BOOK CLUB DISCUSSION & ACTIVITIES

One Single Species:

Why the Connections in Nature Matter

– Susan E. Quinlan

PREPARATION:

1. Be sure the participants have read the book, or read it aloud (while showing the illustrations) at the beginning of your class or meeting.

2. Consider appointing one reader to lead the meeting, or alternatively allow each participant to be the discussion leader for one or more of the suggested questions, or another question (related to the story) which they would like to ask their fellow readers. You might print out then cut up the discussion questions into separate paper slips to pass out to participants if you wish to circulate the discussion leader role among participants.

3. Remind all participants to be respectful and listen carefully to others. You might want to ask participants to raise their hand if they would like to talk, or set up an order for readers to respond to each question after it is asked.

4. Encourage participants to raise their hand, if they would like to ask a question or comment about something someone else has said. Remind them that it is okay to agree or disagree with fellow readers, but only respectful questions or comments are appropriate.

5. Check out the suggested follow-up activities so you have the materials and page copies needed on hand and ready to hand out.

BEGINNING THE DISCUSSION:

Ask readers to use their thumbs to show their overall reaction to the book—

Up for "Loved it,"

Sideways for "It was okay," or

Down for "Did not enjoy the story."

SUGGESTED DISCUSSION QUESTIONS:

General Reactions:

1. Have you visited or would you like to visit the environment where Dr. Paine worked and explore the tidepools there? If you have visited, what one thing do you most clearly remember about that environment? If you haven't visited it, why or why wouldn't you want to visit?

2. Many different organisms are pictured and discussed in the book. Which did you think were the most interesting or would you most like to see? Why?

3. Which organisms would you like to learn more about?

4. Can you imagine yourself working out in nature like the scientist in the story? Do you think it would be fun, easy, or challenging to do that kind of work?

5. Share a favorite quote from the book. Why did this quote stand out to you?

6. Which illustration in the book did you like the most? Why?

7. What feelings did this book evoke for you?

Scientific Process Related

8. The scientist in the book wondered about a question—do you remember his question? Is it a question you have ever wondered about? Will you think about it more after reading about Paine's study? Why or why not?

9. What were some of the problems the scientist had to solve to be able to set up his experiment?

10. What do you think was likely the most challenging task Dr. Bob Paine had to do during his study?

11. Were you surprised by what happened (the results) of Dr. Bob Paine's experiment?

12. What did the scientist learn from his experiment and how important do you think his finding is?

13. Do you think the term "keystone" is a good word to describe a species whose presence or absence changes an entire ecosystem? Can you think of any other word that could also be used?

Applications to Local Nature

14. Did this book make you wonder about how many different kinds of organisms live right here (in…fill in a local habitat)?

15. Did the book cause you to wonder about what might be happening in nature right around us? Can you think of any connections that exist in nearby environments or habitats?

16. What local organism do you think might be especially important, maybe even a keystone species, in a nearby habitat? Why do you think that?

17. Is there anything about local nature that you wonder about? Might it be possible to set up an experiment to try to find the answer to your question? How?

18. Can you think of a different question about nature you wonder about or to which you'd like to find the answer? Or can you imagine an experiment you think would be interesting to set up in nature?

19. If you could ask the scientist who did this study one question, what would you ask him?

Writing and Author Related:

20. What do you think the author's purpose was in writing this book? What ideas was she trying to get across? Do you think the story helped you understand why the connections in nature matter?

21. If you got the chance to ask the author/ illustrator of this book one question, what would it be?

22. Would you read another book by this author? Why or why not?

23. What do you think of the book's title? How does it relate to the book's contents? What other title might you suggest?

24. What other books or articles have you read about nature? Would you recommend that others read any of those? Why?

SUGGESTED FOLLOW-UP ACTIVITIES:

1. Play a lively game of JENGA™

Goal:

Reinforce the idea of interconnections, illustrating that when things are intertied or interconnected, each part removed makes the structure more fragile and removing the wrong piece will cause a collapse.

