Oregon Envirothon 2020

Envirothon team name: KEY Master_____

School name: _____

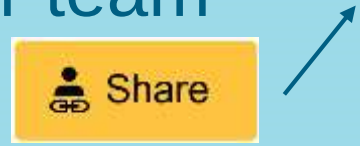
OREGON
ENVIROTHON

Presented by:

Oregon Forest
Resources Institute

Instructions to Representative

You may share the test link with your team members. Push the button in the upper right corner.



Enter team member emails to send them the link or copy the link and send it to them through a messaging system.

Contacts for Assistance

If any technical problems occur, please contact

Julie Woodward, woodward@ofri.org 503-807-1614
or
Rikki Heath, heath@ofri.org 503-799-4792

Honesty Pledge

By placing your name on the next page, you agree that this test will be completed with only the resources provided and without help from any adult, coach, teacher, or non-team member.

Test link may be shared with only members of your team.

Please review the complete list of rules that was sent to the team representative.

Insert Team Member Names

Student Name (first and last)	Mailing address to receive shirt (awards)	T-Shirt Size (S - XXXL)
2.		
3.		
4.		
5.		

Good Luck!

Test answers will be recorded at 3:00 p.m.

Forestry Test

Total of 30 points

Sponsored by:

Oregon Forest
Resources Institute

PART 1: Tree Identification and Forest Products

1) Given the tree sample picture on the slide, write in the correct species of tree using both common and scientific/Latin name. (**Spelling and capitalization need to be correct!)** (12 points- 1 point each answer)

Resource link: https://oregonforests.org/content/tree-variety

Picture	Common Name (1pt)	Scientific Name (1pt)
"Tree was used by and important to NW Native American Tribes." 	Western redcedar	Thuja plicata

2) Given the tree sample picture on the slide, write in the correct species of tree using both common and scientific/Latin name. (**Spelling and capitalization need to be correct!)** (12 points- 1 point each answer)

Resource link: https://oregonforests.org/content/tree-variety

Picture	Common Name (1pt)	Scientific Name (1pt)
“Tree has distinguished blue berry as cone” 	western juniper or juniper	Juniperus occidentalis

3) Given the tree sample picture on the slide, write in the correct species of tree using both common and scientific/Latin name. (**Spelling and capitalization need to be correct!)** (12 points- 1 point each answer)

Resource link: https://oregonforests.org/content/tree-variety

Picture	Common Name (1pt)	Scientific Name (1pt)
"Needles are in bundles of 3" 	ponderosa pine	Pinus ponderosa

4) Given the tree sample picture on the slide, write in the correct species of tree using both common and scientific/Latin name. (**Spelling and capitalization need to be correct!)** (12 points- 1 point each answer)

Resource link: https://oregonforests.org/content/tree-variety

Picture	Common Name (1pt)	Scientific Name (1pt)
"Tree is used for baseball bats and other sporting equipment". 	Oregon ash	Fraxinus latifolia

5) Given the tree sample picture on the slide, write in the correct species of tree using both common and scientific/Latin name. (**Spelling and capitalization need to be correct!)** (12 points- 1 point each answer)

Resource link: https://oregonforests.org/content/tree-variety

Picture	Common Name (1pt)	Scientific Name (1pt)
"Often found along streams in the Coast Range and Cascades." 	red alder	Alnus rubra

6) Given the tree sample picture on the slide, write in the correct species of tree using both common and scientific/Latin name. (**Spelling and capitalization need to be correct!)** (12 points- 1 point each answer)

Resource link: https://oregonforests.org/content/tree-variety

Picture	Common Name (1pt)	Scientific Name (1pt)
"One of the most commonly used trees for lumber production in Oregon" 	Douglas-fir	Pseudotsuga menziesii

7) The Oregon Plan for Salmon and Watersheds was put in place to help protect salmon habitat and watersheds.

Resource Link: **FOREST FACTS**

List two of the four key elements of the Oregon Plan for Salmon and Watersheds. (2 points)

1. Voluntary restoration activities
2. Coordinated tribal, state and federal agency actions
3. Continued monitoring of watersheds
4. Rigorous technical oversight

PART 2: The Oregon Forest Practices Act and Forest Ecology

8) The Oregon Forest Practices Act (OFPA) classify streams by size and type. Each of these classifications have different rules. Use the resource to find “How waters of the state are classified and protected.” Identify the four ways streams are typed and used.

Resource Link: **AN ILLUSTRATED MANUAL**

List two of the four stream types. (2 points, 1 point each)

1. F-fish
2. SSBT-Salmon, steelhead and bull trout
3. D-Domestic
4. N-no fish, no domestic water use

9) What is the term used in the Oregon Forest Practices Act, to mean “the area along each side of specified waters of the state with special vegetation retention and management requirements to protect water quality, fish and wildlife habitat”? (1 point)

Resource Link: **AN ILLUSTRATED MANUAL**

Answer: Riparian Management Area (RMA)

10) Imagine you measured the diameter of a Douglas-fir tree. You got the following measurement at DBH:
Diameter =20”

What is the board feet of the first 16’ of the tree, given that the small end of the diameter is 4” less than your measurement at DBH? (2 points)

Answer: _____160_____board feet

What tool could be used to measure the diameter of the tree? (1 point)

Answer: diamter tape, loggers tape, woodland stick,

SCRIBNER LOG VOLUME TABLE

Length of log in feet

Diameter of log in inches at small end

	8	10	12	14	16
12	40	50	60	70	80
13	50	60	70	80	100
14	60	70	90	100	110
15	70	90	110	120	140
16	80	100	120	140	160
17	90	120	140	160	180
18	110	130	160	190	210
19	120	150	180	210	240
20	140	170	210	240	280
21	150	190	230	270	300
22	170	210	250	290	330
23	190	240	280	330	380
24	200	250	300	350	400

BOARD FEET

11) Identify the foliar pathogen (see photo below) that causes damage to Western redcedar trees. (1 point)

Resource Link: http://archive.org/details/fieldguidetocomm0106gohe/page/n1/mode/2up

Answer: Cedar leaf blight

PART 3:
Forest Succession and Growth

12) Using the sample cross section of a tree, referred to as a “cookie”, answer the following questions.

(4 points, 1 point for each answer)

How old was this tree? ___48_____ (1 point)

Range accepted 45-55

13) Were there any indicators that this tree was stressed? **Describe** what may have stressed this tree. (1 point)

Answer: After 30 years, the growth slowed. Assmpition of stress is due to competition.

14) **Describe** a forest management activity and/or silvicultural technique that could have improved the health of this tree. (1 point)

Answer:Thinning

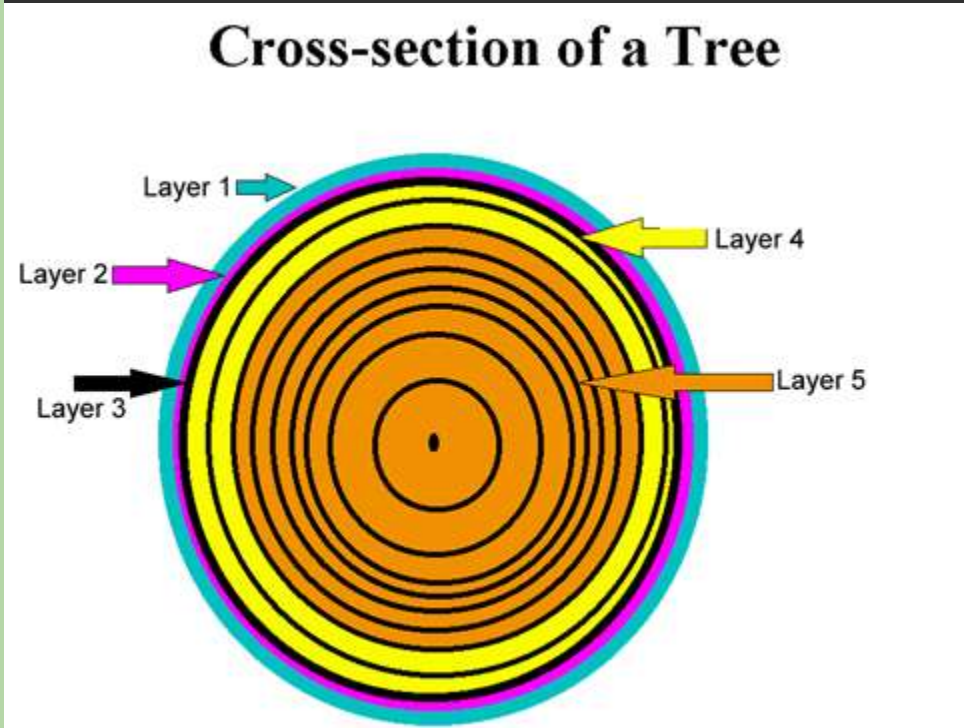
At about 40 years the growth increased, likely due to commercial thinning.

