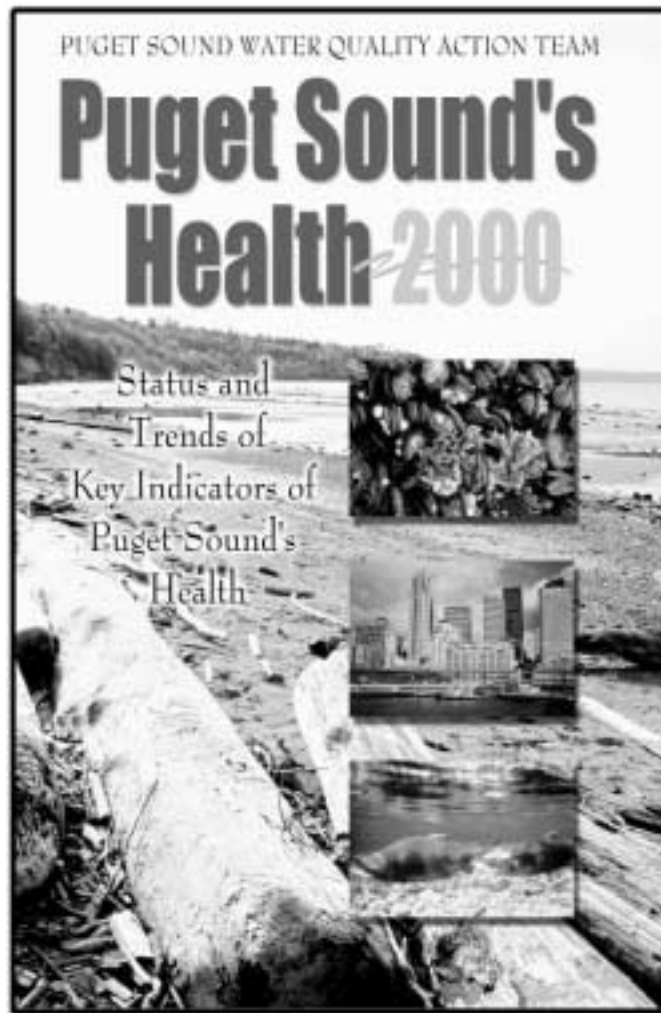


Guide for Reading *Puget Sound's Health*



November 2001



PUGET SOUND
WATER QUALITY
ACTION TEAM
Office of the Governor

Guide for Reading *Puget Sound's Health*

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GUIDE FOR READING *PUGET SOUND'S HEALTH*

Puget Sound's Health was produced by the Puget Sound Water Quality Action Team, a Washington State government agency that coordinates efforts to protect Puget Sound. A division of the Action Team wrote the document to inform the public about the condition of Puget Sound using 17 key environmental indicators. The publication contains information appropriate for middle school students. However, students do not automatically understand how to read and interpret technical documents like *Puget Sound's Health*. As with any skill, reading strategies must be systematically taught in order for students to be successful in fully understanding informational text.

By systematically teaching students to read a scientific document such as *Puget Sound's Health* teachers can address several Washington State Essential Academic Learning Requirements in both reading and science.

Washington State Essential Academic Learning Requirements in READING

1. The student understands and uses different skills and strategies to read. To meet this standard, the student will:

1.3 read fluently, adjusting reading for purpose and material.

1.5 use features of nonfiction text and computer software (such as titles, headings, pictures, maps, and charts to find and understand specific information.

2. The student understands the meaning of what is read. To meet this standard, the student will:

2.1 comprehend important ideas and details.

2.2 expand comprehension by analyzing, interpreting, and synthesizing information and ideas

3. The student reads different materials for a variety of purposes. To meet this standard, the student will:

3.1 read to learn new information (such as reading science and mathematics texts, technical documents, and for personal interest)

Washington State Essential Academic Learning Requirements in SCIENCE:

1. The student understands and uses scientific concepts and principles. To meet this standard, the student will:

1.3 understand how interactions within and among systems cause changes in matter and energy.

2. The student knows and applies the skills and processes of science and technology. To meet this standard, the student will:

2.1 develop abilities necessary to do scientific inquiry.

3. The student understands the nature and contexts of science and technology. To meet this standard, the student will:

3.1 understand the nature of scientific inquiry.

This guide offers suggestions on how to present reading strategies that will help students read *Puget Sound's Health* and other technical documents. The guide presents strategies to be applied **BEFORE**, **DURING** and **AFTER** reading the text.

BEFORE, **DURING** and **AFTER** reading strategies are best completed as a whole group activity for the first two articles *Puget Sound/Georgia Strait* and *Are areas where shellfish can be safely harvested increasing or decreasing?* Some classes will require continued guidance in using the reading strategies for the remainder of the articles in the publication. Other classes will be ready to try additional strategies suggested in the section of this guide titled "Completing the Reading of *Puget Sound's Health*" on page 7.

BEFORE READING

Assess Students' Prior Knowledge

Show students the cover of *Puget Sound's Health*. Encourage them to think about what they have directly experienced, read, or heard in the news about Puget Sound. Have students create a chart:

What I know about the health of Puget Sound	What I learned

Have students work in pairs to record three to four statements about what they already know about Puget Sound's health in the first column of the chart. If they need help with this task, consider distributing local newspapers from the recent months and have students search for articles about Puget Sound.

