“Are we at the mercy of a misguided management of the ecosphere, or can we take control for ourselves and re-discover its innate abundance? Feed ourselves? Reduce our energy demands drastically? Build for a low-carbon future? And find a common cause and positive goals that cross boundaries at home, in our communities, and in the global community? Whilst leaving the world a better and more beautiful place which we have come to understand profoundly…

What’s needed is a framework that will guide us- not giving us the answers, so much as giving us the questions which we can ask to lead us to the answers we need, tailored for our individual and group circumstances.

Permaculture is a design science. Not a cult, religion or political view. It’s about profoundly understanding the power of nature which governs all human activity, and developing a series of practical steps that deliver the world we want and need. So abundant you have left-overs to share. It's not about self-sufficiency, hard work or hair shirts. It's about doing what you can for yourself, working less but cleverer, reducing carbon footprint, and being wildly creative. When you comprehend all that it becomes a way of living.

Let’s replace fear with fun and enjoy connecting into the fabulously rich world we have inherited whilst enriching our lives and the lives of those around us.

Are you a teacher? You will discover we are all teachers.
Are you a builder? You will discover we are all builders.
Are you a gardener? You will discover we are all gardeners.
Maybe you know these things already.
Are you creative? Sharing that creativity will be at the heart of this joyous, moving and practical experience. Come armed with all your worldly wisdom, your skills and knowledge, your enthusiasms ready to share, your artistic and musical talent, your vision and your hope.

As much as anything this course is about opening your heart to things you knew already, but didn’t know you knew. It’s not about me having the answers. It’s about discovering that you do. That you care, and having a plan for how to care as effectively as possible.”

Graham Bell
October 2010
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Garden Cottage, The Lees Stables, Kelso Road, Coldstream, Berwickshire, Scotland TD12 4LF
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- Pruning
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- Harvesting Energy
- Preparing & Preserving Food
- Minimising Waste, Reusing, Recycling

Additional material:
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Legacy
Working with young people
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CORE CURRICULUM & BEYOND

The table in Appendix 1 and on my website shows the core curriculum of this course divided into six modules, as agreed by the members of The Guild of Permaculture Lead Teachers in Scotland in December 2012. The Guild currently comprises the four Permaculture Diploma holders who are teaching the full Permaculture Design Course in Scotland: Ed Tyler, Graham Bell, James Chapman, and Lusi Alderslowe. The Guild is a voluntary grouping: membership is open to diploma holders who also teach the full PDC in Scotland. We have additionally agreed to offer a common charging rate based on ability to pay, and to further enable maximum participation by teaching the same core content in each of six units, so that participants can take units from more than one teacher if need be. We have agreed that Module 1 can be replaced by an Introduction the Permaculture Course if need be, or taken on its own for that purpose. We have also agreed to make available space for apprentice teachers to assist on our courses, and to encourage emerging teachers to reach Diploma standard and join the group in future.

Actually what we teach here is something different from most things that are called education. It’s partly education (learning information and process) and partly training (learning how to do things). And how we do it is different from how most schools, colleges, and universities are run. And what you end up with is different- it’s like paint by numbers… we give you 72 hours of instruction and you get something like a Master’s Degree- but only the framework. You have the rest of your life to colour in the outline. And everyone who has done this course- and there are probably now hundreds of thousands of us – is still doing that- or they’re being composted.

And how we do it is different. It's based on a theory and practice called Participative Training. This suggests a dozen indicators of health:

1. Together a class full of folks always knows more than the teacher
2. You did not arrive here ignorant – you have your whole life’s experience
3. We are not trying to impart facts, we are sharing insight and understanding
4. We are all constantly learning
5. Change is inevitable so we have to move with the times
6. Everyone who comes to this process adds something
7. Observation is crucial to what this is all about
8. Trust your own thinking
9. If you can see something needs doing give yourself permission to do it
10. This course is about empowerment, but we can only deliver that for ourselves
11. Your voice is powerful, speak your own truth
12. In the final analysis the leader is in charge
WAYS OF LEARNING

Think about the answers to these questions:

When has learning worked for you?

And when hasn’t it?

What sources of learning can you think of?

Take ten minutes with someone else to find six aspects of what you think permaculture is.

“He who asks is a fool for five minutes, but he who does not ask remains a fool forever.”

Chinese Proverb
Was your experience like this?

What is your preferred learning style?
How this course is structured
Mindmaps

Mindmaps mimic how the human brain works. They chart process in the same way our neural pathways work. Here’s an example:

We use this non-linear method a lot because it helps us see how things are connected. In the natural world and in permaculture design, understanding and creating connections between useful things is how we create a productive environment for minimal effort.

They were invented by Tony Buzan. To learn more see:

http://www.tonybuzan.com/
WHAT IS PERMACULTURE?

Some Permaculture Definitions

Permaculture is an ethical method for designing systems to meet human needs which are accessible to all.

Permaculture is a patterned approach to problem solving which is transportable between cultures, locations and times.

Users of Permaculture strive to learn from and emulate the example of natural systems.

Permaculture designs centre on connecting energy flows to maximise the harvesting of useful processes. All the material products we need also derive from such processes.

Good Permaculture designs eliminate waste by reconnecting unused products back into the system through careful planning, so they are assets rather than liabilities.

Permaculture practitioners seek to maximise productivity while minimising input needs (work, money, people time, energy).

Good design is achieved through appropriate placement and choice of elements in the system.

Successful designs start small and start locally (‘own doorstep outwards’).

Permaculture designs are evolutionary rather than revolutionary, favouring starting with what we have and progressing through to desired solutions.

Revolution disguised as organic gardening.

Permaculture is just common sense. It just isn’t common enough.

Permaculture is a direction, not a destination.

Permaculture is aikido for communities.

Add your own:
Permaculture Principles

1. Work with nature not against
2. Everything gardens
3. Yield is unlimited
4. Minimum effort maximum return
5. Taking personal responsibility

We set out to:

Minimise pollution (Liabilities into Assets) & reduce work
Learn by:
• Observation (nature knows best)
• Experiment (trial and error)
• Listening to others (storytelling)
• Written, pictorial and digital sources (the global library)

Respect all living things
Share surplus
Consciously design sustainable environments
Leave the world more abundant and rewarding than we found it

We harvest the five dimensions of:
‘Over under sideways down’, i.e. the three dimensions of physical space
Plus the additional dimensions of:

Time
Relationships
“It isn’t how many species you have in a diverse system its how many useful relationships there are.”