15) During the tree's first ten years of growth, **describe** what the forest surrounding the tree may have looked like. (1 point)

Answer: Trees well spaced, as growth was good between rings (growing seasons). Growth is contributed to availability of water, nutrients and sun.

16) Identify the layers on the tree cross section. Write the correct name of the part and its function. (5 points, .5 point for each answer)

Layer	Name:	Function:
1	Bark	Provides protection
2	Phloem	Moves nutrients from leaves/needles
3	Cambium	New growth occurs/cell division
4	Xylem/Sapwood	Transports water; primarily from roots
5	Heartwood	Provides structure



End of Forestry Test!

Team total of _____/ 30 points

Sponsored by:

Oregon Forest Resources Institute

Aquatics Test

30 points

Sponsored by:

Marion Soil & Water Conservation District

CITY OF Salem AT YOUR SERVICE

Imagine your team has tested water from a nearby river to determine if it is good spawning habitat.
Resource link: https://learnforests.org/sites/default/files/Water-Quality-Standards-Classification.pdf

Your results from the test are as followed:

Temperature: 7 C

pH: 6.4

Dissolved Oxygen: 10 mg/l

Phosphate: 1

Nitrate: 0.5

1) What is the water quality classification for your sample according to the Oregon Water Quality Standards for Salmon and Steelhead? (1 point)
   a. Class AA
   b. Class A
   c. Class B

Answer: _____c-Class B___

Identify the macroinvertebrates in **the photos.** You can use common names, for example, “mosquito larvae.” (3 points) Provide tolerance: sensitive, moderate, or tolerant.

Resource Link: Macroinvertebrates of the Pacific Northwest

2)Amphipod scud_____

Tolerance: tolerant_____

3) water boatman_____

Tolerance: _tolerant_____

4) Flathead mayfly_____

Tolerance: moderate_____

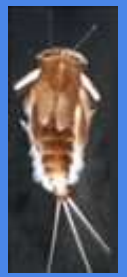
5) Based on your macroinvertebrate sample, do you think the macroinvertebrates you identified came from the same source as your water sample? Why or why not? (.5 point each)

Answer: Yes

Why or why not: It is the same sample due to their moderate/tolerant values to pollution and stream classiffication





Check all of the macroinvertebrates that you find in your stream and calculate the stream's water quality rating. (You may also record the number of each captured, but to calculate the rating at the bottom, only count each KIND of animal once, regardless of the quantity found).

✓	Sensitive	✓	Less Sensitive	✓	Somewhat Tolerant	✓	Tolerant
	Case maker caddisflies		Net-spinning caddisflies		Freshwater clams		Aquatic sow bugs
	Mayflies		Crane flies		Freshwater mussels		Black flies
	Stoneflies		Dragonflies		Planarian		Midge flies
	Water pennies		Riffle beetles		Gilled snails		Leeches
	Hellgrammites				Crayfish		Lunged Snails
					Scuds		Damselflies
							Aquatic worms
# of checkmarks 2		# of checkmarks 2		# of checkmarks 1		# of checkmarks 1	
# above x 3 = 6		# above x 2 = 4		# above x 1 = 1		# above x 0 = 0	

6a) Using the organisms above, fill out the chart to replace the eight sets of question marks. You will use this information to answer the questions on the following two slides. (4 points)

Resource link: http://xerces.org/sites/default/files/2018-05/08-009_01_Macroinvertebrate-Field-Guide.pdf

To answer this question use the numbers you calculated in the chart on the previous slide. Add up all the numbers from each category and replace the question marks with that number to determine water quality rating.

6b) What is the water quality rating?

(1 point)

Answer 11; marginal_____

Check all of the macroinvertebrates that you find in your stream and calculate the stream's water quality rating. (You may also record the number of each captured, but to calculate the rating at the bottom, only count each KIND of animal once, regardless of the quantity found).

✓	Sensitive	✓	Less Sensitive	✓	Somewhat Tolerant	✓	Tolerant
	Case maker caddisflies		Net-spinning caddisflies		Freshwater clams		Aquatic sow bugs
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	Stoneflies		Dragonflies		Planarian		Midge flies
	Water pennies		Riffle beetles		Gilled snails		Leeches
	Hellgrammites				Crayfish		Lunged Snails
					Scuds		Damselflies
							Aquatic worms
	# of checkmarks _____		# of checkmarks _____		# of checkmarks _____		# of checkmarks _____
	# above x 3 = _____		# above x 2 = _____		# above x 1 = _____		# above x 0 = _____

Biological Water Quality Rating:

Add up the numbers you calculated for all four categories above. Write the total number here: ___???___

Circle the rating that corresponds to the total of your columns.

Good: >22 **Fair: 17 – 22** **Marginal: 11 – 16** **Poor: <11**

7) Does the waterbody need improvement? (1 point)

Answer: Yes

8) Name two things you can do to ensure that the water quality or habitat improves or is sustained to ensure continued good health of the waterbody. (2 points)

1. Answers may vary

improve water quality by planting native riparian zone plants to create shade and reduce erosion, educate public on storm water pollution, educate and eliminate litter, planting a rain garden to "soak up" pollutants from home, don't overuse fertilizers or pesticides, don't dump anything down a storm drain, wash cars at a commercial car wash

2.

9) Which two elements are often associated with causing algal blooms? (1 point)

a. Carbon and oxygen

b. Nitrogen and phosphorus

c. Boron and nitrogen

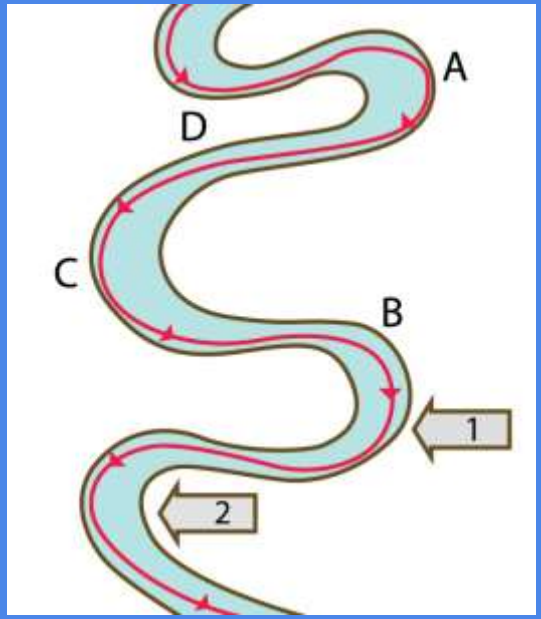
d. Argon and oxygen

Answer: b. nitrogen and phosphorus_____

10) Write the word “deposit” for arrow 1 or 2 where you would see deposition occurring in the meandering stream, and write the word “erode” for arrow 1 or 2 where you would see erosion occurring. (2 points)

Arrow 1: erode

Arrow 2: deposit



11) Which letter, A, B, C, or D, in the diagram indicates the most likely place for an oxbow to form. (1 point)

Answer___D___

12) Using the diagram, name the letter (A, B, C, or D) where you think the land is the least affected by the meandering of the stream and the best place to build a house. (1 point)

Answer__B___

13) Explain your answer for choosing the option in question 12. (1 point)

Answer: No oxbow formation or erosion occuring there, it would be the safest place for a house.