In a whole-group discussion, encourage students to share what they already know about the health of Puget Sound. Record these statements for future reference. The statements will provide information about students' prior knowledge of Puget Sound as a benchmark.

Reading for a Purpose

Students need to know why they are reading *Puget Sound's Health*. Is this activity part of a unit on Puget Sound or is the purpose to teach students how to read informational text? Determining a purpose provides both a reason and a focus for reading.

Reinforce that *Puget Sound's Health* contains informational text requiring the use of specific reading strategies and thinking behaviors.

Skimming the Text

Preview the text with students to help them become active readers. Ask students:

- Why is skimming the text helpful before reading?

Asking this question will reveal students' sophistication with skimming as a pre-reading strategy. To help students begin asking questions and forming opinions while skimming, focus on the text features discussed below. Help students use the label "text features" when identifying and making use of text features to inform their understanding.

COVER

- What do the pictures indicate? Explain.
- Call attention to the words "status," "trends" and "key indicators" in the subheading. Discuss the meaning of these words in reference to the kind of information that will likely be included in the document.
- Who wrote this publication? Where will we be able to read about this Team and their credentials to write about this topic?
- Who is the intended audience? Explain.

INTRODUCTORY PAGE (PAGE 2)

- Where do your eyes focus when previewing this page? Why do you think this happens? Why do the authors want us to see this part first?
- How is the table of contents structured? How might this structure help us read and understand this material?



BODY OF THE TEXT (PAGES 3 — 13)

- How is the text organized in each article? Is this consistent throughout the publication?
- What other text features have been included? How might they help us read the text?
- What do the maps, graphs and charts tell us?
- What unfamiliar words stand out?

Develop a List of Questions

After skimming the material, have each student record one question he or she has about the health of Puget Sound. Display the questions and discuss them as a whole group. Classify the questions. Do the questions address the health of a particular species? Does the question pertain to water quality? Keep these questions posted for reference as reading proceeds.

DURING READING

Teacher-led Reading

Read the first article, “Puget Sound/Georgia Basin”, aloud. To help students construct meaning, discuss the material as it is read. Pose these questions while reading the text.

- What new questions do you have as the text is read? Post new questions as they are generated, adding new categories as necessary.
- If something we read is not totally clear, what strategies could we try?
 - ~ Keep reading
 - ~ Go back and reread
 - ~ Use context clues including illustrations
 - ~ Adjust reading rate. Informational text like *Puget Sound’s Health* needs to be read at a much slower rate than narrative text.
 - ~ Look up new vocabulary or determine the meaning from the context and record definitions.
- How do the graphs and charts help us understand the material?

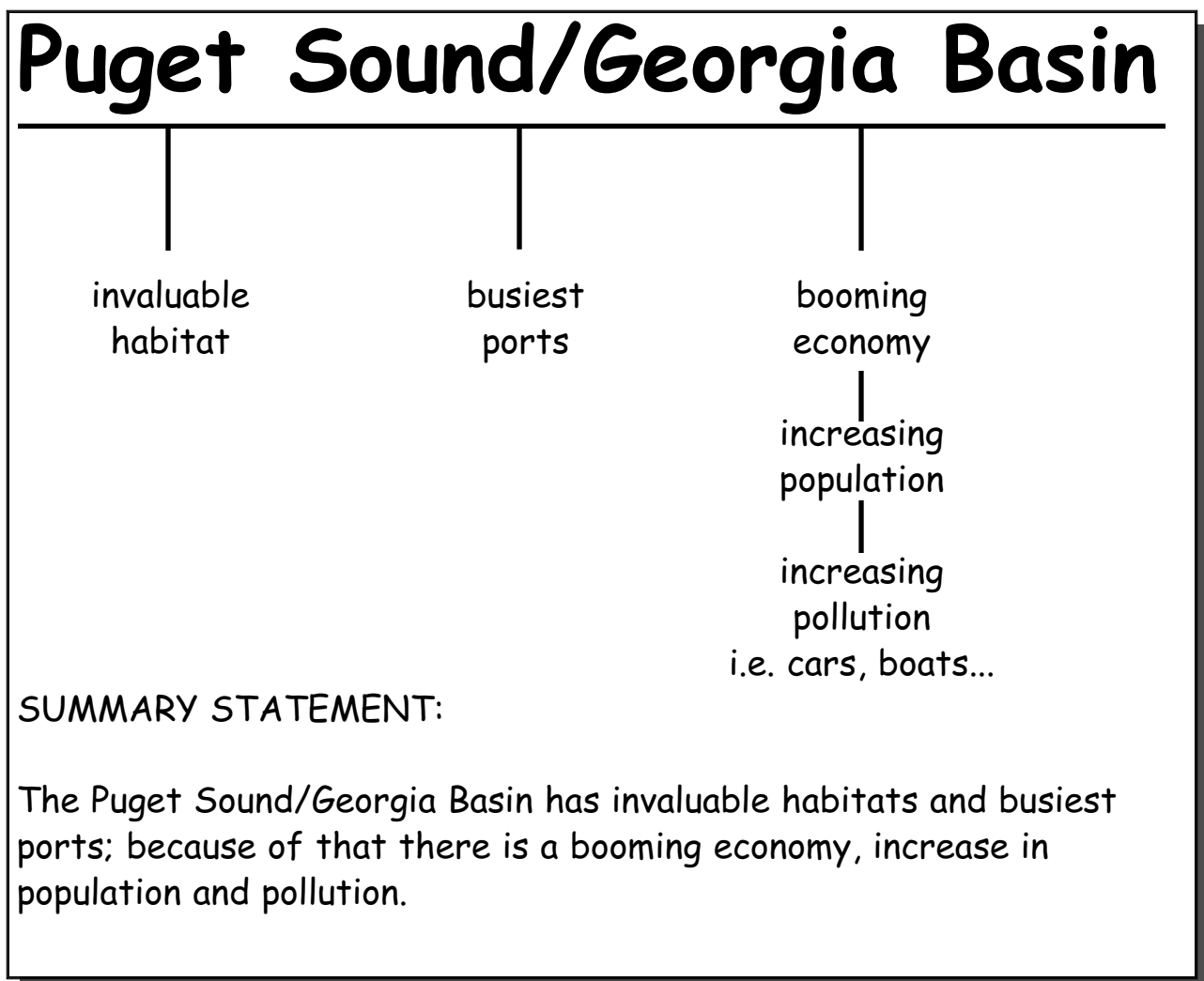
See **Reference Sheet #1, Understanding Charts** (pages 10-11 in this Guide) for teaching hints. Have students write their own interpretations of a chart followed by a whole-group discussion.

