DOCUMENT RESUME

ED 178 289 SE 028 482

AUTHOR Hathway, James A., Ed.
TITLE Individualized Testing System: Perfcrmance Checks, ISCS Level III, WW-CP Form A.
INSTITUTION oFlorida State Univ., Tallahassee. Curriculum Study Center.
SPONS AGENCY National Science Foundation, Washingtcn, D.C.
PUB DATE 73
NOTE 74p.; For related documents, see SE 028 460-488

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Academic Achievement; Course Evaluation; Elementary Secondary Educaticn; *Evaluation; *Individualized Programs; Junior High Schools; *Performance Tests; *Science Course Improvement Project; Science Education; Science Materials; Science Tests; *Student Evaluation
IDENTIFIERS *Intermediate Science Curriculum Study; *National Science Fcundaticn

ABSTRACT

This is one fcrm of three performance checks booklets (A, B, and C) for two texts of Level III of the Intermediate Science Curriculum Study (ISCS). These two texts are Winds and Weather (WW), and Crusty Problems (CP). The 12 perfcrmance checks bccklets for Level III are considered cne cf fcur major subdivisions of a set of individualized evaluation materials for Level III of the ISCS. This booklet (form A), developed tc assess the students' achievement of the objectives of WW and CP of Level III, contains a set of performance checks which are equivalent to the perfcrmance checks of the other two forms (B and C). Each performance check has its own code number which indicates the unit number and identifies whether it is based on core material or excursions. Directions for students' use of performance checks are alsc included. (HM)

INTERMEDIATE SCIENCE CURRICULUM STUDY

ISCS

INDIVIDUALIZED TESTING SYSTEM

Performance Checks

ISCS LEVEL III
WW-CP
FORM A

SILVER BURDETT
GENERAL LEARNING CORPORATION
Morristown, New Jersey · Park Ridge, Ill. · Palo Alto · Dallas · Atlanta

INDIVIDUALIZED TESTING SYSTEM

ALL LEVELS — **Individualizing Objective Testing** (an ITP module)
Evaluating and Reporting Progress (an ITP module)

LEVEL I
Performance Objectives, ISCS Level I
Performance Checks, ISCS Level I, Forms A, B, and C
Performance Assessment Resources, ISCS Level I, Parts 1 and 2

LEVEL II
Performance Objectives, ISCS Level II
Performance Checks, ISCS Level II, Forms A, B, and C
Performance Assessment Resources, ISCS Level II, Parts 1 and 2

LEVEL III
Performance Objectives, ISCS Level III
Performance Checks, ISCS Level III, ES-WB, Forms A, B, and C
WYY-IV, Forms A, B, and C
IO-WU, Forms A, B, and C
WW-CP, Forms A, B, and C
Performance Assessment Resources, ISCS Level III, ES-WB
WYY-IV
IO-WU
WW-CP

ACKNOWLEDGMENTS

The work presented or reported herein was supported by funds provided by the National Science Foundation. However, the opinions expressed herein do not necessarily reflect the position or policy of the National Science Foundation, and no official endorsement by the agency should be inferred.

ISCS STAFF

David D. Redfield, Co-Director
William R. Snyder, Co-Director
Ernest Burkman, Steering Committee Chairman

Marcia Bujold, Artist
Stewart P. Darrow, Teacher Education
George O. Dawson, Teacher Education
Cheval Fagan, Artist
Ronald N. Giese, Evaluation
James A. Hathway, Editor
Adrian D. Lovell, Administration and Field Trial Coordinator
Janet Mauney, Artist
Millicent Shargel, Grammarian
Stephen C. Smith, Art Director
Lois S. Wilson, Assistant Editor

MATERIALS DEVELOPMENT CONTRIBUTORS

Betsy Conlon Balzano, State University of New York at Brockport
Gary Carroll, F.S.U.
Susan K. Castle, Norristown, Pa.
Robert L. Cocanougher, F.S.U.
Allan D. Dawson, F.S.U.
Linda Dubaldi, F.S.U.
Gregory Eckles, Hatboro, Pa.
William H. Fletcher, F.S.U.
Bonnie C. Frear, Ardmore, Pa.
John Hassard, Georgia State University
John Hockett, Governors State University
Linda MacGregor, Warminster, Pa.
Luis A. Martinez-Perez, Florida International University
Gerald G. Neufeld, F.S.U.
Lawrence E. Oliver, F.S.U.
Barney Parker, F.S.U.
Lynn H. Rogers, F.S.U.
George W. Rumpp, Hatboro, Pa.
John Selgrath, Warminster, Pa.
Everett S. Stallings, F.S.U.

FOREWORD

To implement an educational approach successfully, one must match the philosophy of evaluation with that of instruction. This is particularly true when individualization is the key element in the educational approach. Yet, as important as it is to achieve this match, the task is by no means simple for the teacher. In fact, without specific resource materials to help him, he is apt to find the task overwhelming. For this reason, ISCS has developed a set of individualized evaluation materials as part of its Individualized Teacher Preparation (ITP) program. These materials are designed to assist teachers in their transition to individualized instruction and to help them tailor their assessment of students' progress to the needs of all their students.

The two modules concerned with evaluation, *Individualizing Objective Testing* and *Evaluating and Reporting Progress*, can be used by small groups of teachers in in-service settings or by individual teachers in a local school environment. Hopefully, they will do more than give each teacher an overview of individualized evaluation. These ITP modules suggest key strategies for achieving both subjective and objective evaluation of each student's progress. And to make it easier for teachers to put such strategies into practice, ISCS has produced the associated booklets entitled *Performance Objectives, Performance Assessment Resources,* and *Performance Checks.* Using these materials, the teacher can objectively assess the student's mastery of the processes, skills, and subject matter of the ISCS program. And the teacher can obtain, at the moment when they are needed, specific suggestions for remedying the student's identified deficiencies.

If you are an ISCS teacher, selective use of these materials will guide you in developing an individualized evaluation program best suited to your own settings and thus further enhance the individualized character of your ISCS program.

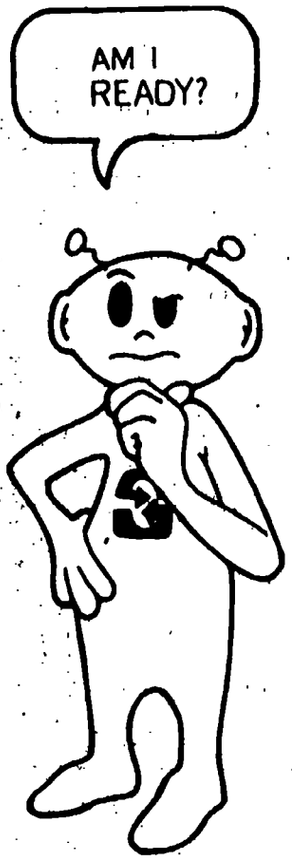
The Co-Directors
Intermediate Science Curriculum Study
Rm 415, W.H. Johnston Building
415 North Monroe Street
Tallahassee, Florida 32301

NOTES TO THE STUDENT

Now that you have completed several chapters, excursions or resources, and self-evaluations, you are ready to help your teacher determine how well you are doing. The performance checks in this book will provide your teacher with this information. Then your teacher can help you with things you may not understand and can keep a record of your progress.

Read the next section carefully. It explains some important things about the performance checks in this book, and it gives you specific suggestions for using them.

What You Need To Know about Performance Checks



1. **You do performance checks when you are ready.** Performance checks are somewhat like the questions in the self-evaluations — you do them when you are ready, not when the whole class is ready.
2. **Your teacher or both of you decide how many you do.** Your teacher or you and your teacher together will decide which ones you should do. You are not expected to do all of the performance checks.
3. **There are three forms for each performance check.** Every performance check is written in three forms — A, B, and C. (The title of this booklet tells you whether it is Form A, B, or C.) Usually the answers for each form are different. When you do a check, you will use only one form. The A, B, and C forms are always in different booklets. Within each booklet all the performance objectives for the same unit are listed together. A unit contains two or three chapters and their related excursions or resources. These units are in numerical order. Each unit has performance checks based on core material and performance checks based on excursions or resources.
4. **Each performance check has its own number.** The number is in the outside margin of the page and will look like this: WW-03-Core-17A, WW-01-Exc 2-1-2A, CP-03-Core-17A, or CP-01-Res 3-2A. These numbers mean

WW - 03 - Core - 17 - A and WW - 01 - Exc - 2-1 - 2 - A

- WW — text
- 03 — unit
- Core — based on core material
- 17 — check number
- A — form of the check
- WW — text
- 01 — unit
- Exc — excursion material
- 2-1 — resource number — excursion number
- 2 — check number
- A — form of the check

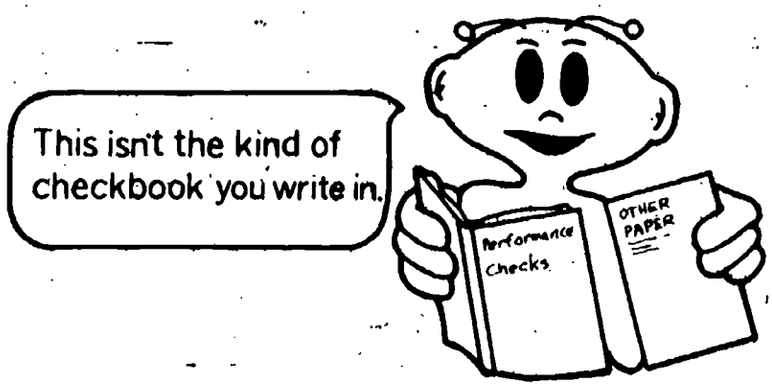
CP - 03 - Core - 17 - A and CP - 01 - Res - 3 - 2 - A

5. **Each performance check is separated from the other.** There is a line before each performance check and one after it. Some performance checks have several parts, so do everything called for between the lines. If there is no line at the bottom of a page, the check is continued onto the next page.

6. **Sometimes you will need to use equipment.** If special materials are needed, they will be in boxes labeled with the same number and sometimes the same letter too as the performance check for which you need them.

7. **Some performance checks have two or more answers.** If more than one answer is correct, you must select all the correct choices. In such cases, selecting just one answer is not enough.

8. **Some performance checks have no answers.** Occasionally, you may be asked to do something that is impossible and to explain your answer. If so, say that the task is impossible and explain why.



9. **You share books of performance checks and YOU DO NOT WRITE IN THEM.** Write your answers on other paper. Give the number and form of the performance check for each answer you write. If you are to draw a graph, a chart, or a map, your teacher may provide you with grid paper or a copy of the chart or map.

10. **Your teacher or his assistant will collect and mark your checks.** And sometimes you must ask him to watch or assist you as you do a check.

11. **Sometimes a review procedure will be suggested.** If you can't do a performance check, you may be asked to review a part of the text or a self-evaluation question. You may then be checked on the same material, so be sure you understand the material you review. Get help if you need it.

Winds and Weather

WW

Alice placed a tray of ice water in her sealed observation box, as shown below. The dots represent air particles.

WW
01-Core-1A

Diagram a.

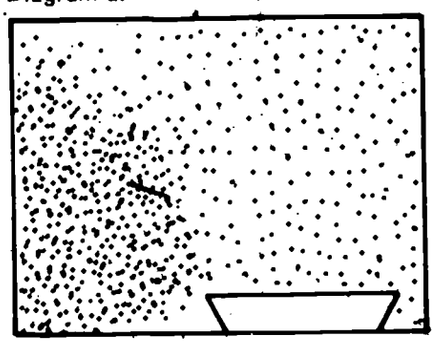


Diagram b.

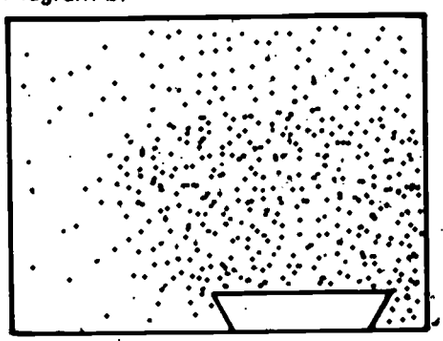
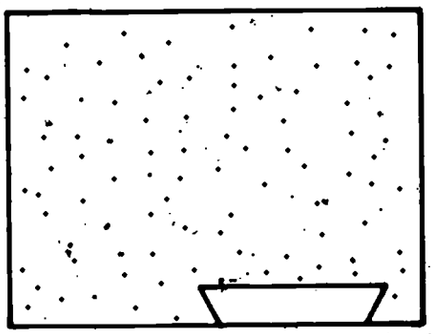


Diagram c.



1. Which of the diagrams best shows how the air particles will be distributed in her observation box?
2. Explain the reason for your choice.

The diagrams below show three paper bags containing air. They are open at the bottom. The small dots represent air particles.

WW
01-Core-2A

Diagram a.

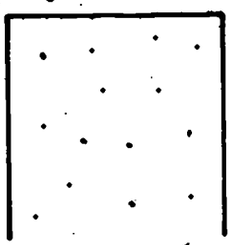


Diagram b.

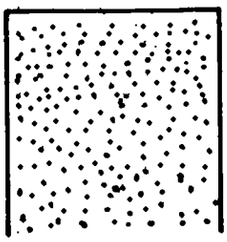
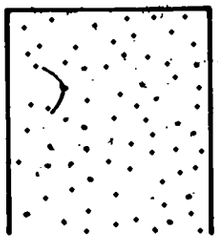


Diagram c.



1. Which bag contains the warmest air?
2. Explain your answer in terms of the things the particle model says about heat and matter particles.

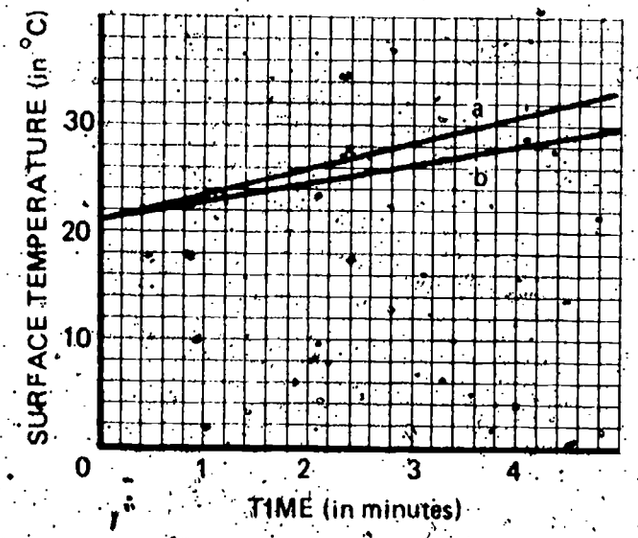
Sometime a lifeguard will spray water on the tiles around the pool area. A good reason for his action would be that

WW
01-Core-3A

a. he owns stock in the local water company.
b. he wants to make the tiles slippery so that children will stop running around the pool.
c. he knows the water will absorb energy and make the tiles hotter.
d. he knows that water spread on the tiles will cool the tiles, making them more comfortable for the swimmers.

WW
01-Core-4A

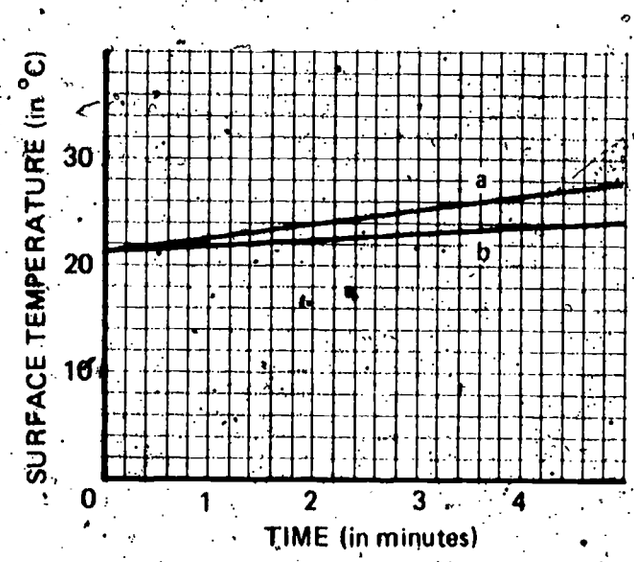
Hank placed two dry substances in sunlight and measured their surface temperatures several times. One substance was white sand and the other black sand. He plotted their surface temperatures on the grid shown below.



1. Which graph (line), a or b, represents the surface temperature of the white sand?
2. Explain your choice.

WW
01-Core-5A

Joanne placed two containers of sand, one wet and one dry, in sunlight. She measured the surface temperatures of the two containers and plotted her data as shown below.



1. Which of the two graphs (lines), a or b, represents the surface temperature of the wet sand?
2. Explain your answer.

Arrange the following events in the order in which they occur. **WW 01-Core-6A**

1. An up-and-down motion of the air above the beach and the water
2. The sun heating the beach and the water
3. The air above the beach warming faster than the air above the water
4. The beach and the water warming at different rates

Roger went outside on a sunny, windless day to measure the temperature of the air in various unshaded places around the school. He measured the air temperature above the following surfaces. **WW 01-Core-7A**

a. The light-colored concrete sidewalk
b. The grass-covered football field
c. The black asphalt basketball court
d. The moist, black earth of the school's garden

Above which surface would he record the highest air temperature?

One day Tina noticed a peculiar thing. A large bird was circling over a field nearby. Although the bird did not flap its wings once during the ten minutes she watched it, it kept rising higher and higher in the sky. How was it possible for the bird to stay up and even to rise without flapping its wings? **WW 01-Core-8A**

Dick and Janet were having an argument. Janet said that energy from the sun first heats a dark-colored surface and that this warm surface then heats the air above it. Dick argued that the sun's energy heated the air first and this hot air then heated the surface below it. State a plan to find out who is correct. **WW 01-Core-9A**

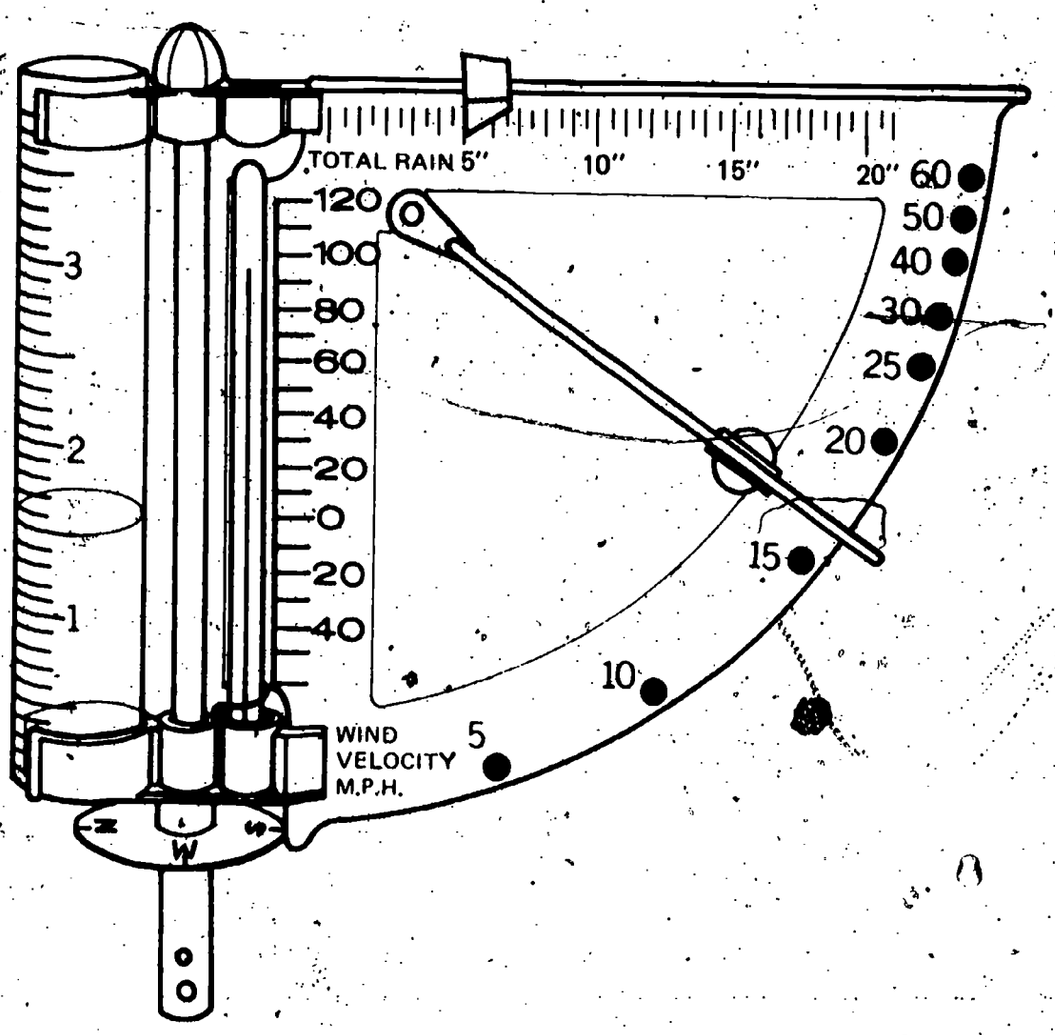
Go to the weather instrument that your teacher has set up in the classroom. Make the readings from the weather instrument, and record them on your answer paper. **WW 01-Core-10A**

The following variables are involved in weather watching. Which of these variables can be controlled? **WW 01-Core-11A**

a. Time of day you take the readings
b. Wind speed
c. Wind direction
d. Temperature
e. Inches of rainfall

State why you should make your weather-watch measurements at the same time each day. **WW 01-Core-12A**

Use the diagram of the weather instrument below to answer the three questions that follow.

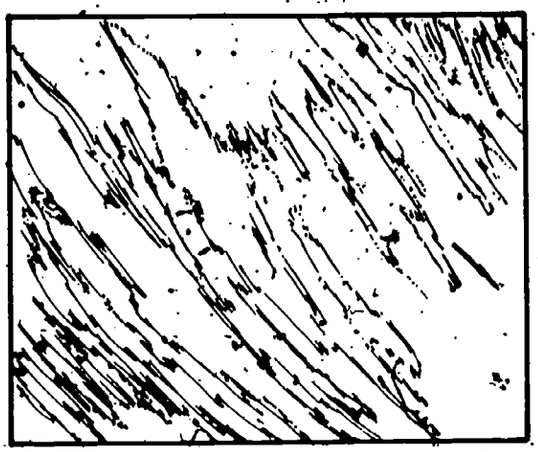


1. What is the wind speed?
2. What is the wind direction?
3. How much precipitation has there been since the last reading?

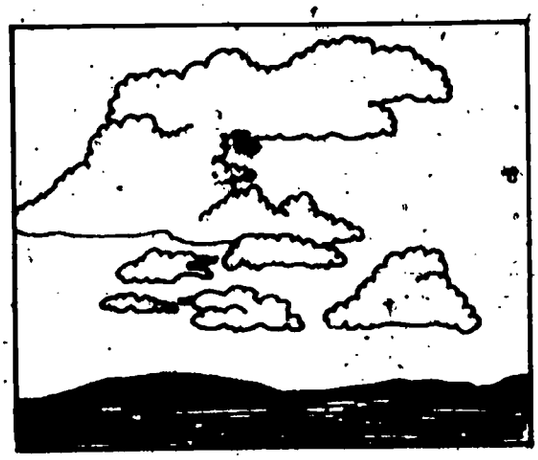
Identify the type of cloud shown in each diagram below.

