Study Guide for Unit 23:
Grasslands

Grasslands

Read Unit 23 (Grasslands) *Grasslands* and *Grasslands Provide Valuable Ecosystem Services*.

1. How much of the land on the Earth is covered by grasslands?

2. Why are grasslands found in some places and forests in others?

There are 3 major kinds of grasslands: tropical, temperature, and cold.

3. Which kind of grasslands prefer warmer places (higher temperatures)?

4. Which kind of grasslands prefer colder places (low temperatures)?

5. Which kind of grasslands prefer moderate climates (not too hot, not too) in places with 4 seasons?

6. Which kind of grasslands are also called prairies?

7. Which kind of grasslands are also called savannas?

8. Which kind of grasslands are steppes?

9. Which kinds of grasslands have very thin layers of soil?

10. Which kinds of grasslands have very thick layers of soil?

11. Which kind of grasslands have a higher species diversity than other kinds of grasslands?

Ecosystem Services II

27. How do humans typically create carbon dioxide pollution?

28. How do grasslands help reduce our carbon dioxide pollution?

29. Some of the carbon that grasses absorb from the atmosphere becomes part of the soil when dead grasses on the ground are decomposed by fungi and bacteria. Why is

storing carbon in soil an ecosystem service? In other words, how does it benefit humans if there is less carbon dioxide in the atmosphere?

Economic Benefits of Grasslands

Read Unit 23 (Grasslands) *Economic Benefits of Grasslands and Grasslands Provide Valuable Ecosystem Services.*

12. True or false? “Some of the most nutrient-rich soil in the world is found on grasslands, making them excellent places for growing food.”

13. What economic benefits do grasslands provide?

14. What is the most widespread human use of grasslands? In other words, what do we use grasslands for the most?

15. About how much of the world’s grasslands are used for grazing livestock like cattle, goats, and sheep?

16. About how much of the land in the United States is used to grow food to feed livestock like cattle?

17. Suppose we can use land to grow a food crop (like wheat) or we can use it to grow food for cattle (cows). In both cases, we have something to eat (wheat or meat), but which choice would give us MORE food to eat?

18. True or false? “Some grasslands do NOT have soil that is good for growing food. However, often this land can produce food for us, because we can sustainably graze livestock like cattle, sheep, and goats on the land.”

Ecosystem Services I

19. What ecosystem services do grasslands provide?

20. True or false? “The roots of grasses hold onto soil, and help prevent soil erosion.”

20. Do grasses and other plants make rainwater runoff move faster or slower? How? Why?

21. If rainwater runoff flows more slowly, does more water soak into the ground or less? Why?

22. How do grasses and other plants help reduce flooding?

23. How do grasses and other plants help reduce water pollution?

24. True or false? “Grasses absorb water and nutrients as water flows by them, so less rain runoff carrying pollutants gets into bodies of water like rivers, lakes, and the ocean.”

25. How do grasses and other plants help increase our supplies of fresh water?

26. True or false? “Water is filtered as it flows through soil and rocks as groundwater (bacteria and contaminants get trapped), making it cleaner.”

Soil

Read Unit 23 (Grasslands) *Soil: Not Just Sediments.*

30. What is soil?

31. How is more soil created over time? (Where do the rocks come from? Where do the nutrients come from?)

32. Why is soil a valuable resource? What would life on land be like without soil?

33. What are the two major things that cause soil to erode? In other words, what carry soil away from places and thus reduces the ability of plants to grow in these places?

34. How fast can soil be created by ecosystems like grasslands?

35. Which happens faster, soil formation (creation of new soil) or soil erosion (removal of soil)? What are the implications? Is it important to prevent soil erosion?

Kinds of Soil

Some soils are better than others for growing things. One important factor is the size of the pieces (particles) of rock making up the soil. Soils typically include bits of rock of many sizes, but often one size range is more abundant (more common) than others.