Identifying Organizational Patterns

Identify *Puget Sound's Health* as expository writing. Its purpose is to inform the reader about the health of Puget Sound. Explain that expository writing can be organized in many ways. **Reference Sheet #2, Types of Non-Fiction** (pages 14–18) identifies several of these organizational patterns. After reading “Puget Sound/Georgia Basin,” show students Reference Sheet #2. Explain that the article contains two organizational patterns. The article begins by following the pattern of “Main Ideas with Supporting Details” and ends in a “Cause and Effect” pattern.

Point out to students that each organizational pattern of expository text has a corresponding graphic organizer that is useful for taking notes. Work with students to create a table graphic organizer for Main Ideas with Supporting Details and moving to a Cause and Effect organizer for “Puget Sound/Georgia Basin.”

Example of graphic organizer created by 7th grade student:



AFTER READING

Summarizing Key Points

Explain to students that it is important to summarize what they have read. This reflection time increases understanding. Discuss the text with students. The following questions may be useful for discussion:

“Puget Sound/Georgia Basin”

- Where are these two bodies of water located? Why have they been linked in this article?
- Why are Puget Sound and the Georgia Basin important?
- What is happening to this region?
- How fast is the Puget Sound region’s population growing?

“Are areas where shellfish can be safely harvested increasing or decreasing?”

- Why are shellfish harvest areas a good indicator of Puget Sound’s health?
- What is the status of commercial shellfish growing areas?
- What is the status of recreational shellfish harvest areas?
- How are shellfish growing areas classified?
- What are the main sources of contamination for shellfish growing areas?
- How does the contamination enter Puget Sound?

***Reference Sheet #3, Questions for Discussion After Reading on page 19 of this Guide includes additional discussion questions for the remaining sections of *Puget Sound’s Health*.

Writing a Summary Statement

After discussion, write a summary statement. Answer the following questions.

- Which note-taking organizer did we use? Why was this graphic organizer selected? How could we use the graphic organizer to write a summary statement?
- Why would it be useful to use the subheadings in the summary statement?

COMPLETING THE READING OF *PUGET SOUND'S HEALTH*

After reading the first two articles with your students, if you think they are ready to work more independently on the rest of the publication, try one or more of the following techniques:

► Jig Saw

Divide students into groups of six people. Explain the jigsaw activity. Each student in the group will break off and go to another group. This new “expert” group will read and analyze one article in *Puget Sound's Health*. Students then return to their original group to present and summarize the most important information about the article they read.

Before grouping students into the expert group, review some of the reading strategies. Ask students:

- What reading strategies did we use while reading the text of Puget Sound/Georgia Basin? Which seemed to work the best? Why?
- Were any of the text features particularly helpful in understanding the material? Explain?
- State expectations about what students should record for each article presented. For example, should students include the graphic organizer they used? Is a summary statement for each article expected?

► Student Expert Groups

Divide students into small expert groups. Assign each group one of the remaining sections of *Puget Sound's Health* to read. Explain that each group will present their section to the rest of the class.

Each expert group will use the reading strategies to read and understand the text. Distribute the appropriate discussion questions on Reference Sheet #3 to each group or have them come up with their own. A working framework may be useful for students. See **Reference Sheet #4, Expert Group Presentation Outline** on page 20 of this Guide for a sample.

The completed outline can be used for the presentation to the rest of the class. Encourage the use of visual aids during the expert group presentations.

GOING FURTHER

Checking Understanding

After reading all of *Puget Sound's Health*, have students examine the recorded statements about what they knew about the health of Puget Sound before they read the text in depth. Have students complete the chart by recording what they learned from reading the publication.

<u>What I know about the health of Puget Sound</u>	<u>What I learned</u>

Have students analyze each statement on the left side of the chart by placing a “+” or a “-”, depending on whether it was confirmed or negated by their reading. If some of their statements were not addressed by *Puget Sound's Health*, discuss how they might research the topic.