WW
01-Core-14A

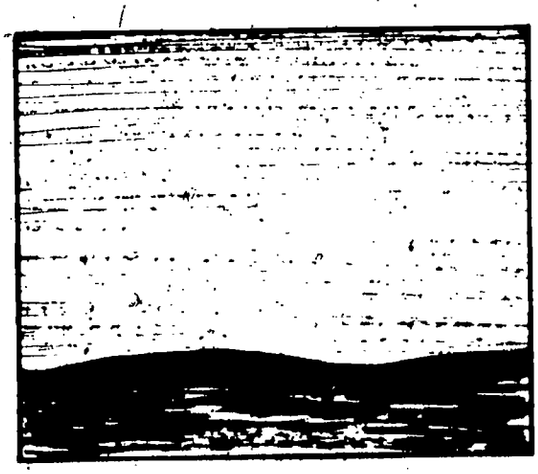
Cloud Type 1:



Cloud Type 2.



Cloud Type 3.



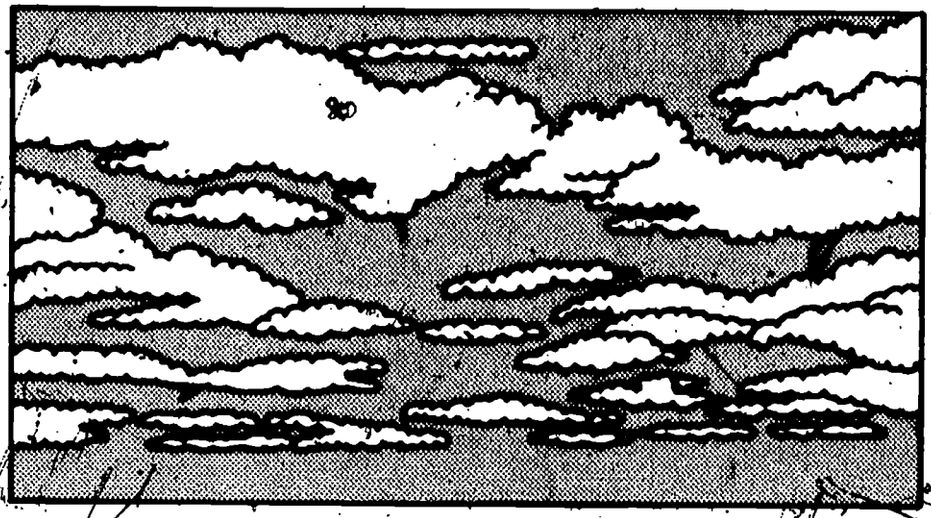
Draw the symbols that are used to indicate the following amounts of cloud cover.

1. 25% overcast
2. 100% overcast

WW
01-Core-15A

WW 01-Core-16A

Draw the cloud-cover symbol that indicates the amount of cloud cover on the day the following diagram of the sky was drawn.



WW 01-Core-17A

You may have noticed that symbols like °C for *degrees Celsius*, Na for the element *sodium*, and % for *percent* are often used in science. Why do scientists use symbols?

WW 01-Core-18A

Scott measured the depth of snowfall to be 15 inches in an area where there had been no drifting. How many inches of rainfall is approximately equivalent to a snowfall 15 inches deep?

WW 01-Core-19A

Your teacher will observe you for this check when he can.

WW 01-Core-20A

Your teacher will observe you for this check when he can.

WW 01-Core-21A

Your teacher will observe you for this check when he can.

WW 01-Core-22A

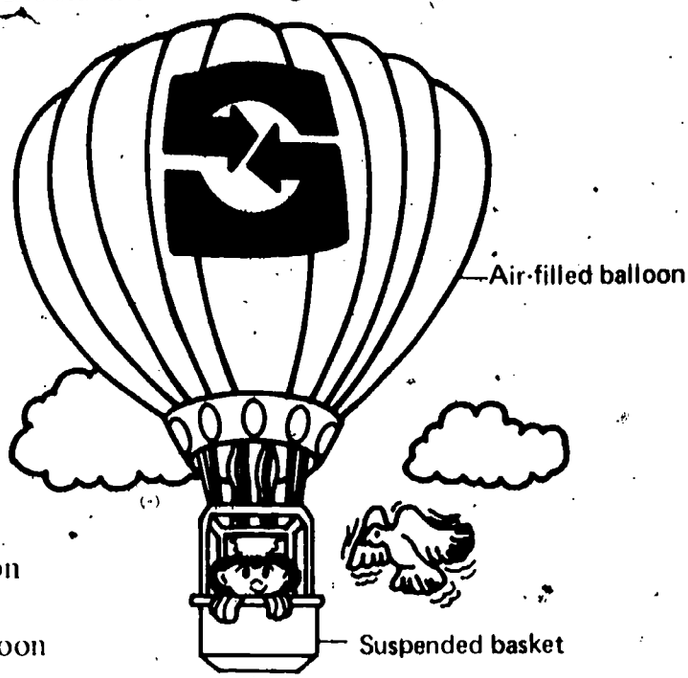
Your teacher will observe you for this check when he can.

WW 01-Core-23A

Your teacher will observe you for this check when he can.

High-Flying Frances, world famous air balloonist, is suspended in a basket from her balloon, as shown below. The balloon is beginning to descend too soon. She opens her supplies and begins to look for something. What should she be looking for?

WW
01-Exc 1-1-1A



a. A device to cool the air in the balloon
b. A butane burner to heat the air in the balloon
c. An air pump to blow up the balloon
d. A valve to release some of the air in the balloon

Suppose you filled a balloon with hot air.

WW
01-Exc 1-1-2A

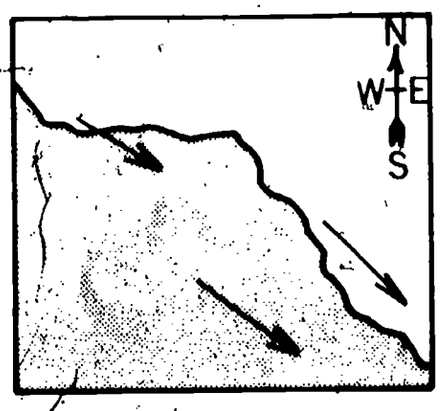
1. Would it have more lifting force if the air surrounding the balloon were warm or if it were cold?
2. Explain your answer.

Describe a plan you could use to measure the relationship between the lifting force of a hot-air balloon and the temperature of the air inside the balloon.

WW
01-Exc 1-1-3A

In the diagram below, arrows indicate the way the wind is blowing along the coast.

WW
01-Exc 2-1-1A



Which of the following is the best name for the wind direction?

a. W wind
b. N wind
c. SE wind
d. E wind
e. NW wind

WW
01-Exc 2-1-2A

Suppose that the pointer on your wind-direction instrument keeps moving from NE through E to SE and back to NE again as you try to take a reading. You should

a. wait until wind direction is steadier before you take a reading.
b. record N.
c. record E.
d. record S.
e. record all three directions – NE, E, and SE.

WW
01-Exc 2-1-3A

Frank made the following observations concerning wind speed on a weekend when he didn't have a wind-measuring instrument available. Arrange his observations in order of increasing wind speed. List the number of the lowest wind speed first.

1. The branches of the old maple tree in front of his house sway.
2. The flag hangs limp on his neighbor's flag pole.
3. A pile of leaves from autumn raking begins to blow around.
4. Bushes and shrubbery begin to move.

WW
01-Exc 2-2-1A

What does the prefix *alto* mean when it is added to the name of a type of cloud?

WW
01-Exc 2-2-2A

Get pictures 1, 2, and 3 from folder WW-01-Exc 2-2-2. Name the type of cloud shown in each picture.

WW
01-Exc 2-3-1A

Use the following table to convert the two temperatures listed below it.

°C	°F	°C	°F	°C	°F	°C	°F
20	68.0	10	50.0	0	32.0	-10	14.0
19	66.2	9	48.2	-1	30.2	-11	12.2
18	64.4	8	46.4	-2	28.4	-12	10.4
17	62.6	7	44.6	-3	26.6	-13	8.6
16	60.8	6	42.8	-4	24.8	-14	6.8
15	59.0	5	41.0	-5	23.0	-15	5.0
14	57.2	4	39.2	-6	21.2	-16	3.2
13	55.4	3	37.4	-7	19.4	-17	1.4
12	53.6	2	35.6	-8	17.6	-18	-0.4
11	51.8	1	33.8	-9	15.8	-19	-2.2

1. How many °F equal -13°C?
2. How many °C equal 62°F?

Convert the following wind speeds from miles per hour to kilometers per hour. (HINT: There are 1.6 kilometers in 1 mile.)

WW
01-Exc 2-3-2A

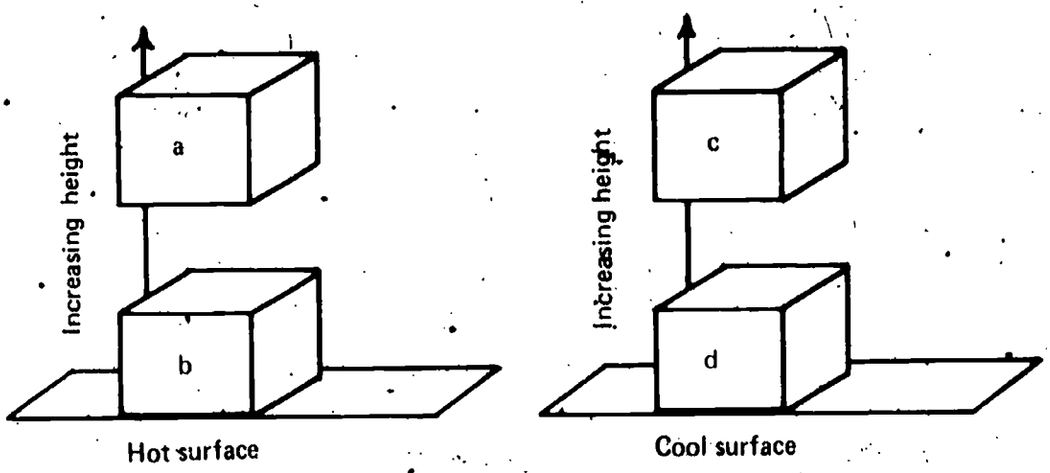
1. 15 mph
2. 68 mph

When Martha checked the rain gauge, she found that 3.8 inches of rain had fallen last night. She knows that there are 2.54 cm in one inch. How many centimeters of rain fell last night?

WW
01-Exc 2-3-3A

Look at the diagram below showing cubes of air over two different surfaces.

WW
02-Core-1A

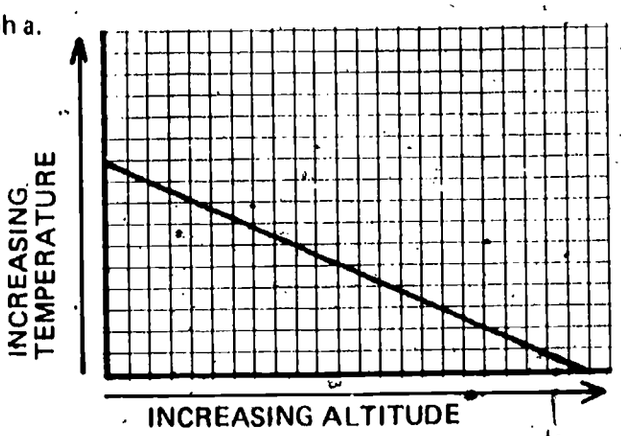


1. Which cube of air will be the hottest?
2. Which cube of air will be the coolest?

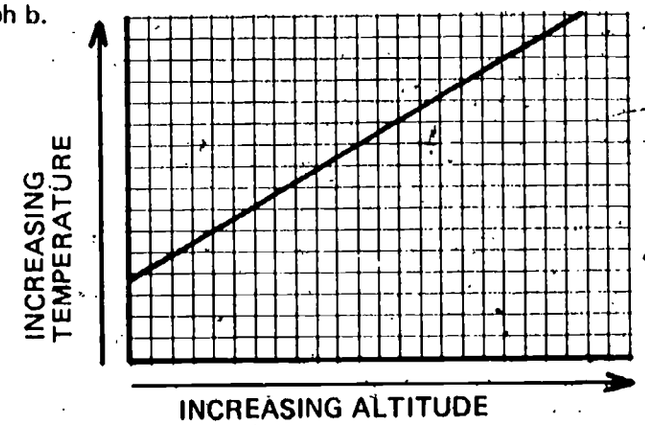
Which of the following graphs best shows how air temperature usually changes with altitude above the earth's surface?

WW
02-Core-2A

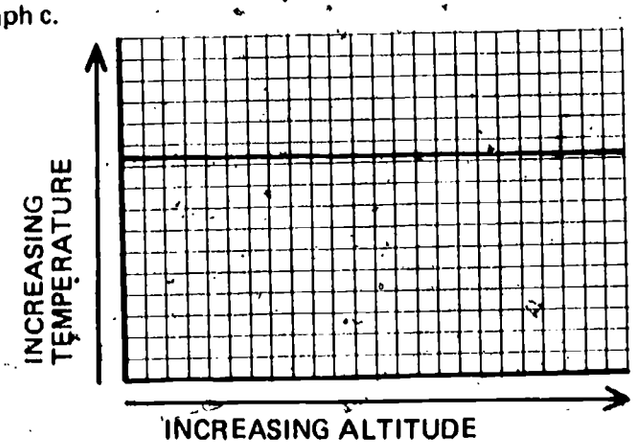
Graph a.



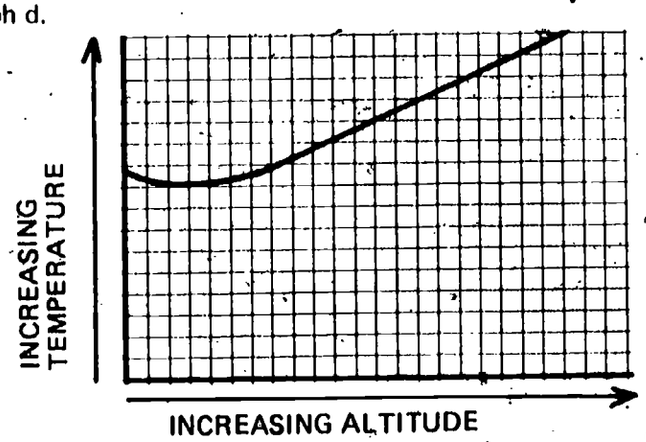
Graph b.



Graph c.



Graph d.



What causes air pressure on an object at the earth's surface?

WW
02-Core-3A

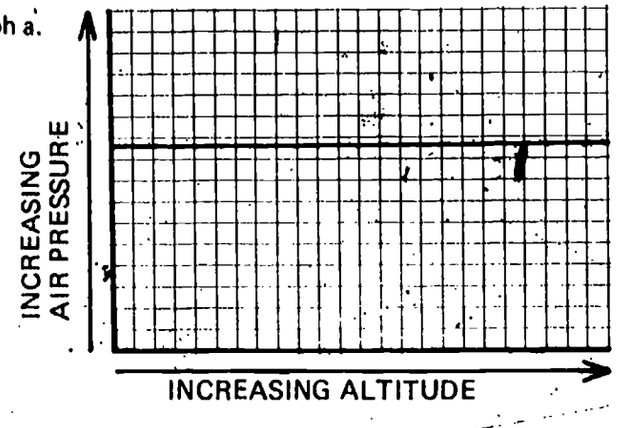
WW 02-Core-4A

People often measure air pressure in terms of the height of a column of mercury. What is air pressure that causes it to support a column of mercury?

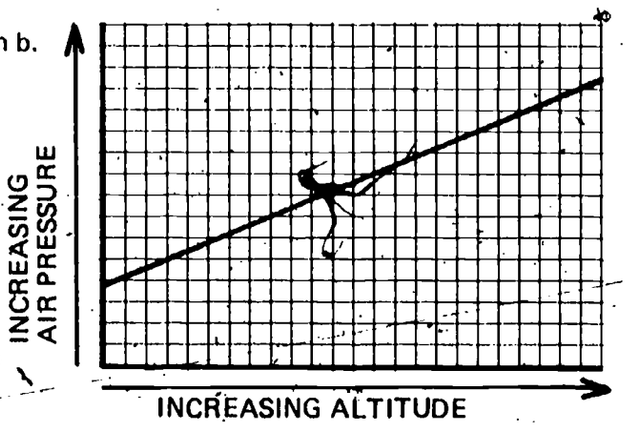
WW 02-Core-5A

Which of the following graphs best shows how air pressure usually changes with altitude above the earth's surface?

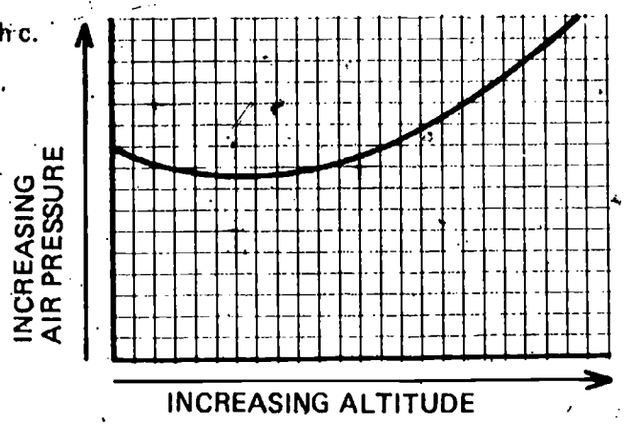
Graph a.



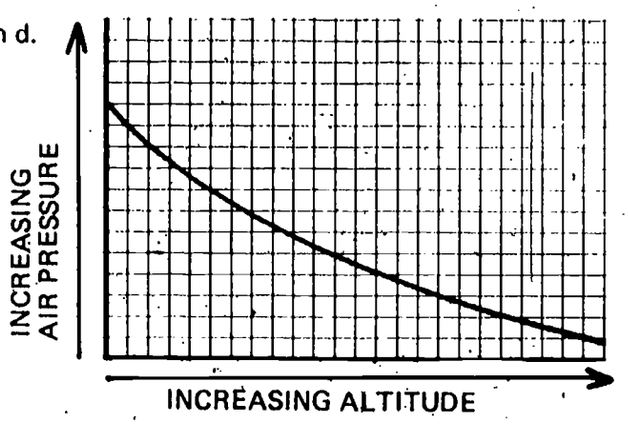
Graph b.



Graph c.



Graph d.



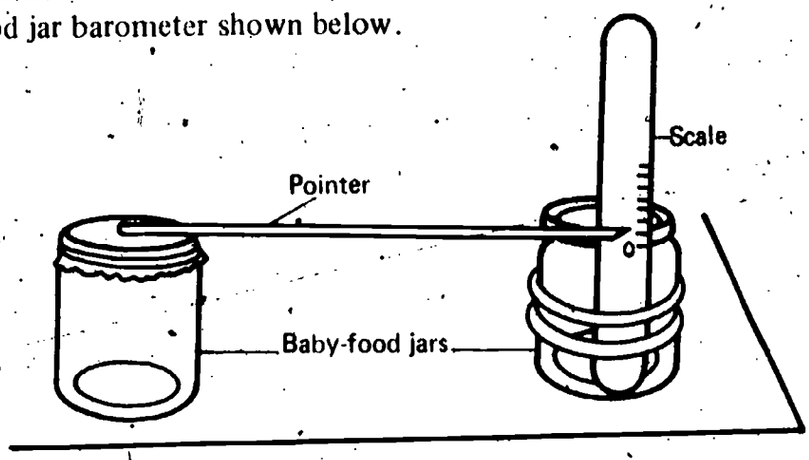
WW 02-Core-6A

Air pressure measured by a barometer on the top of a high mountain is less than air pressure measured at sea level because

a. the air is cooler at higher altitudes.
b. air particles are moving more slowly at higher altitudes.
c. there are fewer air particles at higher altitudes.
d. there is less air above the air on top of the mountain than there is above the air at sea level.

Roger built the baby-food jar barometer shown below.

WW
02-Core-7A



1. Suppose Roger carried his barometer to the top of a tall mountain. Would the pointer move up on the scale or down on the scale as Roger's altitude increased? (Assume the temperature remains constant.)
2. Explain your answer.

Each jar shown below is capped with the end of a rubber balloon. Match the best description of the relationship between the pressure inside the jar and the pressure outside the jar with each of the diagrams. Write the number of the diagram and after it the letter of the matching description.

WW
02-Core-8A

Diagram

1. Bulged out

2. Dished in

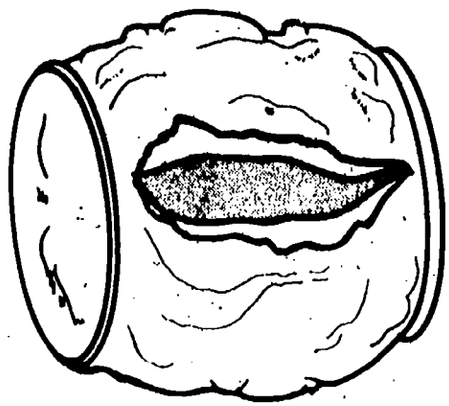
3. Flat

Description

a. Pressure inside equal to pressure outside
b. Pressure inside less than pressure outside
c. Pressure outside less than pressure inside
d. None of these

WW
02-Core-9A

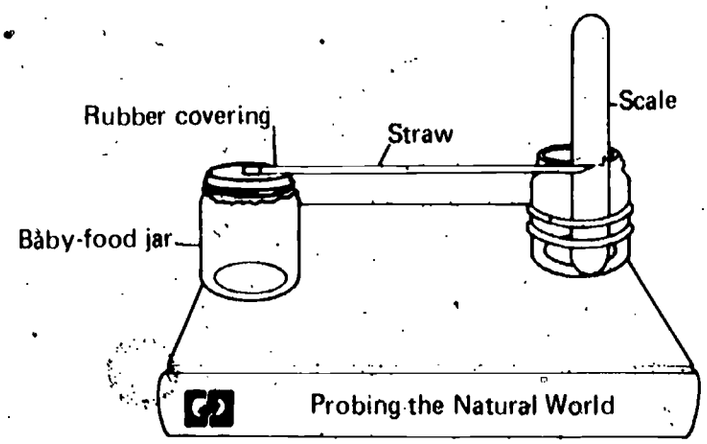
Ruth found a tin can that had been damaged because there was too much pressure difference between the air inside and the air outside the can. She drew the diagram shown below.



1. Was the air pressure inside the can greater or less than the air pressure outside?
2. What evidence do you have to support your decision?

