



Time Consideration

Prep time: 0-5 minutes, Activity time: 15-20 minutes

Materials

Printed handouts, clipboards, writing utensils, an area outside to observe the environment

Teacher Preparation

- Print all of the Ecosystem Services BINGO! cards.
 There are ten different cards, with and without images for different ages or abilities of students. All of the BINGO cards can be found in the Appendix.
- 2. Get writing utensils for all of the students.
- 3. Place the BINGO cards on clipboards with writing utensils for the students to use. Having the students work in pairs is recommended.



Figure 1. Example of "Ecosystem Services BINGO" card, available in Appendix 2.

Procedure

1. Talk about the concept of ecosystem services: providing the benefits that humans receive from nature with your students. Have students provide examples of ecosystem services and related human benefits.

Examples of ecosystem services: trees provide oxygen which we breathe; trees provide shade on the playground (US EPA 2008); wetlands filter water (Vellidis et al., 2003); forests provide places for people to recreate (Kline et al., 2011). Examples of human benefits: reductions in stress and anxiety from spending time at the beach (MacKerron & Mourato 2013); reduced symptoms of post-traumatic stress disorder after spending a weekend fly-fishing by the river (Vella et al., 2013).

2. Explain that you're going to examine your local environment and to look there for elements on the BINGO cards. Tell students that when they find something outside that fits the slots on their BINGO cards, they should write in some details about it. For example, in the "Can positively impact air quality" BINGO slot, the students could write "trees remove pollutants from the air."

ESL/ELL tip: Allow students to draw images instead of writing words in their BINGO cards.

Optional: Use Power Point slides with images of different ecosystems as a guide to walk your class through the entire activity indoors.

3. Once outside, walk through the natural environment wherever you are (playgrounds, fields, and woods work well). Narrate some of the things you see and have ongoing discussions with students as they discover ecosystem services right in front of their eyes and around their schoolyards.

4. Evaluate:

Discuss ecosystem services elements as you see them outdoors. These informal conversations during the activity can help evaluate student understanding.



Figure 2. Students find a flower for pollination as they explore local ecosystem services during the "Ecosystem Services BINGO" activity.



Figure 3. Mrs. Jennifer Carson, ESL 4th and 5th grade teacher at Grady A. Brown Elementary School in North Carolina, instructs students on the ecosystem services in their schoolyard during "Ecosystem Services BINGO."



- The cards that follow are all the same on the front side but are different on the back side (the BINGO side) so that you can give different cards to different pairs of students. There are ten cards total, and they are numbered 1-10. It is recommended that students work in groups of two, so this would work well with a class size of 20.
- There are also cards without images. Those cards can be used for upper-level students. They have the exact same layouts as the 10 cards with images.

APPENDIX, Lesson #1: Ecosystem Services BINGO! Student Handouts, with images



Ecosystem Services BINGO!

As you spend some time outside with your class, fill in the BINGO card on the back of this page.

Name(s):	Date:	

Ecosystem services provide the benefits that humans receive from nature. They underpin almost every aspect of human well-being, including our health, security, and economy.

- Many of the decisions we make, from how we develop communities to how we manage the land surrounding our communities, impact ecosystem services.
- We are not always aware of the links between our environment and our well-being, so we may
 not always take the true value of ecosystems and their services into account when we make
 decisions.
- Considering ecosystems and their services in our policies and decision-making could help us better manage our resources in a way that would benefit us economically, environmentally, and socially.
- To learn more about ecosystem services, check out this website from the U.S. Environmental Protection Agency:



	Ecosystem Services card 1			Bonus points for details:	
ave	В	I	N	G	0
(and fill in what the item is that you saw. Each box must have le for descriptions and/or details of the item.)	Can positively impact air quality:	Can promote social interaction:	Can positively impact water quality:	Can be like a filter:	Can be used for shelter for humans:
at the item is that you ions and/or details of 1	Has economic value (\$):	Can provide recreation:	Can be used for raw materials:	Can reduce effects of flooding:	Can reduce effects of hot days:
ng that Bonus points availab	Can promote physical activity:	Promotes engagement with nature:	FREE SPACE	Can be used as a source of energy:	Can provide food for humans:
	Promotes positive human health outcomes (which ones?):	Can inspire art:	Has associations with reductions in respiratory symptoms:	Has associations with reductions in stress/anxiety (how?):	Can provide aesthetic value:
Find something something something filled in to count. Bonu	Can provide habitats for species (extra points for naming a species!):	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can help to filter pollutants that may affect water quality:	Has been found to have associations with healing:	Can inspire writing:



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Ecosystem Services BINGO!