Continued Research

Return to the student-generated questions about Puget Sound. Can more of the questions be answered? Do some of the categories of questions need clarification? Challenge students to seek the answers for the questions that remain unanswered.

Ask:

Does this publication provide help for where we might go to find additional information about the topics addressed?

The contact list of member agencies listed on page 15 of the newspaper may be a good place to start. Discuss which agencies would be best to help answer a question still under investigation.

General Public Surveys

Have students create and conduct surveys about the public's perception of the most important issues facing the health of Puget Sound. Present the results in a school newspaper or in a local community paper.

Creating a Report Card for Puget Sound

Scientists attending a recent Puget Sound Research Conference entertained a question similar to “is the news about the *Puget Sound's Health* generally good news or bad news?” Think about this question. Imagine that you are a science reporter for one of the large urban newspapers in the area. What would you write after reading *Puget Sound's Health*? Create a report card for the health of Puget Sound that the general public will be able to read and understand. You may choose to write using the persuasive mode of writing. Refer to Reference Sheet #2 for information on this kind of writing.

30-Second Spots

Challenge students to create 30-second spots or public service announcements to educate a selected audience about the health of Puget Sound using the information presented in *Puget Sound's Health*. Identify where these spots could appear—on school announcements, school telecast, in the school paper, local cable network, etc.

Evaluation

Ask students the following questions:

- What was the most important reading strategy you learned to increase your understanding of difficult text?
- What was the most important thing you learned about Puget Sound? Why was it important to you?
- What additional questions do you have about the health of Puget Sound?

REFERENCE SHEET #1

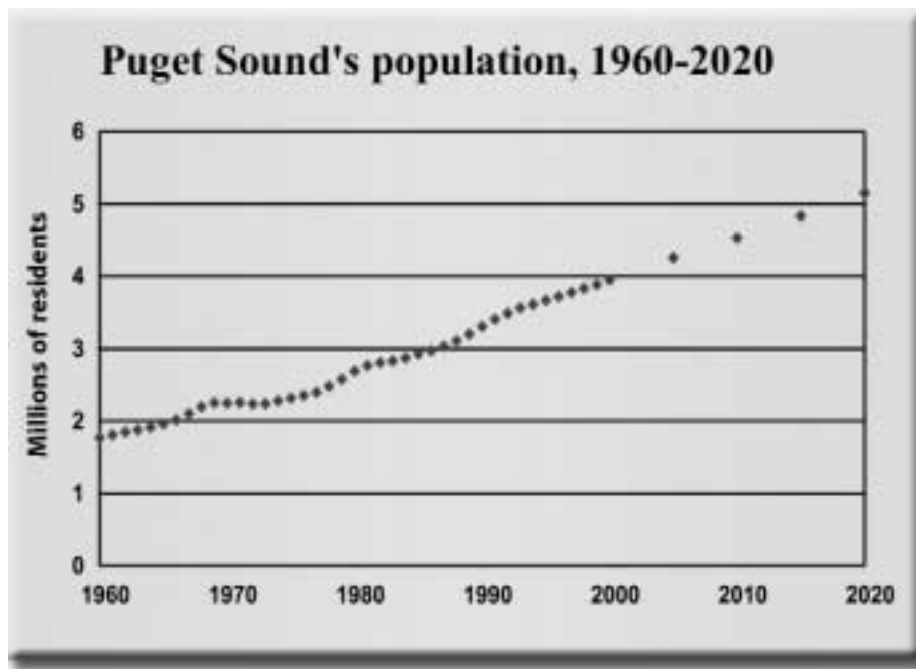
Understanding Charts: Graphs, Tables and Maps

Charts show how pieces of information are related. Different types of charts are used to show different kinds of relationships. Like the old saying “A picture is worth a thousand words,” a good chart can make complex information understandable at a glance. Note that the graphs, tables and maps used in *Puget Sound’s Health* came from a variety of sources. Many of the charts in the publication include time on the horizontal axis and are located in the “trends” section of the publication. Discuss with students why graphs are a useful tool for identifying and understanding trends.

A chart is information presented in the form of a picture. The information in a chart is usually called data. Included here are charts from *Puget Sound’s Health* that represent the most common types that students will likely encounter.

► Line Graph

Example: Puget Sound’s population, 1960 – 2020, page 3

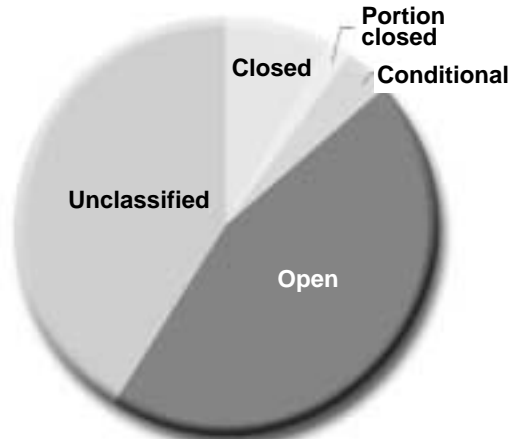


This line graph shows the steady increase of Puget Sound’s population from 1960 to 2000 and the projected population growth to the year 2000. How many people were in the Puget Sound area in 1960? How many in 2000? Discuss impacts this growth will have on the Puget Sound region.