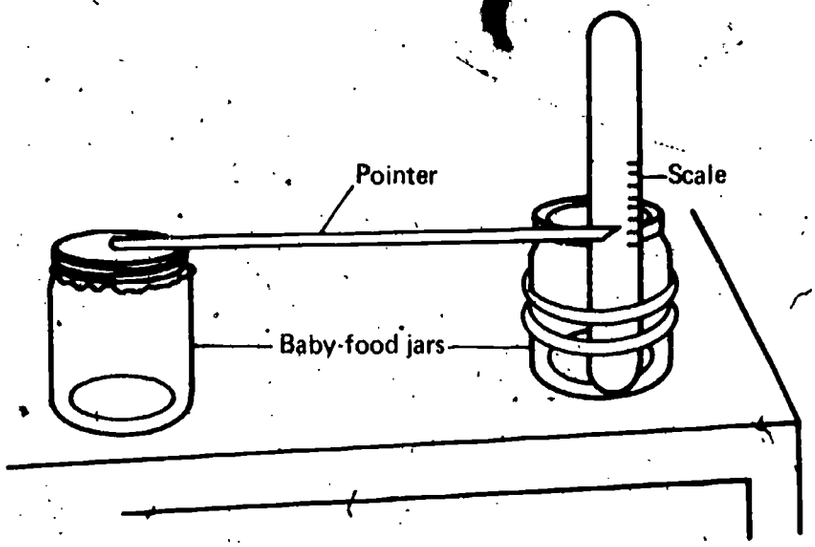
WW
02-Core-10A

The diagram below shows a baby-food jar barometer like the one you used in class. Why is it a good idea to attach a straw to the rubber covering of the baby-food jar barometer?



Jim built the baby-food jar barometer shown below and set it up outside. He read the barometer on a warm day. He read the barometer again the next morning when it was very cold outside. The reading was the same as it had been the day before.

WW
02-Core-11A



1. Had the air pressure outside increased, decreased, or stayed the same?
2. Explain the reason for your answer.

Cindy's little brother has seen moisture collect on the outside of a glass of cold water. He thinks that the water comes out through the sides of the glass. State how Cindy could show him that the water drops do not come from inside the glass.

WW
02-Core-12A

What is meant by the term *dew point*?

WW
02-Core-13A

What is meant by the term *relative humidity*?

WW
02-Core-14A

Ask your teacher to watch you do this check. Get the sling psychrometer, and measure the relative humidity in your classroom. You may use Table 4-2 on page 44 of *Winds and Weather*.

WW
02-Core-15A

Use the following information to calculate the relative humidity.

Temperature = 25°C

Greatest amount of water vapor which can be held in 1000 ml of air at 25°C = 23 milligrams

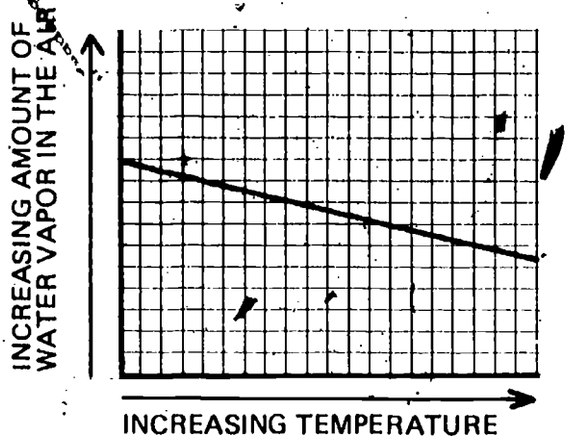
Actual amount of water vapor in this 1000 ml of air = 14 milligrams

WW
02-Core-16A

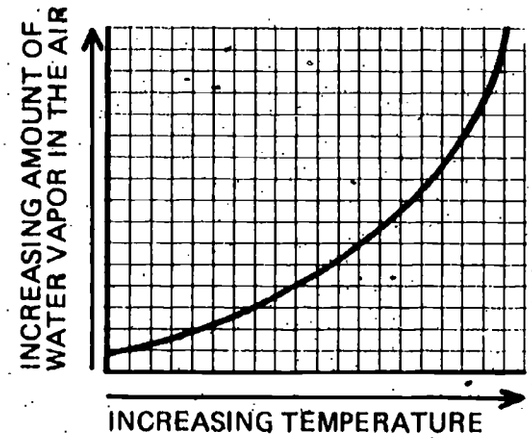
WW
02-Core-17A

Select the graph below that best shows how the greatest amount of water vapor that the air can hold varies with temperature.

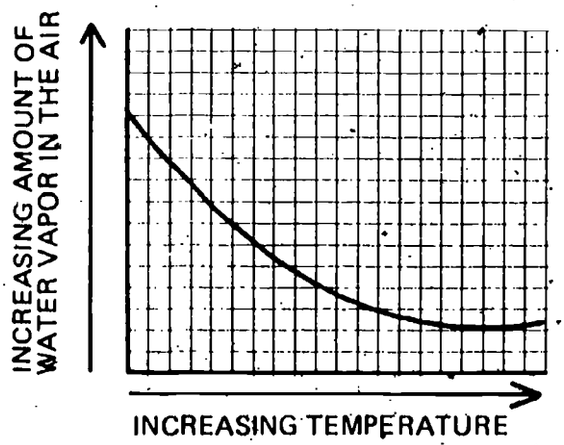
Graph a.



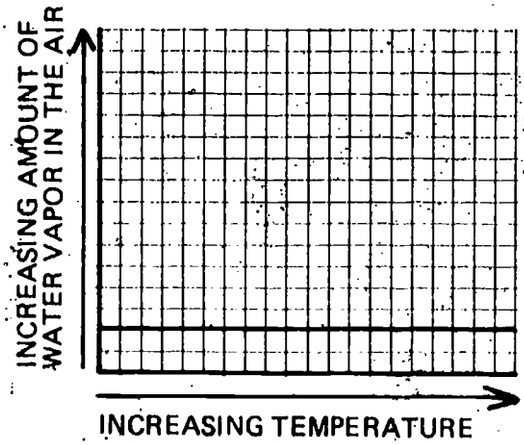
Graph b.



Graph c.



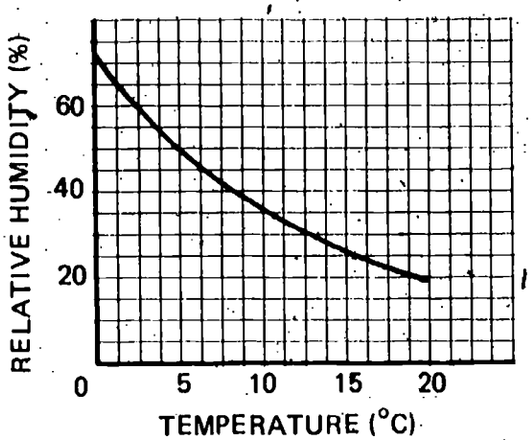
Graph d.



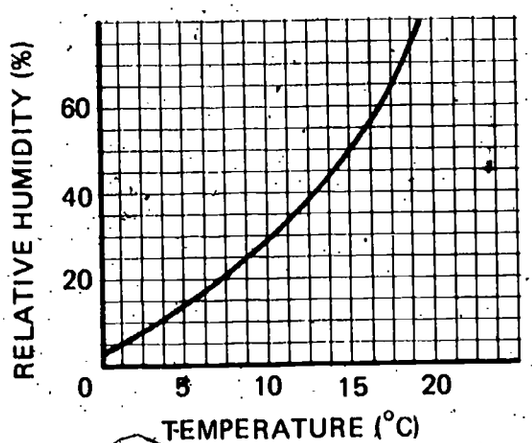
Suppose you heated a sample of air so that the temperature increased but the amount of water vapor in the air stayed constant. Select the letter of the graph below that best shows how the relative humidity would change with temperature.

WW
02-Core-18A

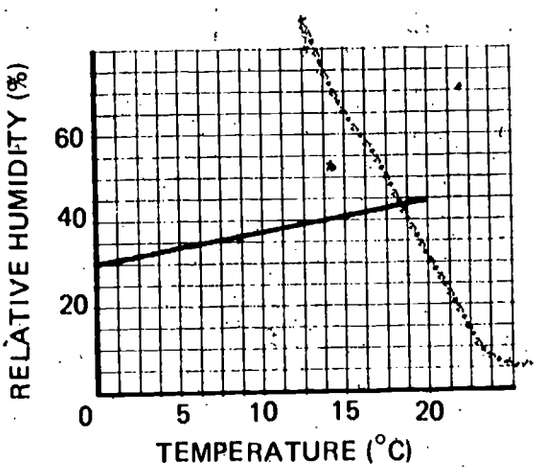
Graph a.



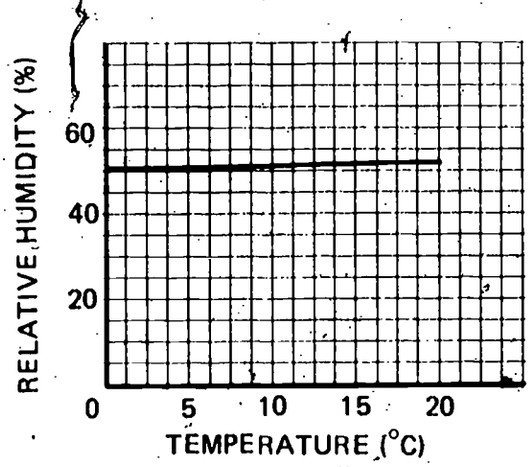
Graph b.



Graph c.



Graph d.



Roger measured the wet-bulb and dry-bulb temperatures on Monday and found that their difference was 3°.

WW
02-Core-19A

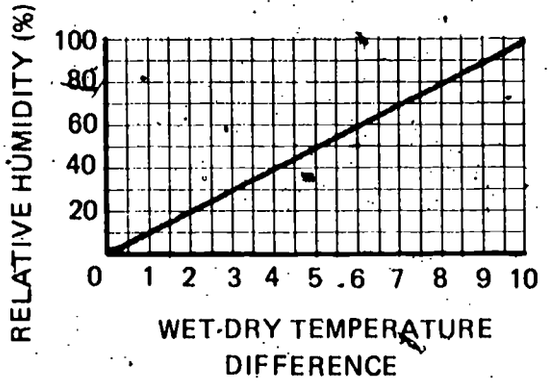
On Tuesday, Isabel measured them and found that their difference was 5°.

1. On which of the two days was the relative humidity higher?
2. Explain your answer.

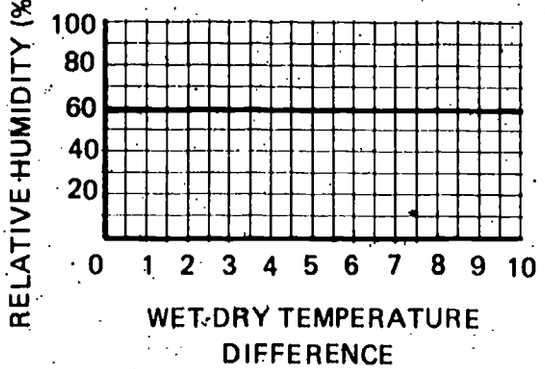
WW
02-Core-20A

For ten days in a row, Hank's dry-bulb reading of his sling psychrometer was unchanged. Yet, each day his wet-bulb reading changed, giving him a greater difference between the two temperatures. He made a graph showing both the daily relative humidity and the difference between his wet-bulb and dry-bulb temperature readings. Select the letter of the graph below that best shows the relationship he found.

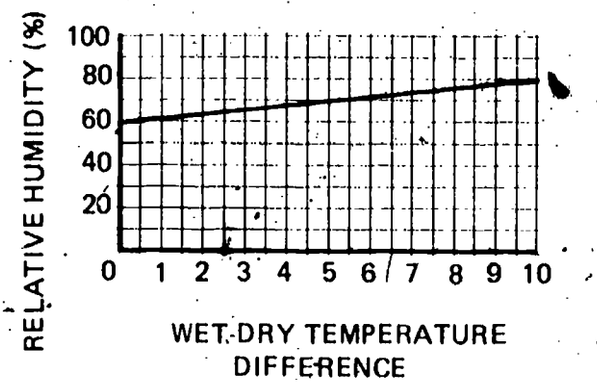
Graph a.



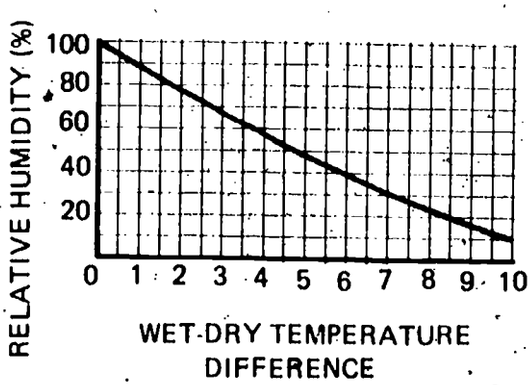
Graph b.



Graph c.



Graph d.



WW
02-Core-21A

Ask your teacher to watch you do this check. Get a sling psychrometer, and determine the dew point in your classroom. You may use Table 4-3 on page 46 of *Winds and Weather*.

WW
02-Core-22A

Why must there be solid particles in the air in order for clouds to form?

WW
02-Exc 3-1-1A

Select all of the following that could be measures of pressure.

a. 23 newtons
b. 0.2 newton per square centimeter
c. 3 newtons per square meter
d. 16 inches
e. 0.46 pound
f. 12 pounds per square foot

Russ weighs 620 newtons. When he ice skates, his weight is distributed over about 20 square cm of the ice's surface. What pressure does he then exert on the ice? (Be sure to express your answer in the proper units.)

WW
02-Exc 3-1-2A

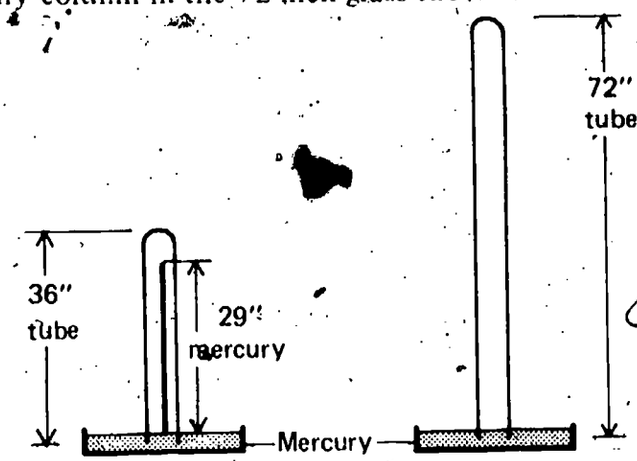
Which exerts the greater pressure, the weight of a 180-pound man exerted on the 9 square inches of the flat heel on his shoe or the weight of a 100-pound woman exerted on the 2 square inches of the high heel of her shoe?

WW
02-Exc 3-1-3A

Sylvia made a mercury barometer from a glass tube 36 inches long. She made another mercury barometer 72 inches long from tubing of the same diameter. Then she measured the height of the mercury column in each tube. She found that the height of the mercury column in the 36-inch tube was 29 inches. Select the answer which best indicates the height of the mercury column in the 72-inch glass tube.

WW
02-Exc 3-2-1A

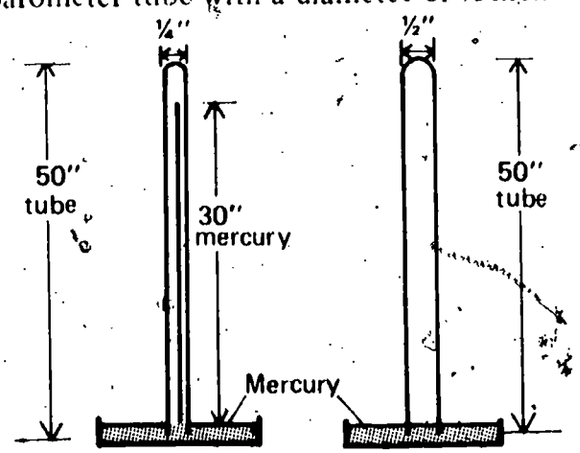
a. 72 inches
b. 36 inches
c. 29 inches
d. 65 inches
e. 14½ inches



Look at the diagram below. Ross used a glass tube with a diameter of ¼ inch and a height of 50 inches to make a mercury barometer. Today the mercury column in Ross's tube is 30 inches high. Select the answer below that best indicates how high the mercury column would be today in a barometer tube with a diameter of ½ inch and a height of 50 inches.

WW
02-Exc 3-2-2A

a. 70 inches
b. 60 inches
c. 30 inches
d. 15 inches
e. 7.5 inches

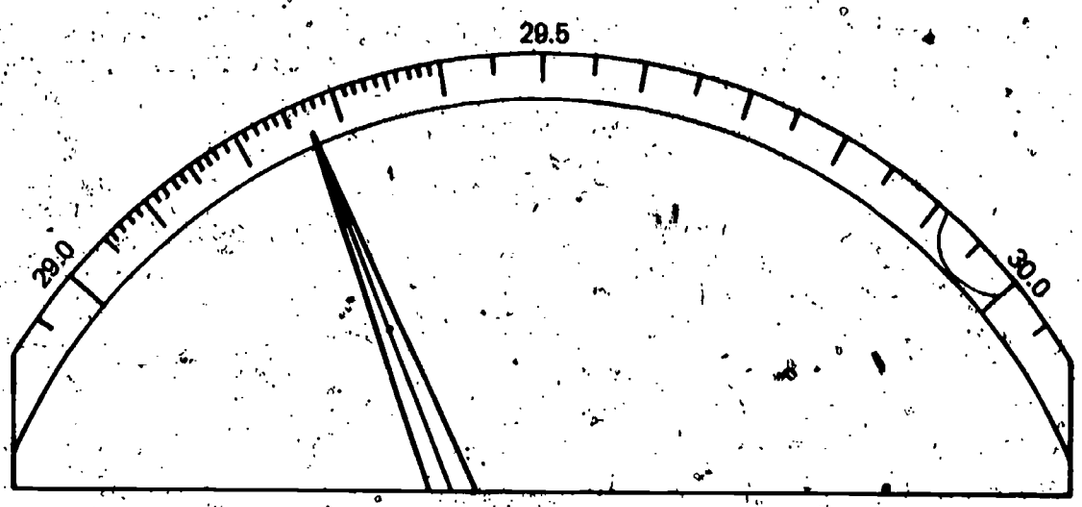


One millibar of pressure is equal to 0.0145 pounds per square inch of pressure. An air pressure of 1016 millibars is required to support a mercury column 30 inches high. What air pressure, in pounds per square inch, is required to support a column of mercury 24 inches high?

WW
02-Exc 3-2-3A

WW
02-Exc 3-2-4A

What is the barometric pressure shown below?



WW
02-Exc 4-1-1A

Janice has two wet-bulb thermometers. She wet the wick of one with water and the wick of the other with alcohol. She then waved both thermometers around for 15 seconds.

1. Which thermometer will register the lower temperature after being waved?
2. Explain your answer.

WW
02-Exc 4-1-2A

Danny has two identical dry-bulb thermometers. He keeps one stationary and waves the other around rapidly for about 15 seconds.

1. Which thermometer will register the lower temperature?
2. Explain your answer.

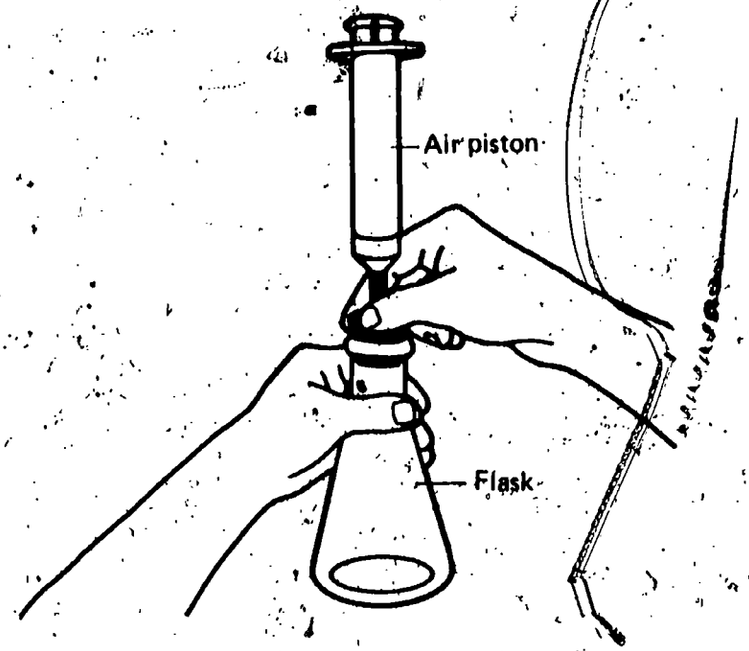
WW
02-Exc 4-1-3A

Ralph moistened the wicks of two wet-bulb thermometers with water. He held one still and waved the other one in the air for 15 seconds.

1. Which thermometer gave the lower temperature reading?
2. Explain your answer.

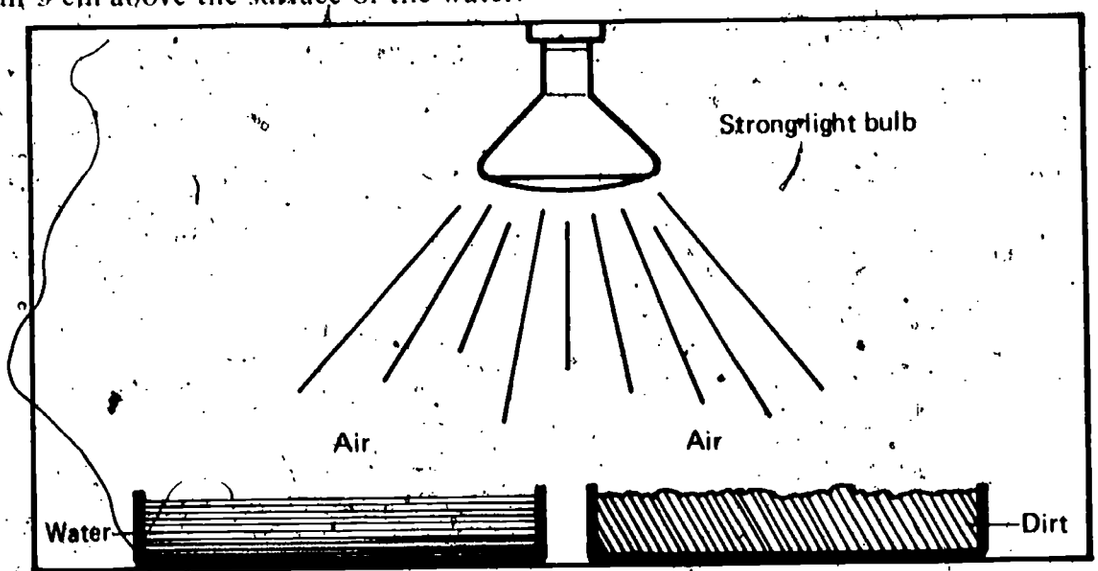
Barb, using the apparatus shown in the diagram, had no trouble forming a mist in the flask. A week later Lou tried the same activity. He had a great deal of trouble. He had to cool the flask with cold water before he could get any mist at all to form. Why might Lou have had trouble forming a mist when Barb did not?

