
Biomimicry : Poetry

by *Mario Petrucci*

RESOURCES FOR POETRY LESSONS & CREATIVE WRITING

(Target users: Year 10 and older)

Notes to the teacher ...

- Potentially, many different lesson plans could be derived from what follows: select and adapt the material to suit your purposes.
- A suite of new poems, inspired by Biomimicry, has been commissioned specifically for this exercise (**Poems ‘A’**). It is important to peruse the poems in advance, choosing those most appropriate for your students.
- Though some of the poems are far from transparent, they all stand as a challenge to wonder at language, to enter its world of associations and resonances. The supporting notes will help (**Support II**); but if you would prefer to use alternative material for a particular class, by all means add or substitute anything from **Poems ‘B’**.
- Use **Part I** in class as a simple introduction to Biomimicry. Or supplement this with material from **Support I** (the Benyus video is both stimulating and accessible). Cite some familiar examples of Biomimicry, such as the glider (birds) and Velcro (burs).
- At the end of your session, encourage students to research the subject more thoroughly in their own time, or to do more writing privately in response to it.

Notes to the student (or Foyle Young Poet) ...

If you are doing this outside class, by all means go ahead and enjoy yourself. If you get stuck at all, talk to a friend, parent or teacher. See if you can get together with some writing friends to do the sections requiring group work.

Part I: Biomimicry. What is it?

The term ‘Biomimicry’ combines *bios* (Greek for ‘life’ or ‘way of living’) and *mimesis* (‘imitation’). This exciting new branch of science explores how we might solve problems – and uncover new opportunities – by studying nature. It focuses on three key aspects of the natural world:

nature as a model

(we can study nature’s designs and imitate them to help overcome our problems)

nature as a measure

(to judge the ‘rightness’ of our inventions and whether they help us flourish in the long term)

nature as mentor

(so we value our environment not just as raw material but as a friend we can learn from)

Part II: Preparation for Writing; Initial Discussion.

(make sure you cover at least 1, 2 & 3)

1. Learning about something is not the same as learning *from* it. Discuss.
2. Students choose one of the poems supplied, and read it – aloud – either to a partner or the whole class. Discuss favourite images and lines. Which passages, if any, seem mysterious? [If there are any problems with **Poems ‘A’**, refer to **Support II.**]
[*Older groups.* Which parts of **Poems ‘A’** are more obviously *about* some aspect of Biomimicry; by contrast, where is there a sense of the poetry springing *from* Biomimicry’s philosophy?]
3. To what extent do these poems give us – or *refuse* to give us – obvious or predictable meanings? Given that Biomimicry encourages us to learn from (not *about*) the natural world, which images and phrases encourage us to struggle with what we know about ourselves and nature, or to engage more deeply with language?
4. In poetry – and in life – what prevents us being able to stay with something (or someone) or listen to it, intently? What distracts us? What are the benefits of visiting a place, or a poem, many times? What qualities in a poem make us want to revisit it? Which of the supplied poems do you most want to read again, and why?
5. Author Janine Benyus tells us that we are “wrapped tightly in our own version of knowledge”, and so must quieten ourselves “long enough to turn to nature for advice”. Does the class agree? How might poetry be an ally in ‘quieting’ ourselves in this way? Should *all* poetry calm us? Should all poetry excite and entertain?
6. How might science and poetry learn from (rather than about) one another?

Part III: Some ‘Biomimetic’ writing ideas ...

(*Suggestions for students, either for individual class work or as follow-up*)

1. **In class, using Poems ‘A’ and ‘B’.** Which of these poems most helps you into thoughtfulness? Jot down your responses to that poem, and *your own* insights arising from it. Compose something, and structure it, to capture what you find.
At home. Find any poem that you really respond to (NOT from Poems ‘A’ or ‘B’). Spend time with it, away from distraction. Quieten in its presence. What does the poem teach you – what do you learn *from it* as opposed to *about it*? Does it reward your patience? Write something that incorporates any insights or feelings that arise.
2. Describe how a blade of grass would think, and feel. What would be important to it? What is it sensitive to? (If you want, choose something else: a garden pond; the woods near your house.) Turn your notes into a monologue, either as a poem or (if you would rather work with prose) as a speech. When doing this, do you feel helped in any way by the poems you have been reading (in ‘1’, above)?
3. Imagine examples of how humans might imitate nature *in the future*. For instance, a young engineer learns an incredible secret by watching ants build a bridge: what is that secret? Set your imagination free: there is no need to worry about whether or not your idea is correct or would actually work. Write your ideas and secrets into a poem.
4. Go out and get some writing ideas by observing nature for a while!
5. In what ways are you, yourself, an integral part of nature? Write a poem in answer.