14) The table below has a pollutant listed in the left column. List a consequence of its presence and a solution to improve the issue. (2 points)

Resource: The Issue | Nutrient

Pollutant	Consequence	Solution
Nuritents	Algae-cyanotoxins	Avoid excess fertilizer and/or prevent runoff

15) Biological control is a type of pest management. Which of the following **is not** a type of biological control? (1 point)

a. Disease of pest

b. Hand removal of pest

c. Parasite of pest

d. Predator of pest

Answer b. hand removal of pest_____

16) Based on the descriptions, name the column that has wetland characteristics. (1 point)

a. Survey A
b. Survey B
c. Survey C
d. Survey D

Answer c. Survey C____

Survey A	Survey B	Survey C	Survey D
Soil is aerobic, not hydric	Soil is anaerobic, hydric	Soil is aerobic, not hydric	Soil is anaerobic
Plants include blue-eyed grass and red flowering currant	Plants include rushes and sedges	Plants include rushes and sedges	Plants include willows and red osier dogwood
No standing water is present	Standing water is present	No standing water is present	Flowing water is present

Use this graphic, answer the question:

17) What role does phytoplankton play in the above diagram? (1 point)

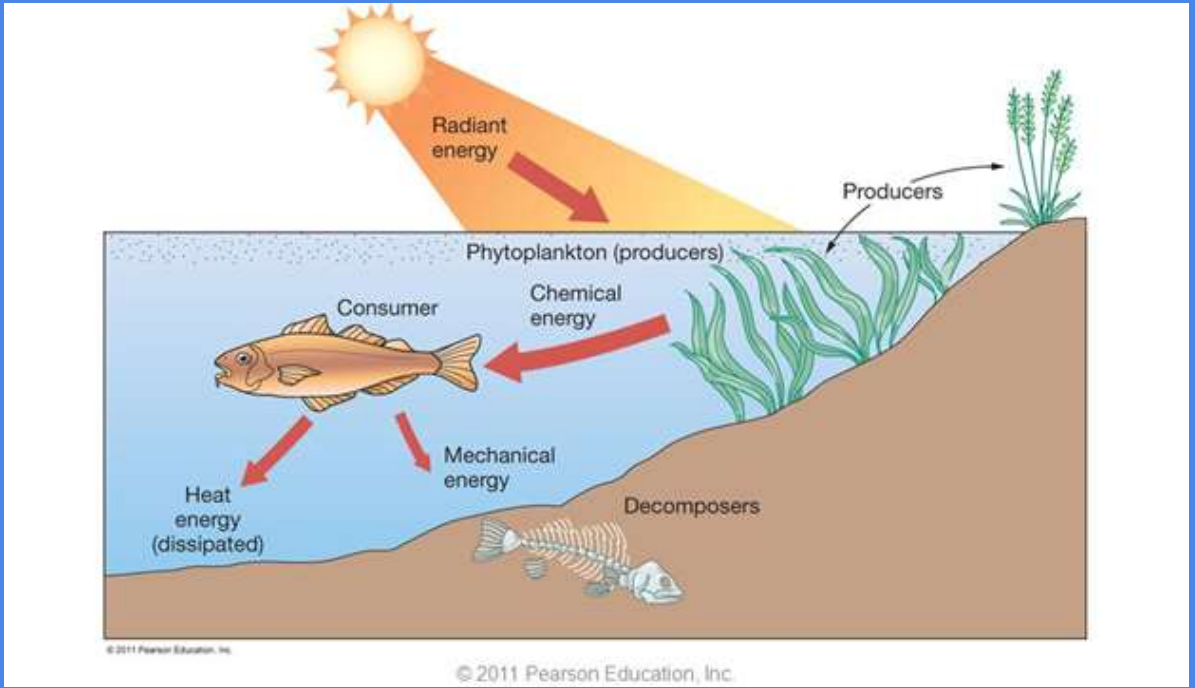
a. Primary producer

b. Secondary producer

c. Primary consumer

d. Secondary consumer

Answer: a. primary producer_

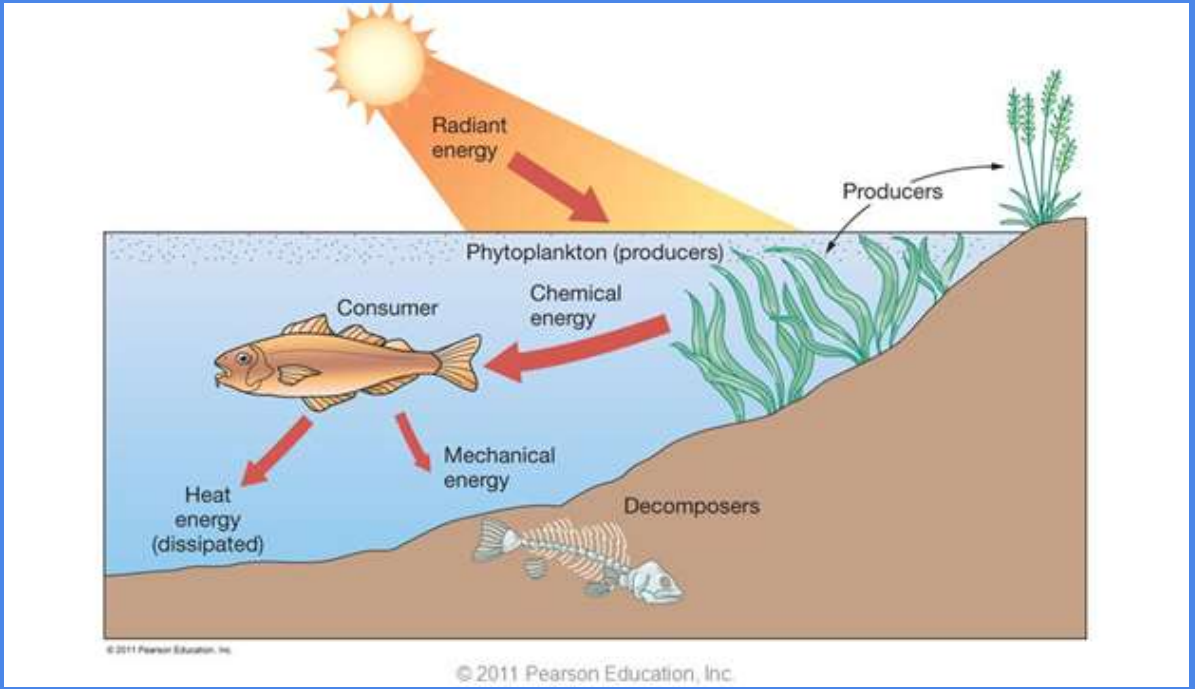


Use this graphic, answer the True or False question below:

18) Pollution from runoff cannot affect the flow of energy between the trophic levels. (1 point)

a. True
b. False

Answer: b. False_____



Many water bodies have competing water usage that may affect the ability of the system to sustain wildlife, forestry and anthropogenic needs. Here is an excerpt from an article in the *Salem Statesman Journal*.

"A project intended to improve conditions for endangered fish could mean essentially emptying Detroit Lake for one or two years.

The U.S. Army Corps of Engineers is planning to build a 300-foot tower and floating screen at Detroit Dam to improve water temperature and fish passage for salmon and steelhead in the North Santiam River.

But the $100 to $250 million project has sparked alarm over the potential impact to water supply in Salem and Stayton, for farmland irrigation, and to the economies of Detroit and the Santiam Canyon from the loss of recreation at the popular reservoir."

19) List four beneficial uses of the river that may be involved in this situation. (2 points, .5 each)

1.

Answers may vary: drinking water, recreation, agriculture, fish habitat, navigation, industrial

2.

3.

4.

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20) List one logical argument against the project that you would use if your livelihood depended on the recreation provided by the lake. (1 point)

1. Answer may vary

21) List one economic impact of removing the dam completely from the infrastructure. (1 point)

1. Answer may vary

Many water bodies have competing water usage that may affect the ability of the system to sustain wildlife, forestry and anthropogenic needs. Here is an excerpt from an article in the *Salem Statesman Journal*.

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22) List two ways that residents in Salem and Stayton could conserve water during the project. (1 point, .5 each)

1. Answer may vary

Minimize lawn irrigation, timing of watering, turn off water when not in use.

2.

End of Aquatics Test!

Team total _____/30 points

Sponsored by:

Marion Soil & Water Conservation District

CITY OF Salem AT YOUR SERVICE

Wildlife Test

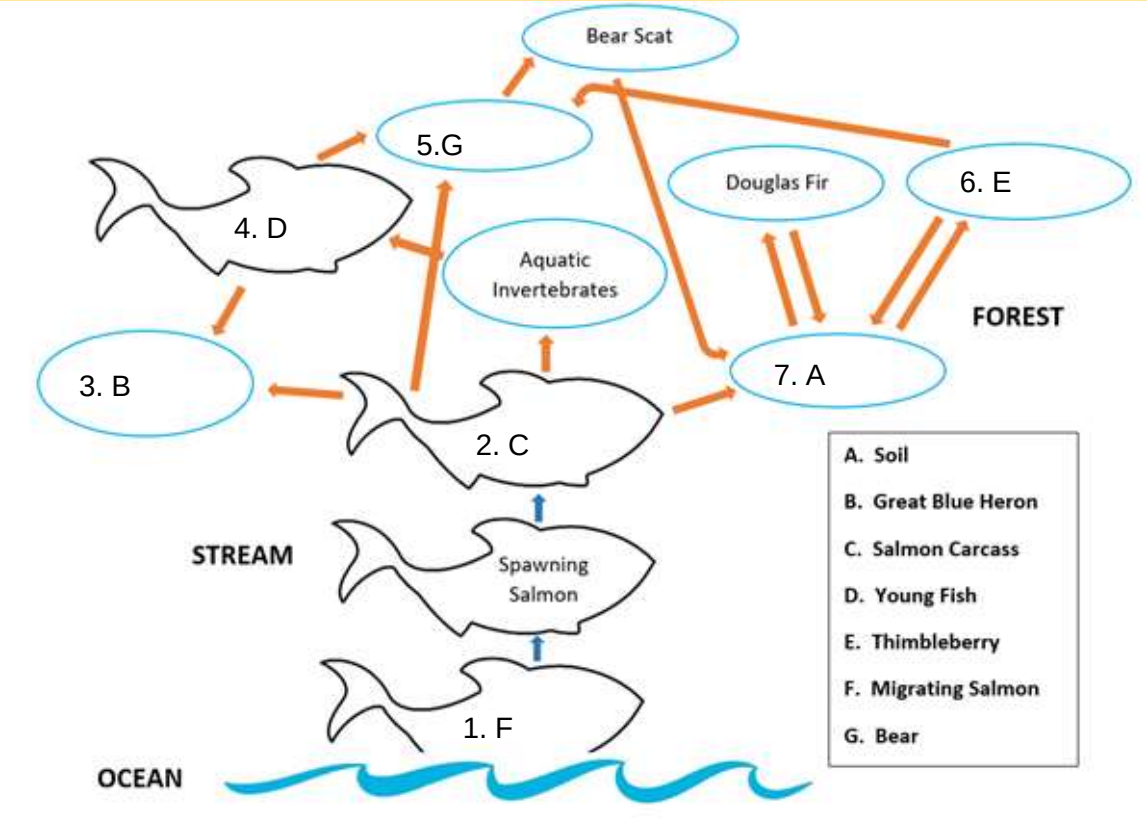
Total of 30 points

Sponsored by:

PART A:
Wildlife Ecology Concepts

1) Salmon affect cycling of nutrients (such as nitrogen) in various ecosystems. In the diagram, create a logical nutrient cycling from ocean to forest that starts with migrating salmon. Write the letter of one of the choices listed in the box into an empty circle or fish shape.

Please note that the arrows point in the direction of nitrogen flow, and that all possibilities of nitrogen flow may not be displayed (i.e., all decomposing species could add nitrogen into the soil but this is not reflected). Also, some non-wildlife options can be thought of as alive or decomposing. (7 points)



PART B: Wildlife Management Issue: Oregon Redband Trout Conservation & Management

Resource link: ***Oregon Department of Fish & Wildlife: Ecology of Redband Trout in the Donner und Blitzen River Basin 2018*.**

Don't worry; you will **NOT** need to read the entire document. Instead, just skim this document and use the table of contents to help you answer the following questions.

2) What is the median growth rate calculated from 225 Redband Trout observations? (1 point)

A. 19mm/year

B. 32mm/year

C. 44 mm/year

Answer: B. 32 mm/year_____

3) Redband Trout use Blitzen River and its tributaries for _____. (1 point)

Answer: spawning, rearing, themal refuge, migratory corridor during juvenille migration

Resource link: ***Oregon Department of Fish & Wildlife: Ecology of Redband Trout in the Donner und Blitzen River Basin 2018*.**

Don't worry; you will **NOT** need to read the entire document. Instead, just skim this document and use the table of contents to help you answer the following questions.

4) How many PIT tagged Redband Trout was the data reported on? (1 point)

Answer:11,240 PIT tagged Redband trout _____

5) Name three ways Redband Trout were surveyed. (3 points)

1. Backpack electrofishing
2. Adult fish traps or trap netting
3. Rotary screw traps or hook and line sampling

6) List three ways the PIT interrogation arrays were used? Why were these studied? (2 points, .5 point for each answer)

1. Characterize abundance
2. Characterize distribution
3. Characterize migratory behavior

Why: It is difficult to assess potential effects of putative increases in avian predation pressure on Redband Trout.

PART C: Wildlife Interactions

Both of these turtles are found in Oregon. Only one of the turtles shown here is a native species, the other is a non-native commonly found throughout the Eastern United States. [Often these are pets that have been released in natural areas.] Here are a couple resources to help you in answering the following questions: Turtles ODFW and Living with Wildlife Turtles

7) Give the common name of Species A. (1 point)

Answer: Western painted turtle

8) Give the common name of Species B. (1 point)

Answer:red-eared slider

Oregon Turtles

Here are a couple resources to help you answer this question: Turtles ODFW and Living with Wildlife Turtles

Salmonella is a deadly bacterium that is commonly found on a turtle's skin and shell. One of these species is thought to be more tolerant to the disease and can spread this deadly bacterium to other species.

9) Besides bacterium, list two other reasons that non-native or invasive species displace native species. (2 points)

1.Compete for food and nesting

2.Compete for basking and cover habitat

Oregon Turtles

Both of these turtles are found in Oregon. Only one of the turtles shown here is a native species, the other is a non-native commonly found throughout the Eastern United States. [Often these are pets that have been released in natural areas.] Here are a couple resources to help you answer this question: Turtles ODFW and Living with Wildlife Turtles

10) These two species utilize the same types of wetland and pond habitats and they will eat similar prey items. What is the term that best describes this type of interaction? (1 point)

a. Predation
b. Parasitism
c. Commensalism
d. Competition

Answer: d. competition_____

Use ODFW's Wildlife Viewing webpage to help you identify the following species.

Species A. This hoofed mammal is the smallest cervid in Oregon. (2 points)

11) Give the common name:Columbian wite-tailed deer_____

12) What is the distinguishing feature (most visible when startled)?: _long, wide tail; brown with white underside_____

Species A

Use ODFW's Wildlife Viewing webpage to help you identify the following species.

Species B. This hare can be identified by the color of pelage on its tail. (2 points)

13) Give the common name: Black-tailed jackrabbit_____

14) What other species has a similar conformation to this species? White-tailed jackrabbit_____

Species B

Use ODFW's Wildlife Viewing webpage to help you identify the following species.

Species C. This Oregon Conservation Strategy species is found in chaparral, juniper woodlands and coniferous forests. (2 points)

Species C

15) Give the family name: ____-

Phrynosomatidae_____

16) What kind of soil is this species associated with?

a. Clay

b. Loamy

c. Sandy

Answer: c. Sandy_____

Use ODFW's Wildlife Viewing webpage to help you identify the following species.

Species D. This bird has an unmistakable song: a succession of single drawn-out, ventiloquial notes, given at different pitches. (2 points)

Species D

17) Give the scientific name: Ixoreus naeyius

_____

18) Which species resembles it in color, particularly around the breast? A robin or American robin

_____

Use ODFW's Wildlife Viewing webpage to help you identify the following species.

Species E. This carnivore commonly uses elevated perches from which to pounce on terrestrial prey, and may rob bird nests.
(2 points, .5 each answer)

Species E

19) What is the State Listing Status of this species?

a. Threatened
b. Sensitive
c. Endangered

Answer b. Sensitive_____

20) Share three conservation strategies/actions that may help this species:

1.Maintain current habitat

2.Minimize forest fragmentation

3.Restore habitat and landscape connectivity

End of Wildlife Test!

Team total _____/ 30 points

Sponsored by:

Soils Test

Total of 30 points

Sponsored by:

Part 1: Soil Properties

1) What are the 5 soil-forming factors in the acronym ClORPT? (1 point)

Climate_____

Organisms_____

Relief_____

Parent material_____

Time_____

2) What is parent material? (1 point)

a. solid bedrock

b. topsoil

c. highly weathered rock fragments or freshly deposited sediments

d. soils that disapprove of their younger counterparts

Answer: a or c_____

3) Where can you expect the rockiest soil types? (1 point)

a. bottom of a hill

b. ridgetop

c. in a pond

d. desert

Answer:_____B_____

4) Why would you expect soils to be rocky in your answer for question three? (1 point)

a) soil moisture

b) magic

c) erosion

d) plant species

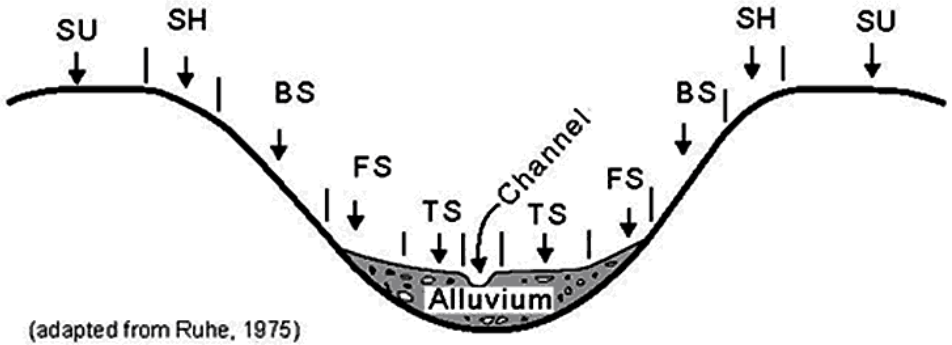
Answer:___C_____

5) Which landscape position (right) would likely be 1% slope? (1 point)

a. shoulder
b. backslope
c. toeslope
d. none of the above

Answer:___C_____

Position	Code
summit	SU
shoulder	SH
backslope	BS
footslope	FS
toeslope	TS



(adapted from Ruhe, 1975)