Least change for maximum effect – thinking precedes working to minimise work and pollution.

The value of edge- the more edge we create the greater energy exchanges are possible, the more diversity of species is possible and the more yield we create.

Everything gardens- all the activities of gardening, (e.g. watering, digging, sowing, harvesting, pruning) are performed in nature by natural forces and creatures (the weather, invertebrates, birds and animals).

Principles of succession In nature regeneration doesn’t happen overnight but through the building of ecological communities over time. We can learn this through observation and enable it to happen in our own communities.

Value of feedback No-one gets it right first time all the time. By listening to (observing) the consequences of our choices for action/inaction we can amend our solutions in the light of experience for greater health and productivity.
To Summarise:

What is Permaculture?
- Ethical Principles
- Work With Nature
- The Problem Is The Solution
- Liabilities Into Assets
- Five Dimensions
- Reducing Work & Pollution
- Understanding Energy
- Favour Diversity
- Least Change for Maximum Effect
- Maximising Edge
- Yield Is Unlimited
- Everything Gardens
- Principles of Succession
- Patterns
- Start Small Start Local
- Value of Feedback
David Holmgren’s 12 principles

Permaculture Design Principles

1. Observe and Interact
   Beauty is in the eye of the beholder

2. Catch and Store Energy
   Make hay while the sun shines

3. Obtain a Yield
   You can’t work on an empty stomach

4. Apply Self-regulation and Accept Feedback
   The sins of the fathers are visited on the children unto the seventh generation

5. Use and Value Renewable Resources and Services
   Let nature take its course

6. Produce No Waste
   A stitch in time saves nine
   Waste not, want not

7. Design from Patterns to Details
   Can’t see the wood for the trees

8. Integrate Rather than Segregate
   Many hands make light work

9. Use Small and Slow Solutions
   The bigger they are, the harder they fall
   Slow and steady wins the race

10. Use and Value Diversity
    Don’t put all your eggs in one basket

11. Use Edges and Value the Marginal
    Don’t think you are on the right track just because it is a well-beaten path

12. Creatively Use and Respond to Change
    Vision is not seeing things as they are but as they will be
An Expansion of David Holmgren’s 12 Design Principles

Permaculture Principles

1. Produce or trade in a balanced way.
2. Observe & interact.
3. Use & care for renewable resources & service systems.
4.仿生学 & 循环利用.
5. Choke & share energy, learning with and from others.
6. Keep what you have built.
7. Know replacements: no replacements are exactly the same, products of lack of 3-dimensional movement.
8. Use the right tools.
9. Use all available renewables & avoid waste.
10. Design from patterns to details.
11. Learn from nature, both in natural ecosystems and cultural landscapes.
12. Make the whole work together in a balanced way.

As humans as with all living things we need too grow. Movement feeds us & we are drawn to too experience pleasure and pain we can observe ourselves. Asking ourselves, ‘are we moving feet or doing feet stuck?’ Start with your feet.

By using ground motion your body’s 3-dimensional movement is an effective, efficient way of transferring and saving precious energy.

The more you increase your physical movement the more your fascia moves, and with that you nourish your body. This includes internal health eg heart, lungs etc. along with mental health.

Video yourself! Listen & observe your body. Ask how do I feel?

When we learn to understand our bodies’ postures and movements with ease and choose our own special patterns, we will stop repeating down our bodies and act in place with unnecessary strain and discomfort. Of course, this only happens if we move in a multidimensional way.

Don’t assume that what you are told or need will give you the best results. Play around with your own body and create your own multidimensional way.

Grandma, teacher, yoga.

Look at nature, with dependences and interrelations.

So this - motion, feet, ears, skin, etc the whole body wants to work as a single system.

Fascia: long skin. Of absorbing movements, it takes time to get a sustained improvement, so work patience and time.
WHY DO WE NEED PERMACULTURE?

On your own, compare the following pairs of statements and decide which is nearest to your own view.

1 a) Demands on the planetary ecosystem are outstripping supply.
1 b) There is enough for all if shared fairly.

2 a) Many factors restrict our actions.
2 b) Terms and attitudes which convey those restrictions (‘predator’, ‘problem’ etc) convey a particular viewpoint which can be changed.

3 a) Modern agriculture can cope with increased demand.
3 b) World population is rising, whilst the area of good quality agricultural land is shrinking.

4 a) Competition is a fact of nature.
4 b) Co-operation is much better than competition.

5 a) Science can overcome problems that seemed insurmountable a few years ago.
5 b) Don’t put too much faith in Scientists.

6 a) I have little control over the world at large.
6 b) The media love to exaggerate world problems.

What else does this question spark off for you? Write it down. How does that make you feel?
The Ability to Design Using Permaculture Starts With Observation

When I was growing up one of the best learning experiences was to be a Boy Scout. Baden-Powell who started the scouting movement has been very misunderstood in more recent times. Because he came from a military background and he started his movement shortly before the Hitler Youth happened, people mis-associated his work with very right wing politics. Actually he had a lot of good things to offer young people. See here [http://www.scout.org/bp](http://www.scout.org/bp)


Developing the ability to notice what is happening about you is fundamental to knowing what you can do with it. And that is the essence of permaculture design.

Throughout this course you are invited to take observational walks, to develop your ability to notice.

And there are lots of ways you can do this outwith the course.

Try:

What native trees can we see?

What are these fungi?

Hmm. What are these unused assets all around us?

How can we stack more productive things into existing systems?

Where can we save energy loss and where can we harness energy?

How could we get people working together more effectively?

If I focussed on the natural world what would it teach me?