36. Which kind of particle is the largest one: clay, sand, or silt?

37. Which kind of particle is the smallest one: clay, sand, or silt?

38. Which kind of soil is thick, making it more difficult for roots to grow down into it?

39. Which kind of soil hold has lots of empty space between its particles, making it easy for roots to grow down into it?

40. Which kind of soil has lots of empty space between its particles, so the roots of plants have difficulty holding onto it? In other words, which kind of soil erodes more easily?

41. Which kind of soil holds onto moisture poorly, because the water passes through it easily?

42. Which kind of soil is typically best for plants to grow in?

Threats to Grasslands & Natural Grazing

Read Unit 23 (Grasslands) *Threats to Grasslands* and *Wild herbivores graze in herds and teach us how to graze our animals*.

43. What are the major ways in which grasslands are being destroyed by humans? In other words, why are there fewer and fewer grasslands?

44. What is desertification?

45. What are the main causes of desertification?

46. True or false? “Once grasslands become deserts, it is very difficult or impossible to restore them.”

The grasses on grasslands have evolved to adapt to how wild herbivores graze. Many species graze close together in large herds that graze in an area for a short period of time, then move on to a new spot.

47. Why do wild herbivores on grasslands graze close together in large herds? What is the most important reason?

48. Why do wild herbivores grazing on grasslands in large herds frequently change location?

Effects of Grazing

49. Why is it important for water to be able to reach the seeds of grass in soil?

50. If there are too many grazers and/or the animals are grazing for too long, what happens to the sediments (soil)? Why does this reduce the amount of grass for them in the future?

51. If there are the right number of grazing animals (not too many and not too few) and the animals are grazing for the right length of time (not too long and not too short), what happens to the sediments (soil)? Why does this increase the amount of grass for them in the future?

52. Under what circumstances will livestock and wild herbivores chew down to the roots of a plant, killing it and resulting in less food for them in the future?

53. If there are the right number of grazing animals (not too many and not too few) and the animals are grazing for the right length of time (not too long and not too short), how does the way they eat grass help more grass grow in the future?

54. If there are NOT enough grazers and/or the animals are not grazing long enough, grass will grow taller. Why will less grass grow in the future if this happens?

55. Given the choice, livestock and wild herbivores will eat the easiest to chew and digest grasses first, and only eat the weeds (harder to chew and digest grasses) if there are no other options. If there are NOT enough grazers and/or the animals are not grazing long enough, which kind of grasses will become more abundant, easier-to-chew-and-digest grasses or the weeds? Why? Is this good or bad for the grazers?

56. True or false? “Urine and fecal matter from grazing livestock and wild herbivores decompose and add nutrients to the soil, which helps more grass (food) grow for them in the future.”

Grazing Methods on Ranches

Read Unit 23 (Grasslands) *Threats to Grasslands* and until the end of the Unit.

57. Describe how we can graze our livestock such as cattle like wild herds of animals.

58. Why is grazing like wild herd animals better for grasslands than just letting our livestock graze wherever they want in one, large pasture?

59. Which kind of grazing takes the most work? In other words, which kind of grazing requires the most people and effort?

60. True or false? “Grazing our herds like wild grazers reduces the profits made by ranchers.”

61. True or false? “Grazing our herds like wild grazers instead of more traditional styles of ranching produces less meat.”

62. How can grazing our herd more like wild grazers produce more meat and higher profits?

How we can protect grasslands

63. True or false? “Grasslands need grazers. If there are not a lot of herbivores grazing, grasslands will degrade and will not support as much life in the future.”

64. What are shelterbelts?

65. What is the conservation reserve program?

66. What is a conservation easement?

67. How can we reduce desertification and protect grasslands?

• build more roads through grasslands so people do not have go off road and compact the soil

• encourage ranchers to graze on national grasslands but to do so sustainably

• pay for ecosystem services: pay landowners to not farm or ranch and allow wild animals to graze

• plant trees in strategic places to block wind

• support changing national grasslands into national parks

• support spraying pesticides to kill pests that cause diseases grasses