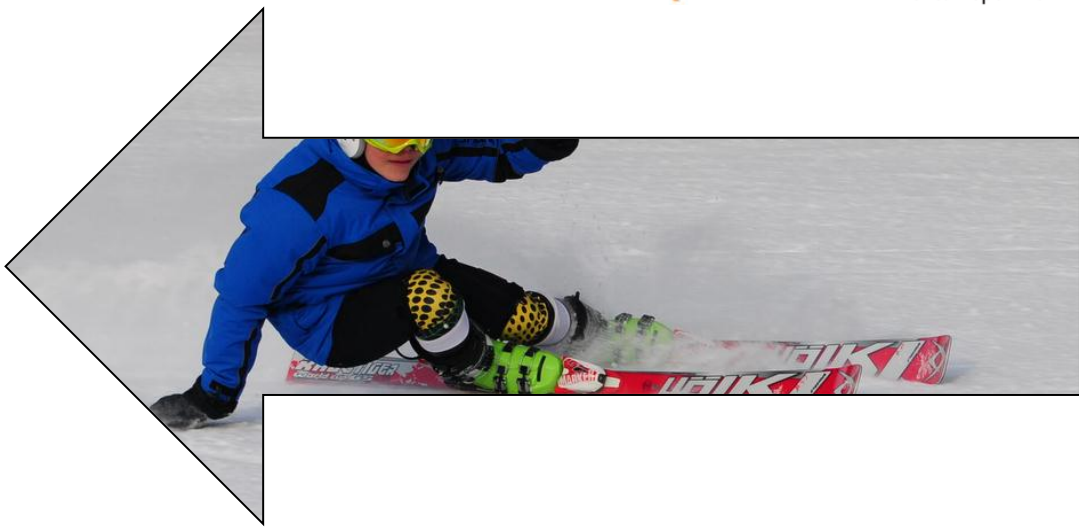
# ENERGY SYSTEMS



## Term 4 program

- Energy systems should be trained as often as possible
- Energy systems can be trained as part of an activity (soccer, agility, footie etc.) or on its own (a long slow distance jog)

**3x per week minimum for best results**

All images provided by visualcoaching®

# Energy Systems

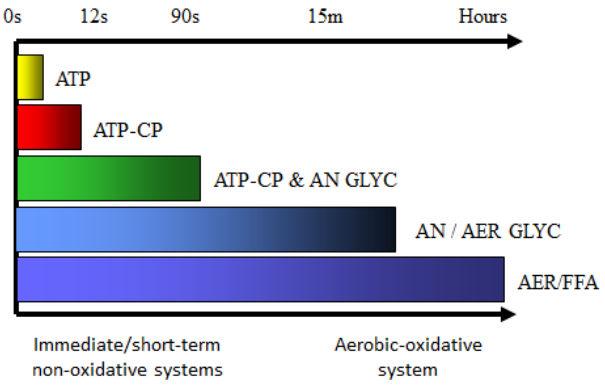
1. Warm up – Full dynamic warm up
2. Recovery – Aerobic recovery - stretch + hot and cold shower – 20 seconds hot followed by 10 seconds cold x3 (time for shower permitting – please be mindful of water usage)
3. Frequency – 3x times per week
4. Training Focus – Stamina – aerobic the priority

**Be creative** – emphasize the following:

- Wear good runners with plenty of tread and always perform these activities on a grippy surface
- See the last page of this document for key points on running technique
- Check out the coming pages for ideas to develop stamina . Activities should be fun & challenging and shouldn't involve monotonous boring activities – you have to want to get out there – it has to be fun!

## Ways to develop stamina:

- Cycling - mountain biking
- Running
- Beach sand running
- Team sports – footie, soccer, netball, basketball
- Individual sports – swimming, squash, x country running