► **Pie Graph**

Example: Recreational shellfish harvest by classified areas, page 5

Most of Puget Sound's 1998 recreational shellfish harvest was taken from areas with good or unknown water quality



Source: Department of Health, 1999

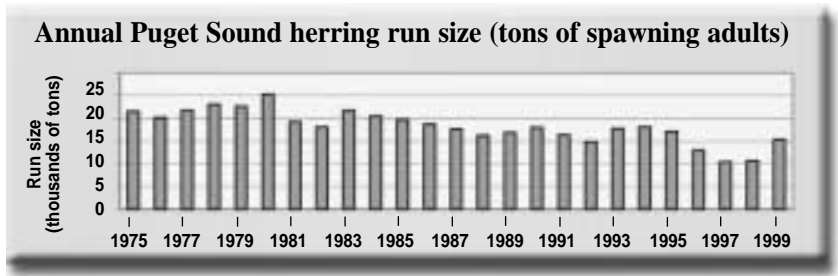
This graph provides information about the classification of beaches where people were observed harvesting shellfish for recreational use in 1998. What does the graph measure? Do you think that the number of people who harvest from unclassified, closed or conditionally open beaches is a potential health hazard? How are the classifications related to water quality?

► **Bar Graph**

Example: Annual Puget Sound herring run size, page 13

trends

The total herring population in Puget Sound has declined considerably since 1975. This overall decline is largely attributed to the poor condition of the Cherry Point stock, which declined from a high of 15,000 tons to a low of 1,200 tons between 1973 and 1999—a 92 percent decrease in the stock during that time period.



Source: Department of Fish and Wildlife, 1999

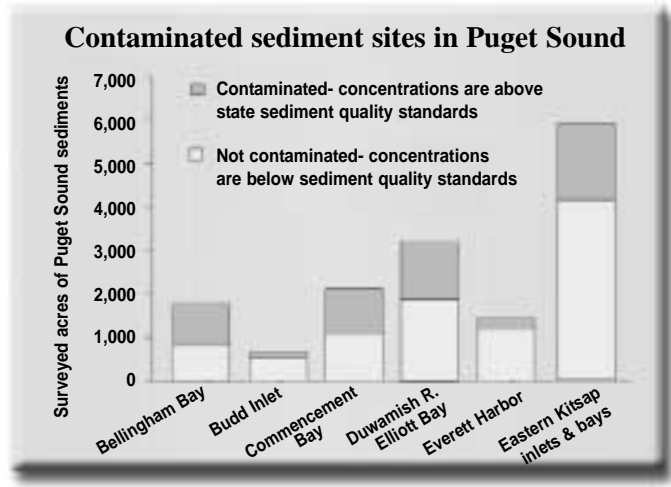
The annual Puget Sound herring run is shown in this bar graph. The run size is shown in thousands of tons of spawning adults. What trend do you see in herring populations? Why have herring been chosen as an important indicator of Puget Sound's health?

► Stacked Bar Graph

Example: Contaminated sediment sites in Puget Sound, page 7

trends

It is too soon to determine whether the total contaminated area of Puget Sound is increasing or decreasing. As the state Department of Ecology continued to evaluate sediment quality information through the late 1990s, the number of acres identified as contaminated and the number of sites requiring cleanup grew. This increase in the area of contaminated sediments reflects improved information from additional surveys and assessments rather than a growing environmental problem in recent years.



Source: Department of Ecology, 1999

This bar graph is stacked to show the acres of sediment in Puget Sound with contaminant concentrations that are above or below sediment quality standards. Why do you think a stacked bar graph was used in this application? *Puget Sound's Health* is updated every two years. If the contaminant level at a site decreases what will happen to the purple section of the bar? If the contaminant level increases what will happen to the purple part of the bar? Why is this type of graph useful for tracking trends?

► Tables

Puget Sound coho production—examples from three streams, page 13

Tables are used to organize numbers and words. How numbers and words relate to one another is more easily shown in a table.

Puget Sound coho smolt production - examples from three streams				
Stream	Low Production	High Production	Average Production	1998 Production
Big Beef Creek (Hood Canal)	11,500	45,600	24,600	22,000
Deschutes River (south Puget Sound)	6,000	133,000	66,000	6,000
Skagit River (north Puget Sound)	618,000	1,760,000	1,000,000	1,760,000

Source: Department of Fish and Wildlife, 1999

This table compares the production of coho salmon smolt in three different Puget Sound streams to production in 1998. The low, high, and average production for any given year in three streams is compared to 1998 production to show the variation that exists in the population from year to year.

► Maps

The Essential Academic Learning Requirements in Geography direct that “The student uses maps, charts, and other geographic tools to understand the spatial arrangement of people, places, resources, and environments on the Earth’s surface. The EALRs also require that students should be able to “identify the characteristics that define the Pacific Northwest and the Pacific Rim as regions.” Several maps in *Puget Sound's Health* help to establish the context for student inquiry into the region.

It is important for students to develop a sense of the Puget Sound basin as the place where they live, its relationship to the Pacific Ocean and mountain ranges, the rivers that flow into it, and its physical and ecological connection to the Strait of Georgia across the border in British Columbia. In addition to establishing location, some of the maps are used to show the position of environmental sites or conditions relating to the health of Puget Sound and Georgia Basin.