Materials:

One or more sets of the **JENGA™** game depending upon the number of participants in your book discussion group.

Set Up:

Explain to participants that this game ties into the story in the book ***One Single Species*** because it illustrates that when things are interconnected, like all the species in an ecosystem, removing one part of the system can cause a collapse of the entire system.

The Challenge:

Which team or person can remove the most pieces before the **JENGA™** tower falls down?

2. Discover Nature's Connections in an Ecosystem

Goal:

Get readers outdoors and encourage them to apply the careful observation techniques used by Dr. Bob Paine as they observe nature firsthand.

Materials:

A copy of the ***Observe & Discover*** handout (p. 7-8) for the leader, or alternatively for each participant.
Pencils

Set Up:

Go outside (to a natural area, if possible) to practice observing and looking for some of the connections that exist in nature. Use the ***Observe & Discover*** handout to guide observations. Depending on group size and the situation, you may wish to have a discussion and fill out one handout as a group, or give copies of the handout to each participant or small groups of participants to fill out as they explore.

The Challenge:

If you looked at an ecosystem using the careful observation techniques of Dr. Bob Paine, what all might you notice? (This activity could be done while watching video clips about an ecosystem or looking at a photo/illustration of an ecosystem, but getting readers outdoors will be far more effective in helping participants learn to observe nature more carefully.) Challenge participants to create an illustration or diorama of the ecosystem they explore.

3. Intertidal Birds Coloring Sheet

Goal:

Review and reinforce the names and appearances of the birds described in the story and encourage attention to the various shapes and color patterns of different bird species.

Materials:

A copy of the ***Intertidal Birds*** Coloring Sheet (p.9) for each participant.
Colored Pencils or crayons
One or more copies of *One Single Species* plus an equal number of book stands.

Set Up:

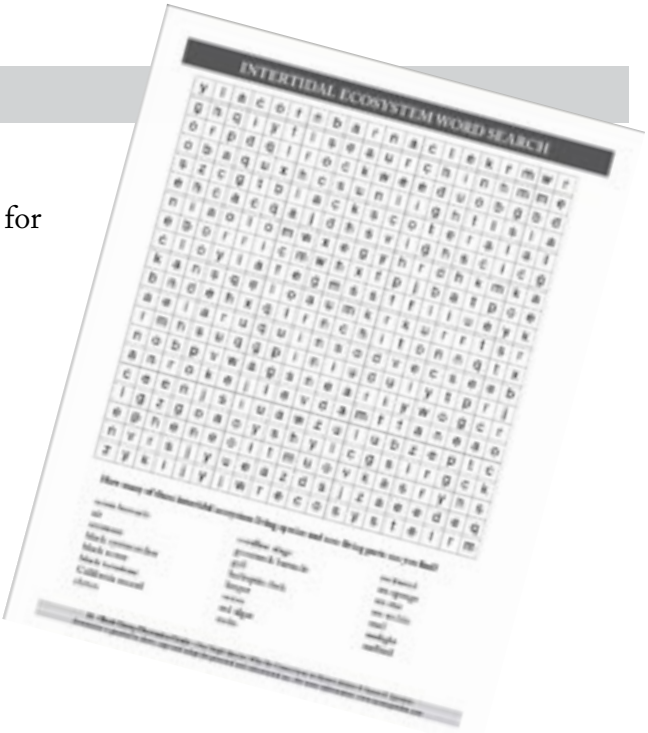
1. Turn to pages 32 -33 in ***One Single Species*** and set the book up on a stand so that the illustrations of the birds with their names is visible to participants.

2. Hand out a copy of the coloring sheet to each participant.

The Challenge:

Who can name all of the birds in the picture after they finish coloring?
Set up a finished coloring page art show or contest for the most neatly, accurately colored page.

4. Intertidal Word Search



Materials:

A copy of the Intertidal Word Search Puzzle (p. 10) for each participant.
Pencils

Set Up:

Hand out a copy of the Word Search Puzzle to each participant or team.