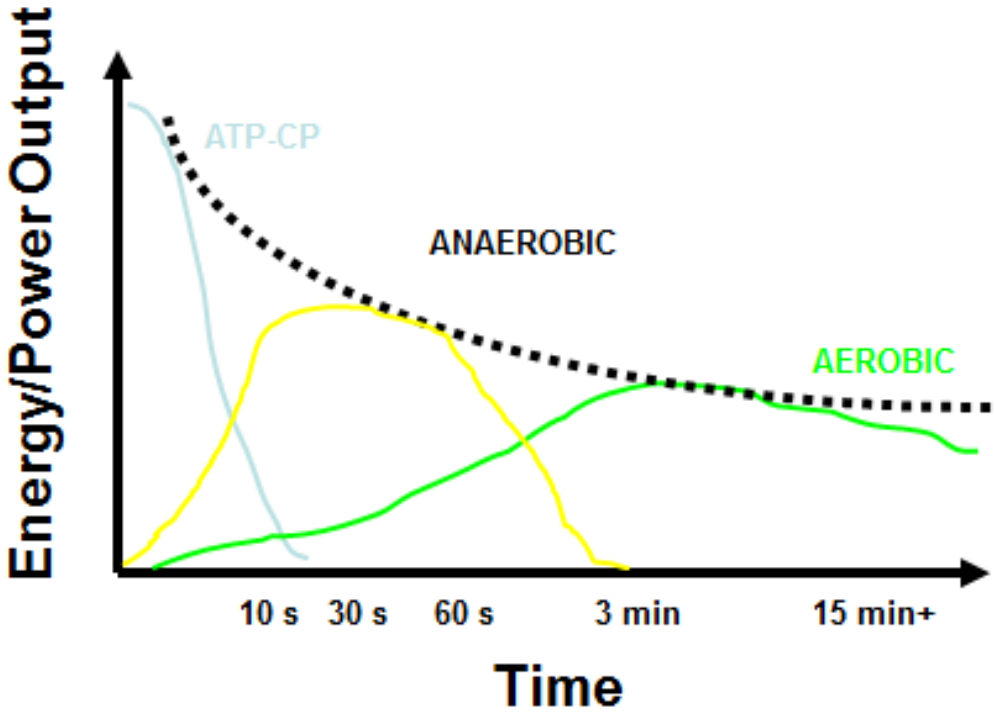
# Energy Systems

## Work & rest periods

| | **C1** – 2000 / 1999 born | **C2** – 1998 – 1997 born |
|---|---|---|
| • Work for … | 12+ minutes | 20+ minutes |
| • Between sets, rest for … | no sets – rest as necessary → | |
| • Total work in minutes (not incl. rest) | 12+ minutes | 20+ minutes |

## Phase Comments:

Weeks 3-4: Add 3 minutes
Weeks 5-7: Add 5 minutes
Weeks 8-9: Add 2 minutes



# Energy Systems 1-2-3

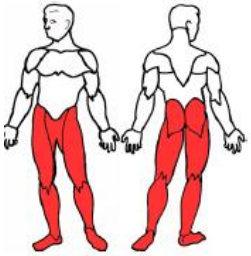
## Energy Systems 1-2-3

- **ES 1 – Base / Recovery**
  - steady state (SS) at 55-65% max.  - 15 minutes run / 20 minutes ride – spin
- **ES 2 - Development**
  - 5 minute SS at 55-65% max.
  - 6-10 minutes – max. sprint for 10 seconds 1x minute
  - 11-15 minutes – max. sprint for 15 seconds 1x minute
  - 16 – 25 minutes – SS at 55-65% max.
- **ES 3 – Threshold**
  - 5 minute SS at 55-65%
  - 15 seconds at 70% - 45 seconds easy jog – 4x times
  - 20 seconds at 85% - 45 seconds easy jog – 6x times
  - 30 seconds at 100% - 60 seconds easy jog – 4x times
  - 10 minute SS at 55-65%

**Staples** – include these as practical

- Sprints – 20, 40, 60, 100 & 200m's
- Cooper run to test your progress
- Run – burpee – run

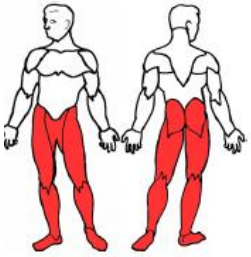
# Energy Systems – ideas



## Running

Run forward at a 10km pace for the prescribed time or distance while maintaining correct running technique. Maintain an upright posture with the chest up & swing the arms straight through. The lower limb mechanics such as the height of the knee lift & the foot strike may vary depending on the purpose of

**Cautions -** Warm up adequately prior to increasing the speed of the run.

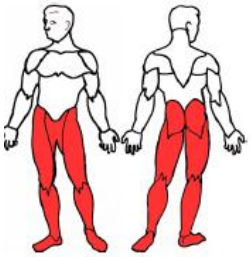


## Run throughs

Run forward at a reasonably pace for the prescribed time or distance while maintaining correct running technique. Maintain an upright posture with the chest up & swing the arms straight through. The lower limb mechanics such as the height of the knee lift & the foot strike may vary depending on the purpose of

**Cautions -** Warm up adequately prior to increasing the speed of the run.

# Energy Systems – ideas

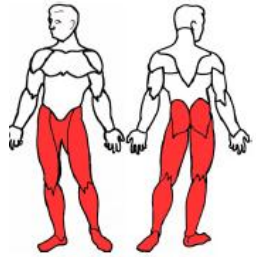


## Accelerating & decelerating

From a standing position, lean forward & accelerate to a fast run maintaining correct running technique. Hold the top speed for the prescribed time or distance then decelerate & completely stop. Maintain an upright posture with the chest up & swing the arms straight through. The lower limb mechanics such as the height of the knee lift & the foot strike may vary depending on the purpose of

**Cautions -** Warm up adequately prior to increasing the speed of the run.

Ensure that the ground has adequate grip do decelerate safely.