Part IV: Editing

(Group/ Class Work)

Once the new poems have been drafted, share two or three of them with the group by reading them out loud. Give each poem time; try not to read too fast, or under the breath. How difficult is it to *really* listen? What can we learn from one another's work?

In each case, discuss – in a constructive way – what alterations might be made, to deepen or clarify the poem's effect. (If necessary, ask for the draft to be read out again.) Does all the group agree with the suggested changes? Does the editing of this poem amplify its capacity to show us something? Is a better balance struck between mystery and clarity?

Part V: Preparation for a further session.

In the exercises so far, 'being still' has little to do with behaving oneself. Throughout ages, poems have helped people to look into stillness – rather like peering into a dark pond and slowly adjusting the eyes to what lies (or lurks) on the bottom. Perhaps this is how poetry can effect personal, and therefore social and technological, change (a hypothesis usefully compared with Auden's "poetry makes nothing happen").

With all this in mind, ask students to recall any poem that 'stilled' them in the past. They should try to track it down, and bring it to the next session to share with the group. (Those genuinely stuck for ideas can pick a favourite from **Poems 'B'**.) In that session, discuss each poem in depth. Allow silences. Go deeply into what can be learnt *from* each poem.

Support I: Further reading, viewing, listening.

- ***Biomimicry: Innovation Inspired by Nature.*** Janine M. Benyus (Harper Perennial, 2002). Her story about duckweed and the stagnant pool (*Where Will We Go From Here?*, p.285-287) is particularly instructive.
 - **YouTube.com.** Many useful videos here. Simply search for 'Biomimicry', or add 'Benyus' to the search to hear her groundbreaking talk in Monterey.
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Support II: Some notes (and teaching suggestions) for Poems 'A'.

These notes are only for those in need of bearings. They are not meant to 'explain' the poems or to dictate how they should be responded to.

Poem 1: 'Velcro' Writing through one of Nature's inventions (I)

Find out how Velcro works. Who invented it and what was its inspiration? Bring some to class – what kind of sound does it make when used? In the first nine lines of the poem, how is Velcro employed to suggest the changed relationship between humanity and nature? Why is everything in the past tense? Which words are repeated in the poem, almost as 'key words', and what are the effects of these repetitions? Given the phrase 'wrong weather' (line 12), what do the poem's images of wetness and hail point us towards? What two sounds are compared in the closing lines, and why?

Poem 2: 'The Listening' Biomimicry: listening to, learning from (I)

This poem follows the images and tone of 'The Listeners' (if necessary, have copies of Walter de la Mare's famous poem to hand). How dependent is the new poem on the old, and what qualities have carried over into it? Notice the use of italics in the new poem to emphasise the sense of a speaker. Who might the speaker(s) be? In the penultimate line, who do the 'plunging grey eyes' belong to?

Poem 3: 'who put their box' Thinking outside/ inside the box

Pool ideas on the significance and possible meanings of the boxes in this poem. How are 'boxes' and 'life' variously contrasted? Returning to line 1, in what sense is the box 'in me'? Who (or what) put it there; what might they be up to? Who is this 'me' anyway (discuss alternatives: is it the poet, all of us (i.e. the reader), or someone/ something else)? Brainstorm the 'eight-/ cornered conundrum'. Consider why the poem chooses to describe the world as 'a spy/ under questioning' (stanza 3). By the end of the poem, what has 'life' come to mean and, according to the poem, what is it unable to do?

Poem 4: 'Heat/ Beat/ Treat' Biomimicry: Nature's efficiency (I)

The poem takes its title from a phrase used to summarise the general approach of manufacturing industry (think of molten steel that ends up in a car). Nature makes life in the 'cold' and with very little waste; by comparison, 'Heat/ Beat/ Treat' is wasteful and energy-intensive. In the poem, why are certain stanzas in italics? What kind of exchange is going on, and how does it conclude? Be sure to read this particular poem aloud: how are the strong and shifting rhythms integral to its meaning?

Poem 5: 'Periodic Table' Biomimicry: Nature's efficiency (II)

Look up the Periodic Table (non-chemists can refer to Wikipedia or ask a science teacher). Some of the heavier elements are made in nuclear reactors and are very toxic (e.g. plutonium). Industry utilises most of the Table and produces a great deal of waste; living things, however, focus on just a few elements to reproduce themselves and do so, in the main, without toxic by-products or pollution.

