**Carbon Cycle**

**Enquiry question 1: How does the carbon cycle operate to maintain planetary health?**

|  |  |  |
| --- | --- | --- |
| **Spec Point** | **Article** | **Link** |
| 6.1a | Tropical forests are now emitting more carbon than oxygen, alarming new study finds | <https://www.independent.co.uk/news/science/tropical-forests-carbon-rise-oxygen-study-climate-change-emissions-a7974941.html> |
|  | **Geofactsheet 342**- Introduction: The Carbon Cycle |  |
|  | ^NA FSC resources for Carbon fieldwork | <https://padlet.com/FSCMalhamTarn/CarbonFieldwork> |
| 6.1c | Volcanic eruptions triggered global warming 56m years ago, study reveals (2017) | <https://www.theguardian.com/science/2017/aug/30/volcanic-eruptions-triggered-global-warming-56m-years-ago-study-reveals?CMP=Share_iOSApp_Other> |
| 6.2a | Climate Change dials down Atlantic Ocean heating system | <https://www.bbc.co.uk/news/science-environment-43713719> |
| 6.3a | **Geofactsheet 342**- Introduction: The Carbon Cycle |  |
|  | Invisible scum on sea cuts CO2 exchange with air 'by up to 50%' | <https://www.theguardian.com/environment/2018/may/28/invisible-scum-on-sea-cuts-co2-exchange-with-air-by-up-to-50?CMP=Share_iOSApp_Other> |
| 6.3b | Tropical forests are now emitting more carbon than oxygen, alarming new study finds | <https://www.independent.co.uk/news/science/tropical-forests-carbon-rise-oxygen-study-climate-change-emissions-a7974941.html> |
|  | Invisible scum on sea cuts CO2 exchange with air 'by up to 50%' | <https://www.theguardian.com/environment/2018/may/28/invisible-scum-on-sea-cuts-co2-exchange-with-air-by-up-to-50?CMP=Share_iOSApp_Other> |
|  | There's Worrying New Evidence That Arctic Soils Are Releasing Ancient Stored Carbon | <https://www.sciencealert.com/there-s-worrying-new-evidence-that-arctic-soils-are-releasing-ancient-stored-carbon> |
|  | Deep oceans can help us better understand our climate | <http://www.open.edu/openlearn/nature-environment/deep-oceans-can-help-us-better-understand-our-climate> |

**Enquiry question 2: What are the consequences for people and the environment of our increasing demand for energy?**

|  |  |  |
| --- | --- | --- |
| **Spec Point** | **Article** | **Link** |
| 6.4a | 'Political watershed' as 19 countries pledge to phase out coal (2017) | [https://www.theguardian.com/environment/2017/nov/16/political-watershed-as-19-countries-pledge-to-phase-out-coa](https://www.theguardian.com/environment/2017/nov/16/political-watershed-as-19-countries-pledge-to-phase-out-coal) |
|  | Coal production and consumption fell in  2016 while renewables saw growth, analysis from BP shows (2017) | <https://www.cnbc.com/2017/06/14/coal-production-and-consumption-fell-in-2016-while-renewables-saw-growth-analysis-from-bp-shows.html> |
|  | Australia's greenhouse gas emissions highest on record | <https://www.theguardian.com/environment/2017/dec/11/australias-transport-emissions-in-past-year-the-highest-on-record> |
| 6.4b | Europe's oil imports 'dependent on unstable countries' | <https://www.theguardian.com/environment/2016/jul/12/europes-oil-imports-dependent-on-unstable-countries> |
| 6.4c | **Geofile 713**- The role of TNCs in energy production and distribution |  |
|  | OPEC Is Already Thinking About $70 Oil (2017) | <https://www.bloomberg.com/gadfly/articles/2017-11-05/opec-is-already-thinking-about-70-oil> |
|  | Europe's oil imports 'dependent on unstable countries' | <https://www.theguardian.com/environment/2016/jul/12/europes-oil-imports-dependent-on-unstable-countries> |
| 6.5a | BP takes another $1.7bn Deepwater Horizon charge (2018) | <https://www.ft.com/content/99e62644-0085-3079-b318-332cabed10e4> |
| 6.5c | Canadian tar sands: Interactive map | <https://www.theguardian.com/environment/ng-interactive/2015/may/28/carbon-bomb-canada-tar-sands-fort-mckay-town-sold-itself> |
|  | **Geofile 718**: Fracking hell! A new dash for gas |  |
|  | **Geoactive 461:** The environmental effects of the Deepwater Horizon Oil Spill |  |
|  | **UK frackers are running out of time** | <https://www.theguardian.com/environment/2017/dec/25/uk-frackers-are-running-out-of-time> |
|  | **UK fracking may produce less fuel than claimed, says geologist** | <https://www.theguardian.com/environment/2017/aug/17/uk-fracking-may-produce-less-fuel-than-claimed-says-geologist> |
| 6.6a | **Geofile 599**: The energy mixes of China, Brazil and France |  |
|  | Renewable energy capacity overtakes coal (2016) | <https://www.bbc.co.uk/news/business-37767250> |
|  | Rain or shine: new solar cell captures energy from raindrops  (2018) | <https://www.theguardian.com/environment/2018/mar/13/rain-or-shine-new-solar-cell-captures-energy-from-raindrops> |
|  | BP returns to solar power with $200m stake in Lightsource | <https://www.theguardian.com/business/2017/dec/15/bp-returns-solar-power-stake-lightsource> |
|  | Ikea joins Big Clean Switch to offer 100% renewable energy tariff | <https://www.theguardian.com/business/2018/feb/20/ikea-joins-big-clean-switch-to-offer-100-renewable-energy-tariff> |
|  | Tidal energy – the UK's best kept secret | <https://www.theguardian.com/environment/2011/may/18/tidal-energy-uk-best-secret> |
|  | Maldives on the way to becoming a low-carbon economy | <http://menafn.com/1096331593/Maldives-on-the-way-to-becoming-a-lowcarbon-economy> |
| 6.6c | The carbon-capture era may finally be starting (2018) | <https://www.technologyreview.com/s/610296/the-carbon-capture-era-may-finally-be-starting/> |
|  | Viewpoint: The Indian state to become a global leader in clean energy (2018) | <https://www.bbc.co.uk/news/world-asia-india-42971504> |
|  | How Bill Gates aims to clean up the planet/ CCS (2018) | <https://www.theguardian.com/environment/2018/feb/04/carbon-emissions-negative-emissions-technologies-capture-storage-bill-gates> |