WW
03-Core-1A



Eric set up the apparatus shown below. After having the light on for 5 minutes, he measured the temperature of the air 3 cm above the surface of the dirt and of the air 3 cm above the surface of the water.

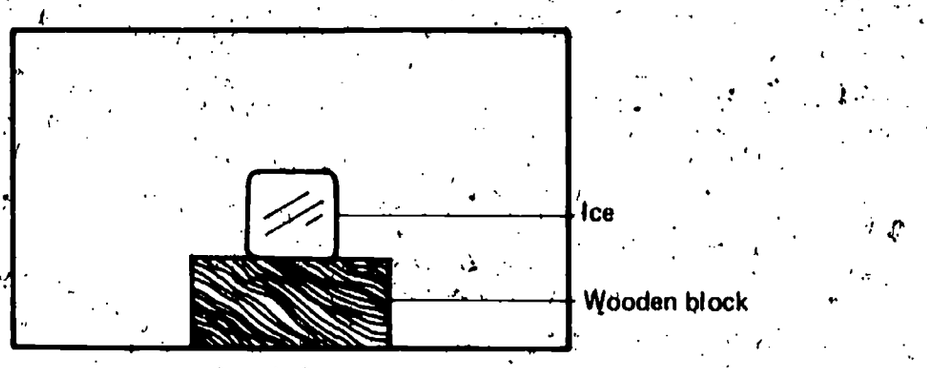
WW
03-Core-2A



1. Is the air warmer above the water or above the dirt?
2. Explain your answer.

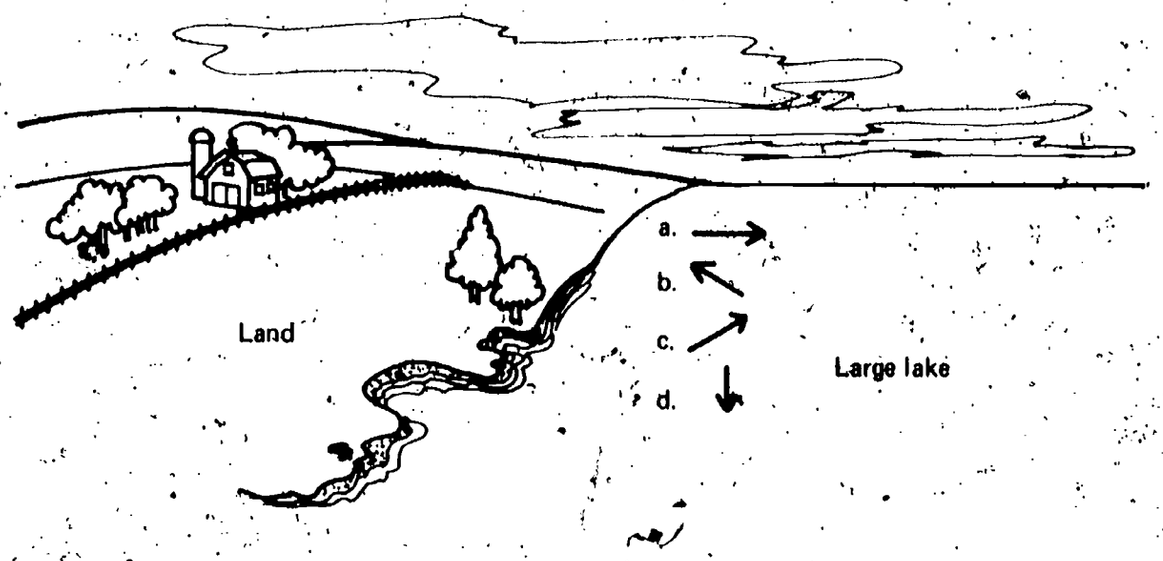
WW
03-Core-3A

Danny put a piece of ice on a wooden block in his observation box as shown in the diagram below. Copy the diagram onto your answer sheet, or get a copy of it from your teacher. Draw arrows on your copy to indicate the direction of motion of the air throughout the entire box.



WW
03-Core-4A

The diagram below shows a farm located near a very large lake. Select the arrow which best indicates the wind direction on a hot, sunny day.



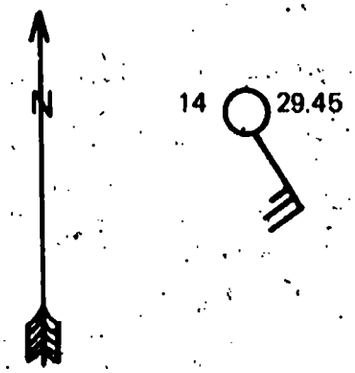
WW
03-Core-5A

Heather is staying at a summer cottage near a very large lake. Every day she notices that there is a cool breeze blowing in from the lake. Which statement below explains the reason for this cool breeze?

a. The air over the lake is warmer than the air over the land.
b. The air over the land contains more water vapor than the air over the lake.
c. The cooler air above the lake moves in over the land, causing the warmer air over the land to rise.
d. There is less air over the lake than over the land.
e. The waves on the lake cause the air to be blown over the land.

WW
03-Core-6A

WIND SPEED (in mph)	WIND SPEED SYMBOL
Less-than 1	
1-3	
4-7	
8-12	
13-18	
19-24	
25-31	



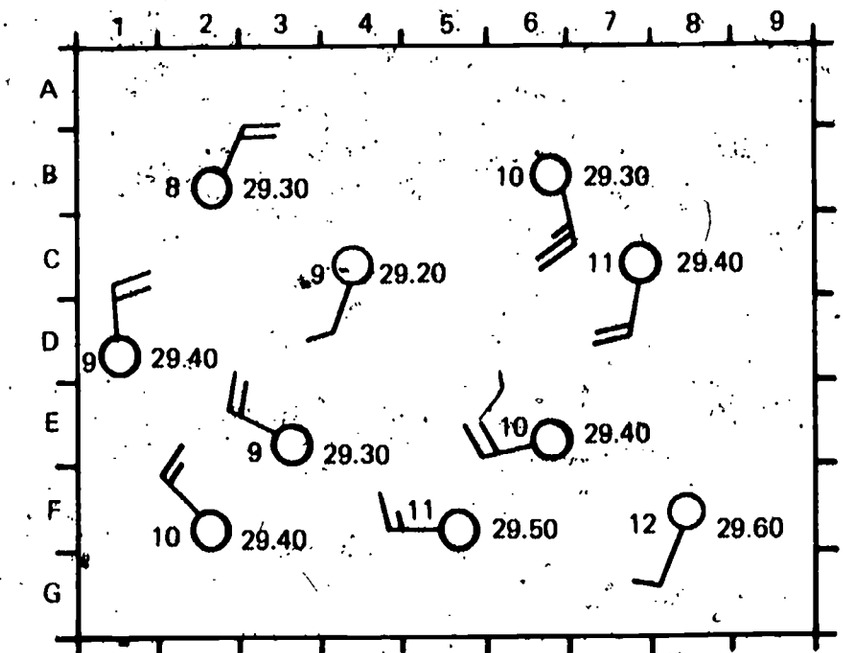
Use the information above to help you interpret the weather map symbol shown next to the arrow. Then answer the four questions about the symbol.

1. What is the wind direction?
2. What is the wind speed?
3. What is the temperature?
4. What is the air pressure?

WW
03-Core-7A

Use the horizontal and vertical scales on the weather map shown below to answer the two questions.

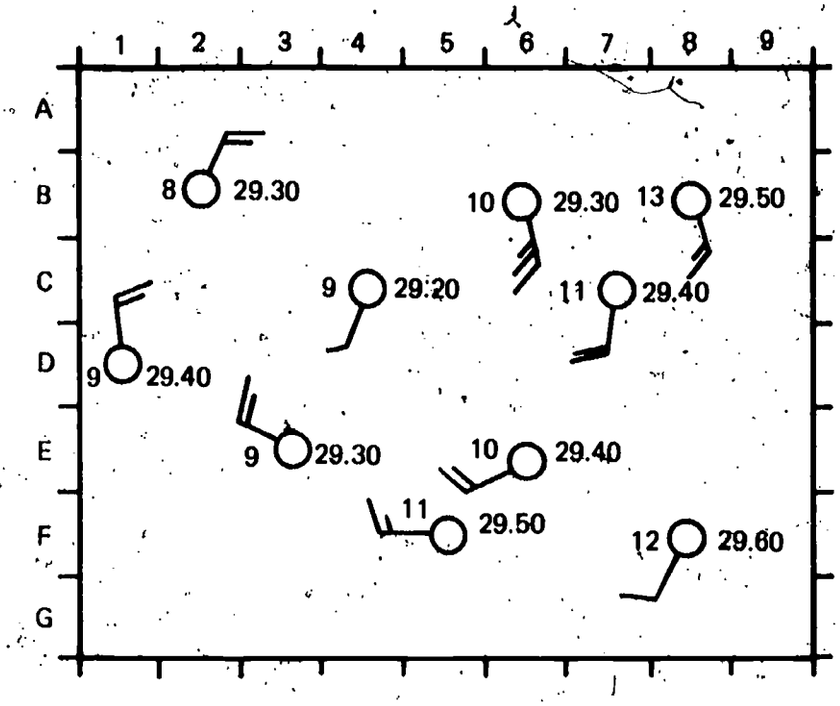
1. Which weather station reported the highest air pressure?
2. Which weather station reported the lowest air pressure?



WW 03-Core-8A

Use the horizontal and vertical scales on the weather map shown below to answer the two questions.

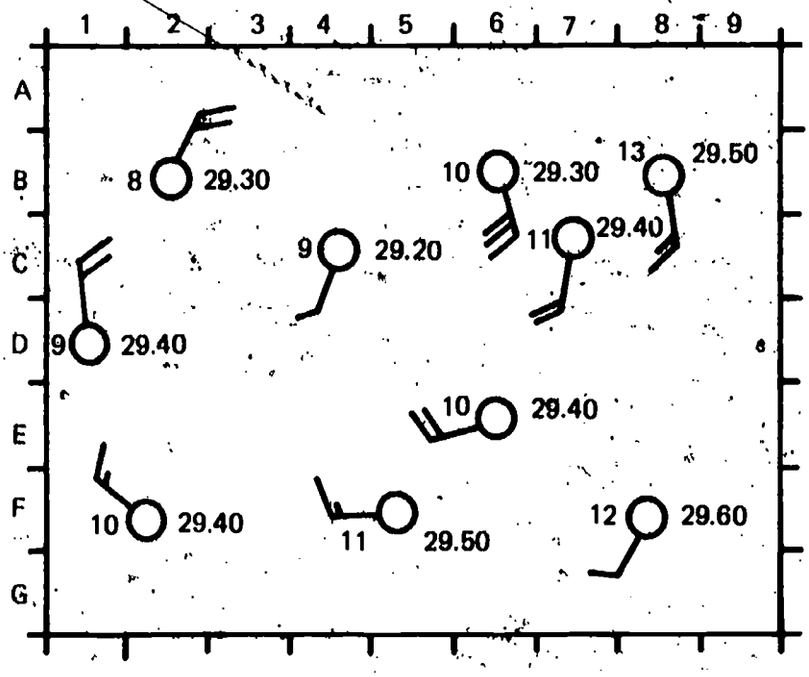
1. Which weather station reported the highest wind speed?
2. Which weather station reported the lowest wind speed?



WW 03-Core-9A

Use the horizontal and vertical scales on the weather map shown below to answer the two questions.

1. Which weather station reported the highest temperature?
2. Which weather station reported the lowest temperature?

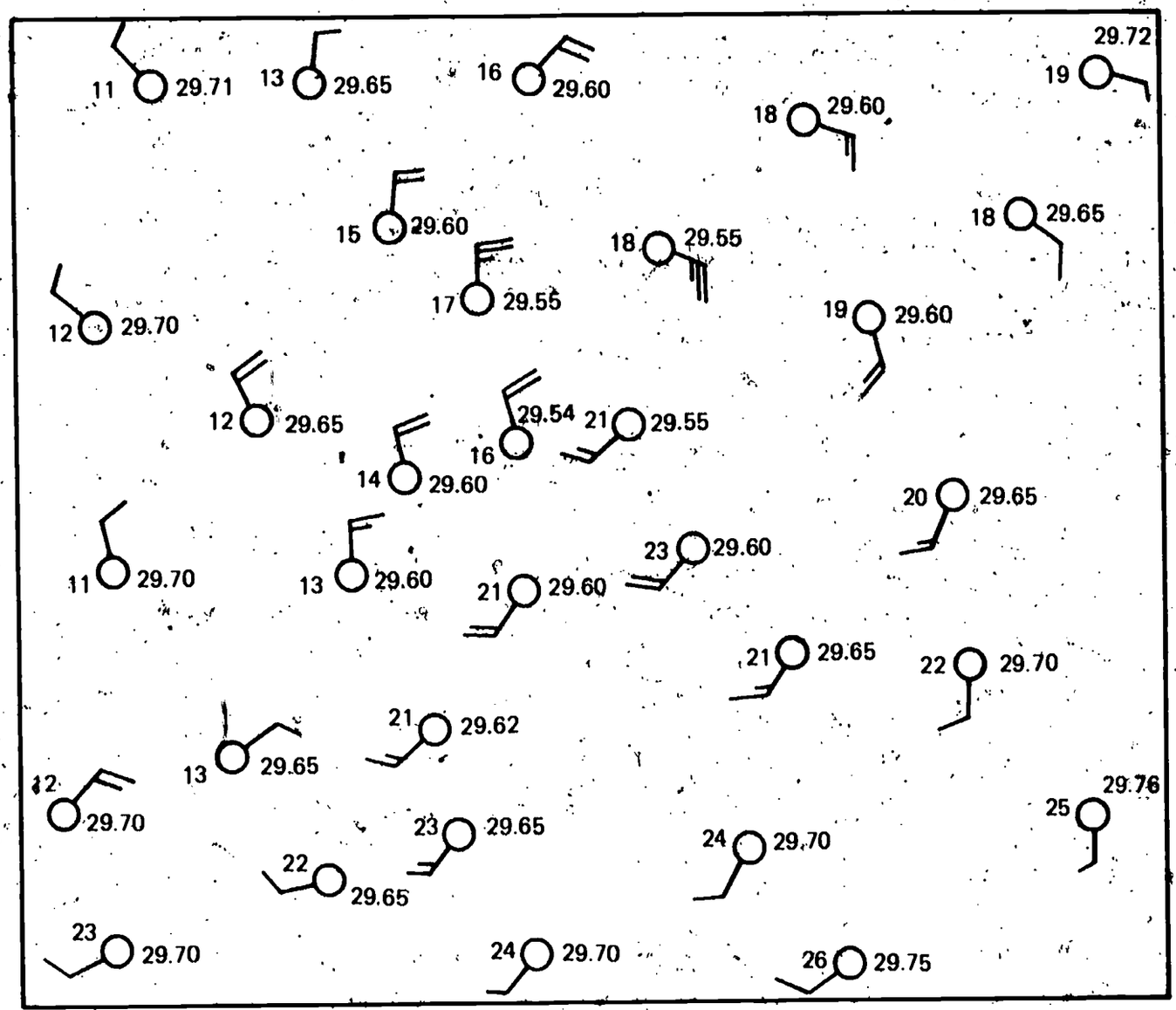


Weather forecasters often use isobars in predicting the weather. What is meant by the term *isobar*?

WW
03-Core-10A

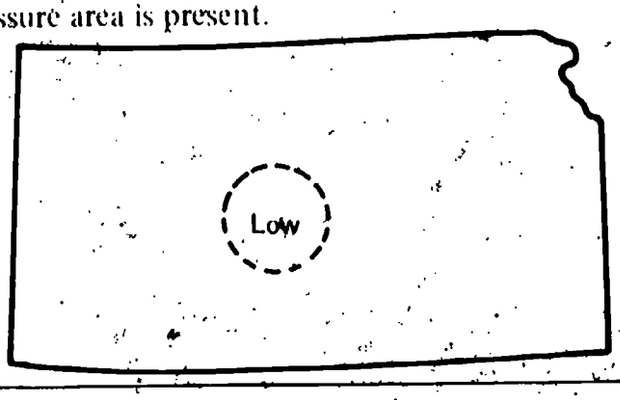
Get a copy of the weather map shown below from your teacher. Draw in two isobars on your copy of the weather map.

WW
03-Core-11A



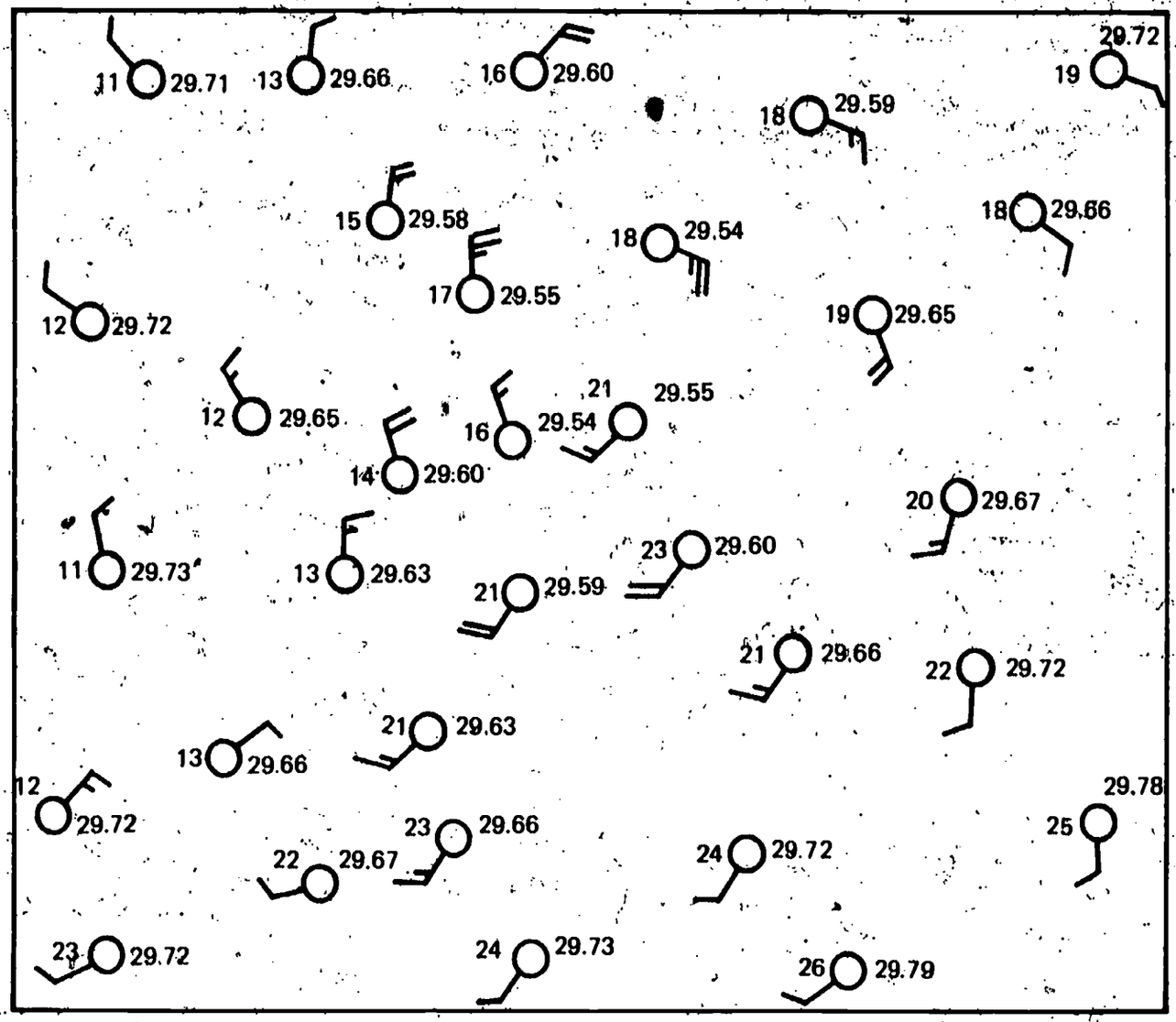
Copy the map of the state of Kansas shown below. The map shows a low pressure area near the middle of the state. Use arrows to indicate the directions of the wind over the state when the low pressure area is present.

WW
03-Core-12A



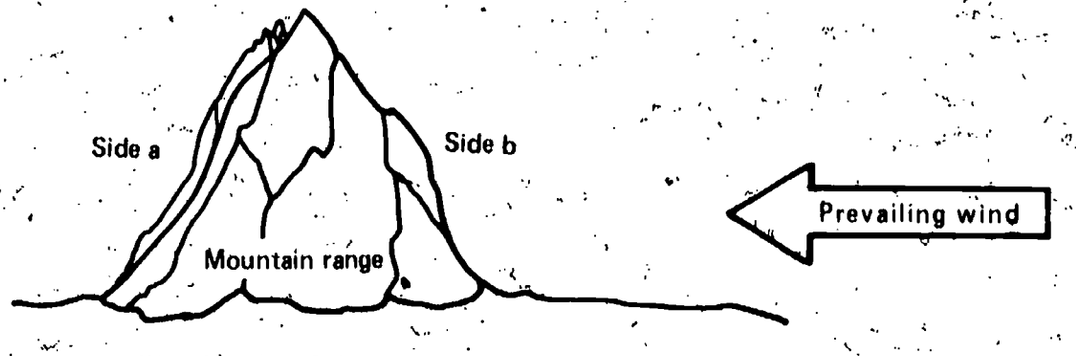
WW
03-Core-13A

Ask your teacher for a copy of the weather map shown below. Use the information on the map to determine the areas where you would expect to find overcast skies. Shade in those overcast areas on your copy of the weather map.



WW
03-Core-14A

Examine the diagram of the mountain range shown below.



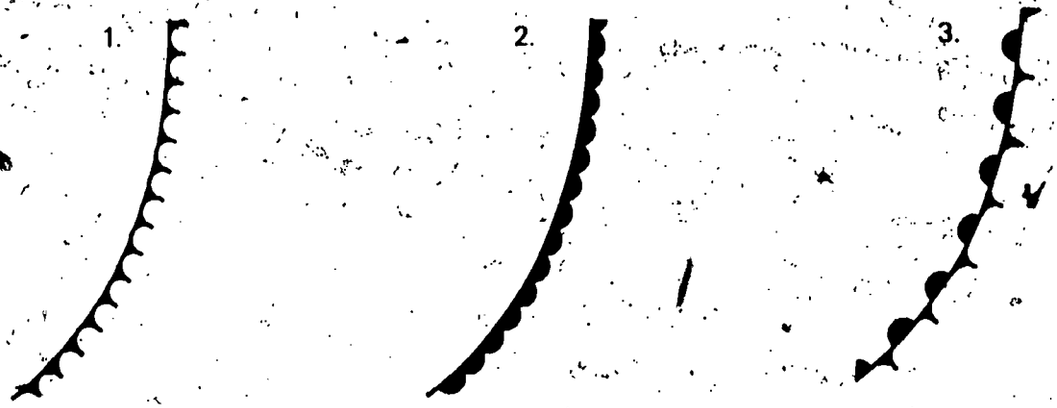
1. Which side of the mountain range, a or b, will receive more rainfall?
2. Explain your answer.

