

1.	The principle that early successional species may prevent the entrance of later successional species is called:
a)	tolerance
b)	succession
c)	facilitation
d)	interference
e)	reforestation
	Ans: d Difficulty: Easy Link to: 10.5

2.	The principle that one species can prepare the way for the next and/or may even be necessary for the occurrence of the next is called:
a)	tolerance
b)	succession
c)	facilitation
d)	interference
e)	reforestation
	Ans: c Difficulty: Easy Link to: 10.5

3.	Gradual, sequential changes in the composition of an ecosystem, particularly following an initial disturbance is called:
a)	tolerance
b)	succession
c)	facilitation
d)	interference
e)	reforestation
	Ans: b Difficulty: Easy Link to: 10.3

4.	In bogs, sedge plants form floating mats that grow out over the water surface. What role do these mats play in natural succession:
a)	they reduce the acidity of the water, allowing a wider range of species to colonize the bog

b)	sedges are climax species, the result of increasing eutrophication of the water
c)	they choke off any trees that might take root and arrest succession
d)	they are pioneer species that form a substrate from which other plants grow
e)	the sedges widen bogs and promote their eventual evolution into ponds
Ans: d Difficulty: Medium Link to: 10.3	

5.	Chapter 10 discusses the problems associated with _____ of the Euphrates Marshlands.
a)	flooding
b)	warming
c)	destruction
d)	timbering
e)	pollution
Ans: c Difficulty: Easy Link to: Case Study	

6.	The example of the Boundary Waters Canoe Area describes how, even with no major human disturbance, fire periodically burns large areas of wilderness. Fire initiates the important and necessary natural process of:
a)	natural selection
b)	succession
c)	episodic conflagration
d)	soil development
e)	compaction of the soil
Ans: b Difficulty: Easy Link to: 10.1	

7.	Chronic patchiness of vegetation occurs mainly within:
a)	tropical rain forests
b)	deserts
c)	areas with low nutrient soil
d)	bogs

e)	forests undergoing secondary succession
	Ans: b Difficulty: Easy Link to: 10.5

8.	The seeds of early-successional species are readily transported by wind or animals while seeds of late-successional plants are distributed less readily. This is an example of:
a)	chronic patchiness
b)	life history differences
c)	ecosystem recovery
d)	interference
e)	facilitation
	Ans: b Difficulty: Easy Link to: 10.5

9.	Succession usually occurs:
a)	in harsh environments
b)	where nutrients are limited
c)	where disturbance is unusual or rare
d)	where a physical, degrading environment dominates
e)	after each disturbance, the environment fulfills all the above criteria
	Ans: c Difficulty: Easy Link to: 10.3

10.	Why does the availability of chemical elements increase immediately after a fire?
a)	many elements are blown onto the atmosphere
b)	fire restores the natural habitat
c)	many compounds in the ash are highly soluble in water
d)	toxins are removed by smoke
e)	natural predators are eliminated by the fire
	Ans: c Difficulty: Medium Link to: 10.4

11.	Of the following, which is the major distinction between primary succession and secondary succession?
a)	length of time necessary for recovery
b)	secondary succession involves human disturbance or intervention
c)	in secondary succession, there are remnants of a previous biological community
d)	primary succession is characterized by low genetic diversity
e)	amount of soil nutrients present
	Ans: c Difficulty: Easy Link to: <a href="#">A Closer Look 10.1, 10.3</a>

12.	In which of the following examples will primary succession occur?
a)	in the rain shadow of mountains
b)	at the edges of retreating glaciers
c)	in a forest after a fire
d)	on abandoned pastures
e)	in dune areas after a hurricane
	Ans: b Difficulty: Medium Link to: <a href="#">10.3</a>

13.	Late successional plants:
a)	are shade intolerant
b)	require soil rich in all nutrients
c)	are called "climax species"
d)	grow rapidly
e)	have seeds that are widely dispersed
	Ans: c Difficulty: Easy Link to: <a href="#">10.3</a>

