

## Lab: Global Warming & the IPCC

**Background:** The Intergovernmental Panel on Climate Change is the world's leading authority on climate change. The IPCC was created to provide policymakers with regular scientific assessments on climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation options. Answer the following questions using their [most recent report](#). (3 pts each / #30 = 13 pts)

### PART A (pg6)

1. What is the current estimated rate of anthropogenic warming? (A.1) (pg6)
2. How does warming over land compare with warming over the ocean? (A.1) (pg6)
3. What are the **three** substances named as responsible for the maximum temperature rise, determined by cumulative net CO<sub>2</sub> emissions and net non-CO<sub>2</sub> radiative forcing? (SPM.1) (pg8)

### PART B (pg9)

4. How much above the global mean surface temperature (GMST) are extreme hot days in mid-latitudes (like Cary, NC) expected to rise? Give both the 1.5°C amount AND the 2°C amount. (B.1) (pg9)
5. Which specific areas are cited as likely to experience risk from heavy precipitation events? (B.1) (pg9)
6. What are the risks of sea level rise to small islands, low-lying coastal areas and deltas? (B.2) (pg10)
7. Which biomes are particularly at risk from climate change-induced degradation and loss? (B.3) (pg10)
8. Describe the projected loss to coral reefs. (B.3) (pg10)
9. What are the impacts expected to cause increasing risk to fisheries and aquaculture? What is the projected decline in the global annual catch? (B.4) (pg11)
10. Human health is also at risk from global warming. Name **two** vector-borne diseases that are projected to increase AND explain what is meant by the term "vector-borne disease". (B.5) (pg11)
11. Increasing food insecurity is also a concern that will result from a warming planet. What parts of the world are at the greatest risk? (B.5) (pg11)
12. List **three** options to reduce the risks of global warming to natural and managed ecosystems. (B.6) (pg12)
13. List **three** options to reduce the risks of global warming to health, livelihoods, food, water, and economic growth. (B.6) (pg12)
14. List **three** options to reduce the risks of global warming to urban areas. (B.6) (pg12)
15. Rank these areas from greatest risk to least risk: warm-water corals, mangroves, arctic region and terrestrial ecosystems. (SPM.2) (pg13)

### PART C (pg14)

16. To limit global warming to below 2°C, CO<sub>2</sub> must decline by what percent by 2030? By 2070? (C.1) (pg14)
17. According to the graph "Global total net CO<sub>2</sub> emissions", what is the range of emissions achievable by the year 2100 under the four model pathways with little or no overshoot? (SPM.3a) (pg15)
18. According to the chart "Breakdown of contributions to global net CO<sub>2</sub> emissions in four illustrative model pathways", what industry will be primarily responsible for the reduction in CO<sub>2</sub> emissions under all four model pathways? (SPM.3b) (pg16)

19. What is the main driver of CO<sub>2</sub> reduction in model pathway P1? (SPM.3b) (pg16)
20. What is the main driver of CO<sub>2</sub> reduction in model pathway P2? (SPM.3b) (pg16)
21. What is the main driver of CO<sub>2</sub> reduction in model pathway P3? (SPM.3b) (pg16)
22. What is the main driver of CO<sub>2</sub> reduction in model pathway P4? (SPM.3b) (pg16)
23. Pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in what five systems? (C.2) (pg 17)
24. All pathways that limit global warming to 1.5°C with no or limited overshoot project the removal of how much CO<sub>2</sub> this century? What does the unit, GtCO<sub>2</sub>, stand for? (C.3) (pg19)

**PART D** (pg20)

25. According to the IPCC, will the ambitions of the Paris Agreement be enough to limit warming to 1.5°C? (D.1) (pg20)
26. What are the benefits of targeting a 1.5°C warming as opposed to a 2°C warming? (D.2) (pg20)
27. According to the chart “Indicative linkages between mitigation options and sustainable development using SDGs”, which **two** SDGs (Sustainable Development Goals) have the highest synergy with climate mitigation of energy supply? (SPM.4) (pg22)
28. Which SDG has the highest trade off with climate mitigation of energy demand? (SPM.4) (pg22)
29. Which **three** SDGs do you feel are the most important synergies that will result from climate mitigation? (SPM.4) (pg22)
30. Discuss your thoughts on the evidence for climate change, the necessary steps to mitigate climate change and the resulting synergies that will result from climate mitigation. (13 pt question)