List three major causes of the uplifting of air.

WW
03-Core-15A

Name each of the following weather map symbols.

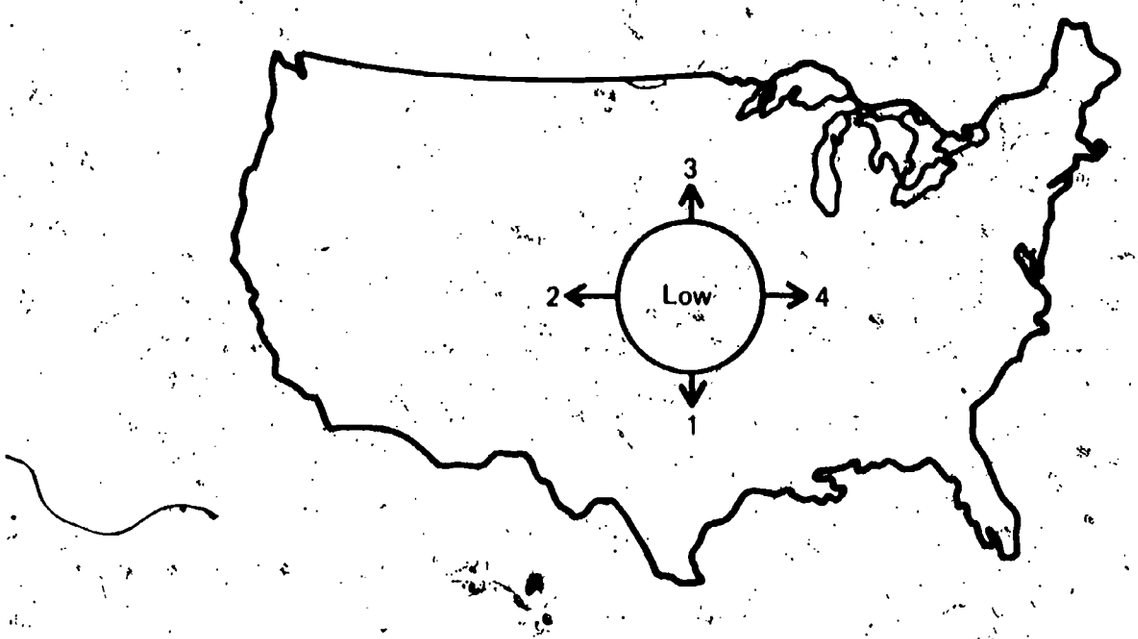
WW
03-Core-16A



From the list below, select the option that shows the direction in which the low pressure area shown on the map is most likely to move.

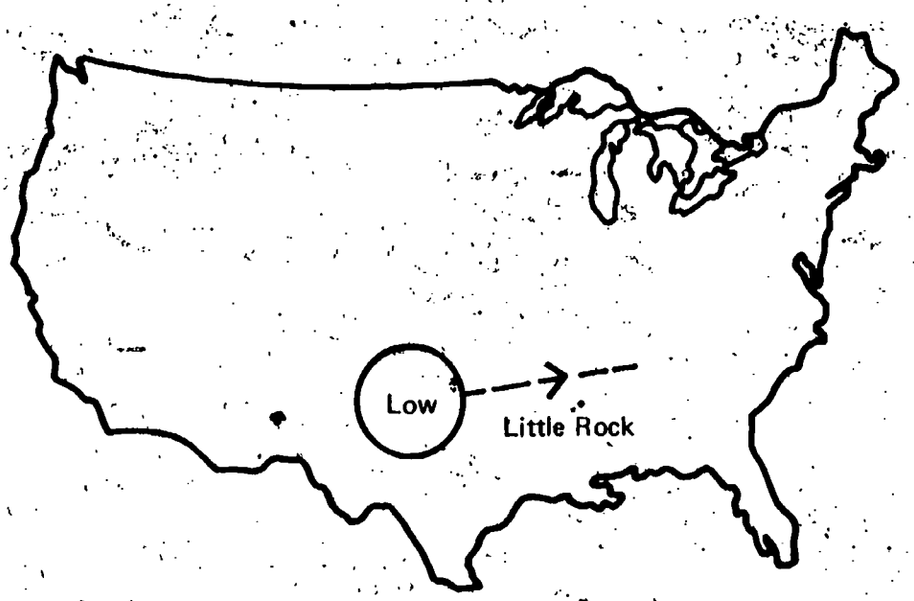
WW
03-Core-17A

a. Arrow 1
b. Arrow 2
c. Arrow 3
d. Arrow 4
e. All of the directions indicated are equally likely.



WW
03-Core-18A

The weather map below shows a low pressure area approaching Little Rock, Arkansas.

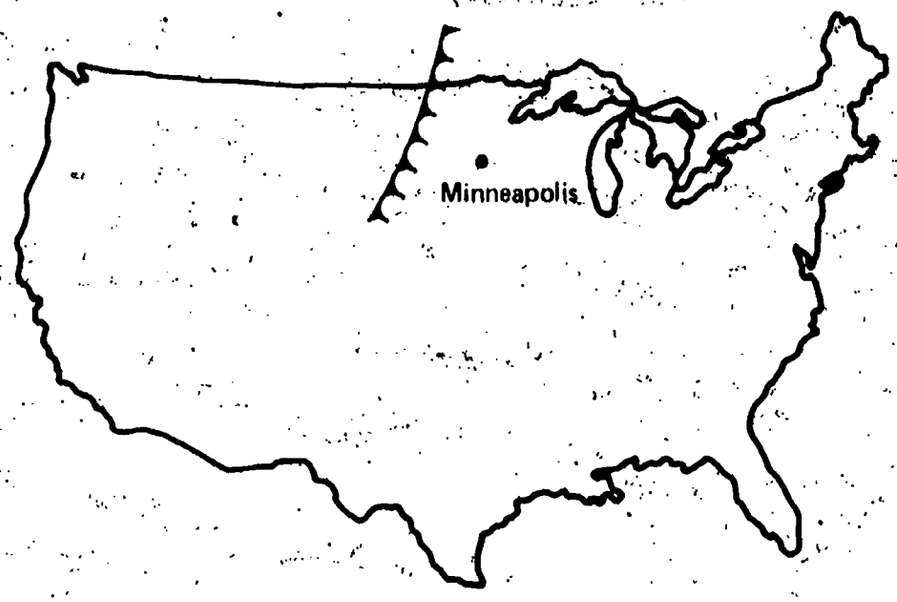


List the letters of all the changes in the weather you would expect as the low pressure area approaches.

a. There will be a sudden drop in temperature.
b. The wind will shift until it is blowing from the southwest.
c. The barometric pressure will drop.
d. There will be a sudden shift in wind direction so that it blows from the north.
e. The sky will cloud over.

The weather map below shows a cold front approaching Minneapolis, Minnesota.

WW
03-Core-19A

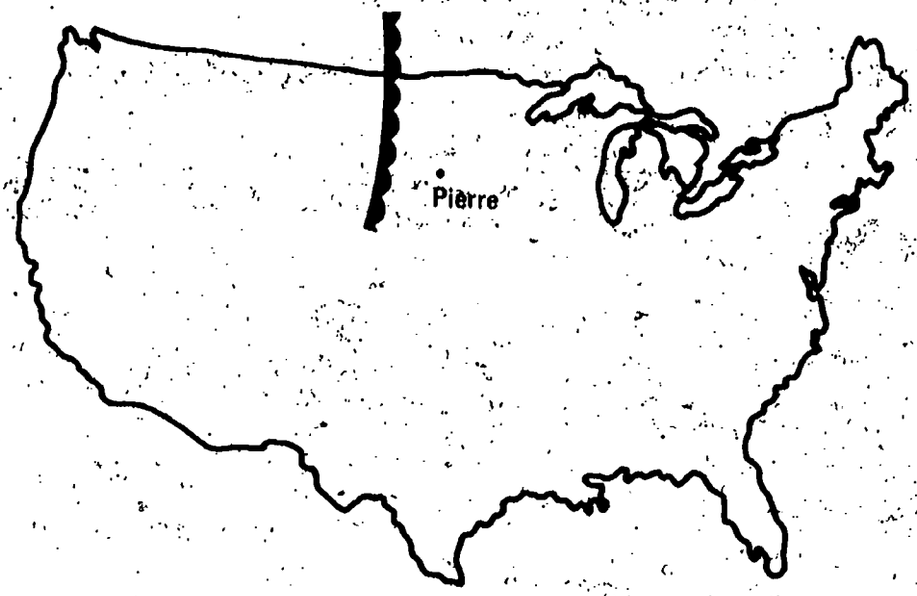


Indicate which of the weather changes below you would expect to occur as the cold front approaches and passes through.

a. Cirrus clouds in the sky will provide advance warning of the approaching cold front.
b. As the cold front passes through, the wind will shift so that it blows from the north.
c. The barometric pressure will rise steadily as the cold front approaches and then will drop.
d. As the cold front approaches, the sky will cloud over, primarily with cumulus and cumulonimbus clouds.
e. The temperature will drop as the cold front passes through.

WW
03-Core-20A

The weather map below shows a warm front approaching Pierre, South Dakota.



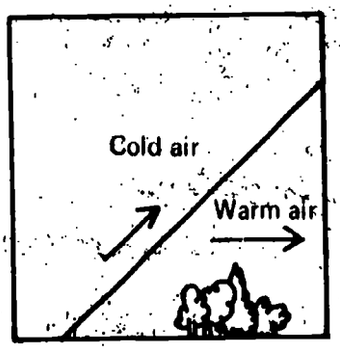
List the letters of all the weather changes you would expect to occur as the warm front approaches and passes through.

a. There will be a south wind as the warm front approaches.
b. The barometric pressure will rise steadily as the warm front approaches and passes through.
c. As the warm front approaches, the sky will cloud over, primarily with cumulus and cumulonimbus clouds.
d. The temperature will increase as the warm front passes through.
e. Cirrus clouds will appear in the sky first, followed by cumulus, and then by stratus clouds as the warm front gets closer.

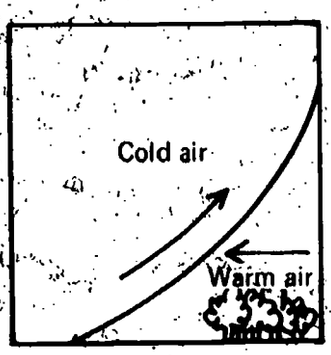
The arrows in the diagrams below represent the directions of air movement. WW 03-Core-21A

1. Which diagram best represents a warm front?
2. Which diagram best represents a cold front?

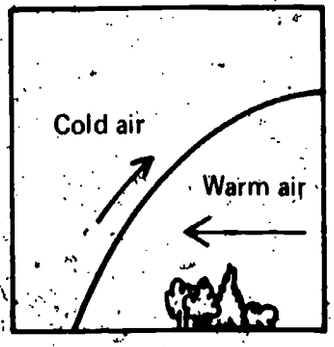
a.



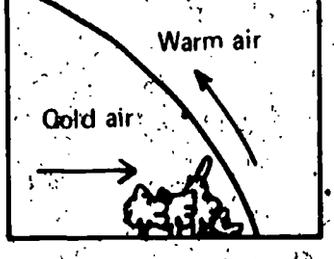
b.



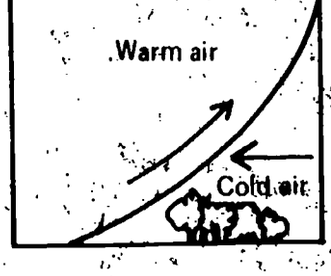
c.



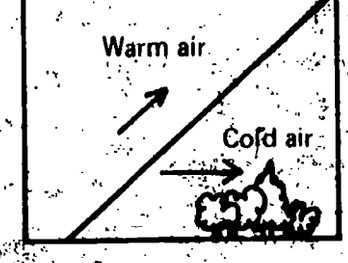
d.



e.



f.



Philip measured the air temperature at the earth's surface. It was 22.5°C. He knows that the air temperature decreases at an average rate of about 1.0°C per 100 m. Calculate the air temperature at an altitude of 940 meters above the earth's surface at the time Phil made his measurement. WW 03-Exc 5-1-1A

Bill wants to calculate the dew point at an altitude of 1540 meters above the earth's surface. He has measured the dew point at the earth's surface. It is 12.6°C. He knows that the dew point of air decreases at an average rate of 1.0°C per 550 m. What is the dew point at an altitude of 1540 m at the time Bill took his measurement? WW 03-Exc 5-1-2A

Kathy made the following measurements on May 8. WW 03-Exc 5-1-3A

Temperature, using dry-bulb thermometer = 20°C

Temperature, using wet-bulb thermometer = 10°C

She used these measurements to find that the relative humidity was 24% and the dew point was 11°C. The height of the cloud bottoms can be obtained using the following formula:

$$\text{Height of cloud bottom in meters} = 122\,(T_{air} - T_{dew\ point})$$

Use Kathy's information to calculate the height of the cloud bottoms on May 8.

WW
03-Exc 5-2-1A

Ralph wants to use his nephoscope to measure the speed of the clouds. Which of the following measurements must he make?

a. The height of a cloud
b. The radius of the nephoscope circle
c. The height of his eye above the nephoscope
d. The time required for the cloud to travel from the center to the edge of the nephoscope circle
e. All of the measurements listed in a, b, c, and d
f. Only the measurements listed in a, b, and c

WW
03-Exc 5-2-2A

Tim wants to use the following formulas to calculate the speed of the clouds.

$$D = \frac{H \times d}{h} \qquad S = \frac{D}{t}$$

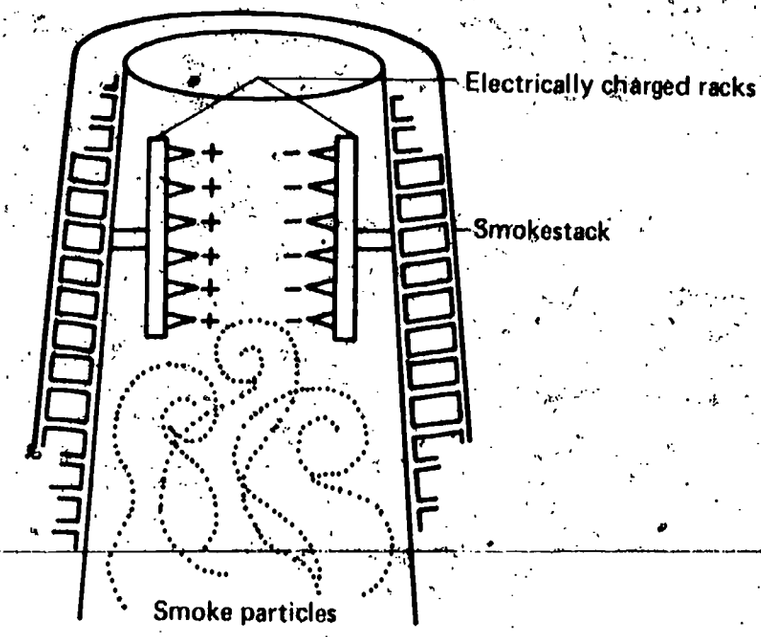
He has made the following measurements.

d (radius of nephoscope circle) = 0.05 meters
h (height of eye above nephoscope) = 0.3 meters
H (estimated height of cloud) = 1500 meters
t (time for cloud to move from center to edge of the nephoscope circle) = 6 seconds

Use Tim's measurements to calculate the speed (S) of the clouds.

WW
03-Exc 7-1-1A

A factory has just installed in its smokestacks the new device shown below. What effect will these large, electrically charged racks have on the smoke particles? Select the letter of the best possible answer from the list below.



a. Remove the color from the smoke
b. Get the smoke out of the stack faster
c. Cause small particles to clump together
d. Stop all gases from going up the stack
e. Keep rain from entering the stack

Some scientists are very interested in learning how to make rain when they want it. One technique that has been used is to drop millions of tiny crystals of dry ice into clouds from an airplane. Dry ice crystals are very cold, about -73°C. Explain how dropping dry ice crystals into a cloud can cause rain.

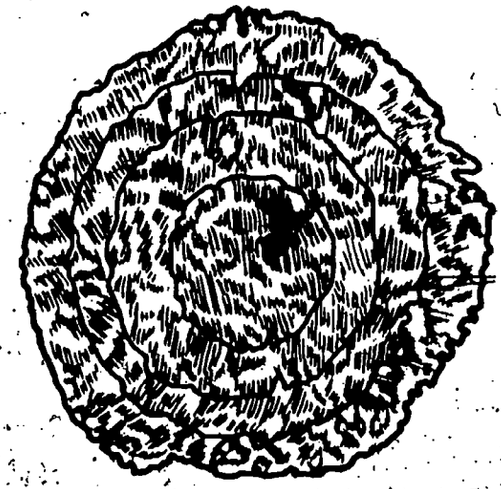
WW
03-Exc 7-1-2A

When you watch a single cumulus cloud, you can see that it often does not last very long. Explain why these clouds tend to fade away rather quickly.

WW
03-Exc 7-2-1A

Explain why hailstones usually consist of layers of ice in concentric shells as shown below.

WW
03-Exc 7-2-2A



Concentric ice shells

The table below shows measurements that Bruce has made during the last four days. Open *Winds and Weather* to page 165.

WW
03-Exc 7-3-1A

DATE	TIME	TEMP. (in °C)	WIND DIR.	WIND SPEED (in mph)	CLOUD TYPE	CLOUD COVER	PRECIPITATION (in inches)	BAR. PRESS. (in inches)	REL. HUM. (in %)	DEW POINT (in °C)
6	12:15	12	SW	3-5	clear	○		29.90	40	6
7	1:00	11	S	8-12	cirrus	◔		29.92	45	6
8	11:45	13	S	8-12	cumulus	◕		29.86	60	9
9	12:00	14	W	28-31	stratus	●	0.8	29.81	90	14

Based on Bruce's data and on Table 2 on page 165, answer the following questions to tell what changes will probably occur during the next 24 hours.

1. Will the temperature increase, decrease, or stay constant?
2. Will the relative humidity increase, decrease, or stay constant?
3. Will the sky become cloudier, clearer, or stay the same?
4. Will there be any clouds? If so, name the type.
5. Will there be no, some, or heavy precipitation?
6. Will there be no wind, a light breeze, or a strong wind?

Crusty Problems

CP

What did Alfred Wegener state about the origin of the continents on the earth?

CP
01-Core-1A

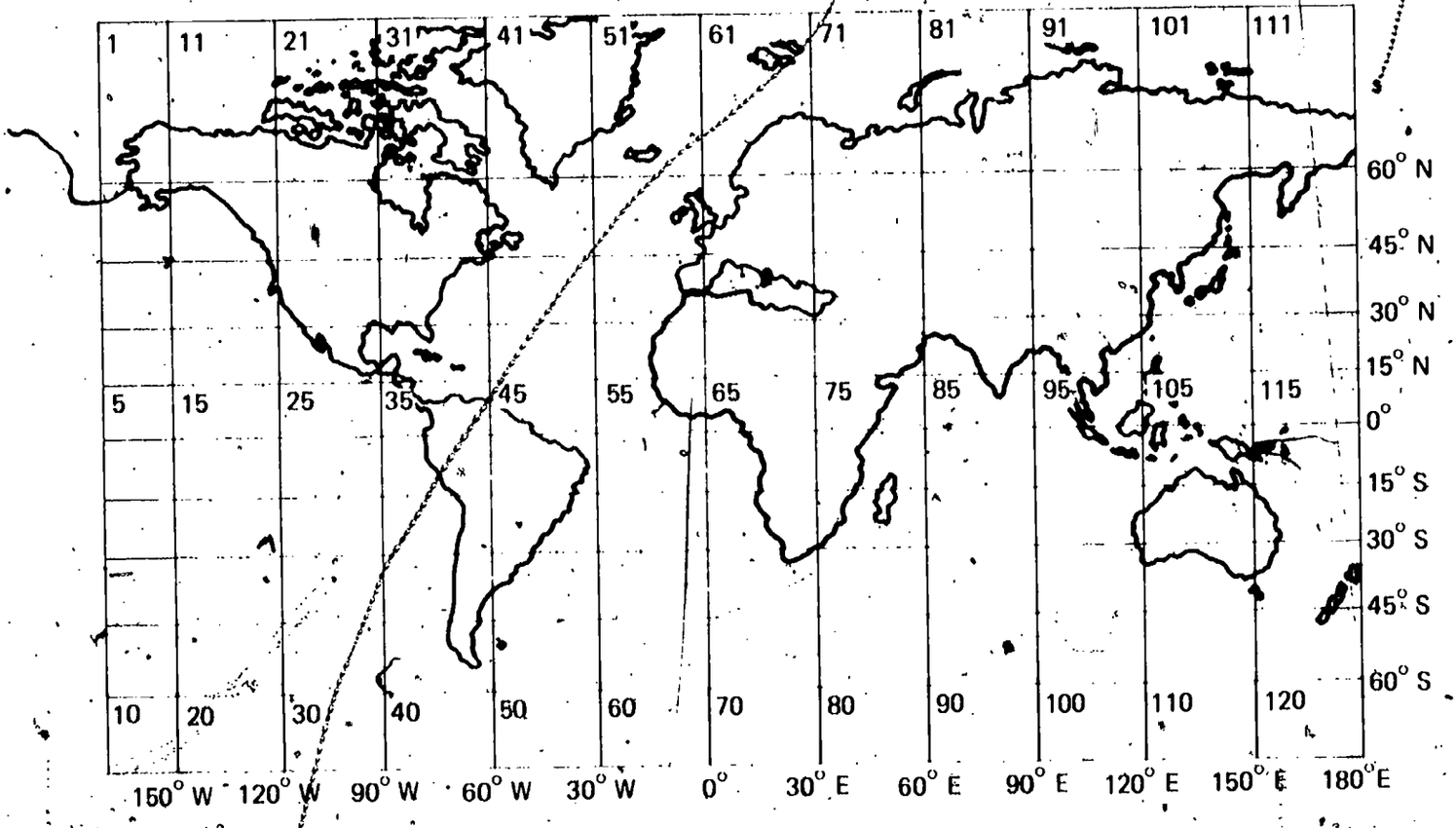
Many geologists now accept the idea that the continents were once joined together and later drifted apart. What evidence can be cited that would support this idea?

CP
01-Core-2A

The data below are from the "Preliminary Determination of Epicenters" table. For each of the four earthquakes, use the map below to determine its location. Write the number of the earthquake and after it the number of the box in which the earthquake is located. Note that the boxes on the map are numbered in order from top to bottom. (For example, box 86, though unnumbered, is the box directly below box 85.)

CP
01-Core-3A

EARTHQUAKE	ORIGIN TIME (GMT)			GEOGRAPHIC COORDINATES		DEPTH (in km)
	Hr	Min	Sec	Lat	Long	
1	05	16	56.2	4.3 S	152.9 E	45
2	05	40	12.7	40.5 N	127.3 W	10
3	16	10	55.4	19.9 S	177.9 W	590
4	16	27	47.7	38.6 N	69.8 E	36



CP
01-Core-4A

The diagrams below show the motions of four plates.