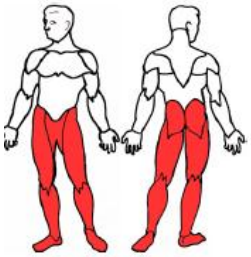


## Accelerating – decelerating over short distance

The distance of the forward sprint should be greater than the distance of the backwards sprint. Maintain a slight forward lean at the hips during the backwards running. The body position during the sprint may vary depending on the distance covered. Concentrate on increasing stride frequency rather than stride length during the acceleration. Keep the shoulders facing forward throughout the exercise & continue swinging the arms.

**Cautions -** Warm up prior to commencing this exercise. Ensure that the ground has adequate grip.

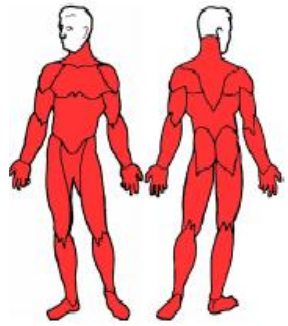
# Energy Systems – ideas



## Backwards running with acceleration

Run backwards then turn & lift the knee high over the hurdle & simultaneously dorsi flex the foot. Continue to accelerate forward & focus on fast leg movements rather than long stride lengths. The distance of backwards running can vary depending on the requirements of the exercise. Consider incorporating more hurdles to further emphasize the knee lift during the early stages of acceleration.

**Cautions -** Warm up adequately before commencing this exercise. Ensure that the ground has adequate grip to accelerate.



## Running with burpees

Sprint forward then perform burpees for the prescribed repetitions then sprint forward again. Repeat this pattern continuously for the prescribed time or distance. Establish correct sprinting mechanics as soon as possible after the burpees.

**Cautions -** Warm up adequately prior to increasing the speed of the run. Ensure that the ground has adequate grip do accelerate & decelerate rapidly.

# Overview – **Energy Systems**

Check out the information below for a basic overview of the energy systems.

**Aerobic:**

- low power
- very high capacity (can last for hours)
- approximately 180 seconds (3 minutes) to peak power
- peak power will last for approximately 3 to 5 minutes

This involves training at below maximum effort; <70% of HRMx. Running, swimming and cycling are common methods of aerobic training. An aerobic session should be longer than 15 minutes in duration. A strong aerobic base is essential for your ability to:

- Adapt to new training stimulus
- Handle big training loads days in day out – on and off snow
- Provide foundation for anearobic development
- Recovery adequately from day to day – particularly important during on snow camp

**Anaerobic:**

- high power
- limited capacity
- approx 8 seconds to peak power
- peak power lasts for approximately 40 to 70 seconds
- power capacity of approximately 90 to 120 seconds

This involves high intensity bouts of training over short periods at >75% of HRMx…max heart rate. Sprints, box jumps, interval bike hill sprints are examples of anaerobic training. Developing teens have little capacity to effectively train this system; the big gains will come post puberty. The ability to effectively deal with the bi products of focused anaerobic training is limited in most teens.

# Overview – Energy Systems

**ATP – CP:** ***(****adenosine triphosphate; phospho creatine)*

- very high power
- very low capacity
- very quick to reach peak power
- peak power and capacity; approximately 8 to12 seconds

Explosive power over short periods; explosive starts; 40m sprint, quick lateral, a tackle in football are good examples of the use of this system.

Proper maintenance of the energy systems is vital through the ski season to ensure rapid and consistent recovery in addition to increased on snow volume and training quality (aerobic fitness will lead to an ability to work harder for longer and recover better).

Ski racing requires the use of all of the energy systems, listed below is an approximate breakdown of how your body supplies the energy for the various disciplines:

| | Time | ATP; CP | Aneorobic lactic | Aerobic |
|---|---|---|---|---|
| Slalom | 45-60 | 25 to 30% | 50% | 20-25% |
| GS | 70-90 | 20 to 25% | 50% | 25-30% |
| SG | 80-120 | 10 to 15 | 45% | 40-45% |
| DH | 90-150 | 5 to 10% | 45% | 45-50% |

** The above #'s are approximate; statistics from the Canadian Sports Centre, Calgary*

# Running technique

## Key points

- **Head** - The head should be erect, with eyes focused forward to a point on the ground about 20 to 30 metres away
- **Shoulders** - The shoulders should be square and level. Do not round your shoulders or swing them forwards or backwards – maintain neutral spine (core engagement!!)
- **Arms** - Arms should be swinging freely but in a general forwards/backwards motion (in a tight figure of eight), not a circle or a straight line. Elbows should be bent approximately 90 degrees with forearms remaining roughly parallel to the ground
- **Hands** - Hands are held in a relaxed fist with the thumb resting on the forefinger
- **Torso** - The torso should be erect, with chest up and plenty of room for the diaphragm to move for proper breathing actions. Do not lean forwards, backwards or slouch, as all of these posture deviations can place a lot of stress on the lower back, interfering with proper running mechanics and possibly causing lower back injury
- **Hips** - The hips should be square and level with no sideways movement
- **Legs** - The leg action should be relaxed, with pendular movements and moderate knee lift
- **Feet** - The feet should be pointed straight ahead and land directly under the hips