14.	Early successional plants:
a)	grow slowly
b)	are shade tolerant
c)	are called "climax species"
d)	require soils rich in nutrients
e)	have seeds that are not widely dispersed

	<p>Ans: d Difficulty: Easy Link to: 10.3</p>
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15.	What happens if an ecosystem persists for a very long period without any disturbances?
a)	all wild fires are suppressed naturally
b)	a slow definite loss of stored chemicals
c)	accumulation of high biomass occurs
d)	the soil ability to store chemicals increases
e)	the reproductive rate of plants increases
	<p>Ans: b Difficulty: Easy Link to: 10.4</p>

16.	Which of the following is an example for 'facilitation'?
a)	dune grass anchors the sandy soil and allows other seeds of other plants to germinate
b)	a bog closes up because sphagnum moss covers up the water
c)	early successional species produce seeds that are readily transported by wind and animals
d)	dense mats of early successional grasses cover the ground so later successional species cannot reach the soil and germinate
e)	none of the above
	<p>Ans: a Difficulty: Medium Link to: 10.5</p>

17.	The storage of chemical elements and organic matter is highest:
a)	in the beginning of succession
b)	in the middle of succession
c)	in the end of succession
d)	as rapid new growth occurs
e)	The storage of chemical elements and organic matter does not peak in a specific succession stage. It is always the same.
	<p>Ans: b Difficulty: Medium Link to: 10.4</p>

18.	Which of the following characteristics depicts an early successional plant?
I.	fast growing
II.	long-lived
III.	needs high amounts of nutrients
a)	I only
b)	II only
c)	III only
d)	I and II
e)	I and III
	Ans: e Difficulty: Medium Link to: 10.3

19.	Immediately after a fire, vegetation grows back extremely rapidly mainly because:
a)	the shade of the forest is gone, and all the plants are able to grow faster
b)	there is an increase in the availability of chemical elements
c)	of an increase of organic compounds in the soil
d)	there is sufficient water for all new plants available
e)	predators are removed from the environment
	Ans: b Difficulty: Medium Link to: 10.3

20.	Succession in a bog is the process that:
a)	begins with forest and ends with a sphagnum moss filled bog
b)	begins with open water and ends with a forest
c)	fills up a body of water with sediment
d)	increases the chemical elements in a body of water
e)	allows a pond to change from an oligotrophic to an eutrophic environment
	Ans: b Difficulty: Easy Link to: 10.3

21.	As a pond goes from an early successional stage to late succession, it acquires all of the following characteristics except:
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a)	water in the pond becomes richer in nutrients
b)	sediments at the bottom of the pond become more organic rich
c)	water in the pond becomes less clear
d)	greater biological productivity
e)	the pond becomes "oligotrophic"
Ans: e Difficulty: Difficult Link to: 10.3	

22.	A forest in equilibrium:
a)	goes downhill from a biological viewpoint
b)	increases its capacity for storing chemical elements
c)	is important for recreation and from the aesthetic standpoint of view
d)	is an important virgin wilderness ecosystem
e)	does not exist
Ans: a Difficulty: Medium Link to: 10.4	

23.	Generally, from early- to mid-succession, a community experiences:
a)	an increase in diversity and a decrease in biomass
b)	an increase in diversity and an increase in biomass
c)	a decrease in diversity and a decrease in biomass
d)	a decrease in diversity and an increase in biomass
e)	no change in either diversity or biomass
Ans: b Difficulty: Easy Link to: 10.3	

24.	How may earlier and later species in succession interact with each other?
I.	facilitation
II.	interference
III.	life history differences
a)	I only
b)	II only
c)	III only
d)	I and II

e)	I, II and III
	Ans: e Difficulty: Medium Link to: 10.3

25.	If an ecosystem persists a long time without disturbance:
a)	chronic patchiness will develop
b)	a "steady state" stage will develop
c)	there will be a high content of organic matter in the soil
d)	there will be a slow but definite loss of chemical elements from the soil
e)	it is not able to support rapid growth
	Ans: d Difficulty: Medium Link to: 10.4