Diagram A

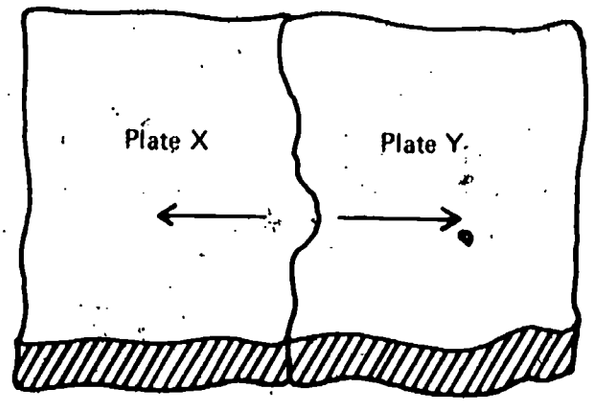
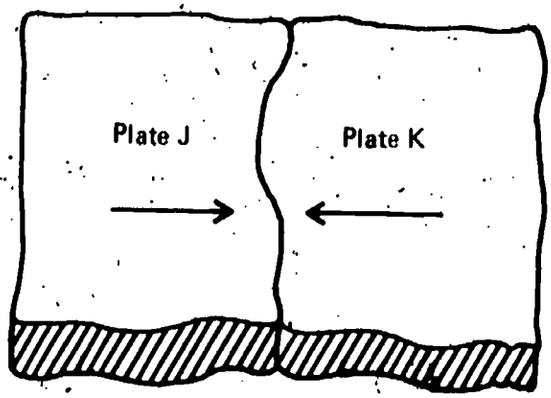


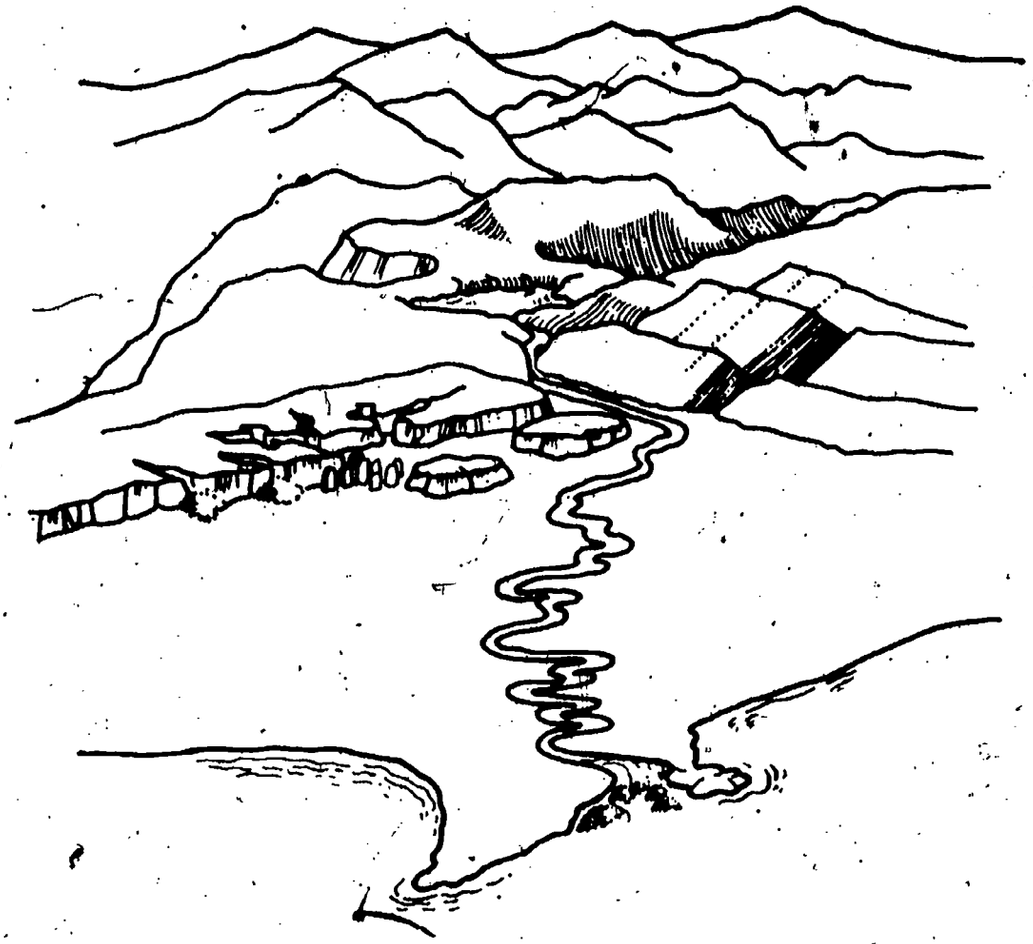
Diagram B



1. Which of the following describe the line between the plates in Diagram A?
   a. It is probably near the edge of a continent.
   b. It is probably in the middle of an ocean.
   c. It is the source of no earthquakes.
   d. It is the source of deep earthquakes.
   e. It is the source of shallow earthquakes.
   f. The line is between colliding plates.
   g. The line is between separating plates.
2. Which of the following describe the line between the plates in Diagram B?
   a. It is probably near the edge of a continent.
   b. It is probably in the middle of an ocean.
   c. It is the source of no earthquakes.
   d. It is the source of deep earthquakes.
   e. It is the source of shallow earthquakes.
   f. The line is between colliding plates.
   g. The line is between separating plates.

Examine the diagram below.

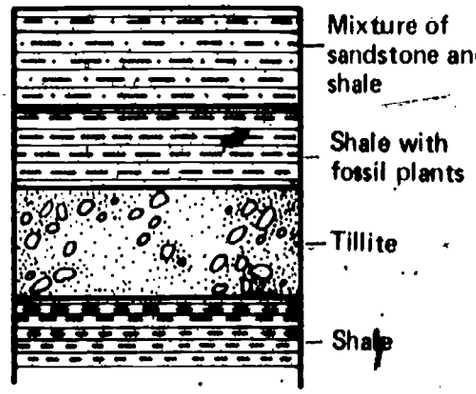
CP
01-Core-5A



1. Is there any evidence in the diagram that geologic change has occurred?
2. If there is, name the processes that caused the change.

CP
01-Core-6A

In the late 19th century, a geologist in the Southern Hemisphere found on at least three different continents deposits of rock whose layers were in the sequence shown in the diagram below. Each rock deposit included a layer which contained the same kind of fossil plant. Assume you are a geologist living at that time, and you want to find an explanation for this. List two questions whose answers would help you get more information.



CP 01-Core-7A Your teacher will observe you for this check when he can.

CP 01-Core-8A Your teacher will observe you for this check when he can.

CP 01-Core-9A Your teacher will observe you for this check when he can.

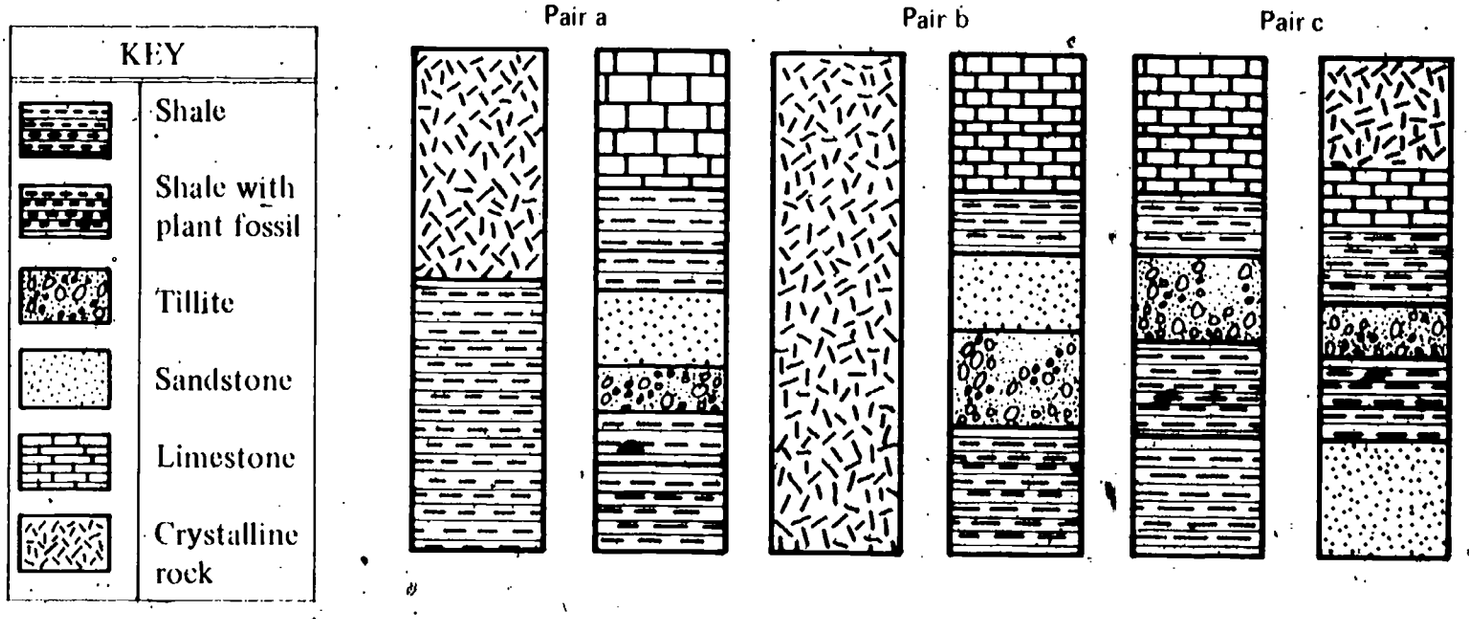
CP 01-Core-10A Your teacher will observe you for this check when he can.

CP 01-Core-11A Your teacher will observe you for this check when he can.

CP 01-Res 1-1A Geologists often use evidence from the Ice Age to support their theory of continental drift. State this evidence.

CP 01-Res 2-1A Three pairs of rock sequences are shown below. The two rock sequences making up each pair were found on different continents.

1. Which pair of rock sequences, a, b, or c, represents rock sequences that may have been formed at the same time on the same original continent?
2. What evidence supports your answer?



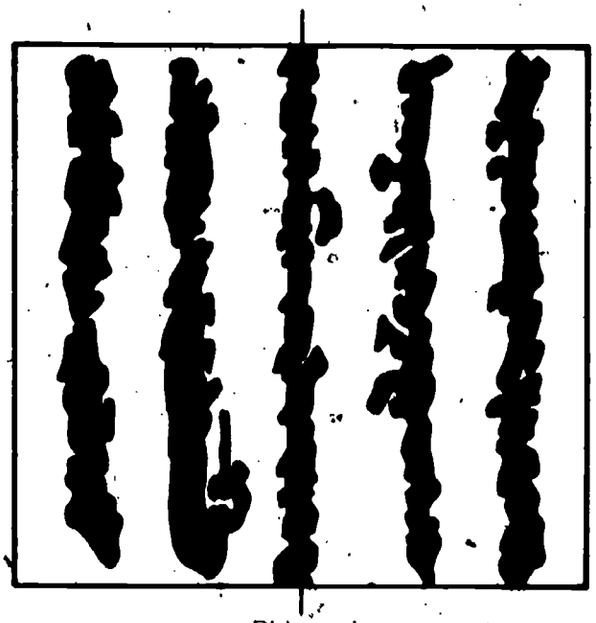
In what ways is a baked apple similar to the earth so that it serves as a model to explain mountain building?

CP
01-Res 3-1A

The diagram below shows the magnetic field recorded in the rocks in an ocean basin. The shaded areas represent rocks on the sea floor that record the earth's magnetic field as it is today. The white areas indicate rocks with a reversed magnetic field. The ridge-axis is shown at the center of the diagram.

CP
01-Res 4-1A

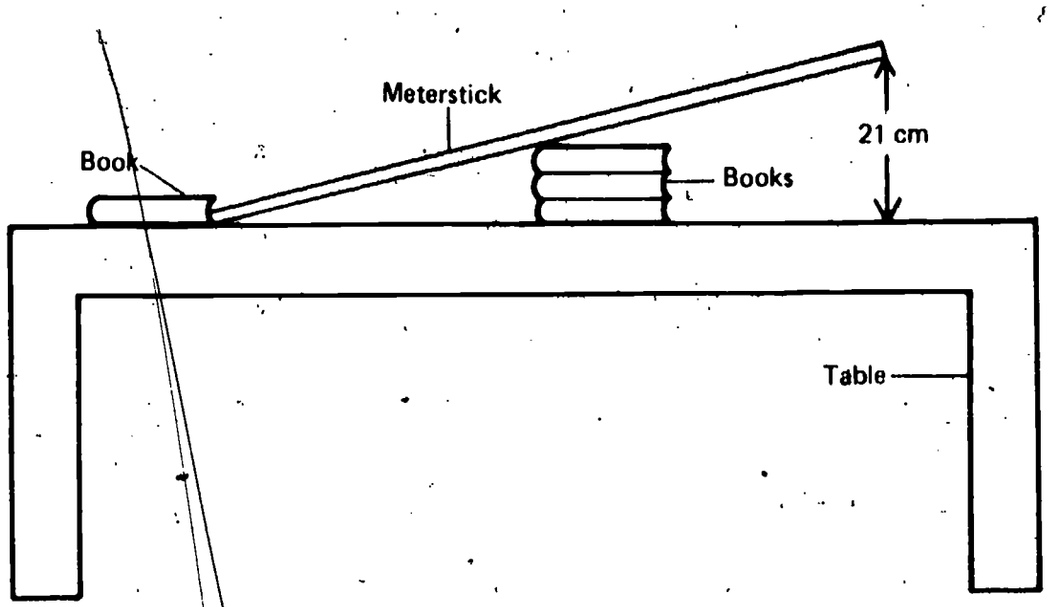
Below are four statements. Some of them are observations, and some are not. List the letter of each statement which is not directly observable in the diagram.



a. Four reversals are recorded in the rocks shown in the diagram.
b. The rocks farther from the ridge are older than those near it.
c. The sea floor is spreading away from the ridge.
d. The ridge axis appears to bisect the magnetic lines.

Get a meterstick, and put several books under one end of it to make the distance between the table and the stick 21 cm at the high end. Keep the other end of the meterstick steady with a book, as shown in the diagram below. Get a clinometer, and measure the dip angle of the meterstick.

CP
02-Core-1A



The five statements listed below refer to cutout block CP-02-Core-2. Get the block from your teacher. The key for the block is given below.

CP
02-Core-2A

KEY	
Symbol	Rock
	sandstone
	shale
	conglomerate
	shale-sandstone

On your answer sheet, write the number of each statement, and after it indicate whether it is an observation or an interpretation. Then, after each statement you labeled as an interpretation, state the observation on which that interpretation is based.

1. There are four rock layers in the section.
2. The sandstone layer is the youngest.
3. The conglomerate layers were formed during a time when conditions changed.
4. The rocks are tilted approximately 30°.
5. The rocks were uplifted and tilted after formation.

CP 02-Core-3A

Get rock F from the CP Rock Check Kit and a hand lens.

1. Does this rock have interlocking or noninterlocking texture?
2. Give your reason for your answer.

CP 02-Core-4A

Get rock I from the CP Rock Check Kit and a hand lens.

1. Does the rock have interlocking or noninterlocking texture?
2. What evidence led to your decision?

CP 02-Core-5A

Get rock H from the CP Rock Check Kit and a hand lens and a steel nail. Open your textbook to Table 1 on page 47.

1. Is the rock sample igneous, sedimentary, or metamorphic?
2. Explain the reason for your answer.

CP 02-Core-6A

Which of the characteristics below are important in describing a rock's texture?

a. Cement visible
b. Interlocking grains
c. Grain size
d. Random grains
e. All of these
f. None of these

CP 02-Core-7A

Get rock A from the CP Rock Check Kit. It's a sample of igneous rock. Observe its texture and appearance.

1. Under what conditions was the rock formed?
2. Where in or on the earth's crust might this occur?

CP 02-Core-8A

Select the letter of the mountain type which has the characteristics of a faulted mountain.

MOUNTAIN TYPE	LOCATION	CHIEF ROCK TYPE	SHAPE
a.	scarp and basin regions	marine sediments; may be metamorphic	long and wedge-shaped
b.	earthquake and geyser zones	surface-cooled igneous	round, cone-shaped
c.	isolated on plains	deep-cooled igneous or metamorphic	round, dome-shaped
d.	valley and ridge regions	marine sediments, may be metamorphic	groups of long, symmetrical, parallel slopes

Get rock samples E, H, J, and L from the CP Rock Check Kit. Below is a list of environments in which the samples may have formed. Write the letter of the rock sample after the number of the environment in which you think it was formed.

CP
02-Core-9A

Environments

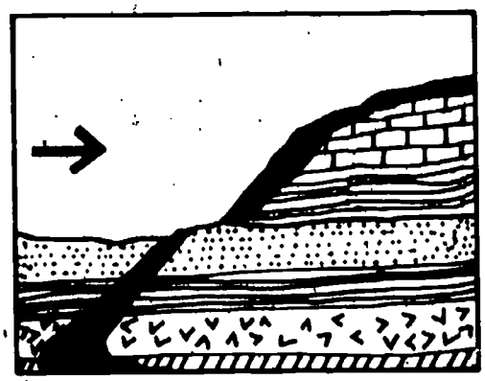
1. In a pool of molten rock deep within the crust
2. In solid rock of the crust, under pressure
3. In an ocean basin
4. From the flow of volcanic material

Recall what you know about Death Valley and look at Figure 2-7 on page 36.

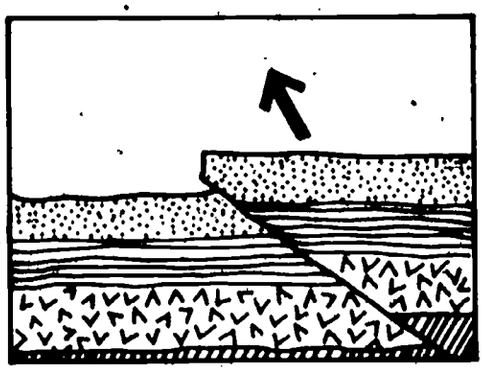
CP
02-Core-10A

1. Which diagram below shows the probable way Death Valley was formed?
2. Give two pieces of evidence for your choice.

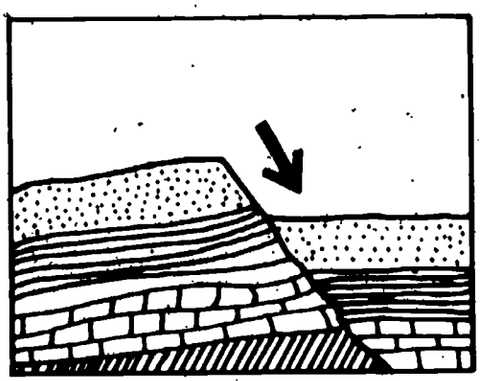
a.



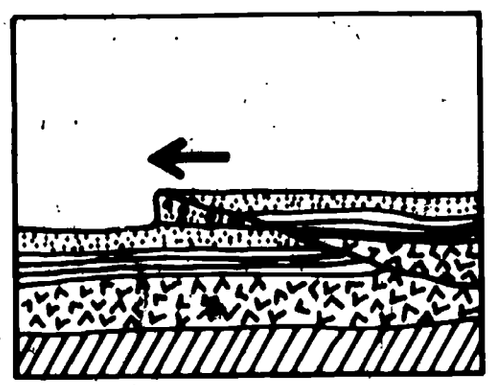
b.



c.



d.



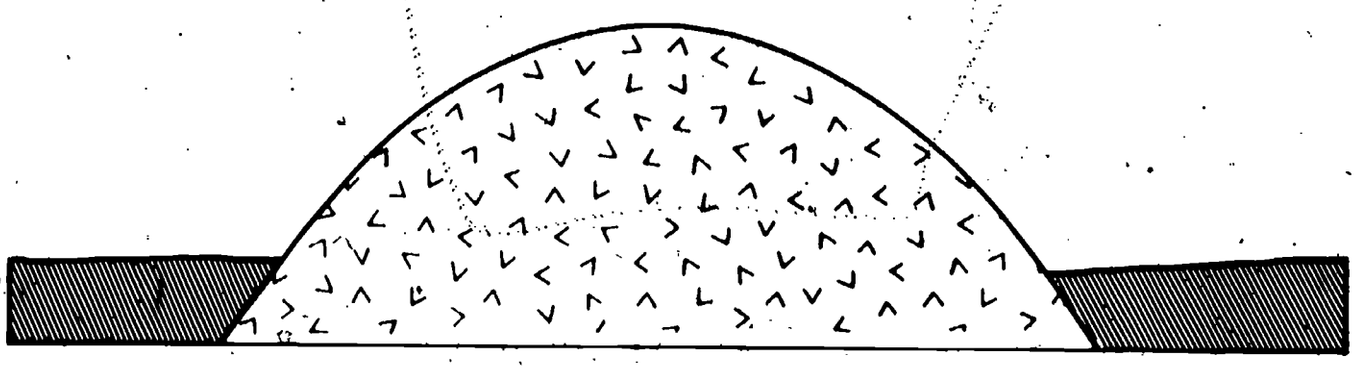
CP
02-Core-11A

Write the letter of the mountain type which has the characteristics of an erosional mountain. Erosional mountains form when softer surrounding materials erode away.

MOUNTAIN TYPE	LOCATION	CHIEF ROCK TYPE	SHAPE
a.	valley and ridge regions	marine sediments, may be metamorphic	groups of long, symmetric, parallel slopes
b.	scarp and basin regions	marine sediments, may be metamorphic	long and wedge-shaped
c.	earthquake and geyser zones	surface-cooled igneous	round, cone-shaped
d.	isolated on plains	deep-cooled igneous or metamorphic	round, dome-shaped

CP
02-Core-12A

Get rock G from the CP Rock Check Kit. Below is a cross section of a mountain. Rock sample G is like the rock found in the mountain. Explain what the rock sample and the shape of the mountain tell about how the mountain was formed.



CP
02-Core-13A

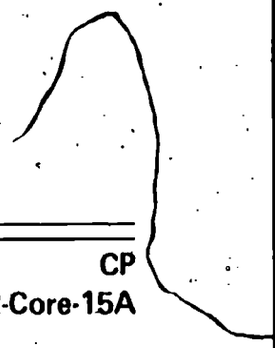
In the table below, four types of mountains are described. Write the letter of the mountain type which has the characteristics of folded mountains.

MOUNTAIN TYPE	LOCATION	CHIEF ROCK TYPE	SHAPE
a.	scarp and basin regions	marine sediments, may be metamorphic	long and wedge-shaped
b.	valley and ridge regions	marine sediments, may be metamorphic	groups of long, symmetric, parallel slopes
c.	earthquake and geyser zones	surface-cooled igneous	round, cone-shaped
d.	isolated on plains	deep-cooled igneous or metamorphic	round, dome-shaped

Write the letter of the mountain type which has the characteristics of an old volcanic crater.