The Challenge:

Which team or person can find all, or the highest number, of words in the puzzle within a set time? (Answer sheet on page 12 of this booklet.)

5. Tidepool Organisms Coloring Sheet

Goal:

Review and reinforce the names and appearances of the diverse intertidal organisms in the story and learn to look carefully.

Materials:

A copy of the ***Tidepool Organisms*** Coloring Sheet (p.12) for each participant.
Colored Pencils or crayons
One or more copies of ***One Single Species*** plus an equal number of book stands.

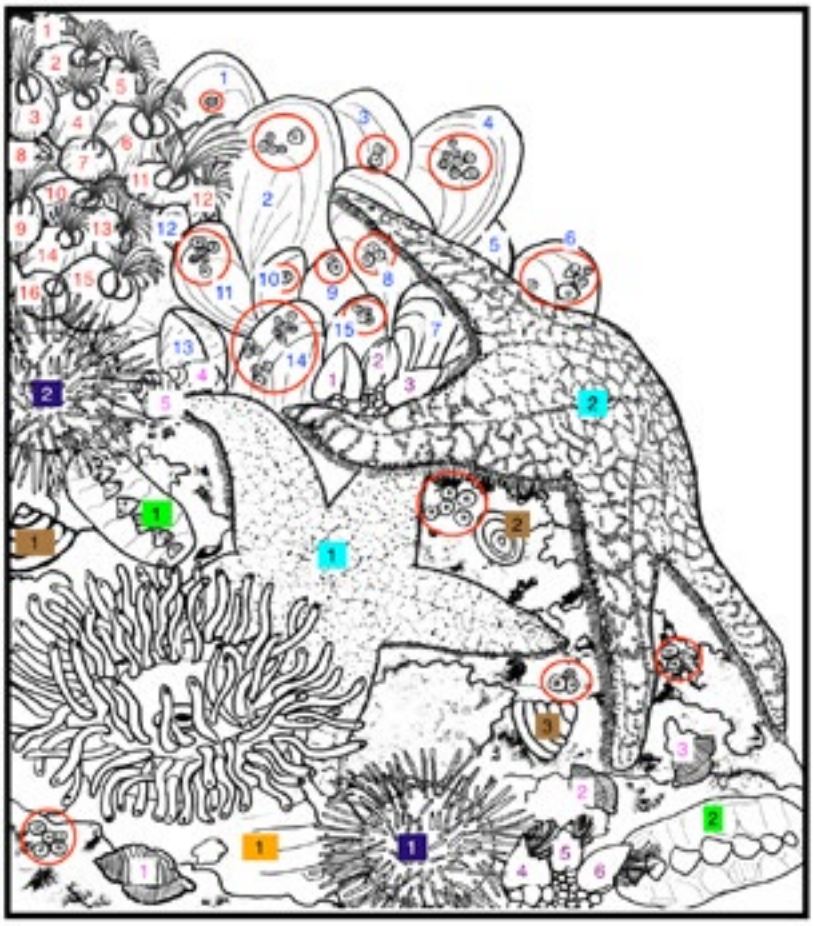
Set Up:

1. Turn to pages 12-13 in ***One Single Species*** and set the book up on a stand so that the illustrations of the organisms with their names is visible to participants.
2. Hand out a copy of the coloring sheet to each participant.

The Challenge:

Who can count the total number of each of the kinds of organisms in shown the picture?

16 (large) acorn barnacles
(+65 tiny ones = 81)
15 California mussels
2 chitons
6 gooseneck barnacles
3 limpets
1 sea anemones
2 sea stars
2 sea urchins
5 snails



ECOSYSTEM CONNECTIONS_OBSERVE & DISCOVER

Dr. Bob Paine began his work by carefully observing the intertidal ecosystem he studied. Try looking at nature in a similarly thoughtful way! Dr. Paine studied the intertidal along the coast of Washington state. Where are you? Name the location of the ecosystem you are exploring:

_____

1. THE NON-LIVING ENVIRONMENT:

The non-living environment shapes an ecosystem. Notice the non-living parts of the ecosystem you are exploring:

air water sunlight rocks & dirt

These features determine the local climate and the kinds of organisms that can live here.
Do any features of the non-living environment here seem particularly important?

