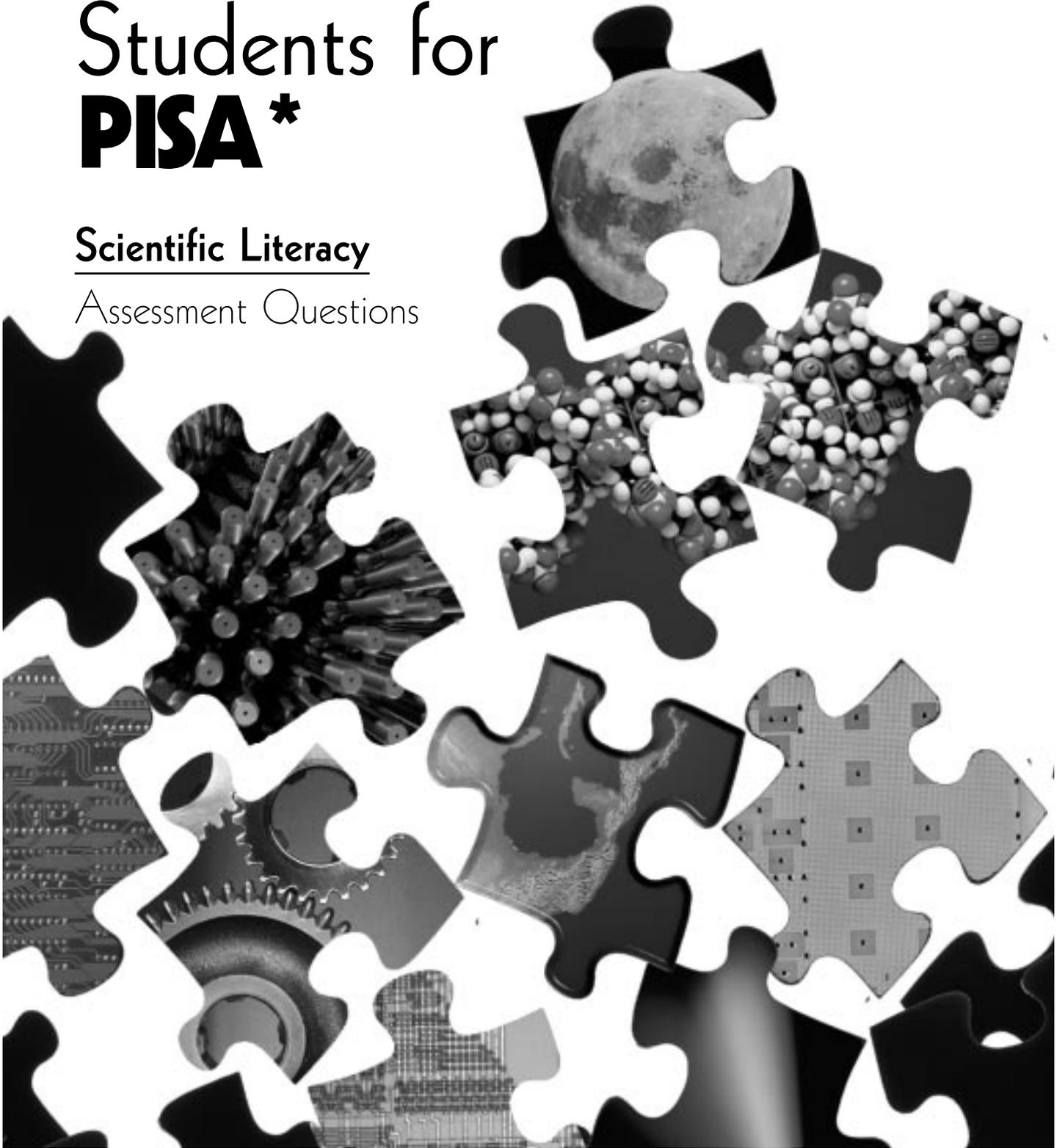


Preparing Students for **PISA***

Scientific Literacy

Assessment Questions



*Programme for International Student Assessment

Based almost entirely on the Organisation for Economic Co-operation and Development document *Sample Tasks from the PISA 2000 Assessment: Reading, Mathematics and Scientific Literacy*
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Dear Student,

The tasks and questions in this booklet are for you to practise your scientific skills. If you have been selected to participate in the Programme for International Student Assessment (PISA) then you should be confident that you will do well. By paying close attention in your science class and by working through the tasks and questions in this booklet you will be well prepared to complete the assessment with success.

Here are a few assessment-taking strategies:

- Always read the information for each task carefully. Think about what the information is telling you.
- Reread each task question and any accompanying text before attempting an answer.
- Give each question a try, even if you are not sure. Remember that partial value is given for partially correct answers.
- Questions that begin with Why? Why do you think? or How do you know? require more than a few words to answer. Take your time to fully explain and give reasons for your answer.
- For graphs, study the axes and determine the purpose of the information before attempting an answer.
- For multiple choice questions, look at each choice and eliminate those that are incorrect or not the best possible answer. There is no penalty for guessing, if you do not know the exact answer.