26.	The main difference between a pond and a bog in the succession process is:
a)	acidic water in ponds
b)	eutrophication in bogs and oligotrophication in ponds
c)	at the end of the succession, the bog itself is usually disappeared
d)	a bog fills up from the top to the bottom, whereas a pond fills from the bottom to the top
e)	a bog has inlets and outlets while a pond usually has only inlets but no outlets
	Ans: c Difficulty: Medium Link to: 10.3

27.	Since the extensive fires in Yellowstone National Park in 1988, the park often has been cited as an example of the connection between forest fire and natural succession. An important part of understanding the danger of wildfire in Yellowstone is understanding its history. From the time of the founding of the park in 1872 until 1963, what was the policy regarding wildfires?
a)	to suppress all fires
b)	to allow all fires started naturally to burn naturally
c)	park officials set annual control burns
d)	seasonal control – suppress fires during the tourist season
e)	to allow fires in areas with species that need fire to reproduce



	<p>Ans: a          Difficulty: Medium          Link to: 10.1</p>
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28.	A depauperate ecosystem has all of the following characteristics except:
a)	it is less able to support rapid growth
b)	it has a high biomass density
c)	it has a high biological diversity
d)	it develops patchiness through time
e)	it slowly "runs down"
	<p>Ans: d          Difficulty: Medium          Link to: 10.5</p>

29.	In a forest ecosystem, most short-lived plant species die out after about 30 years of ecological succession because these species:
a)	cannot tolerate the higher levels of nutrients in the soil
b)	require a high groundwater level
c)	live no longer than 30 years
d)	cannot grow in the shade of trees that develop later
e)	become victims of herbivorous animals species that move in
	<p>Ans: d          Difficulty: Medium          Link to: 10.3</p>

30.	Fire suppression in a forest can actually lead to <u>increased</u> danger from future fires because it leads to an increased _____ of trees and increased amounts of _____ on the forest floor.
a)	number; organic matter
b)	height; seedlings
c)	root depth; weeds
d)	height; insect pests
e)	fire resistance; grass
	<p>Ans: a          Difficulty: Medium          Link to: 10.1</p>

31.	The main reason that succession does not lead to a "climax state", in which organic matter and stored chemical elements are both at a maximum is that:	
a)	organic matter and chemical elements become concentrated in the soil, not in biomass	
b)	after a time, decreased input of sunlight reduces biological production	
c)	human activities always interfere before the final balance is achieved	
d)	late-successional animal species deplete the ecosystem of organic matter and chemical elements	
e)	through time, erosion removes organic matter and chemical elements	
	Ans: e Difficulty: Medium Link to: 10.3	

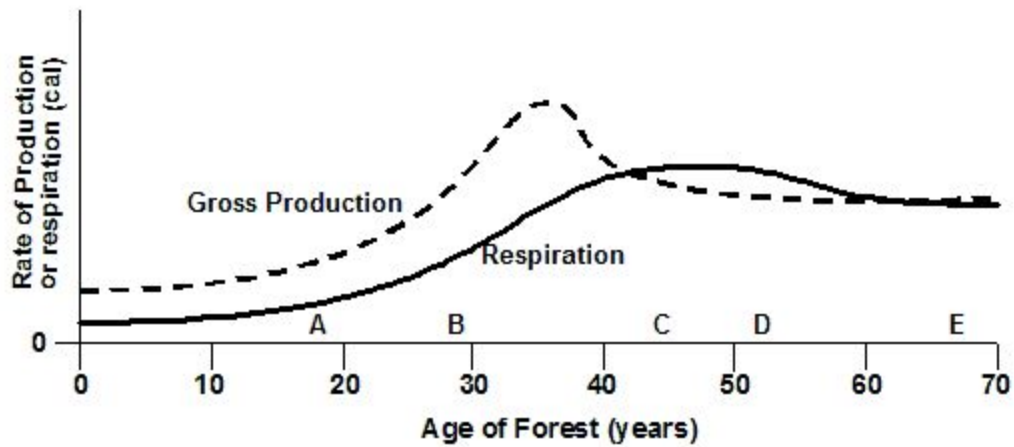
32.	Which of the following is an example of facilitation?	
a)	fire helps some seeds germinate	
b)	bamboo growth prevents neighboring plant species from germinating	
c)	pine trees provide shade that promotes the growth of oak trees	
d)	lichens breaking down bare rock	
e)	all of these	
	Ans: c Difficulty: Medium Link to: 10.5	