How would you describe the non-living environment here? What makes this environment different from other environments? Some possible descriptive terms: hot, warm, cool, cold, wet, damp, dry, calm, windy, rocky, sandy)

Do you notice any variations in the non-living environment? (high and low spots, wet and dry areas, slopes that face in different directions?) Does it look as if different living things occur in different areas? Dr. Paine noticed the repeated pattern of barnacles, kelp, mussels, and other organisms along the rocky shore. Do you notice any patterns in the landscape you are observing?

2. THE LIVING THINGS

Take note of what kinds of living things occur in this ecosystem. Dr. Paine noticed various birds and many different kinds of organisms in the tidepools he examined. What kinds of organisms can you notice in the ecosystem you are examining?

_____ Birds?
_____ Mammals?
_____ Insects?
_____ Fish?
_____ Reptiles?
_____ Amphibians?
_____ Plants?
_____ Algae?
_____ Lichens?
_____ Micro-organisms?
(anyone have a microscope?)

3. THE CONNECTIONS

PRODUCERS:

Which of the living things in this area do you think are producers--living things that can make food from sunlight, air, and water via photosynthesis? Name or (draw pictures) of three kinds of producers that you notice:

_____ _____ _____

How many different species (kinds) of producers can you count as you look around? _____

CONSUMERS:

Do you see any consumers (living things that eat other organisms because they can't make their own food like a producer could)?

_____ _____ _____

Look around for evidence of consumers that you don't actually see. Can you observe:

_____ Any sounds of animals? (birds singing, animals chattering, insects buzzing or chirping?)

_____ Any clipped off stems or leaves?

_____ Any holes in leaves, bark, or shells

_____ Any animal droppings?

_____ Any tufts of fur or loose feathers?

_____ Any tracks?

_____ Any bent over plants or a trail of some kind-evidence that an animal has walked by or laid down?

_____ Any holes in the ground?

_____ Any mounds of sand, dirt, gravel, plant clippings?

_____ Any other evidence that you think might be a sign of some animal?

Decomposers are consumers that help break down dead producers and consumers and return the nutrients they contain to the nonliving environment. What evidence of decomposers do you see?

____Anything rotting, like a rotting log or dead organism?

____ Soil that contains rotted leaves?

____Old bones

_____Any mushrooms, mold, or other fungi?

____The smell of anything rotting?

POLLINATION:

Do any of the plants here likely need pollination? What might they rely on for this service?
Wind? Insects? Birds? Other?

SEED DISPERSAL:

How might the seeds of various kinds of plants here get dispersed?
Do any appear to be wind-dispersed?
Do any produce berries or seeds that likely depend on animals to carry their seeds?

Congratulations! You have begun learning to observe nature like Dr. Bob Paine. Keep discovering!