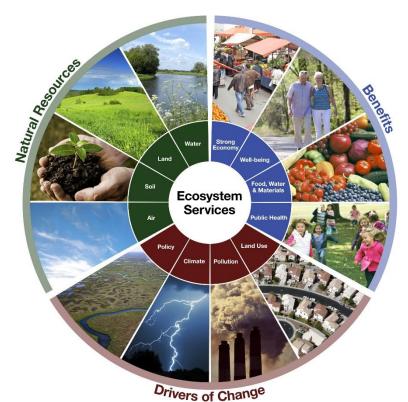
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	Ecosystem Services card 2			Bonus points fo	r details:
tem.)	В	I	N	G	0
at (and fill in what the item is that you saw. Each box Bonus points available for descriptions and/or details of the item.)	Can provide food for humans:	Has been found to have associations with healing:	Has economic value (\$):	Has associations with reductions in respiratory symptoms:	Promotes engagement with nature:
ill in what the item is i	Promotes positive human health outcomes (which ones?):	Has associations with reductions in stress/anxiety (how?):	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can positively impact water quality:	Can be used for shelter for humans:
	Can be used for raw materials:	Can be like a filter:	FREE SPACE	Can help to filter pollutants that may affect water quality:	Can inspire art:
thing filled in to cou	Can inspire writing:	Can positively impact air quality:	Can provide recreation:	Can provide habitats for species (extra points for naming a species!):	Can reduce effects of flooding:
Find some must have something	Can be used as a source of energy:	Can reduce carbon dioxide in the atmosphere:	Can reduce effects of hot days:	Can promote social interaction:	Can promote physical activity:



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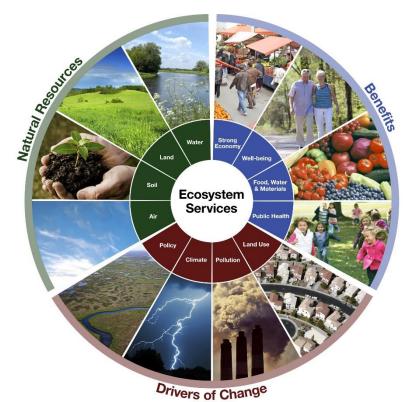
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(and fill in what the item is that you saw. Each box must railable for descriptions and/or details of the item.)	Can be like a filter:	Can provide recreation:	Promotes engagement with nature:	Can inspire writing:	Can positively impact water quality:
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••• (and fill in v	Can help to filter pollutants that may affect water quality:	Has been found to have associations with healing:	FREE SPACE	Has economic value (\$):	Promotes positive human health outcomes (which ones?):
	Can promote physical activity:	Has associations with reductions in respiratory symptoms:	Can reduce carbon dioxide in the atmosphere:	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can reduce effects of hot days:
Find something filled in to count.	Can positively impact air quality:	Can be used for raw materials:	Can be used for shelter for humans:	Can be used as a source of energy:	Can promote social interaction:



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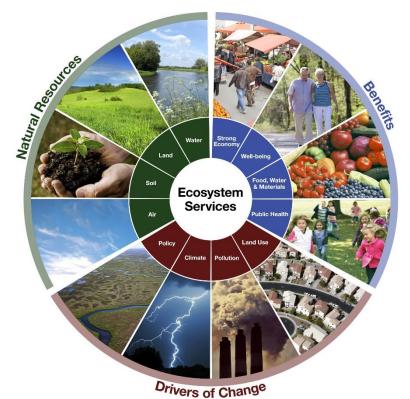
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saw. Each box n ils of the item.)	Can inspire writing:	Can promote social interaction:	Has economic value (\$):	Can reduce effects of flooding:	Has associations with reductions in stress/anxiety (how?):
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Find someth have something filled in to	Can be like a filter (how?):	Can be used for shelter for humans:	Can positively impact air quality:	Can be used for raw materials:	Has associations with reductions in respiratory symptoms:



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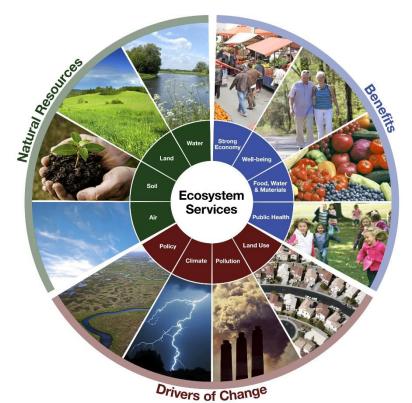
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	Ecosystem Services card 5 Bonus points for details:					
must	В	ı	N	G	0	
ou saw. Each box i	Has associations with reductions in stress/anxiety (how?):	Has been found to have associations with healing:	Can be used for shelter for humans:	Can provide food for humans:	Can inspire art:	
(and fill in what the item is that you saw. Each box must ailable for descriptions and/or details of the item.)	Can promote social interaction:	Can positively impact air quality:	Can reduce carbon dioxide in the atmosphere:	Can reduce effects of hot days:	Promotes positive human health outcomes (which ones?):	
that (and fill in what the item is that you saw. Each box Bonus points available for descriptions and/or details of the item.)	Can inspire writing:	Has associations with reductions in respiratory symptoms:	FREE SPACE	Can positively impact water quality:	Can help to filter pollutants that may affect water quality:	
ing count.	Can be used for raw materials:	Promotes engagement with nature:	Can provide recreation:	Can promote physical activity:	Can reduce effects of flooding:	
Find someth have something filled in to	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can be used as a source of energy:	Can be like a filter (how?):	Has economic value (\$):	Can provide habitats for species (extra points for naming a species!):	



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nust	В	I	N	G	0
u saw. Each box r ails of the item.)	Can be used for raw materials:	Can help to filter pollutants that may affect water quality:	Can be like a filter:	Has been found to have associations with healing:	Can reduce effects of flooding:
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••• (and fill in ints available for	Promotes engagement with nature:	Can be used for shelter for humans:	FREE SPACE	Can provide food for humans:	Can be used as a source of energy:
ing count.	Can reduce carbon dioxide in the atmosphere:	Can inspire writing:	Has associations with reductions in stress/anxiety (how?):	Can reduce effects of hot days:	Can positively impact air quality:
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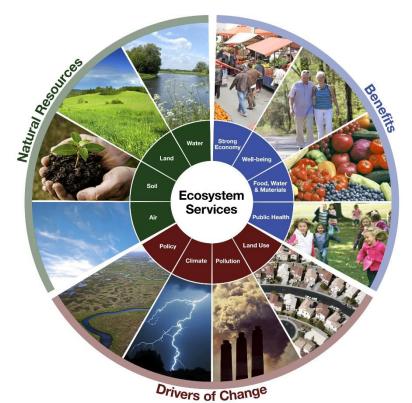
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	Ecosystem Services card 7			Bonus points for details:	
nust	В	I	N	G	0
you saw. Each box r r letails of the item.)	Can provide food for humans:	Can reduce effects of flooding:	Can reduce carbon dioxide in the atmosphere:	Can reduce effects of hot days:	Can provide recreation:
that (and fill in what the item is that you saw. Each box must Bonus points available for descriptions and/or details of the item.)	Can be used as a source of energy:	Can positively impact water quality:	Has associations with reductions in respiratory symptoms:	Has been found to have associations with healing:	Can inspire art:
1a t (and fill us points available f	Promotes positive human health outcomes (which ones?):	Can positively impact air quality:	FREE SPACE	Can be used for shelter for humans:	Has associations with reductions in stress/anxiety (how?):
<u> </u>	Can inspire writing:	Can promote social interaction:	Can help to filter pollutants that may affect water quality:	Can promote physical activity:	Can provide aesthetic value:
Find something filled in to count.	Promotes engagement with nature:	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can provide food for humans:	Has economic value (\$):	Can be used for raw materials:



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	Ecosyst	tem Ser	vices card 8	Bonus points fo	or details:
ust	В	I	N	G	0
 (and fill in what the item is that you saw. Each box must available for descriptions and/or details of the item.) 	Can be used for raw materials:	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can provide recreation:	Has associations with reductions in respiratory symptoms:	Can provide aesthetic value:
that (and fill in what the item is that you saw. Each bo. Bonus points available for descriptions and/or details of the item.)	Can provide food for humans:	Has economic value (\$):	Can promote physical activity:	Can inspire writing:	Can be used for shelter for humans:
that (and fill onus points available	Promotes positive human health outcomes (which ones?):	Can be used as a source of energy:	FREE SPACE	Can positively impact water quality:	Can provide habitats for species (extra points for naming a species!):
ing count.	Promotes engagement with nature:	Can promote social interaction:	Can positively impact air quality:	Can reduce effects of hot days:	Has been found to have associations with healing:
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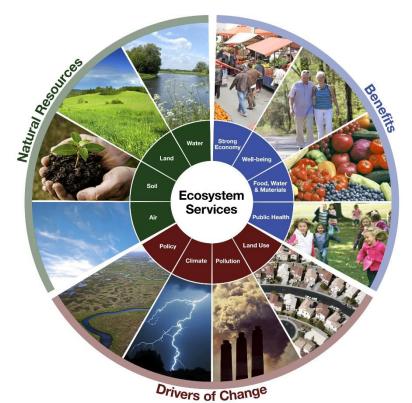
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	Ecosystem Services card 9			Bonus points fo	r details:
	В	I	N	G	0
aw. Each box mus : of the item.)	Promotes engagement with nature:	Can reduce effects of hot days:	Can be used as a source of energy:	Can promote social interaction:	Has been found to have associations with healing:
that (and fill in what the item is that you saw. Each box must Bonus points available for descriptions and/or details of the item.)	Can help to filter pollutants that may affect water quality:	Has associations with reductions in respiratory symptoms:	Can inspire art:	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can provide aesthetic value:
lt (and fill in who onts available for de	Can promote physical activity:	Can positively impact water quality:	FREE SPACE	Can positively impact air quality:	Can provide habitats for species (extra points for naming a species!):
5 6	Can reduce effects of flooding:	Can reduce carbon dioxide in the atmosphere:	Can be used for raw materials:	Can provide recreation:	Has associations with reductions in stress/anxiety (how?):
Find somethin have somethin have something filled in to cou	Can provide food for humans:	Can inspire writing:	Promotes positive human health outcomes (which ones?):	Has economic value (\$):	Can be used for shelter for humans:



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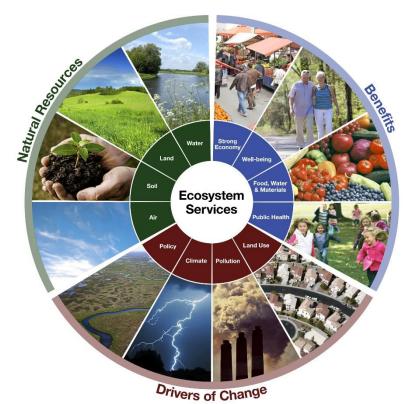
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	Ecosyst	tem Ser	vices card 10	Bonus points fo	or details:
ust	В	I	N	G	0
u saw. Each box m ils of the item.)	Can promote social interaction:	Can help to filter pollutants that may affect water quality:	Can provide aesthetic value:	Promotes engagement with nature:	Can positively impact air quality:
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Lesson Plan

www.epa.gov/enviroatlas

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	Ecosyst	tem Ser	vices card 1	Bonus points fo	or details:
: have	В		N	G	0
«. Each box must item.)	Can positively impact air quality:	Can promote social interaction:	Can positively impact water quality:	Can be like a filter (how?):	Can be used for shelter for humans:
g that (and fill in what the item is that you saw. Each box must have nus points available for descriptions and/or details of the item.)	Has economic value (\$):	Can provide recreation:	Can be used for raw materials:	Can reduce effects of flooding:	Can reduce effects of hot days:
(and fill in what th	Can promote physical activity:	Promotes engagement with nature:	FREE SPACE	Can be used as a source of energy:	Can provide food for humans:
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These materials are all part of EPA Report #: EPA/600/R-18/231.