**Enquiry question 3: How are the carbon and water cycles linked to the global climate system?**

|  |  |  |
| --- | --- | --- |
| **Spec Point** | **Article** | **Link** |
| 6.7a | Half of world's oceans now fished industrially, maps reveal (2018) | <https://www.theguardian.com/environment/2018/feb/22/half-of-worlds-oceans-now-fished-industrially-maps-reveal> |
| 6.7b | How does climate change affect coral reefs? | <https://oceanservice.noaa.gov/facts/coralreef-climate.html> |
|  | Increasing ocean acidification threatens Alaska’s valuable commercial and subsistence fisheries | <https://www.climate.gov/news-features/featured-images/increasing-ocean-acidification-threatens-alaska%E2%80%99s-valuable-commercial> |
|  | How will acidification change the ocean? | <https://www.weforum.org/agenda/2015/07/how-will-acidification-change-the-oceans> |
|  | More acidic oceans 'will affect all sea life' (2017) | <https://www.bbc.co.uk/news/science-environment-41653511> |
| 6.7c | Climate change could triple Amazon drought, study finds (2015) | <https://www.washingtonpost.com/news/energy-environment/wp/2015/10/12/climate-change-could-triple-amazon-drought-study-finds/?noredirect=on&utm_term=.572f59d19a39> |
|  | The Amazon effect: how deforestation is starving São Paulo of water (2017) | <https://www.theguardian.com/cities/2017/nov/28/sao-paulo-water-amazon-deforestation?CMP=> |
| 6.8a | Why forests are spreading in the rich world | <https://www.economist.com/the-economist-explains/2017/12/12/why-forests-are-spreading-in-the-rich-world?fsrc=scn/tw/te/bl/ed/whyforestsarespreadingintherichworldtheeconomistexplains> |
|  | Ultimate bogs: how saving peatlands could help save the planet | <https://www.theguardian.com/environment/2017/jul/28/ultimate-bogs-how-saving-peatlands-could-help-save-the-planet> |
|  | PODCAST- Forests and the Carbon Cycle | <https://itunes.apple.com/gb/podcast/rgs-ibg-ask-the-experts/id1196746426?mt=2> |
|  | Urban ‘forests’ can store almost as much carbon as tropical rainforests | <http://theconversation.com/urban-forests-can-store-almost-as-much-carbon-as-tropical-rainforests-98885> |
| 6.8b | Mapped: How global warming and land-use change threaten water security worldwide | <https://www.carbonbrief.org/mapped-how-global-warming-land-use-change-threaten-water-security-worldwide?utm_content=bufferdc481&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer> |
| 6.8c | Carbon dioxide pollution is making rice less nutritious and could stunt growth in millions of children, finds study | <https://www.independent.co.uk/environment/rice-carbon-dioxide-emissions-less-nutritious-stunt-growth-children-health-a8365556.html> |
|  | Help small island states win their battle against climate change | <https://www.theguardian.com/environment/2014/aug/29/small-island-states-climate-change-sea-level> |
|  | Threats to oceans and coasts | <http://wwf.panda.org/our_work/oceans/problems/> |
|  | Arctic permafrost thawing faster than ever, US climate study finds (2017) | [https://www.theguardian.com/environment/2017/dec/12/arctic-permafrost-sea-ice-thaw-climate-change-report?CMP=Share\_iOSApp\_Othe](https://www.theguardian.com/environment/2017/dec/12/arctic-permafrost-sea-ice-thaw-climate-change-report?CMP=Share_iOSApp_Other) |
|  | Great Barrier Reef with Sir David Attenborough- Episode 3 | <https://www.bbc.co.uk/programmes/b06whkdf> |
| 6.9a | Even with global warming, extremely hot summers would be less frequent if it weren’t for deforestation | <https://www.climate.gov/news-features/featured-images/even-global-warming-extremely-hot-summers-would-be-less-frequent-if-it> |