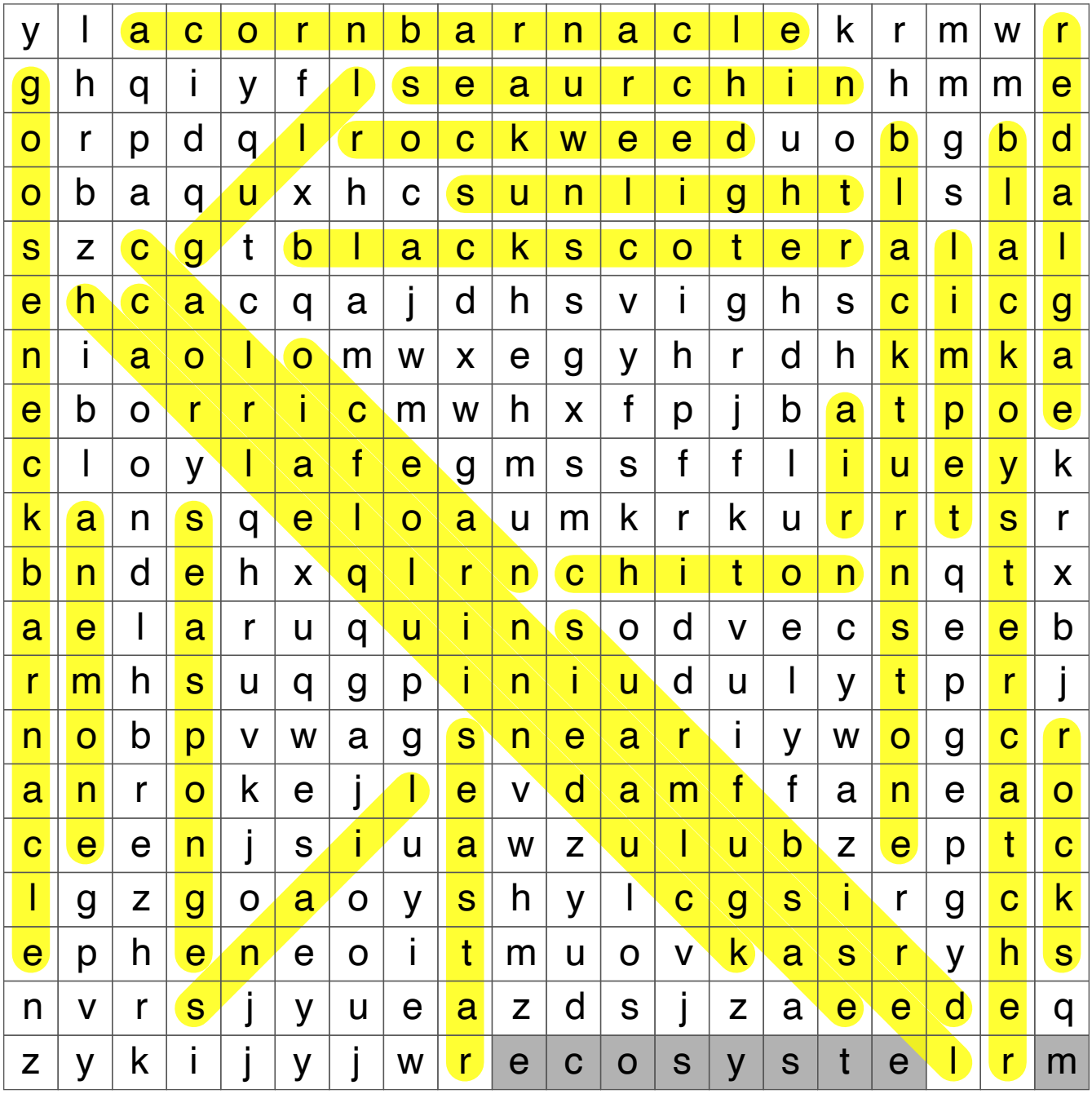
INTERTIDAL ECOSYSTEM WORD SEARCH

y	l	a	c	o	r	n	b	a	r	n	a	c	l	e	k	r	m	w	r
g	h	q	i	y	f	l	s	e	a	u	r	c	h	i	n	h	m	m	e
o	r	p	d	q	l	r	o	c	k	w	e	e	d	u	o	b	g	b	d
o	b	a	q	u	x	h	c	s	u	n	l	i	g	h	t	l	s	l	a
s	z	c	g	t	b	l	a	c	k	s	c	o	t	e	r	a	l	a	l
e	h	c	a	c	q	a	j	d	h	s	v	i	g	h	s	c	i	c	g
n	i	a	o	l	o	m	w	x	e	g	y	h	r	d	h	k	m	k	a
e	b	o	r	r	i	c	m	w	h	x	f	p	j	b	a	t	p	o	e
c	l	o	y	l	a	f	e	g	m	s	s	f	f	l	i	u	e	y	k
k	a	n	s	q	e	l	o	a	u	m	k	r	k	u	r	r	t	s	r
b	n	d	e	h	x	q	l	r	n	c	h	i	t	o	n	n	q	t	x
a	e	l	a	r	u	q	u	i	n	s	o	d	v	e	c	s	e	e	b
r	m	h	s	u	q	g	p	i	n	i	u	d	u	l	y	t	p	r	j
n	o	b	p	v	w	a	g	s	n	e	a	r	i	y	w	o	g	c	r
a	n	r	o	k	e	j	l	e	v	d	a	m	f	f	a	n	e	a	o
c	e	e	n	j	s	i	u	a	w	z	u	l	u	b	z	e	p	t	c
l	g	z	g	o	a	o	y	s	h	y	l	c	g	s	i	r	g	c	k
e	p	h	e	n	e	o	i	t	m	u	o	v	k	a	s	r	y	h	s
n	v	r	s	j	y	u	e	a	z	d	s	j	z	a	e	e	d	e	q
z	y	k	i	j	y	j	w	r	e	c	o	s	y	s	t	e	l	r	m

How many of these intertidal ecosystem living species and non-living parts can you find?

acorn barnacle
air
anemone
black oystercatcher
black scoter
black turnstone
California mussel
chiton
coralline alage
gooseneck barnacle
gull
harlequin duck
limpet
ocean
red algae
rocks
rockweed
sea sponge
sea star
sea urchin
snail
sunlight
surfbird

INTERTIDAL ECOSYSTEM WORD SEARCH SOLUTION



y	l	a	c	o	r	n	b	a	r	n	a	c	l	e	k	r	m	w	r