The idea of painting drives this poem along. In what ways is that effective, and how does the concept of a palette relate to the poem's title? Note, also, the two distinct voices. Contrast their vocabulary and personality. How are the differences reflected in their palettes? In the second stanza, who (or what) is the child? Does the poem's structure and shape have any bearing on its message?

Poem 6: 'he left himself' Need for Environmental Awareness

Given his 'silver/ hammer' (stanza 5), what might be the profession of the character in this poem? What is he searching for in 'each round// stone' (clue: what might we find, when we split open a rock, as a 'spoor/ of bone')? In the closing lines, where he looks into the halved stone, what does he see there? Having discussed the alternatives, choose one interpretation and use it to explore what the poem is saying about our relationship with the environment and the possible fate of our species.

Poem 7: 'find your stone wall' Biomimicry: listening to, learning from (II)

This complex, impressionistic poem flows through a series of images, rather like a stream. It is best not to read it expecting straight, logical meanings. Enjoy its sound and movement. Try to keep the mind open to associations as they arise. For instance, the poem's title suggests the verb 'stonewall' (meaning 'to refuse to co-operate; to block, stall or hinder'). Be prepared to read the text several times, letting its leaps of imagery connect and deepen. List your reactions, or annotate the poem's margins. Continue this process to build up a larger picture of the poem. How does this help in getting to grips with its meanings? Are there different ways of reading, of listening?

It might help to examine where the poem is asking us to look. Does that change as the piece progresses? Notice, too, the shift in person: broadly speaking, from 'you' to 'I' to 'we'. Share opinions on who the 'you', the 'I' and the 'we' might be. Does this shed light on the poem's secret, concerning what has been lost in our relationship with nature, or what might need to be regained?

Poem 8: 'each shell grows' Writing through one of Nature's inventions (II)

Seashells grow by crystallizing calcium carbonate from seawater. This is similar to how 'fur' grows in a kettle, except that (put simply) shells exude a coating of protein either to 'seed' the process or to stop it (scientists are imitating those 'stop' proteins to protect pipes from scaling). Note the phrase 'hard-chalk' (line 10) coined in the poem. What do seashells, limescale and chalk have in common?

The 'Terracotta Army' was discovered in 1974, near Xi'an in China. Find a suitable photograph, taken from distance, and relate this to the poem's opening image. See how the poem acts like an incredibly powerful microscope to visualize – through imagination – the growth protein on a shell's surface. What do the warriors represent, exactly, and (in the poem) how do they make the shell grow, layer on layer? Invite sketches. How is this image developed, later, to 'explain' the growth coming to a stop? Trace the poem's outline – what does it imitate? Finally, what do the closing lines suggest?

Mario Petrucci trained as a physicist and ecologist before becoming a freelance educator and poet. His award-winning collections reflect his scientific and ecological concerns: they include *Bosco* (2001), *Heavy Water: a poem for Chernobyl* (2004) and *Flowers of Sulphur* (2007) [www.mariopetrucci.com].

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Student's notes ...

POEMS 'A'

POEM 1 Writing through one of Nature's inventions (I)

Velcro

it was eye-right between us
Your hooky brain

My loopy light hard
to peel us we came

apart a *shuck*
Then your heart polished-off

machine little red
muscle-glass – nothing of mine

stuck Except once
unstrapping your mac

buttonless bottomless from
wrong weather sock-

tight against my wet that
incoming

hail
slung at glass making glass

young fragile as
ice lipping the pond

– those straps the hail
so hard

of hearing each playing
the other's song

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The Listening

Is there anybody there?
say the lips – shattering
fastnesses of hush.

Is there anybody there?
ears echo : each stirrup-
bone fissuring ice.

Is there anybody there?
say teeth, chattering
forest to final spears
of grass.

Is there anybody there?
mimes each long fingertip
caught between iron
and stone.

Is there anybody there?
cries heart swelled blood-
strange – full of its
own red moon.

Is there anybody there?
snorts the sinus (last sense
awake) as a mare does
at the snake.

Is there anybody here?
hymns the brain. And into
its turret of watching
skims a bird

I kept
my word, it sings. Nothing
answers – though the stars
already know

but how silence surges
softly inward once those
plunging grey eyes
have closed.

