



**Humboldt 250 – Exploring Global Citizenship.**

**Teaching Manual**

**Note:**

We are pleased to present to you the teaching manual for the book **“The Invention of Nature” (2015) by Andrea Wulf.** This manual has been carefully created to provide you with a comprehensive resource for integrating this captivating literary work into the activities of the school project “Humboldt 250 – Exploring Global Citizenship.”

Please note that, due to copyright restrictions, we are unable to include excerpts from the book within this teaching manual. However, we have provided a detailed index that indicates which specific parts of the text you should refer to for each activity. We kindly request that you individually obtain a copy of the book<sup>1</sup> to work with the designated excerpts.

The index will serve as your guide, directing you to relevant sections of “The Invention of Nature” that correspond to each activity. By referring to the index, you will be able to seamlessly navigate the book and align the content with the corresponding teaching exercises and discussions.

Should you require any further assistance or have any questions regarding the teaching manual or the use of “The Invention of Nature” in your curriculum, please do not hesitate to contact us.

<b>1. Humboldt’s new vision of nature</b>	
Title	Excerpt
a. <i>A new idea of nature</i>	<i>(The Invention of Nature, p. 107-8)</i>
b. <i>Naturgemälde</i>	<i>(The Invention of Nature, pp. 108-10)</i>
c. <i>Views of Nature</i>	<i>(The Invention of Nature, pp. 154-5)</i>

<b>2. Colonialism, slavery, and the degradation of the environment: ‘Every drop of sugarcane juice cost blood and groans’</b>	
Title	Excerpt
	<i>(The Invention of Nature, pp. 124-7)</i>

<b>3. ‘A fountain of knowledge:’ Humboldt as an informant to US President Jefferson</b>	
Title	Excerpt
	<i>(The Invention of Nature, pp. 122-4)</i>

<sup>1</sup> © Andrea Wulf (2015). *The Invention of Nature. Alexander von Humboldt’s New World.* New York: Alfred A. Knopf. All rights reserved.



**4. Nature writing: Connecting science, language, and literature**

Title	Excerpt
Biographer Andrea Wulf describes Humboldt's literary style of fusing observation and emotion in one of his best-known books, <i>Views of Nature</i> :	<i>(The Invention of Nature, pp. 153-4)</i>
Humboldt's literary style artfully combined different perspectives and scientific disciplines. In his book <i>Cosmos</i> , he skillfully switched from describing planetary constellations to microscopic details:	<i>(The Invention of Nature, pp. 108-10)</i>
His approach to communicating science was very innovative at the time and so Humboldt's works became literary models for authors and scientists who came after him, for instance U.S.-American writer Henry David Thoreau (1817-62):	<i>(The Invention of Nature, p. 291-2)</i>

**5. Humboldt, the scientist and 'tech geek'**

Title	Excerpt
a. Humboldt's fascination with animal electricity	<i>(The Invention of Nature, p. 40-1)</i>
Humboldt wanted to continue these experiments with electric eels <sup>20</sup> . The following episode unfolded in 1800 in the Llanos, a tropical grassland plain flooded by the Orinoco in present-day Colombia and Venezuela.	<i>(The Invention of Nature, pp. 81-2)</i>
b. Employing modern technology to make scientific discoveries	<i>(The Invention of Nature, pp. 58-9)</i>
Before the expedition, Humboldt carefully packed a treasure of scientific instruments and tools for his experiments, and he knew that his work would depend on them:	<i>(The Invention of Nature, pp. 63-4)</i>
Humboldt seemed fascinated by nature's forces, even in circumstances when it could endanger his life, such as when an earth quake <sup>50</sup> shook South America in 1799:	<i>(The Invention of Nature, pp. 69-70)</i>
Besides his companions and discoveries, Humboldt's instruments were his most precious treasures during the five years of the South America expedition:	<i>(The Invention of Nature, pp. 99-100)</i>