|  | Planet has just 5% chance of reaching Paris climate goal, study says | <https://www.theguardian.com/environment/2017/jul/31/paris-climate-deal-2c-warming-study> |
|  | Climate change dials down Atlantic Ocean heating system | <https://www.bbc.co.uk/news/science-environment-43713719> |
|  | There's Worrying New Evidence That Arctic Soils Are Releasing Ancient Stored Carbon | <https://www.sciencealert.com/there-s-worrying-new-evidence-that-arctic-soils-are-releasing-ancient-stored-carbon> |
|  | Massive Carbon Sink May Be More Resilient Than Scientists Thought (2017) | <https://www.scientificamerican.com/article/massive-carbon-sink-may-be-more-resilient-than-scientists-thought/> |
|  | Rise in global carbon emissions a 'big step backwards', says BP  (June 2018) | <https://www.theguardian.com/world/2002/mar/31/1> |
|  | Are we reaching our climate change tipping points? | <https://www.weforum.org/agenda/2017/11/are-we-reaching-our-climate-change-tipping-points> |
|  | <https://www.bbc.co.uk/news/science-environment-44875508> | <https://www.bbc.co.uk/news/science-environment-44875508> |
| 6.9b | Mexico launches pioneering scheme to insure its coral reef | <https://www.theguardian.com/environment/2017/jul/20/mexico-launches-pioneering-scheme-to-insure-its-coral-reef> |
| 6.9c | ‘Carbon bubble’ could spark global financial crisis | <https://www.theguardian.com/environment/2018/jun/04/carbon-bubble-could-spark-global-financial-crisis-study-warns?CMP=share_btn_tw> |
|  | Limiting global warming to 1.5c would have ‘significant economic benefits’ | <https://www.carbonbrief.org/limiting-global-warming-1point5-celcius-would-have-significant-economic-benefits?utm_content=buffer5df62&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer> |
|  | California becomes first US state to mandate solar on homes (2018) | <https://www.bbc.co.uk/news/world-us-canada-44059865> |
|  | Key 'step forward' in cutting cost of removing CO2 from air(2018) | <https://www.bbc.co.uk/news/science-environment-44396781> |
|  | Turning carbon dioxide into rock - forever | <https://www.bbc.co.uk/news/world-43789527> |
|  | More than 100 cities now mostly powered by renewable energy, data show | <https://www.theguardian.com/cities/2018/feb/27/cities-powered-clean-energy-renewable?CMP=Share_iOSApp_Other> |
|  | The Amazon town, a coral reef, big oil, and a catastrophe waiting to happen | <https://www.theguardian.com/environment/2017/dec/27/amazon-town-coral-reef-big-oil-a-catastrophe-waiting-to-happen> |
|  | Proper carbon tax could wipe billions from polluters' profits (2018) | <https://www.theguardian.com/environment/2017/sep/04/emissions-carbon-tax-profits-polluters-paris-targets> |

|  |  |  |
| --- | --- | --- |
|  | Uk’s biggest Carbon Capture Project | https://www.theguardian.com/environment/2019/jun/27/uks-biggest-carbon-capture-project-is-step-change-on-emissions |

<https://www.independent.co.uk/environment/wind-power-offshore-renewable-energy-electricity-a8811616.html>- renewable energy UK

<https://www.theguardian.com/world/2019/mar/08/back-in-the-water-fukushima-no-go-zone-gets-first-surf-shop-since-disaster>- impacts of nuclear energy

<https://www.nytimes.com/2019/03/08/world/asia/china-shale-gas-fracking.html>

Fracking

<https://www.bbc.co.uk/news/science-environment-47472602>

a future carbon sink?

<https://www.economist.com/graphic-detail/2019/03/05/climate-change-will-affect-more-than-the-weather>

Carbon EQ3

<https://www.independent.co.uk/environment/climate-change-disease-mosquitoes-zika-virus-yellow-fever-dengue-spread-a8809996.html>

carbon eq3