Lesson Plan

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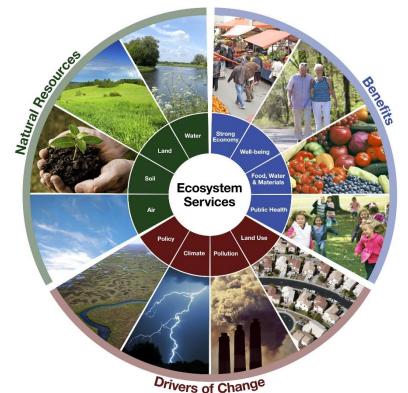
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	В	I	N	G	0
. Each box mus ithe item.)	Can be like a filter:	Can provide recreation:	Promotes engagement with nature:	Can inspire writing:	Can positively impact water quality:
that (and fill in what the item is that you saw. Each box must Bonus points available for descriptions and/or details of the item.)	Can provide habitats for species (extra points for naming a species!):	Can reduce effects of flooding:	Can inspire art:	Can provide food for humans:	Has associations with reductions in stress/anxiety (how?):
••• (and fill in wh	Can help to filter pollutants that may affect water quality:	Has been found to have associations with healing:	FREE SPACE	Has economic value (\$):	Promotes positive human health outcomes (which ones?):
الله ه	Can promote physical activity:	Has associations with reductions in respiratory symptoms:	Can reduce carbon dioxide in the atmosphere:	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can reduce effects of hot days:
Find something filled in to co	Can positively impact air quality:	Can be used for raw materials:	Can be used for shelter for humans:	Can be used as a source of energy:	Can promote social interaction:





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Ecosystem Services BINGO!

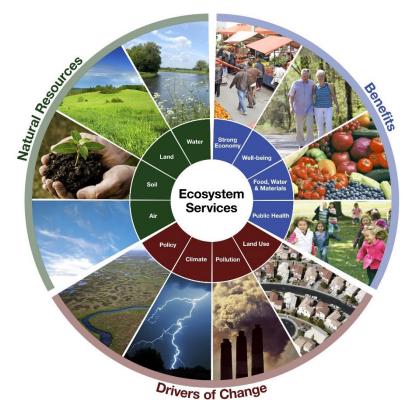
As you spend some time outside with your class, fill in the BINGO card on the back of this page.

Name(3).	(s):	Date:
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Ecosystem services provide the benefits that humans receive from nature. They underpin almost every aspect of human well-being, including our health, security, and economy.

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	Ecosyst	tem Ser	vices card 4	Bonus points fo	or details:
ust	В	I	N	G	0
ı saw. Each box m ils of the item.)	Can inspire writing:	Can promote social interaction:	Has economic value (\$):	Can reduce effects of flooding:	Has associations with reductions in stress/anxiety (how?):
that (and fill in what the item is that you saw. Each box must Bonus points available for descriptions and/or details of the item.)	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can positively impact water quality:	Can be used as a source of energy:	Can inspire art:	Can reduce effects of hot days:
••• (and fill in	Has been found to have associations with healing:	Can reduce carbon dioxide in the atmosphere:	FREE SPACE	Can provide food for humans:	Can help to filter pollutants that may affect water quality:
ing count. E	Can provide habitats for species (extra points for naming a species!):	Can promote physical activity:	Promotes positive human health outcomes (which ones?):	Promotes engagement with nature:	Can provide recreation:
Find someth have something filled in to	Can be like a filter (how?):	Can be used for shelter for humans:	Can positively impact air quality:	Can be used for raw materials:	Has associations with reductions in respiratory symptoms:





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Ecosystem Services BINGO!