CP
02-Core-14A

MOUNTAIN TYPE	LOCATION	CHIEF ROCK TYPE	SHAPE
a.	scarp and basin regions	marine sediments, may be metamorphic	long and wedge-shaped
b.	earthquake and geyser zones	surface-cooled igneous	round, cone-shaped
c.	isolated on plains	deep-cooled igneous or metamorphic	round, dome-shaped
d.	valley and ridge regions	marine sediments, may be metamorphic	groups of long, symmetric, parallel slopes



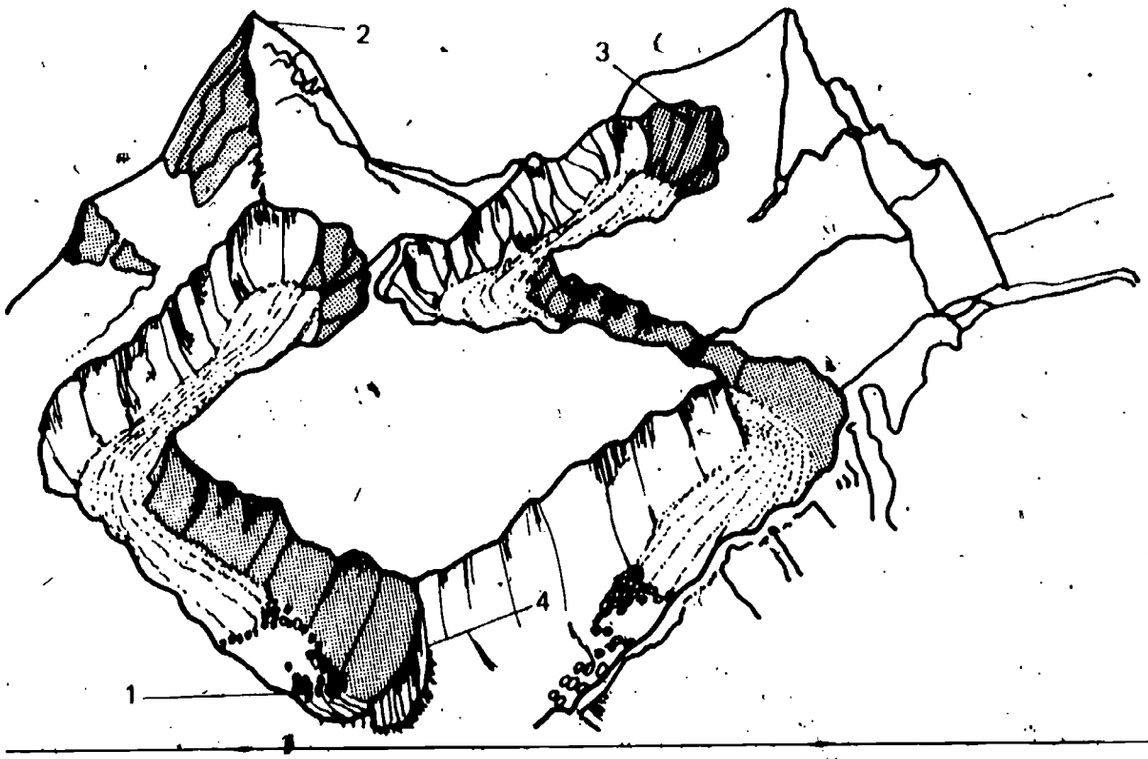
Write the letters of any erosional features listed below which were formed by glacial action.

CP
02-Core-15A

a. Cirque
b. Sill
c. Horn
d. Rock groove
e. Gully

Examine the diagram below. Four features have been indicated by numbers. Which of these features do you think are depositional and which erosional?

CP
02-Core-16A



CP 02-Core-17A

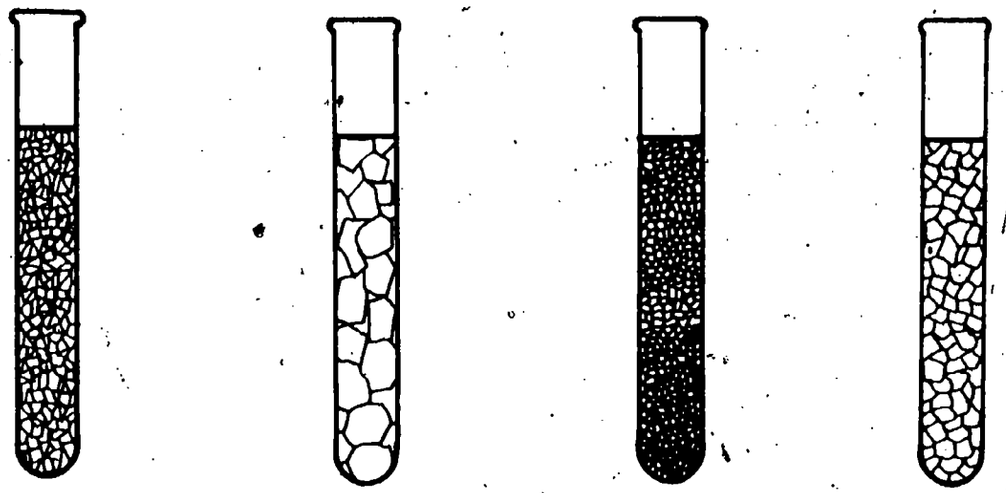
Examine cutout block CP-02-Core-17, showing several layers of sedimentary rock. Explain a process that would cause the rocks to become deformed as they are in the cutout block.

CP 02-Res 5-1A

Get rock samples C, E, and I from the CP Rock Check Kit. Also get a hand lens, a steel nail, and dilute HCl. Open your textbook to the rock test key on pages 45 through 47. Write the letter of each sample, and state if it is igneous, sedimentary or metamorphic.

CP 02-Res 6-1A

The four test tubes shown below contain the same substance which was cooled from a liquid to a solid at different rates. On your answer sheet, list the numbers of the test tubes in the order of the rate from slowest to fastest at which the substance in each was cooled.



CP 02-Res 6-2A

Get a hand lens and, from the CP Rock Check Kit, samples A, C, and L. These are three igneous rocks. Each one cooled and solidified from a molten material. Observe each rock carefully with the hand lens.

1. Using the letter on each, list the rocks in the order that you think they cooled, from fastest cooling to slowest cooling.
2. How did you decide the order?

CP 02-Res 7-1A

Examine the photograph that your teacher has labeled CP-02-Res 7-1A. How was the layer that the arrow points to formed?

CP 02-Res 7-2A

Jake poured a small amount of dilute HCl onto a rock sample. Bubbles immediately appeared.

1. Name the rock that reacts with HCl in this way.
2. What substance is the rock made of?

Ed found a rock near his home. He observed that it was composed of one kind of material, and the grains were noninterlocking. He concluded it was sedimentary. Using his "Mineral Classification Chart," he determined that the single visible component was quartz. He then applied HCl to the rock, and it began to bubble. Since quartz does not react with HCl, what would cause the HCl to bubble?

CP 02-Res 8-1A

Get cups CP-02-Res 8-2a and CP-02-Res 8-2b. Examine the sand in both cups.

1. What difference do you notice in these two samples?
2. Explain how this difference could occur in nature.

CP 02-Res 8-2A

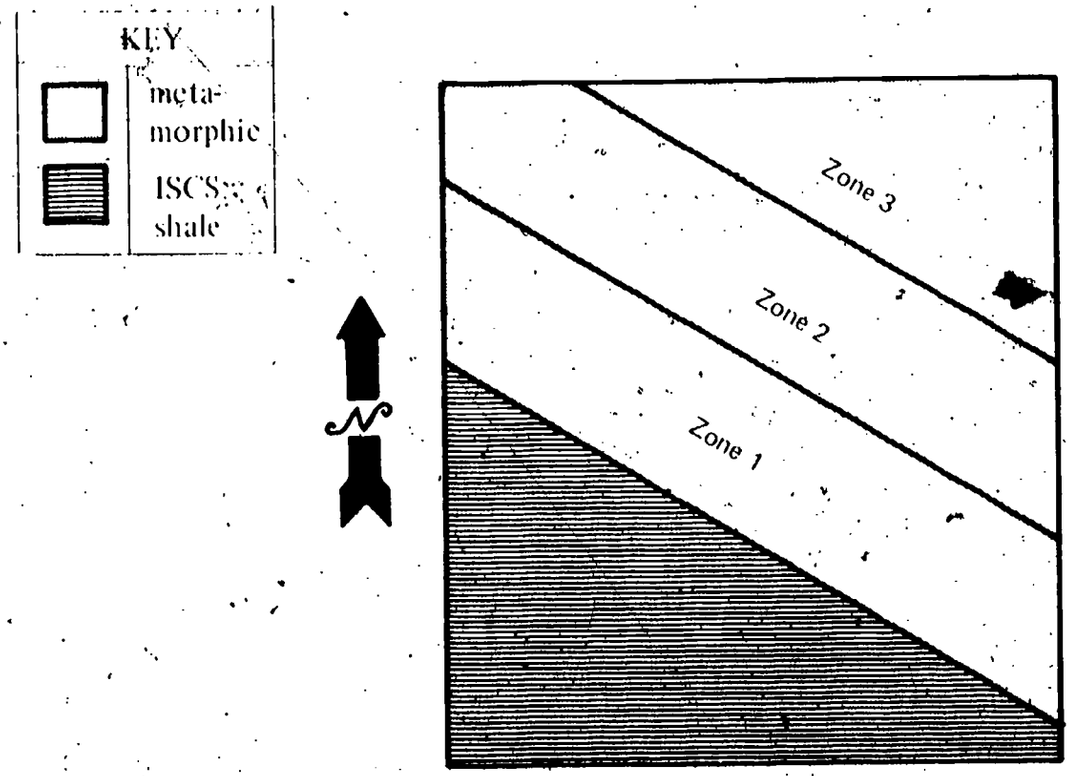
From the CP Rock Check Kit take samples K and O. Also get a hand lens and some dilute HCl.

1. Determine whether each is a sandstone, a shale, or a limestone.
2. Explain how you know.

CP 02-Res 9-1A

Get rock samples E, F, and N from the CP Rock Check Kit. The map below shows where ISCS shale and metamorphic rocks are found. Assume that the intensity of metamorphism is greatest in the northeast part of the map.

CP 02-Res 10-1A



1. In which zones would you most likely find each of the three rock samples you have been given?
2. Explain your answer.

CP 02-Res 11-1A

If you had two minerals to compare, how could you determine (define) their relative hardness?

CP 02-Res 11-2A

Get minerals b, f, and j from the CP Mineral Check Kit. Write the letter of each mineral, and after it state the kind of luster -- metallic or nonmetallic -- it has.

CP 02-Res 11-3A

Get mineral samples m, g, and e from the CP Mineral Check Kit. Study them carefully.

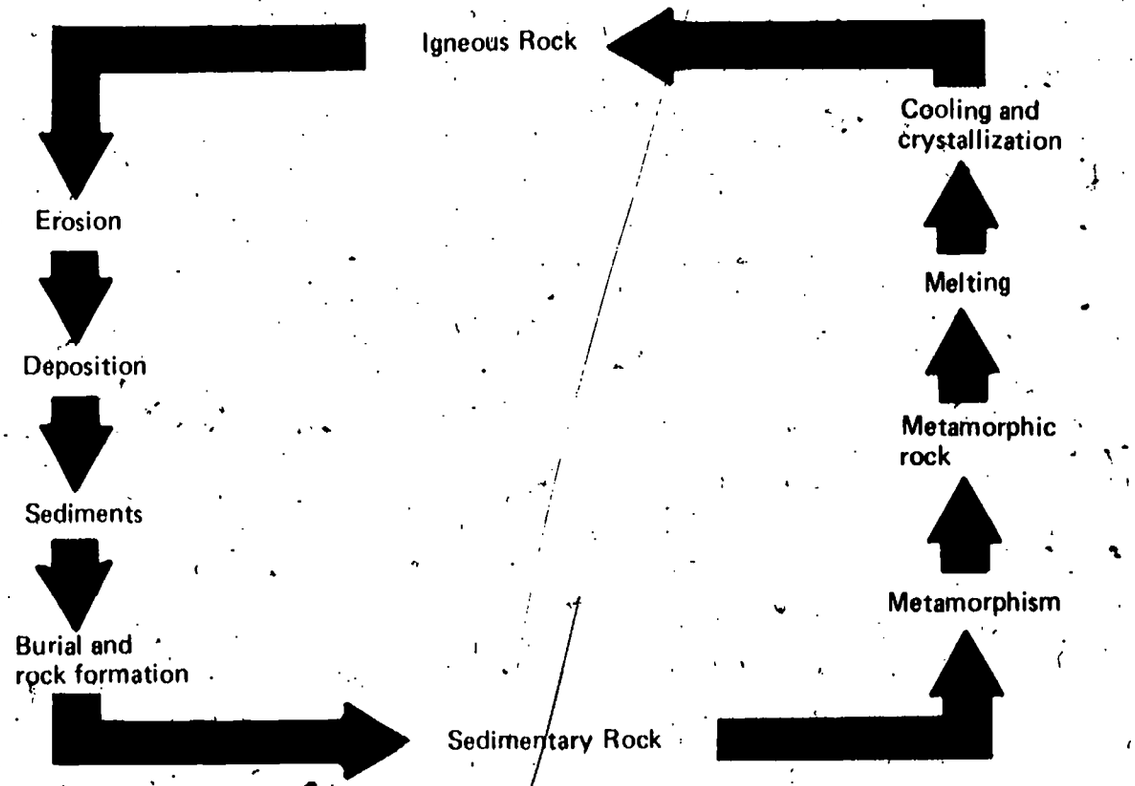
1. Write the letter of each mineral sample that shows cleavage.
2. Explain how you know.

CP 02-Res 11-4A

Get minerals e, l, and g from the CP Mineral Check Kit and a glass plate and a knife. Open your textbook to the "Mineral Classification Chart" on pages 68 and 69. Identify each mineral by writing its letter and name on your answer sheet.

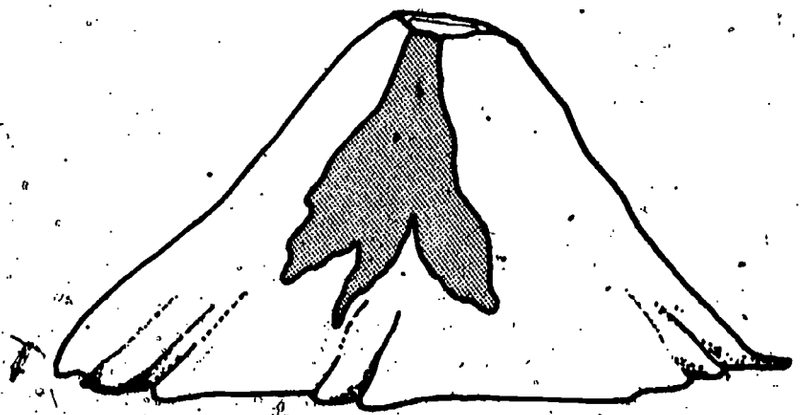
CP 02-Res 12-1A

The diagram below shows a rock cycle. In this case, the sedimentary rock after burial and rock formation is metamorphosed. Using arrows and the labels from the diagram, draw on your answer sheet another path for a sedimentary rock in the cycle.



1. How was the mountain shown in the diagram below formed?
2. What evidence supports your answer?

CP
02-Res 13-1A

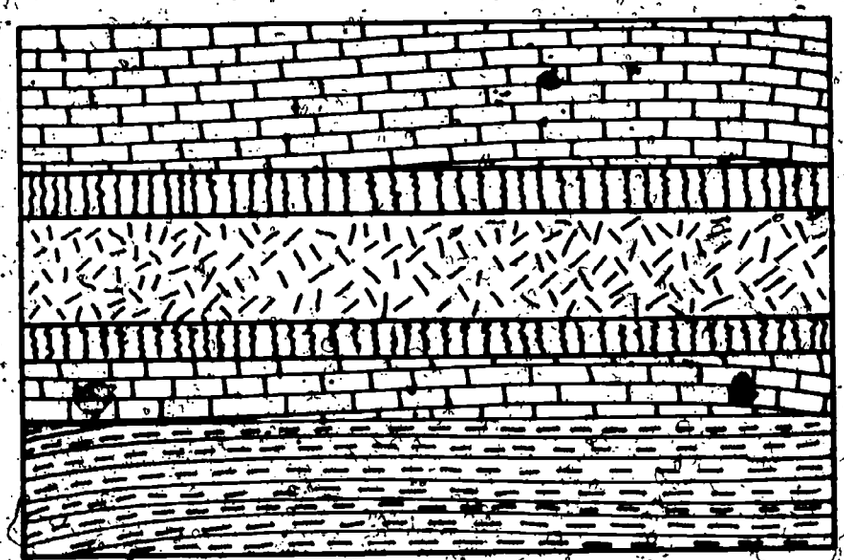


Examine the diagram below carefully.

1. Is the igneous rock an intrusion (intruded rock) or a flow?
2. How do you know?

CP
02-Res 14-1A

KEY	
Symbol	Rock Type
	sedimentary type 1
	sedimentary type 2
	igneous
	metamorphic



CP
02-Res 15-1A

Both of the igneous rocks shown in the diagrams below are intrusions.

1. Which is a sill?
2. Which is a dike?
3. Explain your answers.

KEY	
Symbol	Rock
	igneous
	shale

Diagram A

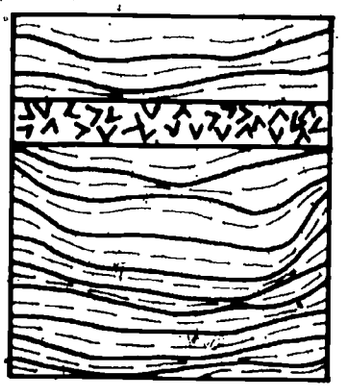
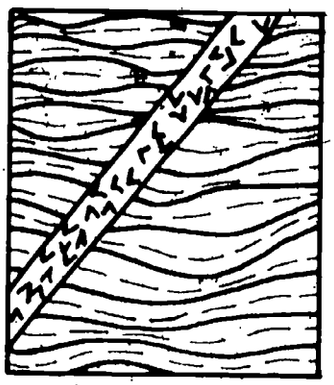


Diagram B.



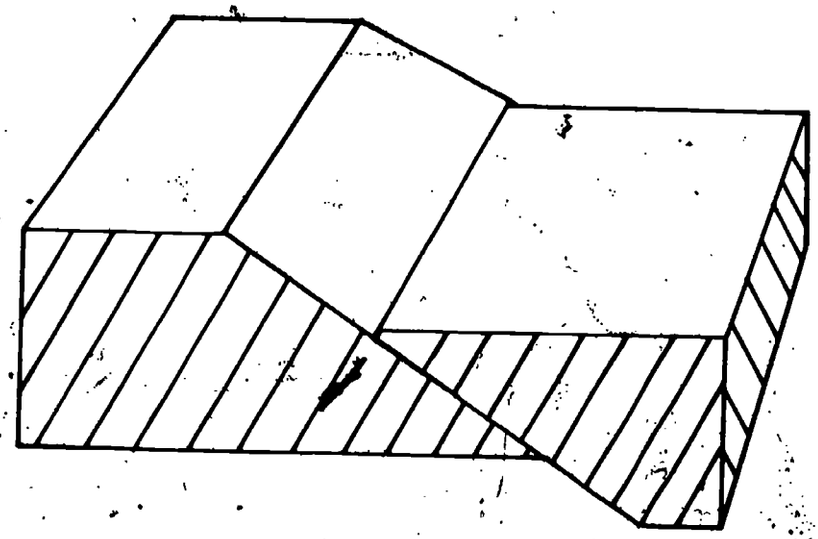
CP
02-Res 16-1A

Not all lava flows from volcanoes. Much of the lava found in the northwestern United States flowed through long cracks in the earth's surface. What is the name given to these cracks?

CP
02-Res 17-1A

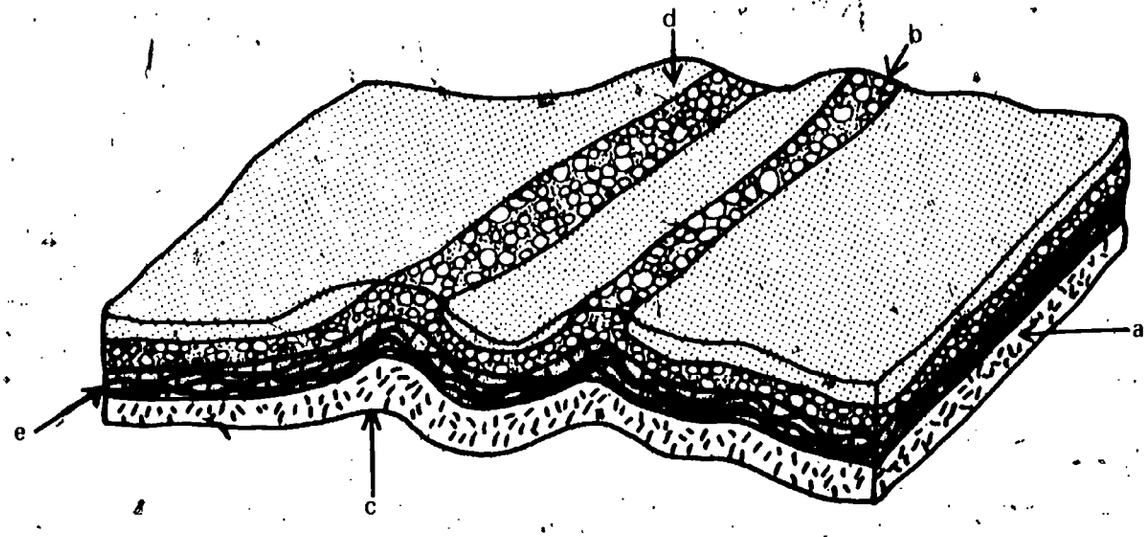
Copy the block diagram below onto your answer sheet.

1. Label the fault line.
2. Using arrows, show the possible directions the rocks could have moved along the fault.



The block diagram below illustrates rock strata that have been compressed into folds. Select the letter of the arrow which indicates the direction of the applied force that caused the rocks to fold.

CP
02-Res 18-1A



The data below concern two different mountains from different mountain chains.

1. Which one do you think is older?
2. Explain your answer.

CP
02-Res 19-1A

CHARACTERISTICS	MOUNT JOY	MOUNT HOPE
Height of peaks	12,000 feet	8,000 feet
Steepness of mountain sides	very steep	gentle slopes
Nature of valley	narrow	broad

Describe the process by which snow turns into glacial ice.

CP
02-Res 20-1A

Kathy suggested that each of the following climate conditions would always result in changing the size of a glacier.

CP
02-Res 21-1A

a. Snowfall in the winter which exceeds the loss from melting and evaporation in the summer
b. Snowfall in the winter which is exceeded by the loss from melting and evaporation in the summer
c. Snowfall in the winter which is equalled by the loss from melting and evaporation in the summer
d. Eighty inches of snowfall per year
e. One hundred inches of snowfall per year

Larry disagreed, saying that only some of those conditions would result in changes in a glacier's size. Which options would cause a glacier's size to change?