6) Saturated hydraulic conductivity of a soil is a measure of _____. (1 point)

a. pH
b. permeability, or how easily water moves through soil
c. the amount of water it takes to fill up all the pores in a soil
d. soil slipperiness

Answer: __B_____

7) Seasonal high water table depth can be indicated by_____. (1 point)

a. soil structure
b. rock fragment content
c. redoximorphic features
d. clay content

Answer: ____C____

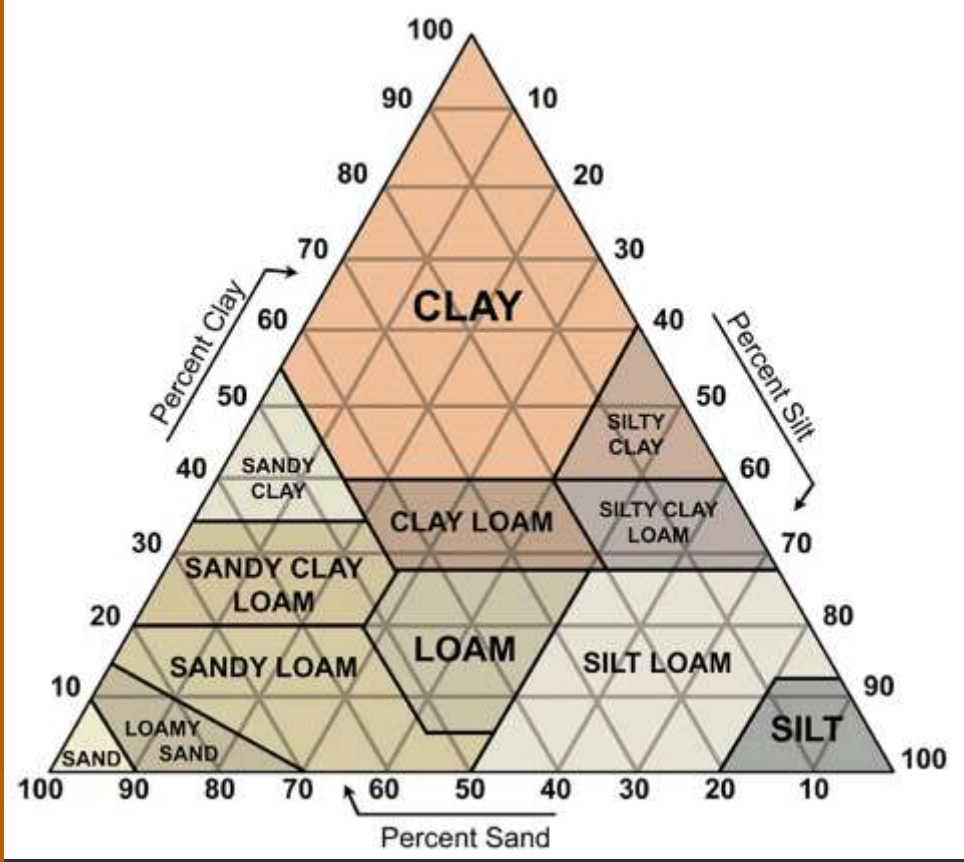
Part 2: Soil Classification

Use the **texture triangle** for the following questions:

8) What is the minimum percentage of silt that can be found in silt loam? (1 point)

Answer:____50%_____

Range (48-52%)



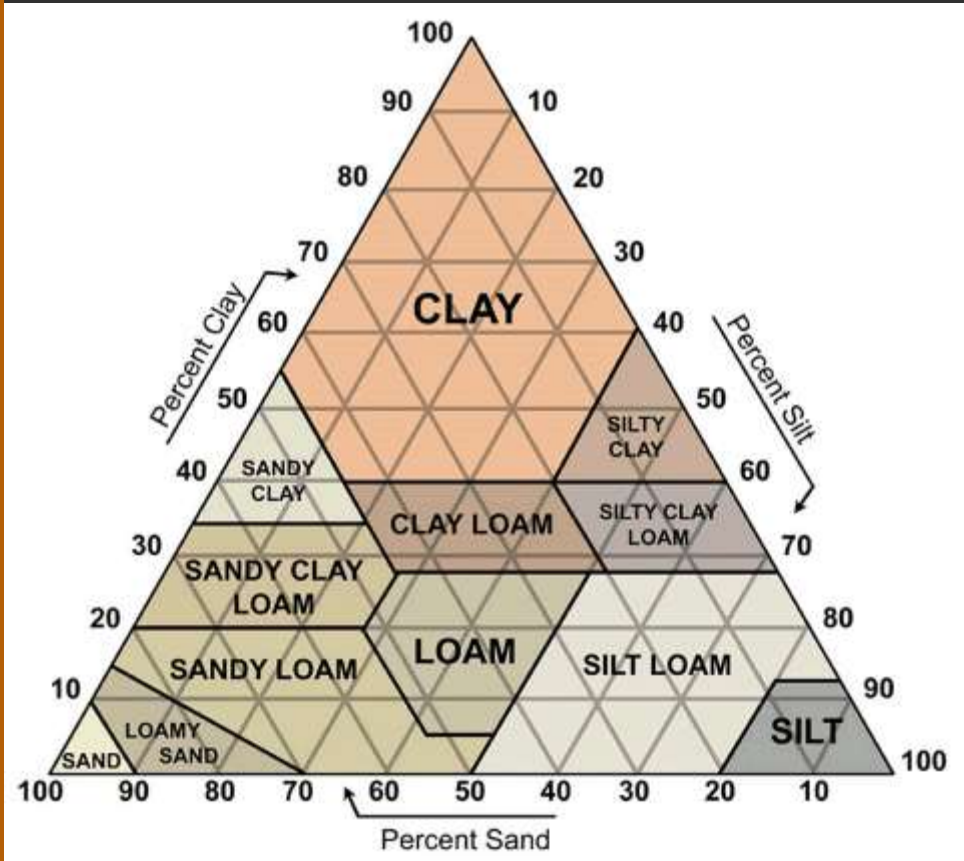
9) What texture describes a soil that has 30% sand and 35% clay? (1 point)

Answer:_____clay loam_____

10) What is the maximum amount of clay in a sandy clay loam? (1 point)

Answer:____35%_____

(Range 33-37%)



Part 3: Soils and Land Use Management

11) What is the name of the soil tool to the right?

(1 point)

a. shovel

b. bucket auger

c. penetrometer

d. spade

Answer: ____B_____

12) Which soil structure listed on the chart would you expect to drain the fastest? (1 point)

a. platy

b. granular

c. massive

Answer: ___B_____

13) Which soil structure listed on the chart can be a result of compaction? (1 point)