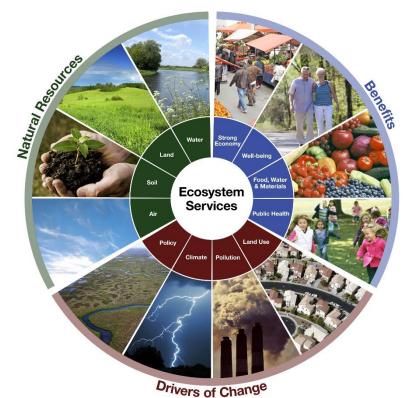
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	Ecosyst	tem Ser	vices card 5	Bonus points fo	or details:
	В	I	N	G	0
 (and fill in what the item is that you saw. Each box must available for descriptions and/or details of the item.) 	Has associations with reductions in stress/anxiety (how?):	Has been found to have associations with healing:	Can be used for shelter for humans:	Can provide food for humans:	Can inspire art:
that (and fill in what the item is that you saw. Each bo. Bonus points available for descriptions and/or details of the item.)	Can promote social interaction:	Can positively impact air quality:	Can reduce carbon dioxide in the atmosphere:	Can reduce effects of hot days:	Promotes positive human health outcomes (which ones?):
L (and fill in	Can inspire writing:	Has associations with reductions in respiratory symptoms:	FREE SPACE	Can positively impact water quality:	Can help to filter pollutants that may affect water quality:
ج ب ر	Can be used for raw materials:	Promotes engagement with nature:	Can provide recreation:	Can promote physical activity:	Can reduce effects of flooding:
Find something filled in to cou	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can be used as a source of energy:	Has associations with increases in asthma and respiratory symptoms:	Has economic value (\$):	Can provide habitats for species (extra points for naming a species!):





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Ecosystem Services BINGO!

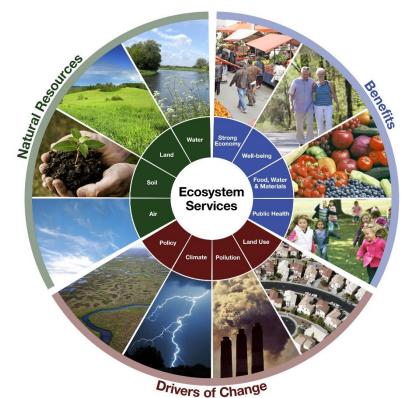
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Name(3).	(s):	Date:
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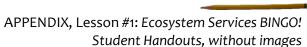
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	Ecosyst	tem Ser	vices card 6	Bonus points fo	r details:
ust	В	I	N	G	0
ı saw. Each box m ils of the item.)	Can be used for raw materials:	Can help to filter pollutants that may affect water quality:	Can be like a filter:	Has been found to have associations with healing:	Can reduce effects of flooding:
that (and fill in what the item is that you saw. Each box must Bonus points available for descriptions and/or details of the item.)	Can provide habitats for species (extra points for naming a species!):	Can promote social interaction:	Can inspire art:	Has economic value (\$):	Can positively impact water quality:
lt (and fill in	Promotes engagement with nature:	Can be used for shelter for humans:	FREE SPACE	Can provide food for humans:	Can be used as a source of energy:
ing count.	Can reduce carbon dioxide in the atmosphere:	Can inspire writing:	Has associations with reductions in stress/anxiety (how?):	Can reduce effects of hot days:	Can positively impact air quality:
Find someth have something filled in to	Has associations with reductions in respiratory symptoms:	Can provide habitats to pollinators (extra points for naming a pollinator!):	Promotes positive human health outcomes (which ones?):	Can promote physical activity:	Can provide recreation:







Ecosystem Services BINGO!

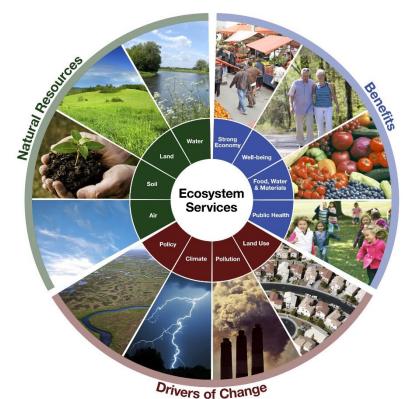
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	Ecosys	tem Ser	vices card 7	Bonus points fo	r details:
ust	В	I	N	G	0
 (and fill in what the item is that you saw. Each box musts available for descriptions and/or details of the item.) 	Can provide food for humans:	Can reduce effects of flooding:	Can reduce carbon dioxide in the atmosphere:	Can reduce effects of hot days:	Can provide recreation:
nat the item is that y	Can be used as a source of energy:	Can positively impact water quality:	Has associations with reductions in respiratory symptoms:	Has been found to have associations with healing:	Can inspire art:
that (and fill in what the item is that you saw. Each bo. Bonus points available for descriptions and/or details of the item.)	Promotes positive human health outcomes (which ones?):	Can positively impact air quality:	FREE SPACE	Can be used for shelter for humans:	Has associations with reductions in stress/anxiety (how?):
ing count.	Can inspire writing:	Can promote social interaction:	Can help to filter pollutants that may affect water quality:	Can promote physical activity:	Can provide aesthetic value:
Find someth have something filled in to	Promotes engagement with nature:	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can provide food for humans:	Has economic value (\$):	Can be used for raw materials:

APPENDIX, Lesson #1: Ecosystem Services BINGO! Student Handouts, without images



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Ecosystem Services BINGO!