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who put their box

in me? – *here*
this boxy head (that
wry need to see straight)

tendency to make world
square then break it
down in my steel

chair as a spy
under questioning :
smaller & ever box-like

those chills of revelation until
even boxiness cannot be
seen though must

still be there visible
only to my naked box-
like stare : life never did

that to me – life
makes life &
the box

makes boxes by
sticking to what they
know though of the pair

life mostly made me who
now makes boxes
which makes

a fine eight-
cornered conundrum
(or is it nine?) without lid or

membrane you
can beat : so let the box
lie – boxes solve boxes while

life plays
I spy & washes its
hair or washes your feet &

just by being
there solves every
problem except the problem

of boxes

Heat/ Beat/ Treat

Baste it. Waste it.
If you must—
deface it. Fuse it
or lose it. Stoke it
to the goal.

*Stroke it, cool it, unspool it
from an apple-pip. Eat it
or leave it. Touch it
as a soul.*

Smash it. Lash it.
Get it on a ratchet.
Rack it. Track it—
seize it for the goal.

*Ease it, tease it, please yourself
around it. Heal yourself and
sound it. Feel what makes you
whole.*

Caustic? Steep it.
Spray it for the stockist
if they want it
sun-kissed. Toxic?
Risk it— the end
defines the means.

*Feel it, heal it, meet it at your
mind-lip. Let fingertip kiss limpet.
The end is what it seems.*

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Periodic Table

*Ah! That would be our palette. Impressive
isn't it. Found ninety or so out in the world. The rest
we made ourselves. In that box. Glair and tempera won't hold
for those. Our methods revolve around gold. True, we've mixed some
awful browns along the way. But look at those skyscrapers! These
bead-lit cities of circuits. Repetitive? Come, come! We'd say
bold. That sizzling shade? Plutonium.*

The child's palette – outside. On the ground. Found
wet-side down. Primary colours fewer than fingers, to mix in
innocence. Oxygen. Hydrogen. Carbon. Sulphur. A pinch
or so of mothering ochre. Trial and error with the patience
of stones. And paintings – paintings stacked higher than
any skyscraper. No two the same. Fins. Feathers.
Bodies. All ready to blow in the wind.

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glair: egg white, when used as an adhesive (e.g. for bookbinding or gilding)

tempera: egg yolk and water, once widely used as a medium for painting

he left himself

this : the rock-spoor
of bone – each round

stone squat as a bird
in his palm in a cower

or some misshapen egg
plucked still warm from

the nest & stuck across
with stray straws of fault

– a single arc from his silver
hammer hatching the squashed

shapes of sparrow a long-legged
field mouse the crow snapped mid-

flight through lava & that last after-
noon lacking a centre when all hands

levered at rock to bob to its surface one
out-sized pebble he took his sledge to – to

cleave near-wet with freshness a double door
through storehouse time : mirrored exposures

caught in truth – his own face watermarking
its other

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find your stone wall

try to answer
what is bitter in each blue
above it & in

the branches
behind you green
as the coffin in

youth when it
danced & was beautiful
with the wind

in that time
you chimed the song
of roses

fell in circles
of stone those wings
already worn

death as yet
unburned now I scatter
through you &

lilacs bloom
in my work in my work
throatsome

– we make this
voyage break
arms with pouring

royal jellies eagerness
of gulls this is
what each is –

spring to other's
spring answer
& question

entering the coffin
together but yes
I interrupt

each shell grows

first putting out
its layer : molecular pro
-tein as secretly arrayed as that

terracotta army but with
hands linked among the ranks &
mouths held wide with evolution to sky

of sea : care-full in-
dentures inviting world to con-
form teeth zig to zag at heels of another in-

coming hard-chalk
army brought to attention on
their shoulders & so shaping what world meets

though once they have
wrought enough hard enough
down on their heads buried selves beneath them-

selves in what world sifts
in then their bloodless revolution
shuts each mouth so world stops coming yet because

shell has made itself
watched shore boils with shells
& because shelled creature is both outward & in

-ward an unprotecting world comes to
it makes shushing lullabies
of it &

protects

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POEMS 'B'

Some suggestions for published poems to add to the mix ...

Walter de la Mare	<i>The Listeners</i>
Wallace Stevens	<i>Thirteen Ways of Looking at a Blackbird</i>
Emily Dickinson	<i>'I'll tell you how the sun rose'</i>
Gerard Manley Hopkins	<i>The Windhover</i>

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