Best wishes with the tasks that follow.

Semmelweis' diary, text 2

Part of the research in the hospital was dissection. The body of a deceased person was cut open to find a cause of death. Semmelweis recorded that the students working the First Ward usually took part in dissections on women who died the previous day, before they examined women who had just given birth. They did not pay much attention to cleaning themselves after the dissections. Some were even proud of the fact that you could tell by their smell that they had been working the mortuary, as this showed how industrious they were!

One of Semmelweis' friends died after having cut himself during such a dissection. Dissection of his body showed he had the same symptoms as mothers who died from puerperal fever. This gave Semmelweis a new idea.

Question 2: Semmelweis' new idea had to do with the high percentage of women dying in the maternity wards and the students' behaviour.

What was this idea?

- A Having students clean themselves after dissections should lead to a decrease of puerperal fever.
- B Students should not take part in dissection because they may cut themselves.
- C Students smell because they do not clean themselves after a dissection.
- D Students want to show that they are industrious, which makes them careless when they examine the women.

Question 3: Semmelweis succeeded in his attempts to reduce the number of deaths due to puerperal fever. But puerperal fever even today remains a disease that is difficult to eliminate. Fevers that are difficult to cure are still a problem in hospitals. Many routine measures serve to control this problem. Among those measures are washing sheets at high temperatures. Explain why high temperature (while washing sheets) helps to reduce the risk that patients will contract a fever.

Question 4: Many diseases may be cured by using antibiotics. However, the success of some antibiotics against puerperal fever has diminished in recent years.

What is the reason for this?

- A Once produced, antibiotics gradually lose their activity.
- B Bacteria become resistant to antibiotics.
- C These antibiotics only help against puerperal fever, but not against other diseases.
- D The need for these antibiotics has been reduced because public health conditions have improved considerably in recent years.



Science Task 2

OZONE

*Read the following section of an article about the ozone layer.
(Source: Sample Tasks from PISA 2000 Assessment)*

The atmosphere is an ocean of air and a precious natural resource for sustaining life on the Earth. Unfortunately, human activities based on national/personal interests are causing harm to this common resource, notably by depleting the fragile ozone layer, which acts as a protective shield for life on the Earth.

5 Ozone molecules consist of three oxygen atoms, as opposed to oxygen molecules, which consist of two oxygen atoms. Ozone molecules are exceedingly rare: fewer than 10 in every million molecules of air. However, for nearly a billion years, their presence in the atmosphere has played a vital role in safeguarding life on Earth. Depending on
10 where it is located, ozone can either protect or harm life on Earth. The ozone in the troposphere (up to 10 kilometres above the Earth's surface) is "bad" ozone, which can damage lung tissues and plants. But about 90 percent of ozone found in the stratosphere (between 10 and 40 kilometres above the Earth's surface) is "good" ozone, which plays a beneficial role by absorbing dangerous ultraviolet (UV-B) radiation from the Sun.

15 Without this beneficial ozone layer, humans would be more susceptible to certain diseases due to the increased incidence of ultraviolet rays from the Sun. In the last decades the amount of ozone has decreased. In 1974 it was hypothesized that chlorofluorocarbons (CFCs) could be a cause for this. Until 1987, scientific assessment of the cause-effect relationship was not convincing enough to implicate CFCs. However, in September 1987, diplomats from around the world met in Montreal (Canada) and agreed to set sharp limits on the use of CFCs.

Question 2: Ozone is also formed during thunderstorms. It causes the typical smell after such a storm. In lines 10–13 the author of the text distinguishes between “bad ozone” and “good ozone.” In terms of the article, is the ozone that is formed during thunderstorms “bad ozone” or “good ozone”? Choose the answer and the explanation that is supported by the text.

	Bad ozone or good ozone?	Explanation
A	Bad	It is formed during bad weather
B	Bad	It is formed in the troposphere.
C	Good	It is formed in the stratosphere.
D	Good	It smells good.

Question 3: Line 14 and 15 : “Without this beneficial ozone layer, humans would be more susceptible to certain diseases due to the increased incidence of ultraviolet rays from the Sun.”

Name one of these specific diseases.

Question 4: At the end of the text an international meeting in Montreal is mentioned. At that meeting lots of questions in relation to the possible depletion of the ozone layer were discussed. Two of those questions are given in the table below:

Which of the questions below can be answered by scientific research?

Questions:	Answerable by scientific research?
Should the scientific uncertainties about the influence of CFCs on the ozone layer be a reason for governments to take no action?	Yes/No
What would the concentration of CFCs be in the atmosphere in the year 2002 if the release of CFCs into the atmosphere takes place at the same rate as it does now?	Yes/No