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	Ecosys	tem Ser	vices card 8	Bonus points fo	or details:
ave	В	I	N	G	0
•• (and fill in what the item is that you saw. Each box must have ilable for descriptions and/or details of the item.)	Can be used for raw materials:	Can provide habitats to pollinators (extra points for naming a pollinator!):	Can provide recreation:	Has associations with reductions in respiratory symptoms:	Can provide aesthetic value:
e item is that you and/or details of '	Can provide food for humans:	Has economic value (\$):	Can promote physical activity:	Can inspire writing:	Can be used for shelter for humans:
that (and fill in what the item is that you saw. Ead points available for descriptions and/or details of the item.)	Promotes positive human health outcomes (which ones?):	Can be used as a source of energy:	FREE SPACE	Can positively impact water quality:	Can provide habitats for species (extra points for naming a species!):
ng Bonus	Promotes engagement with nature:	Can promote social interaction:	Can positively impact air quality:	Can reduce effects of hot days:	Has been found to have associations with healing:
Find something filled in to count.	Can reduce effects of flooding:	Can inspire art:	Can help to filter pollutants that may affect water quality:	Can reduce carbon dioxide in the atmosphere:	Has associations with reductions in stress/anxiety (how?):

APPENDIX, Lesson #1: Ecosystem Services BINGO! Student Handouts, without images



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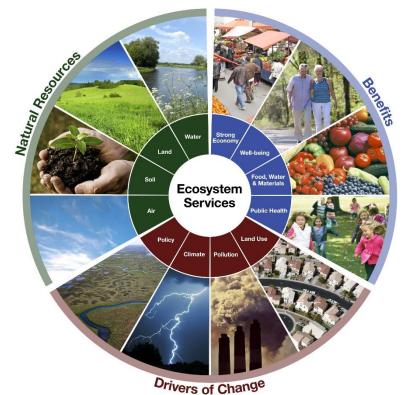
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	Ecosyst	tem Ser	Bonus points for details:		
ave	В	I	N	G	0
. Each box must h . em.)	Promotes engagement with nature:	Can reduce effects of hot days:	Can be used as a source of energy:	Can promote social interaction:	Has been found to have associations with healing:
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	Can promote physical activity:	Can positively impact water quality:	FREE SPACE	Can positively impact air quality:	Can provide habitats for species (extra points for naming a species!):
ng Bonus	Can reduce effects of flooding:	Can reduce carbon dioxide in the atmosphere:	Can be used for raw materials:	Can provide recreation:	Has associations with reductions in stress/anxiety (how?):
Find something filled in to count.	Can provide food for humans:	Can inspire writing:	Promotes positive human health outcomes (which ones?):	Has economic value (\$):	Can be used for shelter for humans:





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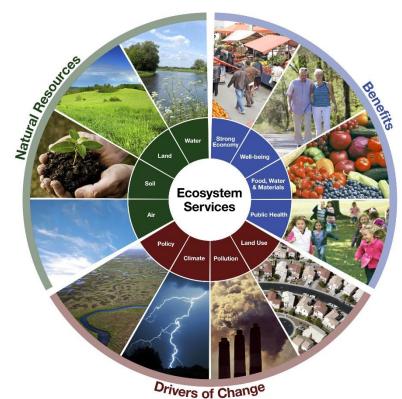
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that (and fill in whe points available for descript	Has been found to have associations with healing:	Can positively impact water quality:	FREE SPACE	Can promote physical activity:	Can provide habitats for species (extra points for naming a species!):
ng Bonus	Can be used as a source of energy:	Can reduce carbon dioxide in the atmosphere:	Can inspire art:	Can provide food for humans:	Can be used for shelter for humans:
Find something something	Has economic value (\$):	Can reduce effects of flooding:	Has associations with reductions in stress/anxiety (how?):	Can inspire writing:	Promotes positive human health outcomes (which ones?):