REFERENCE SHEET #2

Types of Non-Fiction

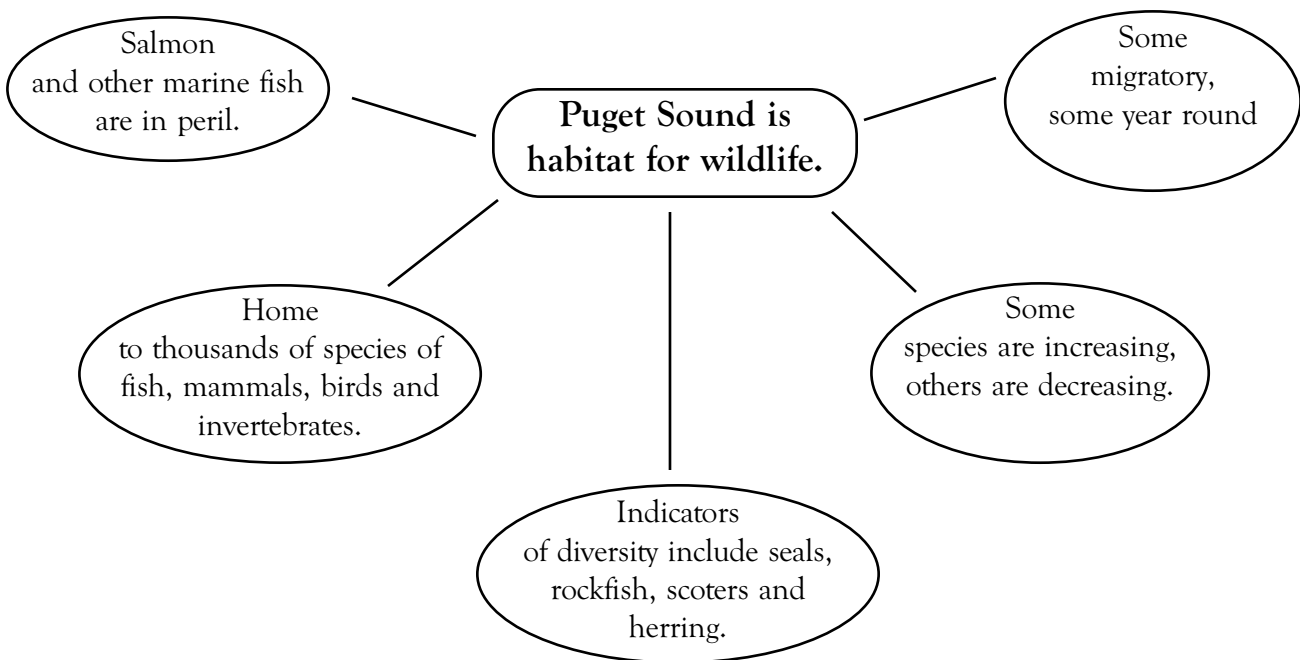
Description

This type of non-fiction focuses on a topic and aspects of the topic that are described in the reading. When previewing you will notice a topic sentence, followed by descriptions of the topic.

TAKING NOTES

A web is a good graphic organizer for this type of non-fiction.

Example: Are fish and wildlife populations increasing or decreasing? Page 12



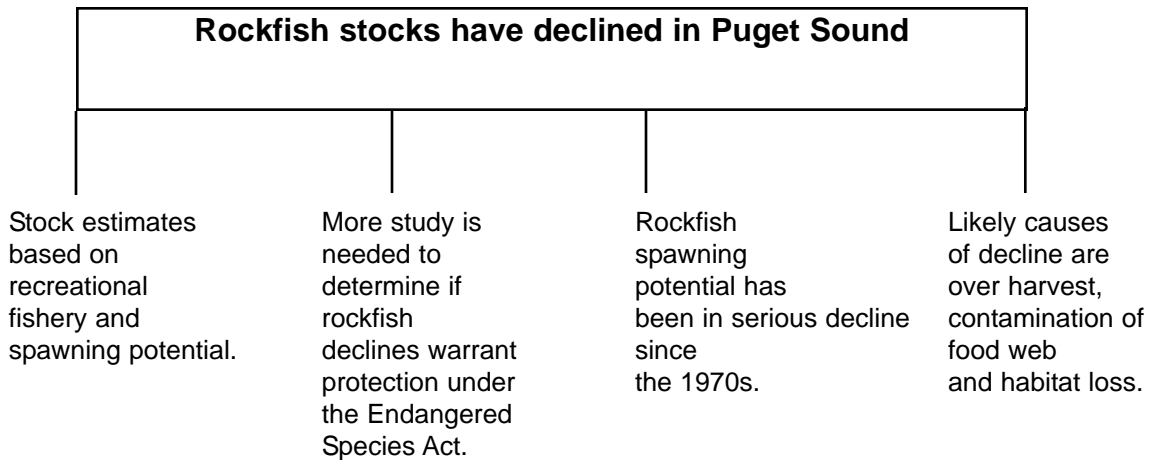
Main Idea With Supporting Details

In this type of reading, a heading at the top of the page often introduces the main idea. The first few sentences follow the main idea. The rest of the reading provides details that support the main idea.

TAKING NOTES

A table is a good organizer for this type of non-fiction.