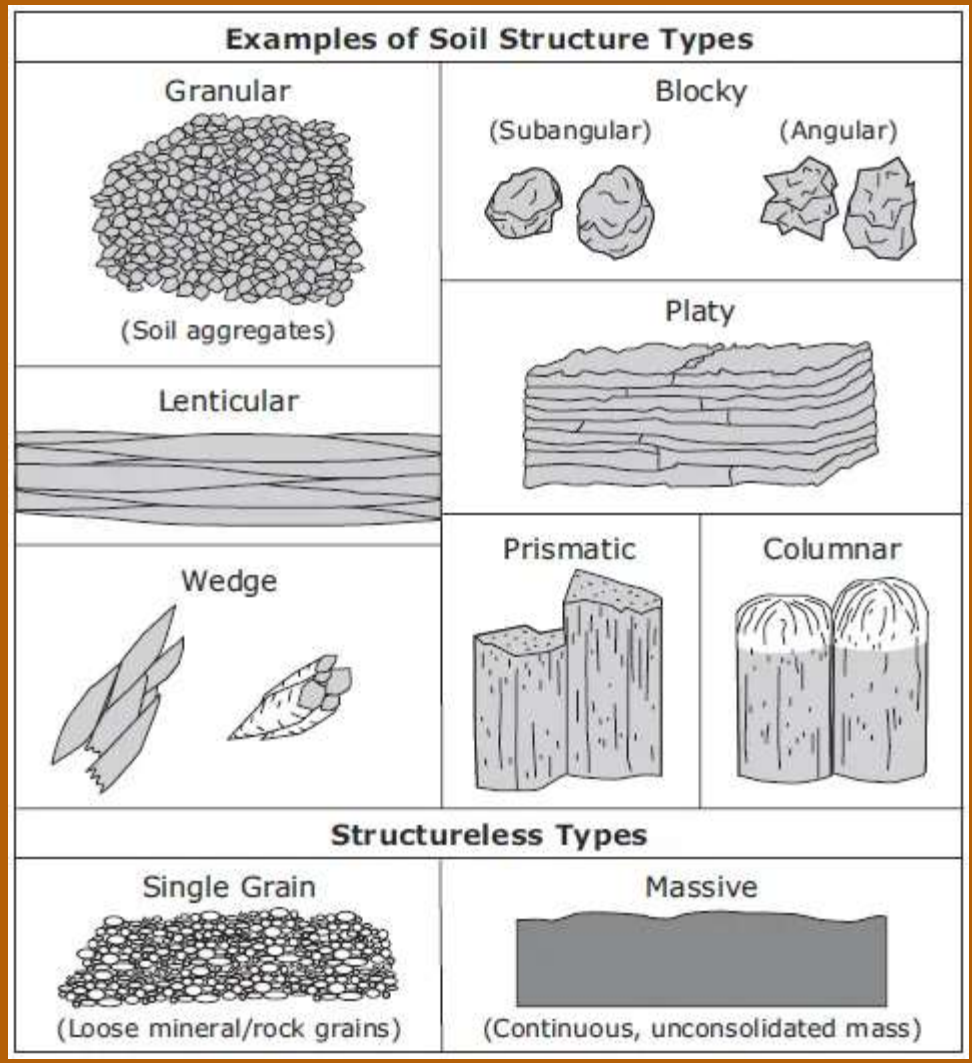
a. blocky

b. single grain

c. granular

d. platy

Answer: __D_____



14) Which are a result of soil surface compaction? List all that apply. (2 points)

a. high organic material
b. decreased infiltration
c. increased runoff
d. low bulk density

Answer: ___B&C___

15) Which soil texture can infiltrate or soak in the most water under normal conditions? (1 point)

a. sandy loam
b. clay
c. silt loam
d. solid bedrock

Answer: ___A_____

16) Place the following in order of driest to wettest soil type. (3 points)

A. brown topsoil with redoximorphic features at 30cm deep	_____B____ Driest
B. brown topsoil, light brown subsoil	___A_____
C. gray topsoil with redoximophic features at 10 cm deep	____C_____ Wettest

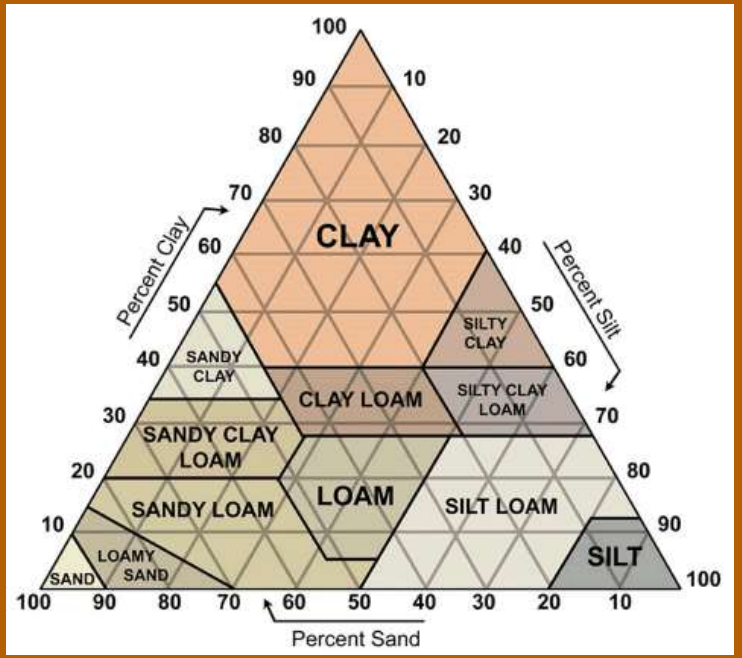
Use the measurements for Fields A and B below to answer the question.

Field A: Lake County, OR: S1979OR037001

Horizon	Depth (cm)	Percent Sand	Percent Silt	Percent Clay	Percent Rock Fragments	pH	Percent Organic Carbon	Bulk Density
A	0-8	33.4	31.3	35.3	17	6.7	2.18	1.39
Bt1	8-30	19.7	22.6	57.7	5	6.4	1.02	1.77
Bt2	30-45	17.5	21.1	61.4	10	6.0	0.62	1.88

Field B: Lake County, OR: S1979OR037004

Horizon	Depth (cm)	Percent Sand	Percent Silt	Percent Clay	Percent Rock Fragments	pH	Percent Organic Carbon	Bulk Density
Ap	0-17	33.2	37.4	29.4	2	6.2	2.40	1.39
Bw1	17-33	41.7	32.6	25.7	2	6.5	1.07	1.32
Bw2	33-46	54.7	26.1	19.2	5	6.6	0.59	1.26



17) Using the textural triangle, what texture is the deepest layer in Field A? (1 point)

Answer: clay

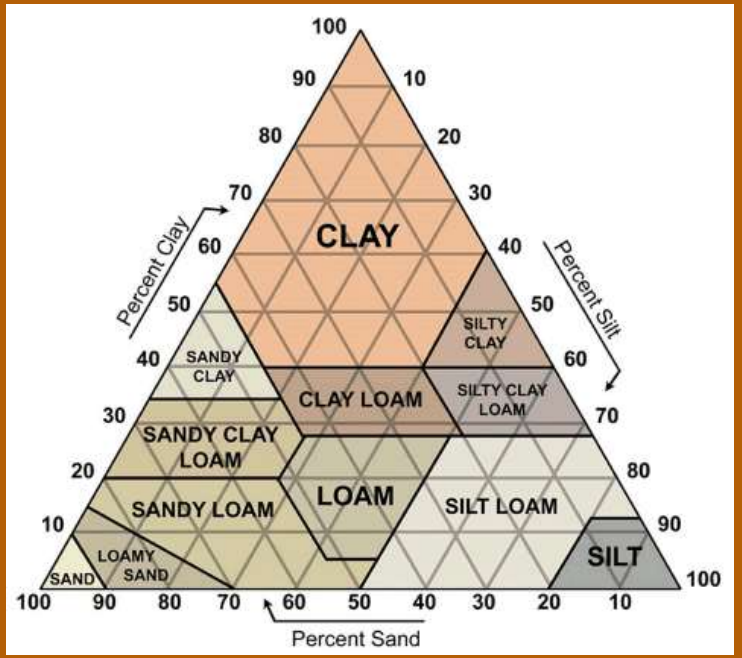
Use the measurements for Fields A and B below to answer the question.

Field A: Lake County, OR: S1979OR037001

Horizon	Depth (cm)	Percent Sand	Percent Silt	Percent Clay	Percent Rock Fragments	pH	Percent Organic Carbon	Bulk Density
A	0-8	33.4	31.3	35.3	17	6.7	2.18	1.39
Bt1	8-30	19.7	22.6	57.7	5	6.4	1.02	1.77
Bt2	30-45	17.5	21.1	61.4	10	6.0	0.62	1.88

Field B: Lake County, OR: S1979OR037004

Horizon	Depth (cm)	Percent Sand	Percent Silt	Percent Clay	Percent Rock Fragments	pH	Percent Organic Carbon	Bulk Density
Ap	0-17	33.2	37.4	29.4	2	6.2	2.40	1.39
Bw1	17-33	41.7	32.6	25.7	2	6.5	1.07	1.32
Bw2	33-46	54.7	26.1	19.2	5	6.6	0.59	1.26



18) Using the textural triangle, what texture is the deepest layer in Field B? (1 point)

Answer: sandy loam

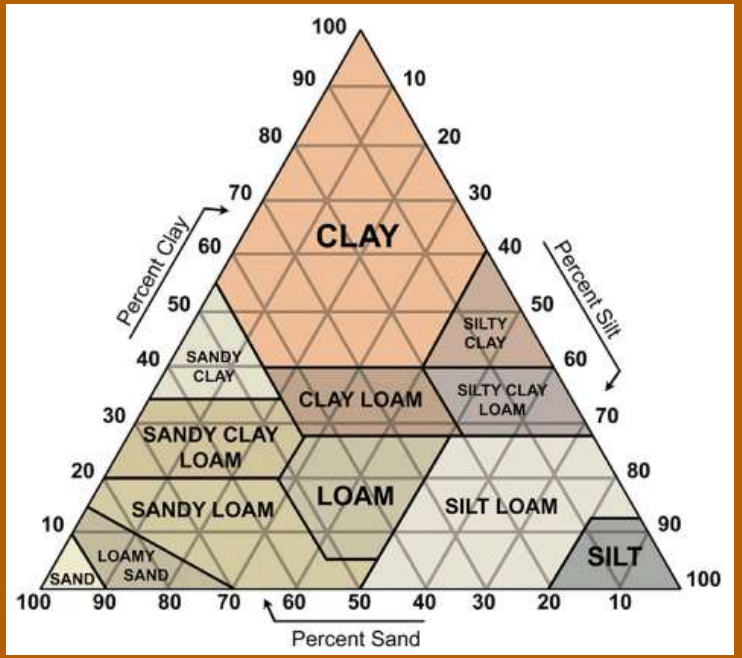
Use the measurements for Fields A and B below to answer the question.