Add your own:
DESIGN METHODS 1

SADIMET

Survey
Tweak
Assess
Design
Evaluate
Maintain
Implement

Survey → Tweak → Assess → Design → Evaluate → Maintain → Implement → Survey
BREDIM

Boundaries

Design

Implement

Research

Evaluate

Maintain
**DESIGN METHODS 2**

If you haven’t had enough acronyms here are a few more:

**CEAP**

Collect site information
Evaluate the information
Apply permaculture principles
Plan a schedule of implementation, maintenance, evaluation and tweaking

CEAP is (as you’ve probably guessed) a permaculture “invention”. Again, it’s just a different way of saying the same thing. Collect site information is the same as Survey. Evaluate...see above. Maybe ‘Apply permaculture principles’ is more precise than ‘Design’.

You can design however you want. Using permaculture principles is one option. So if you buy into the concept ‘Apply permaculture principles’ is better.

Plan a schedule of implementation, maintenance, evaluation and tweaking is obviously just grouping the remaining four steps into one.

**SWOC analysis**

Strengths
Weaknesses
Opportunities
Constraints (or Challenges)

SWOC analysis is actually pretty closely related to SWOT analysis, most commonly used in business. In fact, the first three letters are the same, while the last is Constraints instead of Threats. I guess it sounds less dangerous 😊. SWOC analysis is what you can use in the ‘Assess’ part of SADIMET process.

**PASTE sheet**

Plants
Animals
Structures
Tools
Events

PASTE sheet helps you give an overview of the ‘Design’ part of SADIMET process.

The main thing is to be consciously aware of how you are creating or changing a system and how you will monitor and amend your plan in the light of experience....Thanks to Ziga

http://www.permablogger.net/about/ for input on this Remember no plan survives past the start....

For a very comprehensive show on design methodologies see James Piers Taylor’s presentation at:

http://www.slideshare.net/yourmindfire/frameworks-for-design-past-present-futures
OBSERVATION 1.

Observation lies at the heart of the practice of permaculture design.

Think of the origins of science in the early days of the Enlightenment. People called themselves ‘Natural Philosophers’. They observed the world of nature and tried to learn from it. In permaculture, nature is our model. What do you see around you and what does it tell you about how the world works. Try different things based on your observation and learn from the results. What works in one place may not work in another. What works this year may not work in another when the weather is different. What works for me may not work for you.

Trust your own judgement. Be prepared to learn from feedback.

It’s useful to keep in the forefront of your mind the word ‘notice’. What did you notice today about.… Well anything that matters to you really.

Today I noticed:

1.
2.
3.

What can I do to become more observant?

1.
2.
3.

Further thoughts:
Observation 2.

Observation is the starting point of what we are going to achieve. If Permaculture is a Design Science then we are learning to become natural scientists in the model of those who originated modern science. They looked, they recorded, they made deductions and then on the basis of these they experimented. *Trial and error*. If things didn’t work out they rethought and tried something different.

The only laboratory we really need to do this in Permaculture mode is the living planet.

So Number 1. Observation. How do we observe? By using all our senses.

What do we observe? The things we see, but also the processes that are going on, and the relationships between different elements in what we see. Another acronym that’s used by some in Permaculture circles is PMI- plus minus or interesting. Giving a value judgement to what you see.

**Recommendation.** On first observation don’t make any judgements, just treat it all as interesting. You don’t know the whole story yet, so don’t bias your design decisions by being too opinionated.

You are looking to see what there is. What can you learn from this. Later you will consider what possibilities does this situation offer. They’ll come jumping into your mind now. Just jot them down and consider them later. Open the channels and let the situation talk to you. If you do this you can hear connections and realities that others can’t. Get too busy analysing and you’ll miss all this.
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© Scottish Permaculture 1990
Tale of two...

It's really interesting to contrast how two different systems work.

This started in permaculture with the tale of two chickens. The factory bred versus how could you really integrate a chicken into an organic energy harvesting system?

But try the tale of two apples (native grown apple versus growing a pineapple).

Where do you see such contrasts around you?

Travel?

Water Management?

Bread Making?

Heating Your Home?

Jot down your thoughts...
DESIGN ELEMENT TEMPLATE

Example: Buildings

**USE**  
shelter – warmth/shade – privacy/protection  
Storage  
Windbreak

**NEEDS** somewhere to be  
Materials  
Maintenance  
Know how  
Design & planning - appropriate  
Occupants  
Energy source  
Water & drainage  
Stability or portability

**BY PRODUCTS**  
Sun trap/shade  
Boundaries

**DESIGN INTEGRATION**  
Community & landscape

**PREDATORS**  
Acid rain, tree roots, rising damp, storms, fire, decay, lack of maintenance, vandals, accident, by-passes, earthquakes, volcanoes, disuse, flood, acts of god, planners, subsidence, low flying aircraft

**SPECIES LIST**  
Cottages, palaces, pig sties, apartment, flat, doocots, farms tents, tipis, stables, caves, follies, bird boxes
WHAT DO WE NEED TO LIVE?

We brainstormed a list. It included:

SHELTER - CLEAN WATER - FRESH AIR - ADEQUATE FOOD - CLOTHES

WARMTH – COMPANY – CLEANLINESS – FUN – ENTERTAINMENT – SOCIABILITY

COMMUNITY - NATURE CONNECTION – STIMULATION – CHALLENGE - RESPECT

WORK – SOLITUDE – ART – AESTHETICS - INTELLIGENCE

AFFECTION - FRIENDSHIP - LOVE – INTIMACY - REPRODUCTION - SEX

COMMUNICATION - USE OF INTELLECT – TOLERANCE – TRUST - COMPETITION?

HEALTH – EXERCISE – WELLBEING – TOUCH – SENSE OF PLACE

FEELING OF BELONGING – TRADE – EXCHANGE – COMMODITIES – CULTURE

KNOWLEDGE – EMOTIONS – SKILLS – RESOURCEFULNESS – TRANSPORT – SPIRITUALITY

MUSIC – DANCE – COFFEE – SUPPORT

Remember this was a brainstorm so we weren’t being critical about what came up. The list was recorded randomly as ideas arose.

Is this a fair list?

Is there a value in grouping these ideas?

Are there priorities (See Maslow’s Hierarchy of Needs)  
http://en.wikipedia.org/wiki/Maslow%27s_hierarchy_of_needs

Why should this be a starting point in designing?