g	h	q	i	y	f	l	s	e	a	u	r	c	h	i	n	h	m	m	e
o	r	p	d	q	l	r	o	c	k	w	e	e	d	u	o	b	g	b	d
o	b	a	q	u	x	h	c	s	u	n	l	i	g	h	t	l	s	l	a
s	z	c	g	t	b	l	a	c	k	s	c	o	t	e	r	a	l	a	l
e	h	c	a	c	q	a	j	d	h	s	v	i	g	h	s	c	i	c	g
n	i	a	o	l	o	m	w	x	e	g	y	h	r	d	h	k	m	k	a
e	b	o	r	r	i	c	m	w	h	x	f	p	j	b	a	t	p	o	e
c	l	o	y	l	a	f	e	g	m	s	s	f	f	l	i	u	e	y	k
k	a	n	s	q	e	l	o	a	u	m	k	r	k	u	r	r	t	s	r
b	n	d	e	h	x	q	l	r	n	c	h	i	t	o	n	n	q	t	x
a	e	l	a	r	u	q	u	i	n	s	o	d	v	e	c	s	e	e	b
r	m	h	s	u	q	g	p	i	n	i	u	d	u	l	y	t	p	r	j
n	o	b	p	v	w	a	g	s	n	e	a	r	i	y	w	o	g	c	r
a	n	r	o	k	e	j	l	e	v	d	a	m	f	f	a	n	e	a	o
c	e	e	n	j	s	i	u	a	w	z	u	l	u	b	z	e	p	t	c
l	g	z	g	o	a	o	y	s	h	y	l	c	g	s	i	r	g	c	k
e	p	h	e	n	e	o	i	t	m	u	o	v	k	a	s	r	y	h	s
n	v	r	s	j	y	u	e	a	z	d	s	j	z	a	e	e	d	e	q
z	y	k	i	j	y	j	w	r	e	c	o	s	y	s	t	e	l	r	m

How many of each kind of organism you can find?

____ acorn barnacles	____ gooseneck barnacles	____ sea stars
____ California mussels	____ limpets	____ sea urchins
____ chitons	____ sea anemones	____ snails

Thank you for reading and discussing

One Single Species: Why the Connections in Nature Matter

For more books and additional educational resources created by Susan E. Quinlan, please visit her website: www.susanquinlan.com

For information about scheduling virtual classroom visits or nature walks with Ms. Quinlan, please email her office at info@naturescienceart.com