## 1. Humboldt's new vision of nature

<b>line/word</b>	<b>description</b>
1 to ascend	– go up or climb
2 to traverse	– travel across or through
3 altitude	– the height of an object or point in relation to sea level or ground level
4 slope	– a surface of which one end or side is at a higher level than another; a rising or falling surface
5 resemblance	– the state of resembling or being alike
6 cypress	– an evergreen coniferous tree with small rounded woody cones and flattened shoots bearing small scale-like leaves
7 lichen	– a simple slow-growing plant that typically forms a low crusty, leaflike, or branching growth on rocks, walls, and trees
8 taxonomic	– concerned with the classification of things, especially organisms
9 aggregate	– a whole formed by combining several separate elements
10 to pour	– flow rapidly in a steady stream
11 profusion	– an abundance or large quantity of something
12 to distribute	– give a share or a unit of (something) to each of a number of recipients
13 kernel	– a softer, usually edible part of a nut, seed, or fruit stone contained within its shell
14 incessantly	– without interruption; constantly
15 to depict	– represent by a drawing, painting, or other art form
16 subterranean	– existing, occurring, or done under the earth's surface
17 shrub	– a woody plant which is smaller than a tree and has several main stems arising at or near the ground
18 column	– a vertical arrangement of figures or other information
19 humidity	– a quantity representing the amount of water vapour in the atmosphere or in a gas
20 atmospheric pressure	– the pressure exerted by the weight of the atmosphere, which at sea level has a mean value of 101,325 pascals (roughly 14.6959 pounds per square inch)
21 unprecedented	– never done or known before
22 dependent on/upon	– requiring someone or something for financial or other support
23 to teem	– be full of or swarming with
24 Llanos	– a tropical grassland plain flooded by the Orinoco in present-day Colombia and Venezuela
25 heath	– an area of open uncultivated land, typically on acid sandy soil, with characteristic vegetation of heather, gorse, and coarse grasses
26 ascent	– a climb or walk to the summit of a mountain or hill

## 2. Colonialism, slavery, and the degradation of the environment

line/word	description
1 degradation	– the condition or process of degrading or being degraded
2 sugarcane	– a perennial tropical grass with tall stout jointed stems from which sugar is extracted. The fibrous residue can be used as fuel, in fibreboard, and for a number of other purposes
3 groan	– a deep inarticulate sound conveying pain, despair, pleasure, etc.
4 indigenous	– originating or occurring naturally in a particular place; native
5 to investigate	– carry out a systematic or formal inquiry to discover and examine the facts of (an incident, allegation, etc.) so as to establish the truth
6 boulder	– a large rock, typically one that has been worn smooth by erosion
7 administrator	– a person responsible for carrying out the administration of a business or organization
8 escalating	– increasing rapidly
9 debt	– a sum of money that is owed or due
10 dependency	– see dependence: the state of relying on or being controlled by someone or something else
11 monopoly	– the exclusive possession or control of the supply of or trade in a commodity or service
12 immorality	– the state or quality of being immoral; wickedness
13 missionary	– a person sent on a religious mission, especially one sent to promote Christianity in a foreign country
14 gem	– a precious or semi-precious stone, especially when cut and polished or engraved
15 abundant	– existing or available in large quantities; plentiful
16 prosperity	– the state of being prosperous (= successful in material terms; flourishing financially)
17 fertile	– (of soil or land) producing or capable of producing abundant vegetation or crops
18 relentlessly	– in an unceasingly intense or harsh way
19 to over-exploit	– use (a resource) excessively
20 barren	– (of land) too poor to produce much or any vegetation
21 dye	– a natural or synthetic substance used to add a colour to or change the colour of something
22 edible	– fit to be eaten (often used to contrast with unpalatable or poisonous varieties)
23 to impoverish	– make (a person or area) poor / exhaust the strength or vitality of
24 cash crop	– a crop produced for its commercial value rather than for use by the grower
25 nourishment	– the food necessary for growth, health, and good condition
26 subsistence	– the action or fact of maintaining or supporting oneself, especially at a minimal level
27 devastation	– great destruction or damage
28 irrigation	– the supply of water to land or crops to help growth, typically by means of channels
29 folly	– a foolish act, idea, or practice
30 distribution	– the action of sharing something out among a number of recipients
31 fluctuating	– rising and falling irregularly in number or amount
32 imprudent	– not showing care for the consequences of an action; rash