Your thoughts:
Maslow’s Hierarchy of Needs
YOUR DREAM HOME

Dream Home Exercise

Home is where we centre our lives for quality existence. Whilst work may also be important, most people would agree that a life that is work centred is missing something important!

Think how the list of basic needs you have just drawn up affects the design of your home.

Now take 10 minutes to sketch your dream home. Ideas are more important than artistic skill.

How does your actual home differ from your dream home?

What does this tell you about your life goals and dreams, and your present reality? What can you do to bring the two closer together?

Your Dream Home

In this exercise you are invited to draw your dream home.

This is not an exercise in being an architect. It is an invitation to think about what ideal living space is about.

It’s an invitation to wild design.

What happens when you do wild design is you throw away all pre-concepts and go for your real intuition. You throw up things you didn’t realise you had dreamt of. If you stop worrying about what’s possible – well could you make the impossible happen.

A great way to do this is: with a very big piece of paper (A1) and a set of children’s crayons lie on the floor and draw it.

What did you end up with?

How did you feel about the process?

Could you make this a reality? (Well why put up with what you don’t want if you could have what you do want? And How Would You Get There?)
THINK GLOBAL ACT LOCAL – Where will you start?
GLOBAL THINKING

LOCAL ACTION STARTS HERE!

MY GARDEN

MY HOUSE

ME
Theoretically: A homestead sits at the centre of a series of concentric zones. Across this area various sectors represent the interactions of energy flows with our landscape.

The point of the exercise is that on any site we will make our work more efficient if the things we do most often are sited nearest the dwelling, and the things we do least often furthest away. Bill Mollison calls these zones 1 through 4. Others recognised this didn’t include the house itself, and then the people within it so the picture has become confused with zones 0 and -1 or various other expressions amplifying the original idea.

After defining zones we can then look at sectors—light/shade; seasonal variation, slope and contour. Wind direction and strength. This helps identify energy flows in the landscape, just as water, frost and fire risk. Major modifications of the landscape (building roads, water supply, earth moving for swales etc) should come early in the application of the design.

The concept is sound. The practical application (in relation to the average person’s living circumstances) is more complicated.

By understanding how the climate and changing seasons affect us we can:

- Put shelter belts where they are most effective (facing dominant winds)
- Site trees and structures so that we maximise sunshine to where we most want it and create shade where we most want it.
- Arrange access and water supplies early on in our design
- Generally speaking: be aware of how we are working with wind, light, precipitation, slope and all the things these imply over the totality of our design
- Arrange our tasks to be as efficiently delivered as possible
- Incorporate space for wild life

This theory is much easier to deliver on a farm scale than it is on the average UK house plot.

Notes to self:
MORE DESIGN CONSIDERATIONS

There are many possible approaches to design:

“It’s aye been” – Doing it that way because “that’s how we’ve always done it.”

“The instant solution 1” – The Wimpey House model – it worked in Camberley so it’ll do here (and the pattern’s cheap).

“The instant solution 2” – I read it in a book so it must be true.

“Evolutionary model” – Like Topsy it just grewed. In other words it wasn’t planned in detail at all.

Maybe the circumstances were engineering which encouraged it to evolve well in varying degrees.

You can also consciously design human support structures to fit the people they serve, the environment in which they are at work, and the resources available.

Build up a plan and give restrictions:

- Slope
- Solar aspects and shade
- Summer/winter variation
- Access
- Water supply/Drainage
- Wind directions
- Zonation

Which of these are static, and which represent energy flows through the site?

How would you categorise wildlife on this map?

What difference does access make to, for instance, zonation?

Any other considerations we might think of? EG:

- Neighbours
- Energy supply
- Markets
- Existing structures/trees
- Frost
MAPPING

There are lots of ways to map things.

There is a whole range of geographical maps from the Ordnance Survey and others.

https://www.ordnancesurvey.co.uk/oswebsite/

This now includes both paper and digital products.

The Macaulay Land Use Research Institute in Aberdeen has done some great work on Soil Maps and Land Use Capability. This has now been absorbed into the James Hutton Institute along with the former Scottish Crop Research Institute at Blairgowrie.

http://www.hutton.ac.uk/about

The British Geological Survey offers great information on the rocks beneath your feet.

http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html

Google Earth and Google Maps: free software to take you all over the planet.

http://www.earth.google.com/

But how else can we map things?

How about mind maps, drawings, photographs, oral tradition, song, dance, sound recordings, film, in the sandpit, puppet shows, drama…

What else would you add as a preferred mapping method?
SURVEYING

How do check what is here already?

How about:

Ask questions?

Take photographs?

Draw what you see: as a plan, as a perspective, or in a wild design?

Study weather records: http://www.metoffice.gov.uk/

Talk to the neighbours

Measure stuff, distance, slope, wind direction, shade areas, sun opportunities

Catalogue challenges and opportunities

List species

Count and name trees

How much water is there, where does it come from and how is the drainage

What do the clients actually want?

Financial resources

Skills bank

Shortfall in any of these?

Other ideas:
Session: *Making a Map*  Individual Practical Exercise

Take thirty minutes to map the area assigned to you by the instructor.
WILD SALADS

We harvested wild salads in the garden.

Species included:

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
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<tbody>
<tr>
<td>Ground elder</td>
<td>Aegopodium podagraria</td>
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<tr>
<td>Garlic mustard</td>
<td>Alliaria petiolara</td>
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<tr>
<td>Leeks</td>
<td>Allium ampeloprasum</td>
</tr>
<tr>
<td>Welsh Onion</td>
<td>Allium fistulosum</td>
</tr>
<tr>
<td>Wild garlic</td>
<td>Allium paradoxum (few flowered leek), Allium triquestrum (three cornered leek)</td>
</tr>
<tr>
<td>Garlic</td>
<td>Allium sativum</td>
</tr>
<tr>
<td>Chives</td>
<td>Allium schoenoprasum</td>
</tr>
<tr>
<td>Garlic Chives</td>
<td>Allium tuberosum</td>
</tr>
<tr>
<td>Ramsons</td>
<td>Allium ursinum</td>
</tr>
<tr>
<td>Leaf celery</td>
<td>Apium graveolens var. secalinum</td>
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<tr>
<td>Tarragon</td>
<td>Artemisia dracunculus</td>
</tr>
<tr>
<td>Land cress</td>
<td>Barbarea praecox</td>
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<tr>
<td>Daisy Blossom</td>
<td>Bellis perennis</td>
</tr>
<tr>
<td>Beetroot (Grated root and leaves)</td>
<td>Beta vulgaris</td>
</tr>
<tr>
<td>Borage Flowers</td>
<td>Borago officinalis</td>
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<tr>
<td>Curly Kale</td>
<td>Brassica oleracea ssp</td>
</tr>
<tr>
<td>Ragged Jack Kale</td>
<td>Brassica oleracea ssp</td>
</tr>
<tr>
<td>Jersey Walking Stick</td>
<td>Brassica oleracea ssp</td>
</tr>
<tr>
<td>Marigold</td>
<td>Calendula officinalis</td>
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<tr>
<td>Hairy Bittercress</td>
<td>Cardamine hirsute</td>
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<tr>
<td>Red Valerian</td>
<td>Centranthus ruber</td>
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<tr>
<td>Ornamental Quinces Blossom</td>
<td>Chonomeles japonica</td>
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<tr>
<td>Endives</td>
<td>Cichorium endivia</td>
</tr>
<tr>
<td>Coriander</td>
<td>Coriandrum sativum</td>
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<tr>
<td>Hawthorn leaves</td>
<td>Crataegus monogyna</td>
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<tr>
<td>Cucumber</td>
<td>Cucumis sativus</td>
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<tr>
<td>Courgette Blossom</td>
<td>Cucurbita pepo</td>
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<tr>
<td>Rockat</td>
<td>Eruca sativa</td>
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<tr>
<td>Fennel/Bronze Fennel</td>
<td>Foeniculum vulgare</td>
</tr>
<tr>
<td>Florence Fennel</td>
<td>Foeniculum vulgare</td>
</tr>
<tr>
<td>Strawbery Blossom</td>
<td>Fragaria vesca</td>
</tr>
<tr>
<td>Hyssop</td>
<td>Hyssopus officinalis</td>
</tr>
<tr>
<td>Lettuce</td>
<td>Lactuca sativa</td>
</tr>
<tr>
<td>Deadnettle White</td>
<td>Lamium album</td>
</tr>
</tbody>
</table>
Yellow archangel  Lamium galeobdolon
Deadnettle Red  Lamium purpureum
Ox-Eyed Daisy Blossom  Leucanthemum vulgare
Lovage  Levisticum officinale
Apple Blossom  Malus spp
Lemon balm & variegated Lemon Balm  Melissa officinalis (variegata)
Mint  Mentha spp about four different kinds
Sweet Cicely  Mhyrris odorata
Forget-me-Not Blossom  Myosatis arvensis
Marjoram  Origanum majorana
Golden Marjoram  Origanum vulgare aurea
Alkanet Flowers  Pentaglottis sempervirens
Pea Tops  Pisum sativum
Primula Flowers  Primula spp
Cowslips  Primula vera
Lungwort Flowers  Pulmonaria officinalis
Radishes  Raphanus sativus
Mooli / Daikon  Raphanus sativus var. longipinnatus
Rhubarb Blossom  Rheum rhabarbarum
Rosa Flowers  Rosa spp
Rosemary Blossom  Rosmarinus officinalis
Lemon sorrel  Rumex acetosa var: ?
Ruby Sorrel  Rumex sanguinea
French sorrel  Rumex scutatus
Salad Burnet  Sanguisorba minor
Tomatoes  Solanum lycopersicum
Comfrey Flowers  Symphytum spp
Dandelion  Taraxacum officinale
Clover Blossom  Trifolium spp
Broad Bean Tops  Vicia faba
BOTANICAL NAMES

OK.

So a big mystification for many starters is ‘I DON’T UNDERSTAND LATIN’.

Don’t worry it’s all dog Latin. Made up for the moment. But if we actually accept the botanical names then we have a clear way of identify and agreeing about individual species.

So how does it work?

A botanical name is a formal scientific name conforming to the International Code of Nomenclature for algae, fungi, and plants (ICN) and, if it concerns a plant cultigen, the additional cultivar and/or Group epithets must conform to the International Code of Nomenclature for Cultivated Plants. The code of nomenclature covers "all organisms traditionally treated as plants, whether fossil or non-fossil, e.g. blue-green algae (Cyanobacteria); fungi, including chytrids, oomycetes, and slime moulds; photosynthetic protists and taxonomically related non-photosynthetic groups."[1]

Excuse me- what? Let’s keep it simple.…

Botanical names give us an international language so we know when we are talking about the same thing. This often doesn’t work with common names where many different plants can have the same name. The names are written in italics. They comprise (typically) two words, a genus (origin of the word genetic, which pretty much means ‘family’ and a species (specific) name.

So: Bellis perennis is the common daisy.

Sometimes the name is followed by a person’s name (or letter especially for someone as famous as Linnaeus, who first set up a sound system for naming lots of plants. He’s shown as (L).

There are some other abbreviations used spp means (an unspecified number of) species, and ssp means (an unspecified number of) sub-species, so for example Rosa spp means ‘Roses in general’. Brassica oleracea ssp means ‘some sort of cabbage’.

By gradually learning botanical names you can be much clearer about which plant is actually being referred to when reading about plants or conversing with others on the topic.
WHAT IS ENERGY

Most of us have heard at some time in our lives $E=mc^2$

Some of us know that it’s the basis of his theory of special relativity.

A lot fewer of us know what that means! But you don’t need to.

From a permaculture perspective the key point behind the theory is that matter can neither be created, nor destroyed. And the same is true of energy. Designing efficient systems is all about how we manage energy.

There are three main kinds of energy we need to be concerned about:

- **Potential**
- **Kinetic**
- **Entropic**

**Potential Energy** is energy in a form with the ability to do lots of work

e.g. A car parked at the top of a hill with a full tank of petrol

**Kinetic Energy** is energy when it is doing work

e.g. The driver gets in starts the engine, releases the handbreak and drive down the hill, building up speed

**Entropic Energy** is the energy in some bound form unable to do work

e.g. the driver has driven out of the mountains many miles and has come to rest at the bottom of the mountain range and the petrol tank is empty. The driver (exhausted) falls asleep. No energy has been destroyed but the potential to do work is greatly reduced.