33.	In 1980 a hurricane struck the island of Bimini killing 30% of the date palms on the island. This is an example of:	
a)	succession	
b)	density-independent population regulation	
c)	density-dependent population regulation	
d)	a type-III stable age structure	
e)	trophic-level efficiency	
	Ans: b Difficulty: Hard Link to: 10.3	

34.	<i>In the typical pattern of succession after a farm field in New England has been abandoned, the early successional stage is composed primarily of short-lived herbaceous plants (weeds, for example). The intermediate successional stage consists of fast-growing tree species, including white pine and pin cherry. Finally the late successional stage includes slower-growing tree species, such as sugar maple and beech.</i> Which species is the most tolerant of harsh environmental conditions?	
a)	weeds	
b)	white pine	
c)	sugar maple	
d)	beech	
e)	pin cherry	
	Ans: a Difficulty: Easy Link to: 10.3	

35.	<i>In the typical pattern of succession after a farm field in New England has been abandoned, the early successional stage is composed primarily of short-lived herbaceous plants (weeds, for example). The intermediate successional stage consists of fast-growing tree species, including white pine and pin cherry. Finally the late successional stage includes slower-growing tree species, such as sugar maple and beech.</i> Which of the species listed above is most shade-tolerant?	
a)	weeds	
b)	pin cherry	
c)	white pine	
d)	sugar maple	
e)	beech	
	Ans: d Difficulty: Easy Link to: 10.3	

36. The curves above show total community gross production (dotted line) and respiration (solid line) over time for a forest undergoing succession.

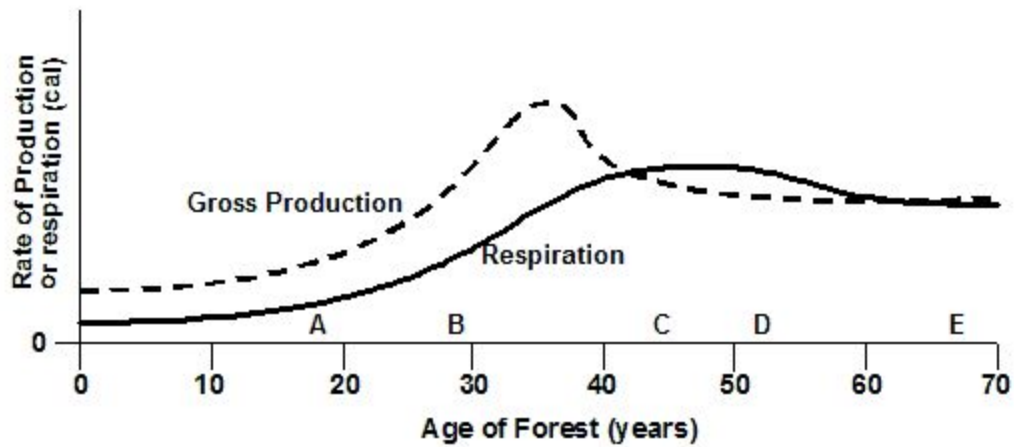


In the figure above, at which point on the horizontal (time) axis (A, B, C, D, or E) would you log this forest if you wished to obtain the greatest possible amount of wood in a single harvest? (biomass)

- |    |   |
|----|---|
| a) | A |
| b) | B |
| c) | C |
| d) | D |
| e) | E |

Ans: b  
 Difficulty: Medium  
 Link to: 10.3

37. The curves above show total community gross production (dotted line) and respiration (solid line) over time for a forest undergoing succession.