### 3. 'A fountain of knowledge:' Humboldt as an informant to US President Jefferson

line/word	description
1 Secretary of State	– (in the US) the head of the State Department, responsible for foreign affairs
2 copious	– abundant in supply or quantity
3 to dispute	– argue about (something)
4 swathe	– a broad strip or area of something
5 qualm	– an uneasy feeling of doubt, worry, or fear, especially about one's own conduct; a misgiving
6 scattered	– occurring or found at intervals or various locations rather than all together
7 indigenous	– originating or occurring naturally in a particular place; native
8 commerce	– the activity of buying and selling, especially on a large scale
9 negotiation	– discussion aimed at reaching an agreement
10 despotism	– the exercise of absolute power, especially in a cruel and oppressive way
11 humidity	– a quantity representing the amount of water vapour in the atmosphere or in a gas
12 dependence	– the state of relying on or being controlled by someone or something else
13 timber	– wood prepared for use in building and carpentry
14 insatiable	– (of an appetite or desire) impossible to satisfy
15 avarice	– extreme greed for wealth or material gain
16 to annihilate	– destroy utterly; obliterate

#### 4. Nature writing: Connecting science, language, and literature

line/word	description
1 sober	– serious, sensible, and solemn
2 to fuse	– join or blend to form a single entity
3 to conjure something up	– make (something) appear unexpectedly or seemingly from nowhere
4 solitude	– the state or situation of being alone
5 fertility	– the quality of being fertile; productiveness
6 gruesome	– causing repulsion or horror; grisly
7 eel	– a snake-like fish with a slender elongated body and poorly developed fins, proverbial for its slipperiness
8 Llanos	– a tropical grassland plain flooded by the Orinoco in present-day Colombia and Venezuela
9 bejewelled	– adorned with jewels
10 ape	– a large primate that lacks a tail, including the gorilla, chimpanzees, orangutan, and gibbons
11 rapid	– happening in a short time or at a great rate
12 vignette	– a brief evocative description, account, or episode
13 to pour	– flow rapidly in a steady stream
14 phosphoric	– relating to or containing phosphorus
15 canopy	– an ornamental cloth covering hung or held up over something, especially a throne or bed
16 turf	– grass and the surface layer of earth held together by its roots
17 lest	– with the intention of preventing (something undesirable); to avoid the risk of / (after a clause indicating fear) because of the possibility of something undesirable happening; in case
18 to tuck	– push, fold, or turn (the edges or ends of something, especially a garment or bedclothes) so as to hide or secure them
19 to trigger	– cause (a device) to function
20 densely	– in a closely compacted or crowded manner; thickly
21 white-stemmed	– (of a plant) having a supporting stalk of white color
22 slender	– (of a person or part of the body) gracefully thin
23 surface	– the outside part or uppermost layer of something
24 terrestrial	– on or relating to the earth
25 stagnant	– (of a body of water or the atmosphere of a confined space) having no current or flow and often having an unpleasant smell as a consequence
26 to penetrate	– go into or through (something), especially with force or effort
27 aurora	– a natural electrical phenomenon characterized by the appearance of streamers of reddish or greenish light in the sky, especially near the northern or southern magnetic pole.
28 quivering	– trembling or shaking with a slight rapid motion
29 splendour	– magnificent and splendid appearance; grandeur
30 wondrousness	– see wondrous: inspiring a feeling of wonder or delight; marvellous
31 to be deprived of something	– suffering a severe and damaging lack of basic material and cultural benefits
32 vivifying	– make more lively or interesting; enliven
33 to scribble	– write or draw (something) carelessly or hurriedly
34 tapestry	– a piece of thick textile fabric with pictures or designs formed by weaving coloured weft threads or by embroidering on canvas, used as a wall hanging or soft furnishing