These terms are relative rather than absolute.

What happened in this example is that the petrol burnt in the engine which generated noise and heat as well as forward motion. These energies became entropic in the environment around.

What we are trying to do in a good permaculture design is store energy as much as possible, and as ‘high’ (figuratively or actually) in the landscape as possible. So it maintains greatest potential.
ENERGY PRIORITIES

It's useful therefore to have a *Scale of Intervention* again, which guides us to the best priorities. So...

1. Firstly – if you can avoid using energy at all
2. If that’s not possible then minimise the amount of energy you use
3. If that doesn’t get you the yield you need, then do the things which harvest energy
4. Try to store the energy harvested for later use
5. Try to capture energy from any processes which you create to use it
6. Can you harvest any by-products from your process

So for a cold winter’s morning you could:

1. Stay in bed
2. Insulate the house better, design in passive solar heating, wear more clothes
3. Grow your own timber to use in a woodstove
4. Have a wood store
5. Incorporate the woodstove into a massive structure which becomes a heat store e.g. kachelofen / masonry stove / rocket stove
6. Dry the washing or fruit and vegetables for storing over the stove
ENERGY EXERCISE

So if yield is unlimited you can always add in more.

Group exercise: In pairs walk round the site and see how many opportunities to reduce energy loss / increase energy gain you can spot. Allow half an hour.

Outcome: by observing and thinking about energy losses and gains students increase their capacity to include energy parameters in design work. Their awareness of energy issues is enhanced.

We spotted the following opportunities:

1. 

2. 

3. 

4. 

5. 

6. 

Further thoughts for personal action:
PATTERNS

Why are PATTERNS important?

They are easy to REMEMBER

They are PORTABLE and so can be used anywhere

They are UNIVERSAL so they fit changing circumstances

They are STRONG because they bind their elements together ('geodesic strength', tesselation)

Patterns can be PHYSICAL, BEHAVIOURAL or STRUCTURAL

Other ideas:

A pattern I use well:

A pattern I would like to change:
**PATTERNS continued**

Some Permaculture patterns worth remembering:

- Start small start local
- Maximum diversity
- Many functions in each aspect, many alternatives for each function
- Everything is a gift
- Liabilities into assets
- The problem is its own solution
- Success comes in cans - *not cannots*
- There is enough for all if we take what we need, not to feed our greed
- Yield is unlimited
- Observe and follow the example of nature
- Care for land, people, and all life
- Maximum output for minimum intervention
- Think in five dimensions - *three physical planes, time and relationships*

Other patterns:
Ten Golden Rules for High Yield

The worst PREDATOR is ...

The word PREDATOR expresses a point of view

Predators REDUCE YIELD

Predators are a NECESSARY PART of functional systems

Predators give IMPORTANT MESSAGES (Killing the messenger)

To reduce damage INTRODUCE THE MISSING PREDATOR which will reduce predation

(‘You don't have a slug problem, you have a duck deficiency’)

Know your SPECIES

It's good to make MISTAKES, just don't keep making the same ones
And avoid terminal errors

Favour DIVERSITY

Practice MINIMUM INTERVENTION

The Scale of Intervention

First DO NOTHING
only if that doesn't work...
INCREASE PRODUCTION to compensate for losses
only if that doesn't work...
Make a BIOLOGICAL intervention
only if that doesn't work...
Make a PHYSICAL intervention
only if that doesn't work...
Make a CHEMICAL intervention

or...

GIVE UP, perhaps you are trying to do something inappropriate.
IT'S YOUR CHOICE
TRUE YIELD

In essence understanding true yield is a very simple equation.

\[ \text{Yield} = \text{Outputs} - \text{Inputs} \]

The point here is that the yield isn’t the harvest (e.g. 200 tonnes of wheat) it’s the harvest less the cost of creating it. (e.g. 200 tonnes of wheat less labour, chemical costs- fertiliser, herbicide, insecticide, fuel costs, depreciation on equipment, costs of getting to market, was the soil fertility enhanced or depleted…) and it may be that you then find a system with lower outputs but less costs has in fact a higher yield.

The underlying permaculture principle is that you can always add more yield into any system.

Masanobu Fukuoka, the great Japanese agronomist maintained that lower input systems eventually become higher yielding because they constantly build fertility.

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

Think about the systems you manage. What do they produce and what do they cost? How can you increase their productivity by converting ‘waste products’ into something useful, redirecting the flow to create further production?

e.g. “I compost vegetable waste. If I fed the waste to chickens I’d still get the fertility from it but I’d also get chickens and eggs”

Three things I could do to improve yield:

1. 

2. 

3. 

Notes:
THE PERMACULTURE ASSOCIATION & THE DIPLOMA

If you are excited by permaculture you would probably wish to support the Permaculture Association. The easiest way to do this is by joining. This gives you access to a number of benefits but most importantly enables you to be connected to other people who are interested in what you are.

If you choose you can consider working up to gaining a diploma in permaculture. This involves working for two years after your permaculture design course using the principles you have learnt, and being able to present 10 designs which show that.

To learn more go to this website.

http://www.permaculture.org.uk/
EROSION vs CONSTRUCTION

Erosion and Construction are both natural patterns. You can see this very clearly at some points on the coastline. Selsey Bill in Sussex is a classic example.

Over time the beach is eroded on one side and built up on the other.
It might be normal to think that construction is good and erosion is bad. In nature they are both realities. As a pattern it is worth considering how we can plan for both erosion and construction over time. They both have their place.

This becomes particularly evident when SUCCESSION cuts in. So when we plant trees and they are young, for example, certain species will flourish in the understorey. But as the trees get larger and create shade some of these species die out. This ebb and flow of energies occurs not just in the TIDES as at Selsey Bill but in all natural systems.

Good designs focus on letting nature do the work for us, rather than fighting it. The lesson is: Work WITH NATURE rather than AGAINST IT.