Field A: Lake County, OR: S1979OR037001

Horizon	Depth (cm)	Percent Sand	Percent Silt	Percent Clay	Percent Rock Fragments	pH	Percent Organic Carbon	Bulk Density
A	0-8	33.4	31.3	35.3	17	6.7	2.18	1.39
Bt1	8-30	19.7	22.6	57.7	5	6.4	1.02	1.77
Bt2	30-45	17.5	21.1	61.4	10	6.0	0.62	1.88

Field B: Lake County, OR: S1979OR037004

Horizon	Depth (cm)	Percent Sand	Percent Silt	Percent Clay	Percent Rock Fragments	pH	Percent Organic Carbon	Bulk Density
Ap	0-17	33.2	37.4	29.4	2	6.2	2.40	1.39
Bw1	17-33	41.7	32.6	25.7	2	6.5	1.07	1.32
Bw2	33-46	54.7	26.1	19.2	5	6.6	0.59	1.26



19) Which field would likely be drier one day after it rains? (1 point)

Answer: Field B

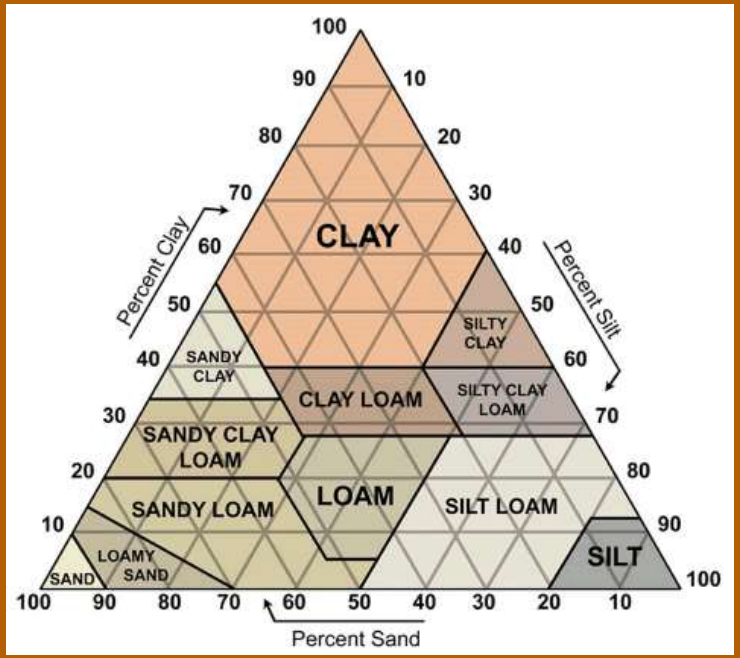
Use the measurements for Fields A and B below to answer the question.

Field A: Lake County, OR: S1979OR037001

Horizon	Depth (cm)	Percent Sand	Percent Silt	Percent Clay	Percent Rock Fragments	pH	Percent Organic Carbon	Bulk Density
A	0-8	33.4	31.3	35.3	17	6.7	2.18	1.39
Bt1	8-30	19.7	22.6	57.7	5	6.4	1.02	1.77
Bt2	30-45	17.5	21.1	61.4	10	6.0	0.62	1.88

Field B: Lake County, OR: S1979OR037004

Horizon	Depth (cm)	Percent Sand	Percent Silt	Percent Clay	Percent Rock Fragments	pH	Percent Organic Carbon	Bulk Density
Ap	0-17	33.2	37.4	29.4	2	6.2	2.40	1.39
Bw1	17-33	41.7	32.6	25.7	2	6.5	1.07	1.32
Bw2	33-46	54.7	26.1	19.2	5	6.6	0.59	1.26



20) Why did you choose your answer for question 19? (1 point)

a. horizon names

b. pH and percent rock fragments

c. organic carbon content

d. bulk density and texture

Answer: ____D_____

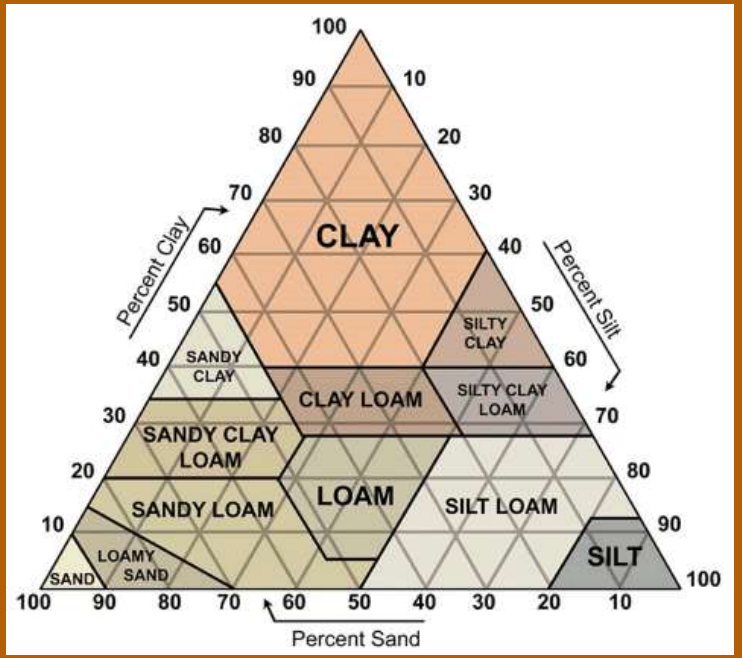
Use the measurements for Fields A and B below to answer the question.

Field A: Lake County, OR: S1979OR037001

Horizon	Depth (cm)	Percent Sand	Percent Silt	Percent Clay	Percent Rock Fragments	pH	Percent Organic Carbon	Bulk Density
A	0-8	33.4	31.3	35.3	17	6.7	2.18	1.39
Bt1	8-30	19.7	22.6	57.7	5	6.4	1.02	1.77
Bt2	30-45	17.5	21.1	61.4	10	6.0	0.62	1.88

Field B: Lake County, OR: S1979OR037004

Horizon	Depth (cm)	Percent Sand	Percent Silt	Percent Clay	Percent Rock Fragments	pH	Percent Organic Carbon	Bulk Density
Ap	0-17	33.2	37.4	29.4	2	6.2	2.40	1.39
Bw1	17-33	41.7	32.6	25.7	2	6.5	1.07	1.32
Bw2	33-46	54.7	26.1	19.2	5	6.6	0.59	1.26



21) Which field would likely transmit more surface water to groundwater? (1 point)

Answer: Field B

Part 4: Soil Survey

Use the **Lake Albert Soil Maps** to answer the following questions:

Resource link: https://learnforests.org/sites/default/files/Lake_Albert_Soil_Map_combined.pdf

22) At what scale was this soil survey mapped (see map Information)? (1 point)

Answer: 1:24,000

23) What is the Map Unit Name of map symbol 520? (1 point)

Answer:Playas

Use the **Lake Albert Soil Maps** to answer the following questions:

Resource link: https://learnforests.org/sites/default/files/Lake_Albert_Soil_Map_combined.pdf

24) What is the saturated hydraulic conductivity (K_{sat}) in micrometers per second for map unit symbol 301? (1 point)

Answer:9.0000

25) Between soil map unit symbols 205 and 301, which is predicted to have higher pesticide runoff potential? (1 point)

Answer: 301

26) Based on these soil data, would you treat the lands next to Highway 395 with pesticides to combat invasive plant species? Why or why not? (2 points)

Resource link: https://learnforests.org/sites/default/files/Lake_Albert_Soil_Map_combined.pdf

Answer: Yes or No is acceptable, based on justification below.

Why or why not: Acceptable answers include mentions of slope, texture, rock fragment content, bedrock, infiltration, K_{sat}, percolation, ponding, flooding, etc. “yes” or “no” both accepted if they back up their answer with soil data from the map or use creative stipulations like only in dry weather or a certain distance from water bodies. They might also mention that highways are common vectors for invasive species and good places to target treatment.

End of Soils Test!

Team total _____/ 30 points

Sponsored by:

Current Issue

Total of 30 points

Sponsored by:

Part 1. Hydrology

1) Define “watershed.” (1 point)

Answer: An area where all precipitation drains to the same point/location.