## 5. Humboldt, the scientist and 'tech geek'

line/word	Description
1 tech geek	– a knowledgeable and obsessive enthusiast in regard to technology
2 velvet-lined	– mark or cover with lines of velvet: closely woven fabric of silk, cotton, or nylon, that has a thick short pile on one side
3 to conduct	– organize and carry out
4 to convulse	– suffer violent involuntary contraction of the muscles, producing contortion of the body or limbs
5 to attach	– join or fasten (something) to something else
6 to prod	– poke (someone) with a finger, foot, or pointed object
7 to poke	– jab or prod (someone or something), especially with one's finger
8 to electrocute	– injure or kill someone by electric shock
9 lizard	– a reptile that typically has a long body and tail, four legs, movable eyelids, and a rough, scaly, or spiny skin
10 Prussia	– a former kingdom of Germany. Originally a small country on the southeastern shores of the Baltic Sea, it became a major European power, covering much of modern northeastern Germany and Poland, under Frederick the Great. After the Franco-Prussian War of 1870–71, it became the center of Bismarck's new German Empire, but was abolished following Germany's defeat in World War I.
11 rod	– a thin straight bar, especially of wood or metal
12 forceps	– a pair of pincers or tweezers used in surgery or in a laboratory
13 vial	– a small container, typically cylindrical and made of glass, used especially for holding liquid medicines
14 incision	– a surgical cut made in skin or flesh
15 electrode	– a conductor through which electricity enters or leaves an object, substance, or region
16 meticulously	– in a way that shows great attention to detail; very thoroughly
17 welt	– a leather rim sewn around the edge of a shoe upper to which the sole is attached
18 battered	– injured by repeated blows or punishment
19 urchin	– a mischievous young child, especially one who is poorly or raggedly dressed
20 eel	– a snake-like fish with a slender elongated body and poorly developed fins, proverbial for its slipperiness
21 to net	– catch or land (a fish or other animal) with a net
22 surface	– the outside part or uppermost layer of something
23 to entrance	– fill (someone) with wonder and delight, holding their entire attention
24 gruesome	– causing repulsion or horror; grisly
25 to thrash	– move in a violent and convulsive way
26 to diminish	– make or become less
27 to retreat	– (of an army) withdraw from enemy forces as a result of their superior power or after a defeat
28 to dissect	– methodically cut up (a body, part, or plant) in order to study its internal parts
29 to endure	– suffer (something painful or difficult) patiently
30 array	– an impressive display or range of a particular type of thing

31	sealing wax	– a mixture of shellac and rosin with turpentine and pigment, softened by heating and used to make seals
32	clay	– a stiff, sticky fine-grained earth, typically yellow, red, or bluish-gray in color and often forming an impermeable layer in the soil. It can be molded when wet, and is dried and baked to make bricks, pottery, and ceramics
33	fibre	– a thread or filament from which a vegetable tissue, mineral substance, or textile is formed
34	feeble	– lacking physical strength, especially as a result of age or illness
35	grisly	– causing horror or disgust
36	variously	– in several or different ways
37	to embark	– go on board a ship, aircraft, or other vehicle
38	to calibrate	– mark (a gauge or instrument) with a standard scale of readings
39	pedantic	– of or like a pedant: a person who is excessively concerned with minor details and rules or with displaying academic learning
40	sextant	– an instrument with a graduated arc of 60° and a sighting mechanism, used for measuring the angular distances between objects and especially for taking altitudes in navigation
41	to investigate	– carry out a systematic or formal inquiry to discover and examine the facts of (an incident, allegation, etc.) so as to establish the truth
42	hothouse	– a heated building, typically made largely of glass, for rearing plants out of season or in a climate colder than is natural for them
43	to pore	– be absorbed in the reading or study of
44	to exude	– discharge (moisture or a smell) slowly and steadily
45	impetuously	– see impetuous: acting or done quickly and without thought or care
46	pendulum	– a weight hung from a fixed point so that it can swing freely backward and forward, especially a rod with a weight at the end that regulates the mechanism of a clock
47	ream	– a large quantity of something, typically paper or writing on paper
48	voyage	– a long journey involving travel by sea or in space
49	interlaced	– crossed intricately together; interwoven
50	earth quake	– a sudden and violent shaking of the ground, sometimes causing great destruction, as a result of movements within the earth's crust or volcanic action
51	thunderclap	– a crash of thunder
52	to reverberate	– (of a loud noise) be repeated several times as an echo
53	hammock	– a bed made of canvas or of rope mesh and suspended by cords at the ends, used as garden furniture or on board a ship
54	turmoil	– a state of great disturbance, confusion, or uncertainty
55	unwavering	– steady or resolute; not wavering
56	to deceive	– (of a thing) give a mistaken impression