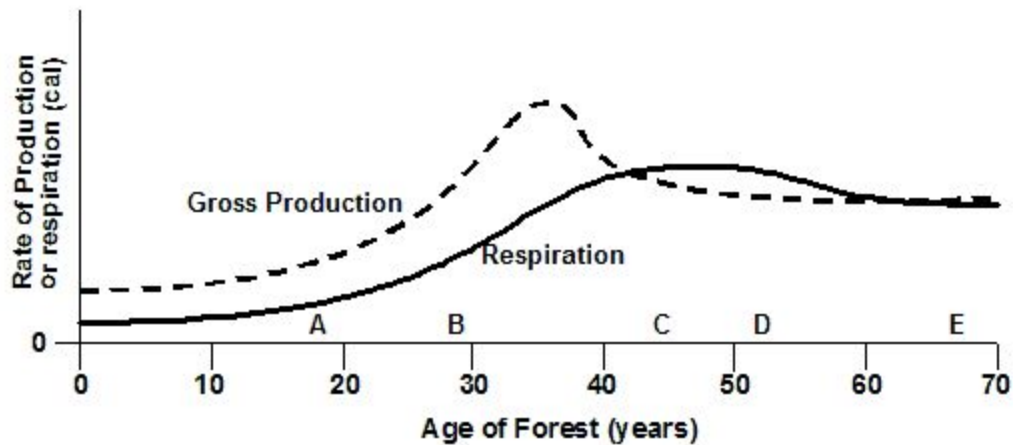


In the figure above, at which point (A,B,C,D, or E) might the community best be called a "climax" community?

- |    |   |
|----|---|
| a) | A |
| b) | B |
| c) | C |
| d) | D |
| e) | E |

Ans: e  
 Difficulty: Medium  
 Link to: 10.3

38. The curves above show total community gross production (dotted line) and respiration (solid line) over time for a forest undergoing succession.



On the figure above, indicate at which points (A, B, C, D, or E) on the graph net production for the community as a whole is positive, negative, and zero.

Ans: Positive: A,B  
Negative: C, D  
Zero: E

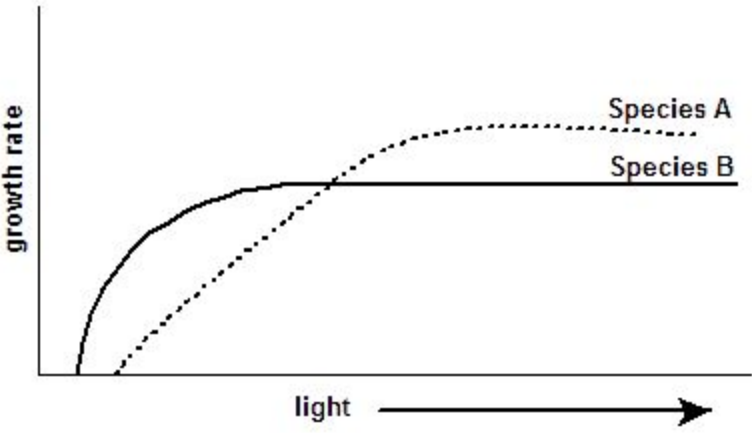
Difficulty: Medium  
Link to: 10.3

39. As succession advances from early to more advanced stages, a number of changes occur. For each of the parameters listed below, indicate whether that factor increases, stays the same, or decreases through time during early to middle succession.  
(For each choice, circle the correct response)

