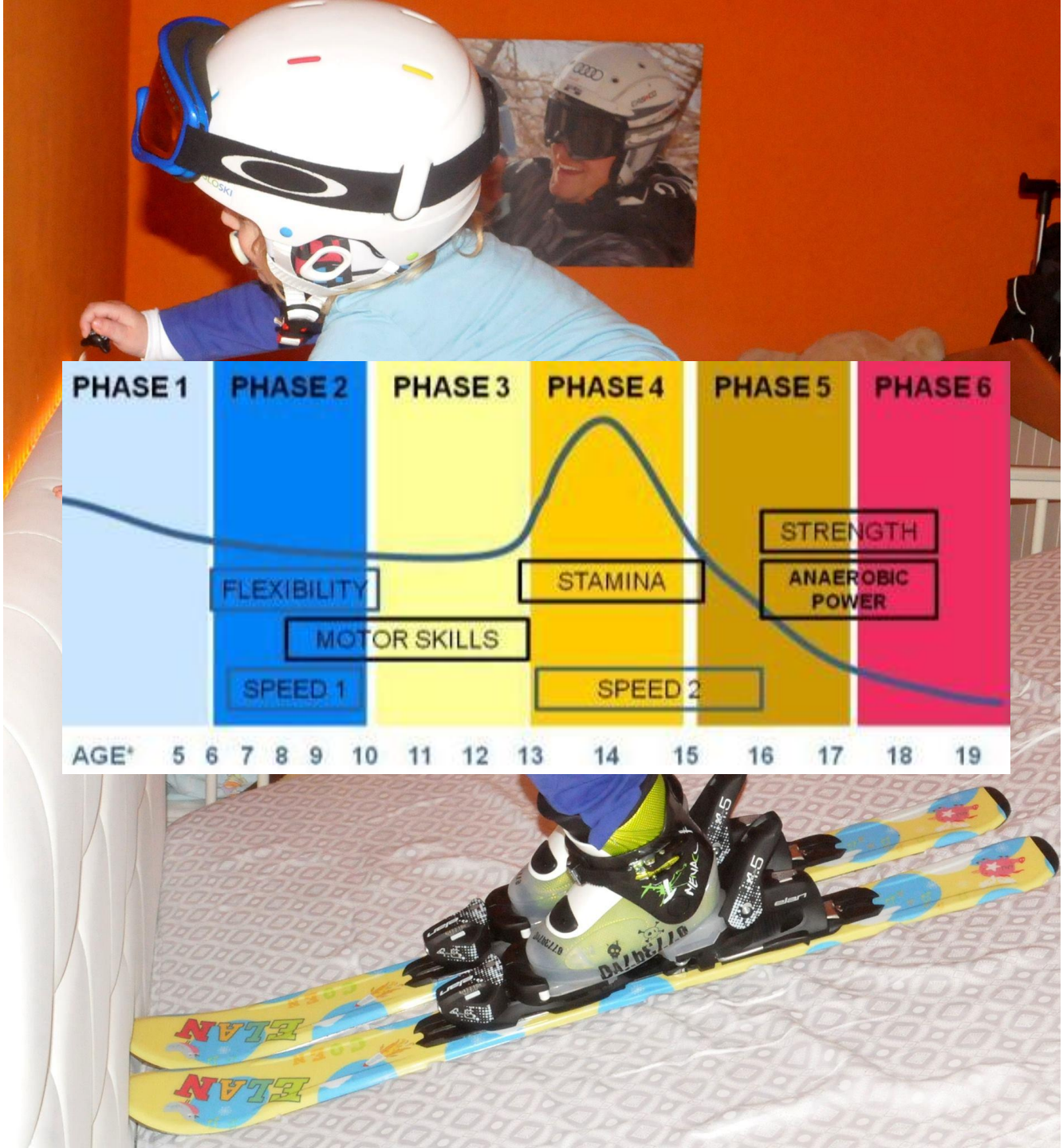


Training and competition plans should be designed based on individual needs. Age alone does not give the full picture.

Children develop and mature at different rates. Age alone does not give the full picture.

We should consider the child's physiological, cognitive, and emotional development when planning their training.

There are certain periods in a child's development where they can make maximal gains in certain areas, so different aspects of training will take priority during different phases.



Competition at each age level should reward their efforts in training as much as possible. Since their training focus will vary through the phases, the competition format should look different from that of a fully mature athlete.

A long-term approach to success may run counter to a short-term approach focused on results.

The athletes have to enjoy what they're doing to commit to it at higher levels and to pursue it as a life-long sport.

other versions…

Long Term Development

- LTAthleteD
- LTCoachD
- LTParticipantsD
- LTMentorsD
- LT ResourcesD

In summary:

- LTAD
- Training volume is important
- Training density is paramount
- “Sensitivity windows” should be recognized
- Specific training should not be limited to the “sensitivity windows”


NORDICA


2014 ALPINE U16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TRENTINO
COLMAR
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