2) Which of the following statements about water are true? List all that apply. (2 points)

a) All forms of life require water

b) Water is the only substance on Earth that is commonly found in the liquid, solid and gas phases

c) Ice is the densest form of water

d) Water has high surface tension

e) Water is a polar molecule

Answer: A,B, D, E___

3) Use the chart to label the four actions in the correct location as water moves through the cycle. (4 Points)

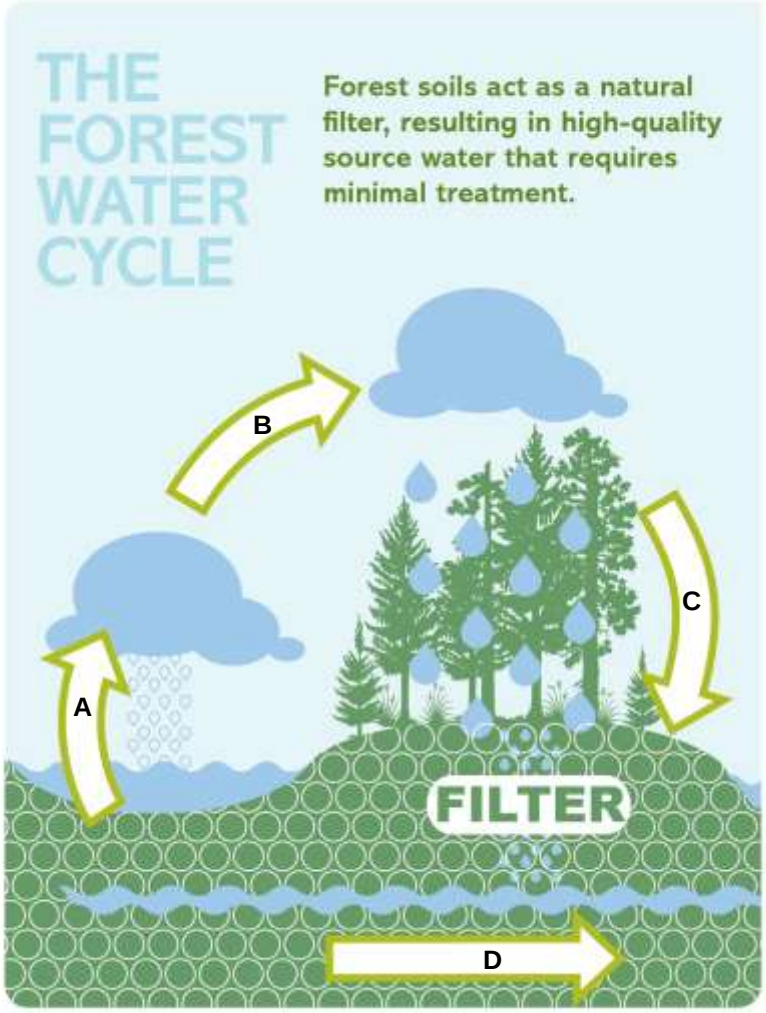
- Groundwater flow
- Transpiration
- Evaporation
- Precipitation

A. Evaporation

B. Transpiration

C. Precipitation

D. Groundwater flow



Use this resource to answer the following questions.
Resource link: Nitrate in Drinking Water

4) What are two potential sources of excess nitrate in water? (1 point)

1. Sources of excess nitrate in water include fertilizers, septic systems, wastewater treatment effluent, animal wastes, industrial wastes, and food processing wastes.

2.

5) If a well is contaminated with nitrates, boiling the water will reduce nitrate levels. (1 point)

a. True
b. False

Answer: ___B_____

Reasoning: Boiling water does not help because it actually concentrates the nitrate.

6) Which of the following are ways to improve fertilizer application efficiency? List all that apply. (2 points)

a) Split application

b) Spread on the soil surface

c) Nitrification inhibitors

d) Use liquid formations

Answer: ___A, C____

Part 2. Groundwater

Resource link: Water Quality Programs - Groundwater Basics

7) What is a confined aquifer? (1 point)

Answer:An aquifer that is bounded by geologic materials that restrict groundwater movement and is usually under pressure

8) Name the four primary outlets for groundwater discharge. (2 points, .5 each)

1. rivers
2. lakes
3. springs
4. wells

9) Identify one action the Oregon Water Resources Department (OWRD) and Department of Environmental Quality (DEQ) have taken to manage Oregon's Groundwater Management Areas due to elevated nitrate concentrations in groundwater. (1 point)

Resource link: Water Quality Programs - Groundwater Management Areas

1. One of the following: restricting or rejecting new water permits, restricting withdrawl timeframes, monitoring groundwater levels, recording water well levels and pumpage, casing and sealing wells, limiting withdrawal quantities, ceasing unlawful diversions.

10) Approximately what percent of Oregon's water withdrawals are from groundwater sources? (1 point)

Resource link: Saving Water in Oregon

a. 68%

b. 32%

c. 17%

d. 83%

Answer___B___

11) Describe two ways that households can conserve water and reduce waste. (2 points)
Resource link: Saving Water in Oregon

1.

2. Two of the following (each 1 pt.):
   - Install water-saving devices/equipment,
   - Maintain systems/prevent leaks,
   - Turn off water when not in use,
   - Run full loads of dishes and laundry,
   - Allow lawn to go dormant,
   - Low water landscaping
   - Only irrigate when needed,
   - Limit car washing,
   - Divert runoff into groundwater recharge systems,
   - Harvest rainwater for supplement,

12) Which of the following are statutory exemptions from permit and certificate requirements for uses of groundwater in Oregon? (1 point)

Resource link: Oregon Secretary of State Administrative Rules

a. Irrigating lawn up to ½ acre in size

b. Domestic water use of no more than 15,000 gallons per day

c. Stockwater use

d. All of the above

Answer__D____

13) Which entity has the primary responsibility for coordination of groundwater quality protection in Oregon under the Oregon Groundwater Quality Protection Act? (1 point)

Resource link: Water Quality Programs - About Oregon's Groundwater Protection

Answer:Oregon Department of Environmental Quality /or/ ODEQ

Part 3. Water Resource Management

14) Approximately how much water is used by each person in the U.S. per day for household use? (1 point)

a. 80 to 100 gallons

b. 20 to 40 gallons

c. 1 to 5 gallons

d. 200 to 240 gallons

Answer____A_____

15) What is the largest household use of water? (1 point)

Answer:The toilet

In 2018, the City of Salem issued a drinking water advisory to avoid consuming public tap water that had become contaminated.

Resource link: https://www.cityofsalem.net/pages/salem-prepares-for-2019-algal-season.aspx

16) What was the water contagion and contamination location?
From the options below, pick only one from each list. (2 points)

<u>Contagions</u>

a. Toxins from algal blooms
b. E.coli from manure
c. Arsenic from airport Reservoir
d. Pharmaceuticals from sewage

Answer:__A_____

<u>Locations</u>

a. City water wells
b. Willamette River
c. Detroit Lake
d. Lake Labish

Answer: __C_____

17) Identify what hydraulic structure is located at Bonneville, The Dalles, John Day and McNary in the map. Give two examples of how these structures influence hydrology. (3 points)

Hydraulic structure answer:

Hydroelectric dams

Two examples:

1. Two of the following (1 pt. each):

Controlling flooding,

- Creating large reservoirs,
- Changing river flow/timing,
- Accumulation of river sediment and nutrients,
- Creating barriers to river passage,
- Lower dissolved oxygen in water,
- Increased water temperature,
- Higher water tables,
- Increased evaporation,

Use the “Oregon Basin Outlook Report” from March 1, 2020 to answer the following questions:

Resource Link: https://www.wcc.nrcs.usda.gov/ftpref/states/or/watersupply/2020/WSOR_2020_Mar.pdf

18) Which basin’s snowpack was above its normal snowpack level in March? (1 point)

Answer: John Day Basin

19) What was the percent of normal snowpack for Rogue and Umpqua Basins? (1 point)

Answer: 71%

20) During what month was precipitation highest across Oregon? (1 point)

Answer: January

End of Current Issue Test!

Team Total _____/ 30 points

Sponsored by:

Feedback

Big applause for being part of this online event. We'd like to hear any constructive feedback you might want to share with the organizers.

Comment:

Feedback

What was the best or favorite part about Envirothon 2020?

Comment:

Name (optional):

You’re finished!

This is the end of the test.

All answers will be recorded, as is,
at 3:00 p.m. today.

Thank you for participating in Oregon Envirothon.

T-shirts and awards will be sent in a few weeks.

OREGON
ENVIROTHON

Presented by:

Oregon Forest
Resources Institute