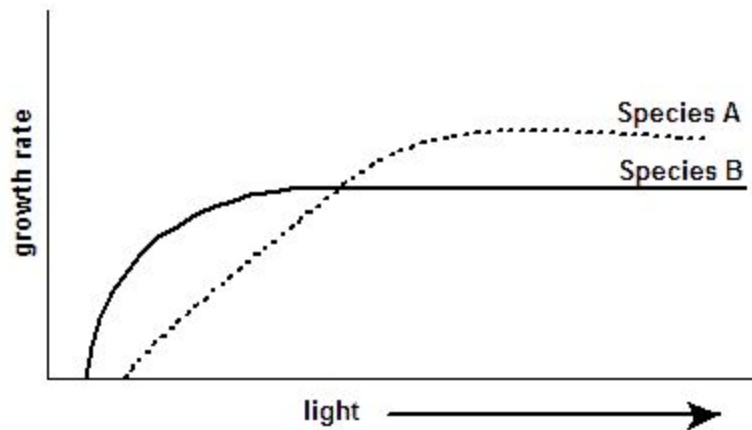
total biomass	increases / stays the same / decreases
the quantity of limiting	increases / stays the same / decreases nutrients
organic matter in the soil	the soil
gross production	increases / stays the same / decreases
net production	increases / stays the same / decreases

Ans:	increases decreases increases increases decreases
	Difficulty: Difficult Link to: 10.3

40.	Why is it generally very difficult to reintroduce a rain forest once it is burned or commercially mined?
Ans:	In rain forests only a small fraction of the chemical elements necessary for life is stored in the soil. Most chemical elements are held in the living biomass. Once the forest is gone, only the infertile soil remains.
	Difficulty: Medium Link to: 10.4

41.	Referring to the figure below, if a forest were cleared and then allowed to re-grow, which species would dominate in the early successional stage? Explain why this species would dominate.
	
Ans:	Species A. Species A is better adapted to light.
	Difficulty: Medium Link to: 10.3

42. In the figure below, which species would dominate in the late successional stage? Why?



Ans: Species B. Species B is still able to grow when the availability of light is decreasing.

Difficulty: Medium  
Link to: 10.3

43. Give three general characteristics of plants found in early and late successional communities.

Ans:		
	Early successional:	Late successional:
	- fast growth	- slow growth
	- fast spreading of seeds	- slow seed production
		spreading
	- adapted to sunshine	- adapted to shade

Difficulty: Medium  
Link to: 10.5

44. What are three ways in which vegetation reduces erosion?

Ans: Vegetation holds the soil in place with its roots.  
Vegetation reduces wind erosion by keeping the soil moist.  
Vegetation protects the surface from raindrop impact.

Difficulty: Easy  
Link to: 10.3



45.	Productivity is greater in tropical rain forests than in temperate forests. However, when these forests are cleared for agriculture, crops grown on temperate fields are more productive than those grown on tropical fields. Why this disparity?	
Ans:	In tropical forests, most nutrients are stored in biomass, not the soil. When the land is cleared, it very rapidly loses its fertility.	
	Difficulty: Medium Link to: 10.5	

46.	The following are examples of primary and secondary succession. Place a "P" next to examples of primary succession and "S" next to examples of secondary succession: ____ chaparral regrowing on a burned hillside ____ weeds infiltrating a mowed lawn ____ grasses taking root on a newly formed beach dune ____ young Ponderosa pine growing where wind has blown adults down	
Ans:	P, S, P, P	
	Difficulty: easy Link to: 10.3	

47.	You visit three stands of forest: 1) a stand clear cut 20 years ago; 2) a stand clear cut 100 years ago; 3) a stand never cut in recorded history. A) Of stands 2 and 3, which stand would lose chemical elements most readily by water erosion? B) In which stand would net primary production be greatest?	
Ans:	Stand 3; Stand 1	
	Difficulty: Medium Link to: 10.4	