Example: Rockfish. Page 13



Process

Non-fiction that outlines steps or stages is written in the process style.

TAKING NOTES

A list is the best organizer for this style. The list should include the important steps or stages in completing the process that is described.

Example: Is the quality of water for recreation improving or declining? Page 5, status section

This is the process used by the department of Ecology to identify and develop clean up plans for fecal coliform contaminated waters in the Puget Sound basin.

1. 24 stations monitor for fecal coliform bacteria.
2. Monitoring is conducted monthly in major rivers around the PS basin.
3. Data is used by the Department of Ecology to identify fecal coliform contamination in fresh water bodies.
4. Ecology staff develop clean up plans for contaminated sites.

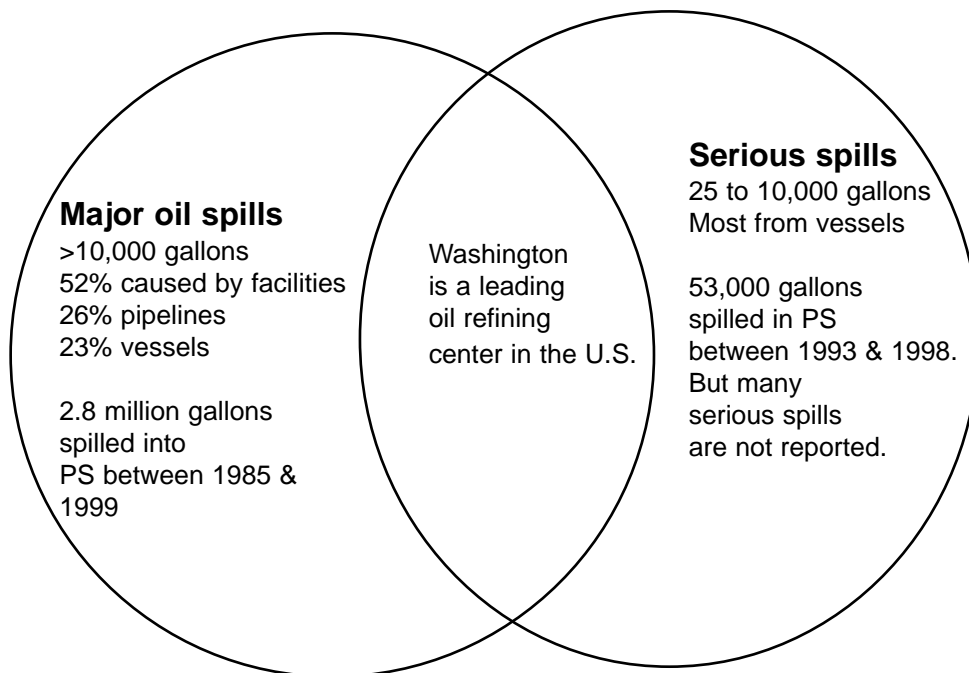
Comparison/Contrast

When some thing is being compared to another, this pattern of non-fiction is called comparison/contrast.

TAKING NOTES

This type of non-fiction lends itself to a Venn diagram for the organization of information that compares two topics.

Example: Are the size and frequency of oil spills increasing or decreasing? Page 9



Chronological Order

This type of non-fiction writing includes details that are presented in time order. It may state a date and describe an event, then it will state another date for another significant event. This style provides historical information.

TAKING NOTES

Write your notes in a timeline to show the chronological order of events.