Remember how King Canute demonstrated the futility of pretending that people (even powerful ones) can defeat nature. [http://en.wikipedia.org/wiki/Cnut_the_Great](http://en.wikipedia.org/wiki/Cnut_the_Great)

*He commanded that his chair should be set on the shore, when the tide began to rise. And then he spoke to the rising sea saying “You are part of my dominion, and the ground that I am seated upon is mine, nor has anyone disobeyed my orders with impunity. Therefore, I order you not to rise onto my land, nor to wet the clothes or body of your Lord”. But the sea carried on rising as usual without any reverence for his person, and soaked his feet and legs. Then he moving away said: “All the inhabitants of the world should know that the power of kings is vain and trivial, and that none is worthy the name of king but He whose command the heaven, earth and sea obey by eternal laws”* Chronicle of Henry of Huntingdon
THE CORIOLIS EFFECT

When a sphere rotates particular forces act in particular ways.

Due to the earth's rotation

Objects deflect to the right in the northern hemisphere

Northern Hemisphere

Objects deflect to the left in the southern hemisphere

Southern Hemisphere

This causes the globe's winds to act in particular prevalent (most common) ways

Lot's more diagrams can be found here: http://bit.ly/1qMIFFO
You can see what the winds are doing around the world NOW at this website: http://bit.ly/1jfY0PL
WEATHER vs CLIMATE
These dominant wind patterns are the cause of CLIMATE.

It's why East coasts in the Northern hemisphere are drier, whilst West coasts are wetter. The opposite is true in the Southern hemisphere.

But don’t forget that CLIMATE is an overall pattern, whilst WEATHER is what is happening now and may differ from the bigger picture.

Some examples:

A) In Britain the prevailing winds are South Westerly. So if planting crops which are wind sensitive (e.g top fruit) we need shelter belts to the South West. However, at blossom time (Spring) there are commonly chilling winds from the North and East, meaning we also need wind protection in that direction.

B) In desert landscapes it doesn’t rain very much. But when it does rain the rainfall can be very heavy. Growing in desert climates therefore suggests rainwater harvesting techniques which capture and spread the rainfall into soils over the widest possible area and also store as much as possible in tanks or underground for later usage.

There is lots of information available in the UK from the MET Office, both current and historical.


In designing sustainable systems we need to plan for what can normally be expected, but also for extreme events. What will happen if it’s really wet or dry? What will happen if it’s really hot or cold? What will happen if it’s really sunny or cloudy? What will happen if it’s really windy or really calm?

The best solution is to target 80% of your efforts at ‘predictable’ weather, and put 10% of you efforts into the upper and lower extremes. Remember that in Britain ‘predictable’ weather is a fairly uncommon thing.
WIND ROSES

Actual wind patterns can be best understood from viewing wind roses. These record how much the wind blows from each direction and at what strength over historical periods of time. Here’s an example.

**WIND ROSE FOR AVONMOUTH**

N.G.R. 3503E 1737N

ALITUDE: 9 metres a.m.s.l.

Other weather patterns which determine yield (or lack of it) and temperature and rainfall.

These can also be assessed from historical information, but individual seasons may differ widely.
Mean daily maximum and minimum temperature (1971-2000) and extremes (1922-2007) at Edinburgh RBG (26 metres amsl)

Average number of days of air and ground frost (1971-2000) at Edinburgh RBG (26 metres amsl)
PLANNING FOR EXTREMES

In small groups set by the instructor make a list of what extremes should be planned for.

List three measures which can be taken for each extreme to guard against its ill effects

<table>
<thead>
<tr>
<th>Extreme</th>
<th>Measure 1</th>
<th>Measure 2</th>
<th>Measure 3</th>
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</table>
WHAT MAKES AN EFFECTIVE WINDBREAK

Good windbreaks are permeable- they let the wind through but slow it down.

A solid windbreak (like a brick) wall actually creates turbulence.

Some examples of permeable windbreak:


Netting, Rubber Strips, Wooden Fencing

**Growing**

Hedging, Shelter belts of trees, Leaving last year’s dead plants standing

**What the Royal Horticultural Society says on the matter:**

Apart from weather records existing trees make excellent indicators of the effects of wind on a given location.
WHY SHOULD WE SHOP LOCALLY?
Session: **Real Capital Team design**

Objective: *Students will recognise that real capital constitutes all our assets, physical, mental and behavioural. They will be familiar with a range of challenges in group sharing of resources.*

In teams of three consider the following scenario.

Member A has inherited an offshore Island from an elderly uncle. Her/his friend, member B has £50,000 in cash in the bank. Their friend member C is extremely talented at farming in these circumstances, and is also a skilled builder and engineer. You can assume that C will be able to deal with most technical matters arising, and will be able to do or direct others to do construction, repairs and maintenance.

Your task is to decide what you will do with the island in forty-five minutes. A map will be supplied. Make reasonable assumptions as necessary, or ask the instructor if you have any difficulties.
DESERT ISLAND RISKS Report back.

What were your conclusions?

What worked well?

What was difficult?

What does this tell you about sharing resources with others?
TOOLS

DESIGN ELEMENT TEMPLATE

Example: Tools

USE
- Physical action: e.g. cutting, mincing, slicing
- Culinary: Cooking, brewing, preserving, distilling
- Mental action: sifting, sorting, deciding
- Motive source: shifting weights, balancing

NEEDS
- Sharpness
- Maintenance, lubrication
- Know how
- Design & planning - appropriate
- Contemporary
- Energy source
- Best materials
- Stability or portability

BY PRODUCTS
- Swarf and chippings
- Time wins

DESIGN INTEGRATION
- A workshop

PREDATORS
- Rust, bluntness, lack of skill

SPECIES LIST
- Saws, toolbox, kitchen drawer, pincers, knives
APPENDIX 1: CORE CURRICULUM

Core Topics PDC 2013

Module 1/intro
- What is permaculture?
- Ethics
- Mollison principles
- SADIMET
- zones and sectors
- Tale of 2?

