**A Perfect Planet**

**Episode 2: The Sun**

**A Perfect Planet**

1. How far away is the Sun?
2. How long does it take for the Sun’s rays to reach Earth?
3. True or false? The Sun shapes the existence for every creature on Earth.
4. True or false? Almost every part of the Earth’s surface receives the same quantity of sunlight throughout the year.
5. How much sunlight is received?

**TRF**

1. Where is 12 hours of daily sunlight guaranteed throughout the year?
2. Which ecosystem benefits from this?
3. Which tropical rainforest tree produces fruit throughout the year?
4. What does the fig tree require to produce ripe fruit?
5. How are fig wasps and fig trees interdependent (rely on each other)?
6. Describe the life cycle of fig wasps.
7. Do tropical rainforests have seasons?
8. How many degrees does the Earth tilt?
9. What causes Earth to have seasons?

**The High Arctic**

1. How long does the High Arctic experience freezing darkness?
2. What is the closest land to the North Pole?
3. How have Muskox adapted to survive the harsh conditions?
4. Which predator preys on Muskox?
5. How often does a pack of arctic wolves need to make a kill?
6. What other food source to wolves depend on?
7. How have wood frogs adapted to the high arctic?
8. How have garter snakes adapted to cold environments?

**Karak Lake**

1. Where is Karak lake?
2. How many hours of sunlight does Karak lake receive during the summer?
3. How many calories do Arctic fox cubs need each day?
4. What is the prey of the Arctic fox?
5. What is the impact of being a weaker Snow goose?
6. How have foxes adapted to the environment?
7. What impact is climate change having on the foxes?

**The Sahara**

1. Why is the environment challenging for living organisms?
2. Why is the temperature on the surface of the sand at 10am?
3. How has the Saharan silver ant adapted to the environment?
4. By how much has the area of the Sahara expanded by in the last 100 years?
5. What proportion of all land is at risk of desertification?
6. How is the sun a potential benefit to humanity?

**Forests of Central China**

1. What happens to leaves in the autumn?
2. How has the golden snub-nosed monkey adapted to the forests of central china?

**Snares Island, New Zealand / Alaska’s Aleutian Islands**

1. How have sooty shearwaters adapted to avoid the cold of winter?
2. What blooms due to the sunlight?
3. What feeds on the plankton that blooms around Alaska’s Aleutian Islands?
4. What do booth the wales and sooty shearwaters feed on in these nutrient rich waters?

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**Answers**

1. 93 million miles away
2. 8 minutes
3. True
4. True
5. 4380 hours of it
6. The tropics, close to the equator
7. The tropical rainforest
8. Fig tree
9. Sun light and fig wasps
10. The fig wasp lays its eggs within the fig fruit (which allows the fig wasps access for just one day) and unpacks fig pollen from her abdomen and fertilises the internal flowers the fruit. The eggs remain in the unripe fruit which then hatch after 5 weeks.
11. Females access a fig fruit to lay eggs and pollinate the flowers of the fruit. They then die. Males hatch after 5 weeks and mate with their unborn sisters. The males burrow out and sacrifice themselves to ants as the females fly from the fruit to find a new fig fruit to lay eggs. They have 48 hours to do this. The males then mate with their unhatched sisters. They then sacrifice themselves to allow their sisters to fly off.
12. No
13. 23.5°
14. The Earth’s tilt
15. 12 months
16. Elsmere Island
17. They feed during the summer to build up fat reserves to survive the winter. They herd and close ranks when being targeted by arctic wolves. They give birth during the summer months.
18. Arctic wolves
19. Once every three weeks
20. Arctic hares
21. It freezes during the winter and its heart stops. When the sun rises its frozen blood melts and flows as its heart beings to beat. It is cryogenic.
22. Hibernate during the winter months. They charge themselves after hibernation when the sun rises to enable them to move quickly. Females absorb heat from males as they are larger and come out of hibernation earlier. Females weed out the strongest male snakes by moving to a higher point where only the fittest can access.
23. Canada, north of the Arctic Circle
24. 24 hours
25. Nearly 300 calories of food each day
26. Snow geese / snow geese eggs
27. They have to nest on the outskirts of the colony (the first part to be raided by foxes) and are more likely to lose their eggs to Arctic foxes
28. They stash eggs away for the winter, stealing over 800 eggs.
29. The timing of the seasons and migration of the geese are becoming unpredictable.
30. Very hot/dry/little cloud cover
31. 60°C
32. Emerge at midday to look for creatures killed by the heat. They are one of the fastest creatures on Earth. They have five minutes in the sun before it kills them. Every few seconds they spin around to take a bearing from the Sun, so they don’t get lost. Glass hairs and shining bodies reflect the Sun’s rays. They work in teams to recover dead creatures and take them to their underground den.
33. Twice the size of France
34. 1/3
35. One hour of solar energy contains more power than that used by all humanity in an entire year.
36. The green chlorophyl breaks down chemically and is reabsorbed.
37. They feed up on pinecones, rich in fats, to build a calorie reserve for the winter. Conflicts occur when pinecones are in short demand.
38. Gorge on fish then migrate for 4 weeks, longest migration on Earth, following the Sun. They travel 10,000 miles from New Zealand to Alaska’s Aleutian Islands.
39. Plankton
40. Krill
41. Krill