Example: Various graphs showing trends of indicators from Puget Sound's Health

1960—Puget Sound human population is about 1.8 million

1970—PS human population is about 2.2 million

1970—PCBs in harbor seals at almost 150 ppm

1975—Herring run size over 20 thousand tons

1980—PS human population is about 2.9 million

1980—Scoter density at about 35 birds/square kilometer

1980—Commercial shellfish acreage is about 140,000 acres

1985—Herring run size at 20 thousand tons

1985—Harbor seal populations at 7,000

1990—PS human population is about 3.4 million

1990—Commercial shellfish acreage is about 100,000 acres

1990—PCBs in harbor seals at about 30 ppm

1995—Scoter populations at less than 15 birds/square kilometer

1995—Harbor seal populations at about 10,000

1997—Herring run size at about 10 thousand tons

2000—PS human population is about 4 million

2020—PS human population will be over 5 million

Cause and Effect

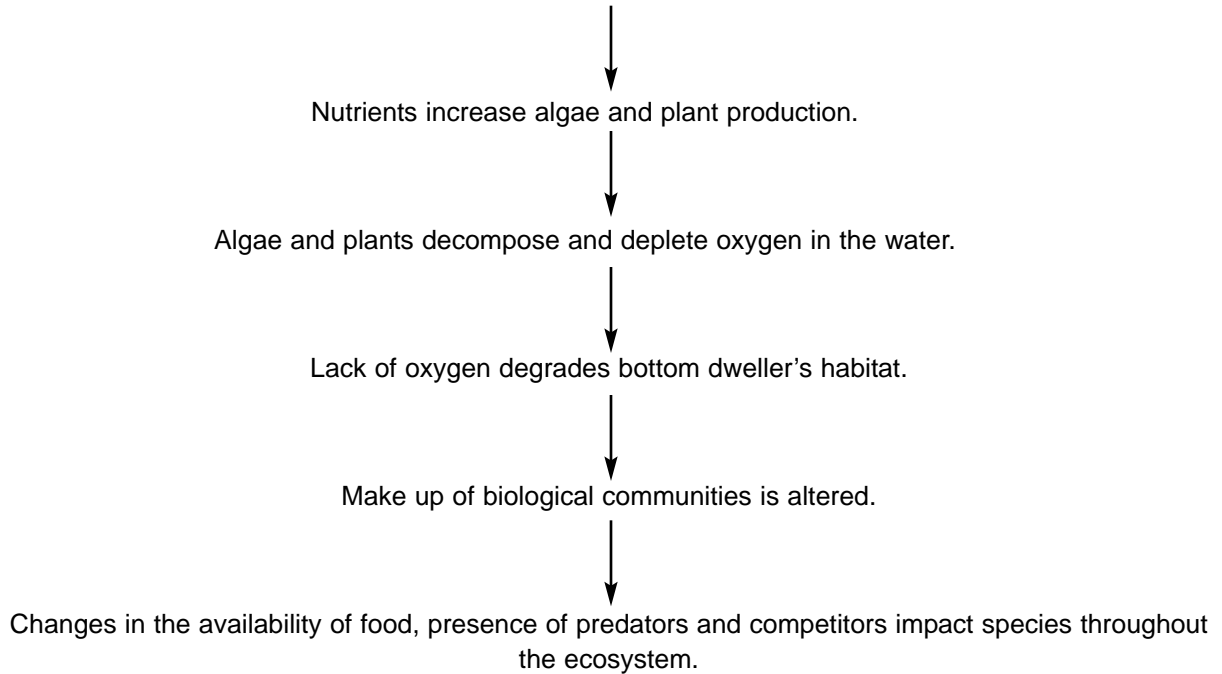
Non-fiction that follows this pattern will describe an event or happening and include a reason or state a probable cause for the event.

TAKING NOTES

To remember the important information when reading this style, try an organizer like this:

Example: Marine water habitat, page 11

Hypothesis: Excessive nutrients can affect the food web in Puget Sound marine waters



REFERENCE SHEET #3

Questions for Discussion After Reading

Is the quality of **water for recreation** improving or declining?

Why measure bacterial contamination in streams and rivers?

How is the quality of water for recreation monitored?

Are **aquatic nuisance species** increasing or decreasing in Puget Sound?

What human activities provide pathways for the introduction of new species to the region?

Why are nuisance species a concern?

How many exotic species have been identified in Puget Sound?

Is the area of **contaminated sediments** increasing or decreasing?

Why measure the acreage of contaminated sediments?

What has to be done to decrease the acreage of contaminated sediments?

Name three pollutants of concern and describe their origin.

Is **toxic contamination** of the marine environment increasing or decreasing?

How are the contaminants that accumulate in organisms evaluated?

Why do you think that mussels, harbor seals and English sole were chosen to describe toxic contamination in the Sound?

English Sole live on the bottom of Puget Sound and are in close contact with sediments. How does this contact affect them?

Are the size and frequency of **oil spills** increasing or decreasing?

What affects the amount and volume of oil spilled?

Where did more than 50 percent of the major oil spills happen from 1985 –1999?

What is the primary source of the serious oil spills?

Is fish and wildlife **habitat** increasing or decreasing?

Why is the analysis of freshwater habitat based on coho salmon?

What blocks fish passage?

What affects stream temperature?

Why are excess nutrients a problem for some marine water habitats?

Are fish and wildlife **populations** increasing or decreasing?

Report on the status of each of the species selected as indicators of Puget Sound's health. Why were these species chosen?

Identify what affects the populations of each species.

REFERENCE SHEET # 4

Expert Group Presentation Outline

Article read:

Graphic Organizer:

Summary Statement:

Additional Questions:

WE WANT TO HEAR FROM YOU!

The Puget Sound Water Quality Action Team is interested in receiving feedback from teachers who have used this guide. Please contact Mary Knackstedt at (360) 407-7336 or mknackstedt@psat.wa.gov with your comments or suggestions.

Publications available for educators

Copies of *Puget Sound's Health* are available for educators. If you need copies of *Puget Sound's Health* or additional reading guides, contact the Puget Sound Water Quality Action Team at **1-800-54-SOUND**. Electronic versions of *Puget Sound's Health* and this reading guide are on the Action Team's web-site www.wa.gov/puget_sound.

Other publications available in hard or electronic copies include:

▶ ***2000 Puget Sound Update***

The *2000 Puget Sound Update* is the seventh report of the Puget Sound Ambient Monitoring Program (PSAMP). This report, like previous versions of the *Update*, attempts to answer the questions of citizens, lawmakers, resource managers and scientists about the condition of Puget Sound's waters and its biological resources. The PSAMP and this *Update* are organized around five monitoring topics that relate to human and management activities: physical environment, pathogens and nutrients, toxic contamination, human health, and biological resources.

Fact Sheets on Puget Sound:

- ▶ ***Monitoring to Assess the Health of Puget Sound***
- ▶ ***Nearshore Habitat***
- ▶ ***Public Information and Education***
- ▶ ***Shellfish Protection Districts***

▶ ***Sound Waves***—Quarterly newsletter on water quality protection.

▶ ***Puget Sound Notes***—Biannual newsletter on scientific research in the Sound.