Module 2 –Observation & Patterns
- Surveying tools (e.g. PASTE, sit spot, Whitefield’s 4 stage observation, client interview, history, boundaries, resources, biotime diaries, shade mapping, photographs, reading the landscape)
- Mapping, elevation and have experience of making a map. (e.g. split into groups with 1 person who knows what they’re doing; mapping a table, that’s not N-S aligned, give different groups different sizes of paper (so scales), or map a Lego house & garden. Measure and triangulate something on the table). Give them a compass per group.
- Energy flows
- output-input analysis
- patterns
- climate and micro-climates

Extra:
- spirals of erosion & entropy

Module 3 –Analysis & Soil
- Analysis tools (e.g. random assembly, identifying functions and elements, SMART goals, SWOC, placement, design by limiting factors, process flows, relative location, PMI,
- Soil (e.g. soil types, soil sampling, soil fertility, compost, tilling pros & cons, mulching, soil indicator plants, erosion, dynamic accumulators)
- permaculture and organic gardening and use of tools (e.g. spades, saw etc).
- Plants/Trees/Forest Gardening (e.g. energy transactions of trees, agroforestry, windbreaks & shelterbelts, riparian buffers, tree/plant ID (winter/summer & botanical names), tree types, species - native vs exotics, invasive species, trees as wind indicators, orchards, woodland management (grafting, coppicing, continuous cover forestry), guilds, mycorrhizal associations, fungi, uses of trees)
- practical e.g. lasagne bed or Hugel bed. (plant a polyculture with stacking in time – e.g. sow radishes?)
- trees

Module 4 –Design & People
- Design tools (e.g. cascade of intervention, 6 coloured thinking hats, Planning for Real, zoning, Yeoman’s Scale of Relative Permanence, wild design, dreaming)
- design process (reviewing e.g. table top design)
- design examples
• Social systems/contexts (e.g. transition towns, the importance of vibrant, well-connected community, consensus decision making, social/physical/mental health, Zone 00, Non-violent communication, Work that Reconnects, diet, Herbal Medicine, Conflict Resolution, nature connection, finance & economics, land tenure & Community Governance, education)
• Built environment (e.g. ecological buildings and structures, working with existing buildings, natural building techniques, local materials, energy management, thermal mass, U value, airflow, plants and buildings, A Pattern Language, transport, desire lines, domestic renewable energy, urban permaculture)
• ethics 2
  ◦ ecological footprint
  ◦ real wealth
  ◦ resources choices

Module 5 –Implement & Maintain, & Water visit an established permaculture site
• Water (e.g. Victor Schauberger, rainwater harvesting, swales, salinity, working with the sea, black and grey water, spiritual significance, ponds, aquaculture, productive aquatic habitats, keyline planning, water use in the home and water saving, catchment, spring line, water cycle, key characteristics)
• ecological buildings and structures

Module 6 –Present, Evaluate & Tweak; Celebrate
• Design project
• Design Presentation (How to create a permaculture design that is both sustainable and productive)
• The next steps (e.g. possible next steps on their permaculture pathway, membership of the Permaculture Association, Diploma, linking/establishing with local groups, setting up action learning guilds/peer support groups, book sales)
• Given feedback and reviewed their course
• Party

Core things which don't have to be in a session but can be spread throughout course:
• practical
• morning circle
• Reviewing your learning

By the end of this course, students will have:
✓ visit an established permaculture site
✓ seen design examples of diploma standard
✓ participated in a practical example of permaculture in action
✓ created a permaculture design that is both sustainable and productive
✓ presented their design
✓ experienced a celebration
✓ received a certificate

Optional topics
✓ Holmgren principles
✓ Morning circle
✓ Plant of the day
APPENDIX 2: FOURTEEN PRINCIPLES OF PERMACULTURE- Toby Hemenway

- **Observe.** Use protracted and thoughtful observation rather than prolonged and thoughtless action. Observe the site and its elements in all seasons. Design for specific sites, clients, and cultures.

- **Connect.** Use relative location, that is, place the elements of your design in ways that create useful relationships and time-saving connections among all parts. The number of connections among elements creates a healthy, diverse ecosystem, not the number of elements.

- **Catch and store energy and materials.** Identify, collect, and hold useful flows. Every cycle is an opportunity for yield, every gradient (in slope, charge, temperature, and the like) can produce energy. Reinvesting resources builds capacity to capture yet more resources.

- **Each element performs multiple functions.** Choose and place each element in a design to perform as many functions as possible. Beneficial connections between diverse components create a stable whole. Stack elements in both space and time.

- **Each function is supported by multiple elements.** Use multiple methods to achieve important functions and to create synergies. Redundancy protects when one or more elements fail.

- **Make the least change for the greatest effect.** Understand the system you are working with well enough to find its “leverage points” and intervene there, where the least work accomplishes the most change.

- **Use small-scale, intensive systems.** Start at your doorstep with the smallest systems that will do the job and build on your successes. Grow by “chunking” that is, developing a small system or arrangement that works well, and repeat it, with variations.

- **Optimize edge.** The edge (the intersection of two environments) is the most diverse place in a system and is where energy and materials accumulate or are translated. Increase or decrease edge as appropriate.

- **Collaborate with succession.** Living systems usually advance from immaturity to maturity, and if we accept this trend and align our designs with it instead of fighting it, we save work and energy. Mature ecosystems are more diverse and productive than young ones.

- **Use biological and renewable resources.** Renewable resources (usually living beings and their products) reproduce and build up over time, store energy, assist yield, and interact with other elements. Favor these over non-renewable resources.

**B. Principles Based on Attitudes**

- **Turn problems into solutions.** Constraints can inspire creative design, and most problems usually carry not just the seeds of their own solution within them but also the inspiration for simultaneously solving other problems. “We are confronted by insurmountable opportunities.” Attributed to Pogo (Walt Kelly).

- **Get a yield.** Design for both immediate and long-term returns from your efforts: “You can’t work on an empty stomach.” Set up positive feedback loops to build the system and repay your investment.

- **The biggest limit to abundance is creativity.** The designer’s imagination and skill usually limit productivity and diversity before any physical limits are reached.

- **Mistakes are tools for learning.** Evaluate your trials. Making mistakes is a sign you’re trying to do things better. There is usually little penalty for mistakes if you learn from them.