48.	Fire suppression in a forest can actually lead to <u>increased</u> danger from future fires because it leads to an increased _____ of trees and increased amounts of _____ on the forest floor.	
Ans:	number; organic matter	

	Difficulty: Easy Link to: 10.1
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49.	The following description represents the typical pattern of succession after a farm field has been abandoned in New England. The early successional stage is composed primarily of short-lived herbaceous plants (weeds, for example). The intermediate successional stage contains fast growing tree species, including white pine and pin cherry. Finally the late successional stage includes slower growing tree species, such as sugar maple and beech. A) During which successional stage does biomass reach its peak? B) Which stage has the highest species diversity?
Ans:	(A) intermediate stage (B) early stage
	Difficulty: Medium Link to: 10.3

50.	The castle of Dracula in Transylvania is surrounded by soil that has an abnormally high concentration of the heavy metal, arsenic. Normal woodlands lacking arsenic are made up of beech, oaks, pines and spruces, with birch and aspens growing along edges of abandoned fields. Based on the ecological principles and general effects of heavy metals, list two ways that the vegetation around Dracula's castle would differ from the normal areas.
Ans:	small stature/early successional/generalists short-lived/adapted to variable conditions/few species
	Difficulty: Medium Link to: 10.4

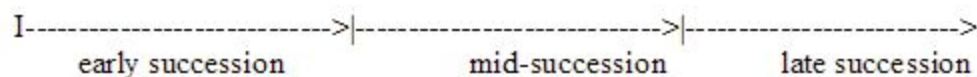
51.	Since the extensive fires in Yellowstone National Park in 1988, the park often has been cited as an example of the connection between forest fire and natural succession. An important part of understanding the danger of wildfire in Yellowstone is understanding its history. From the time of the founding of the park in 1872 until 1963, what was the official policy regarding controlling wildfires, and in what way would that policy have increased the danger of wildfires and the damage they caused when they occurred in 1988?
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Ans:	The official policy until 1963 was to suppress all fire. This may have contributed to the build up of dead underbrush that regular small fires would have cleared out.
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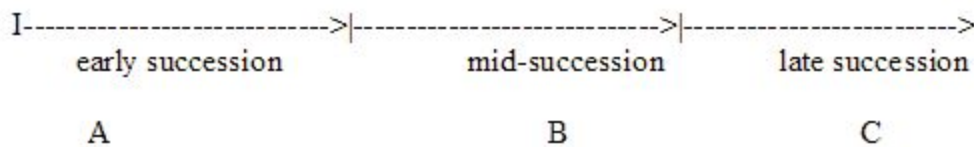
Difficulty: Medium
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Link to: 10.1
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52. A naturalist describes three species of plants to you:  
 Species A produces many easily-spread seeds, but grows more slowly, lives longer, and can tolerate lower light levels.  
 Species B grows rapidly, produces many very light, wind-blown seeds, and requires high light levels for growth.  
 Species C has heavy, poorly-dispersed seeds, and can tolerate low light levels.  
 Below is a time-line representing time elapsed since a succession was initiated.  
 Where on this line would you expect to find each species (show a range for each species and fill into the "time-line" the appropriate letter A, B or C)?



Ans:	
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Difficulty: Medium
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Link to: 10.4
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53. The following are conditions during early and late succession. Place an "E" next to early succession conditions, and an "L" next to late succession conditions:

<input type="checkbox"/> resources less available, more constant
<input type="checkbox"/> much energy/nutrients stored in organic matter
<input type="checkbox"/> biotic effects small compared to abiotic
<input type="checkbox"/> less variable conditions
<input type="checkbox"/> biotic effects large compared to abiotic

	___ resources available, less constant	
	___ highly variable conditions	
	___ little energy/nutrients stored in organic matter	
Ans:	L, L, E, L, L, E, E, E,	
	Difficulty: Medium Link to: 10.3	