Study the list of locations below very carefully.

CP
03-Core-1A

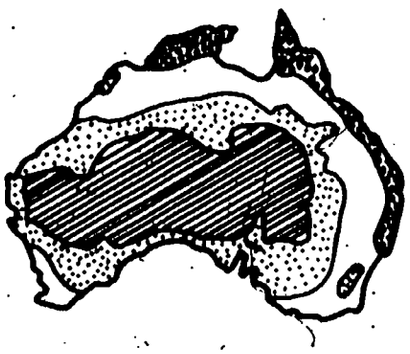
a. The southern Appalachian Mountains
b. The coastal plains of the eastern United States
c. The Mojave Desert
d. The Gulf Coast area of the U.S.

1. Which of them are likely source areas of river systems? Choose all the correct answers.
2. What are the reasons for your choices?

Get a blank map of Australia from your teacher. Study both the average precipitation map and the elevation map shown below. On the basis of these two maps, where do you think river systems originate in Australia? Indicate your selections by shading those large general areas for each location on your blank map.

CP
03-Core-2A

Average precipitation in Australia



KEY	
Symbol	Precipitation (in cm)
	0-25
	26-50
	51-100
	101-150
	151-200

Elevation map of Australia

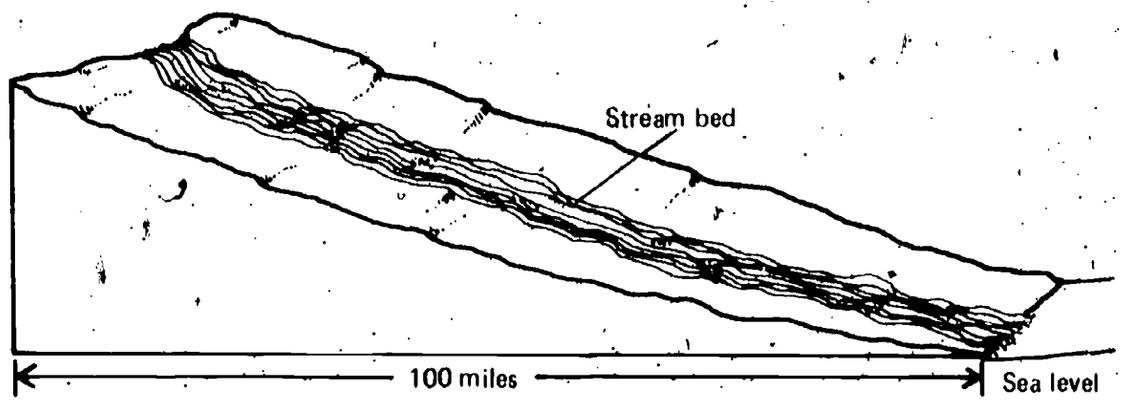
KEY	
Symbol	Elevation (in m)
	1526-2440
	611-1525
	306-610
	0-305

CP
03-Core-3A

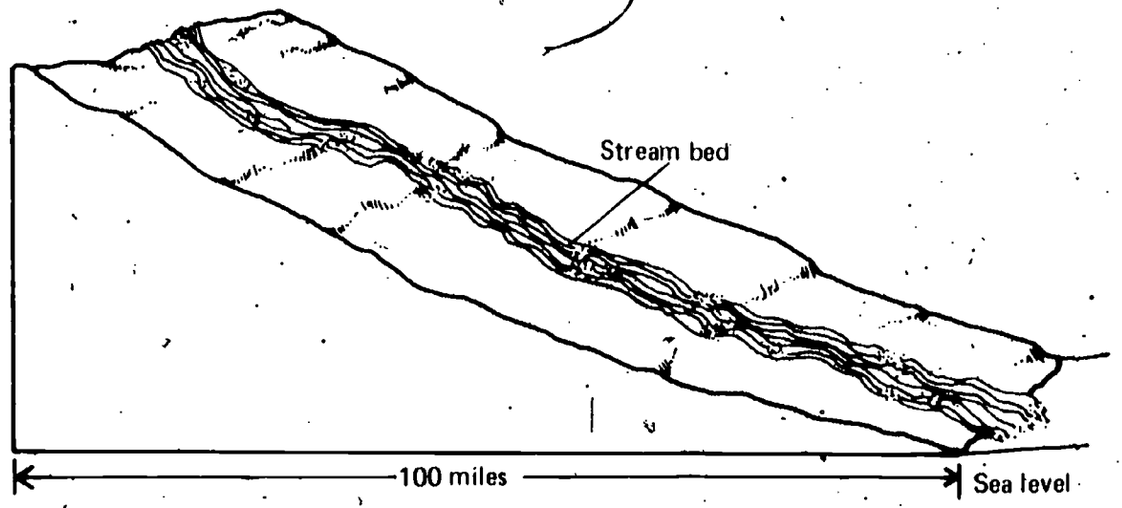
The diagrams below show the profiles of three different streams.

1. Which stream do you think has the greatest potential energy?
2. What is the basis for your selection?

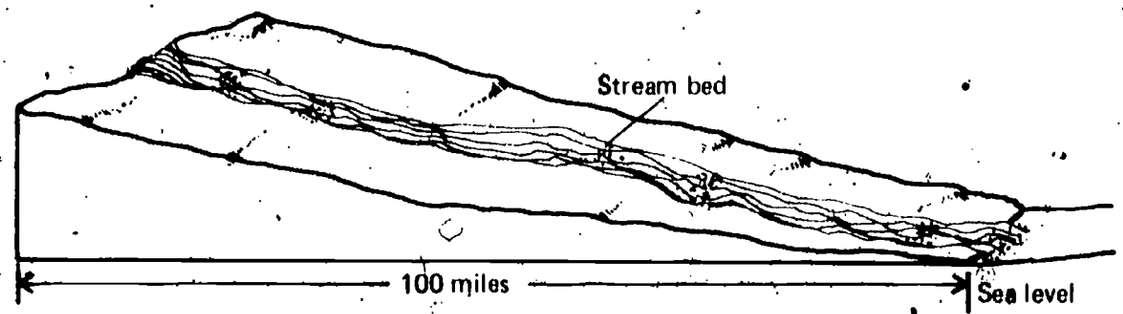
Profile a.



Profile b.



Profile c.



CP
03-Core-4A

Get a supply and two catch buckets and a 100-ml beaker from the supply area. Using these materials and a stream table, adjust the rate of flow in the stream table to 10 ml/sec without changing the slope of the table. When you think you have the correct flow, ask your teacher to check it.

CP
03-Core-5A

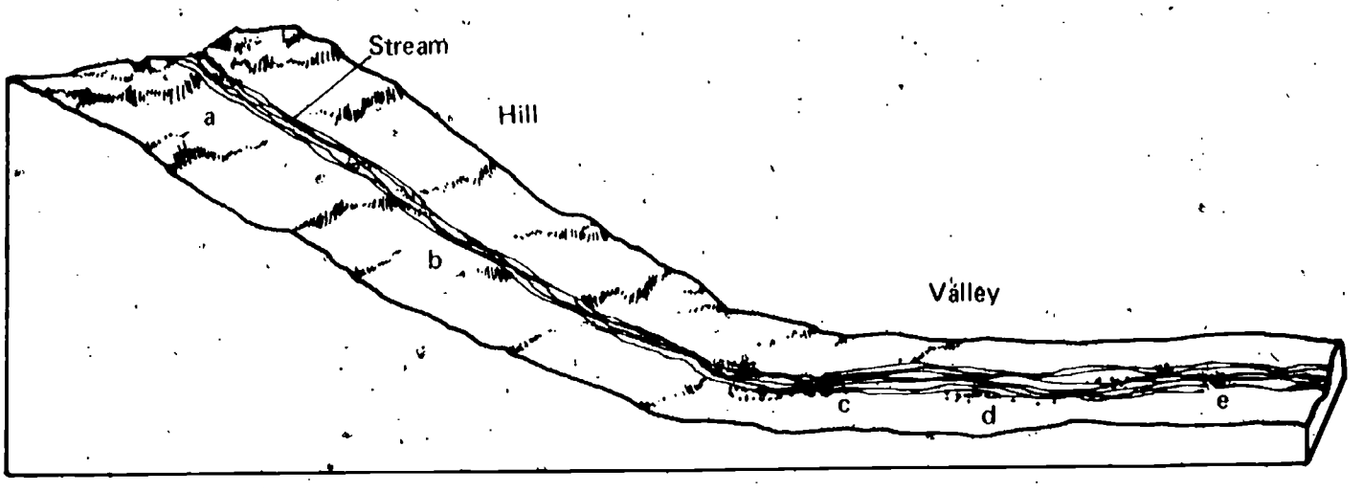
A stream table was used to determine how long it would take for 50 grams of a sand-gravel mixture to be eroded. The slope of the table was varied, but the amount of water used was the same for each trial. Study the data table below carefully. State how you think the slope of the stream table and the rate of erosion of the stream trough are related.

HEIGHT OF STREAM TABLE'S UPPER END ABOVE ITS LOWER END (in cm)	TIME TO REMOVE 50 g OF A SAND-GRAVEL MIXTURE (in sec)	
	Trial 1	Trial 2
4	26	28
8	15	18
12	7	6

CP
03-Core-6A

A stream profile is shown in the diagram below.

1. Select the letter at the location you would expect to find a deposit of gravel.
2. How do you explain the gravel at that spot?



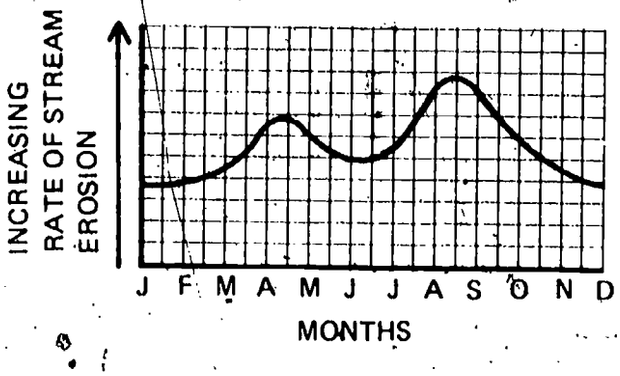
CP
03-Core-7A

Examine the following list of statements. Each describes a change or an event that could occur in some region of the United States. Write the letter of any of the changes listed below that would almost immediately increase a river's kinetic energy.

a. A severe thunderstorm
b. Increased temperatures in mountainous regions in springtime
c. Ten days of clear weather with very low temperatures
d. Removal of rocks from the river bed

CP
03-Core-8A

The graph below shows the erosion rate for one year at a bridge over the St. John's River. What variable would be the major cause for the rate of erosion to increase or decrease as shown on the graph?



CP
03-Core-9A

If you could vary the conditions of a stream as you can a stream table in the laboratory, it would change the effect of the water flow. Get a copy of the following table (CP-03-Core-9A) from your teacher. Complete each box of the table by writing + to show that the change increases the effect, – to show that it decreases the effect, and 0 to show that it has no effect.

CHANGE OR DIFFERENCE	POTENTIAL ENERGY	KINETIC ENERGY	EROSION RATE
Starts at greater height			
Smoother bed			
More water			
Less bed slope			
Harder bed			

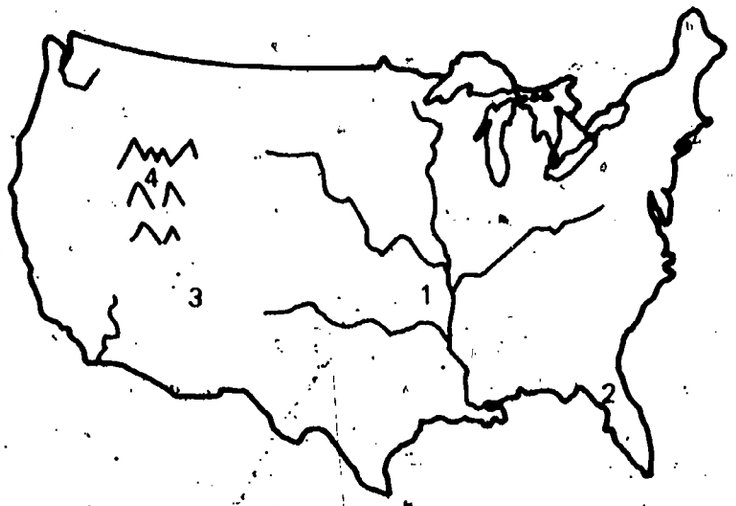
CP
03-Core-10A

Which of the following features are formed when a river's kinetic energy has been reduced? Choose all the correct answers.

a. Stream channels
b. Alluvial fans
c. Gullies
d. Sandbars
e. Potholes

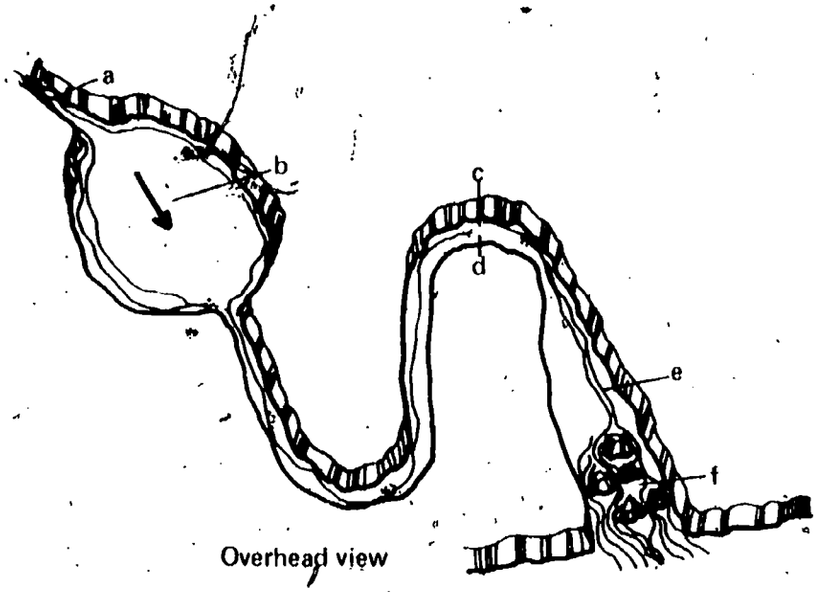
Rock and soil are eroded in different ways according to climate and geography. Erosion is often caused by flowing water, wave action, wind, and glaciers. What causes erosion at each of the four areas numbered below on the map of the United States?

CP
03-Core-11A

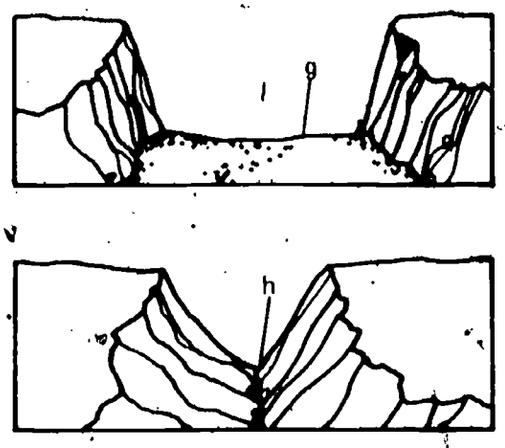


Look at the diagrams below of a river.

CP
03-Core-12A



Overhead view

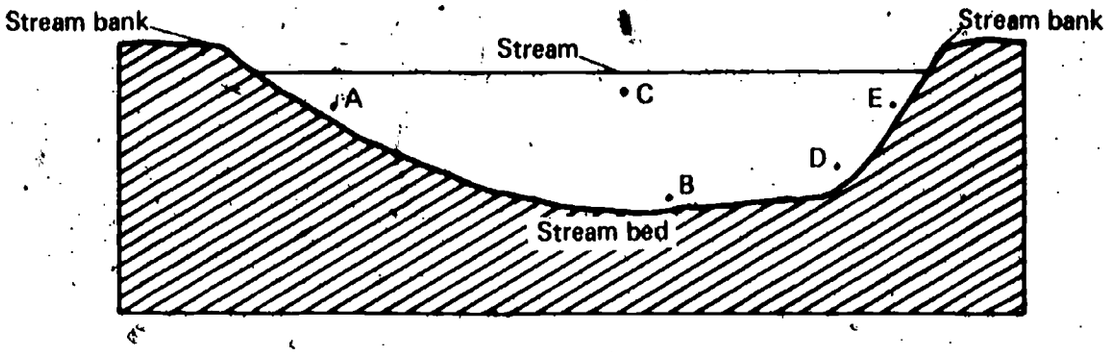


Front views

For each of the pairs of letters, select the location where the river will flow faster. Assume that all parts of the river have the same slope.

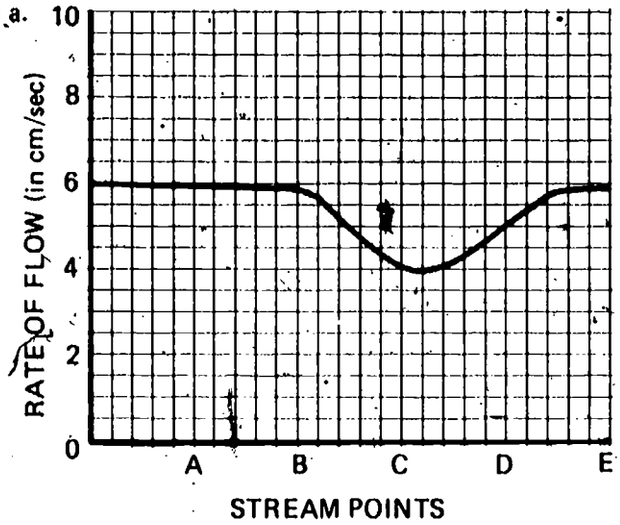
1. Location a or b
2. Location c or d
3. Location e or f
4. Location g or h

CP
03-Res 27-1A

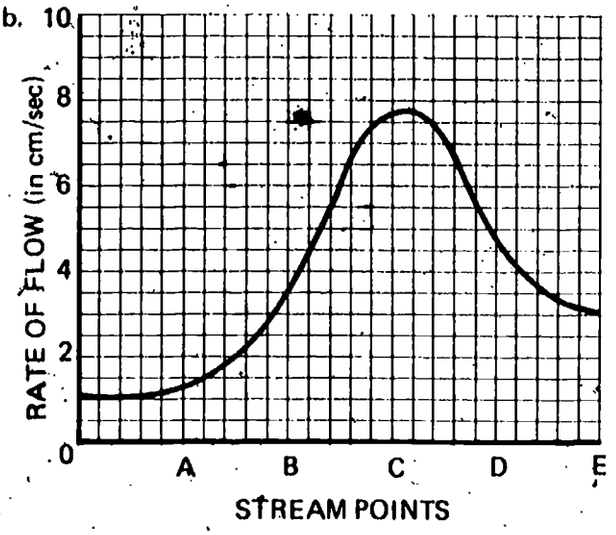


Above is a diagram of a cross section of a stream channel. Which graph below best shows the rates at which water flows at the lettered points?

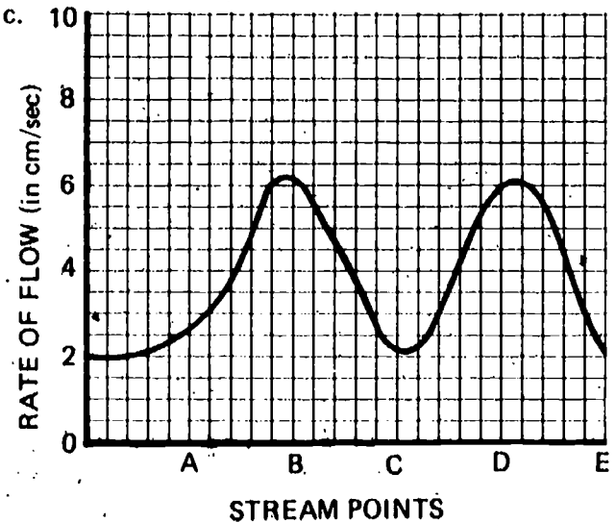
Graph a.



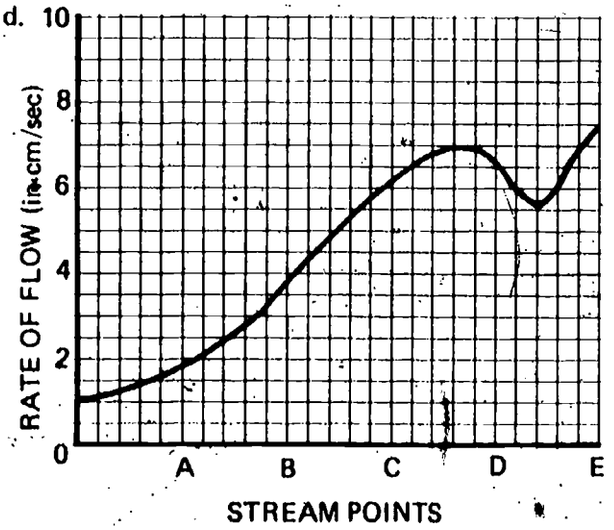
Graph b.



Graph c.



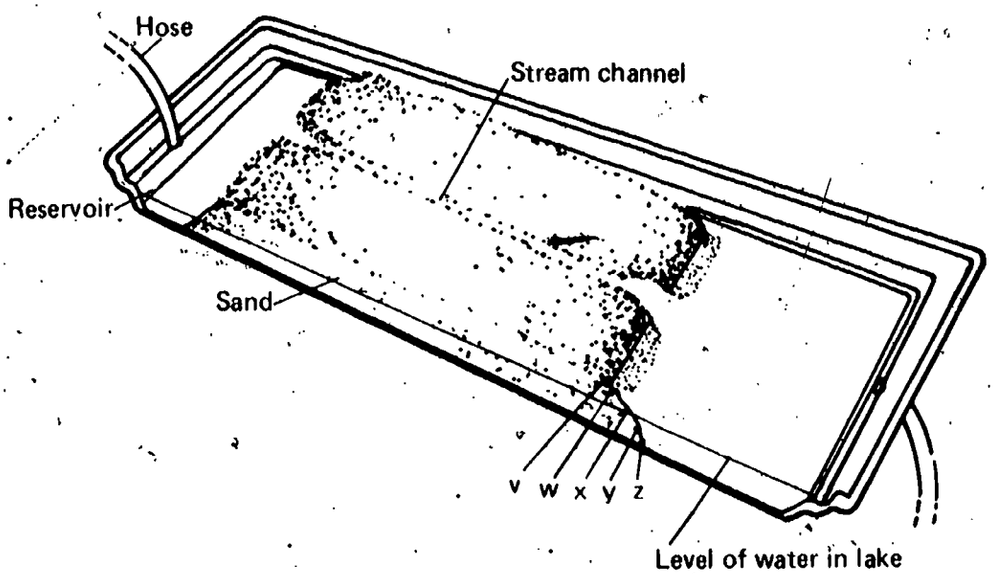
Graph d.



CP
03-Res 29-1A

The diagram below shows a stream table setup. Water will be allowed to flow at 5 ml/sec from the reservoir into the stream channel. The level of water in the lake will be kept constant.

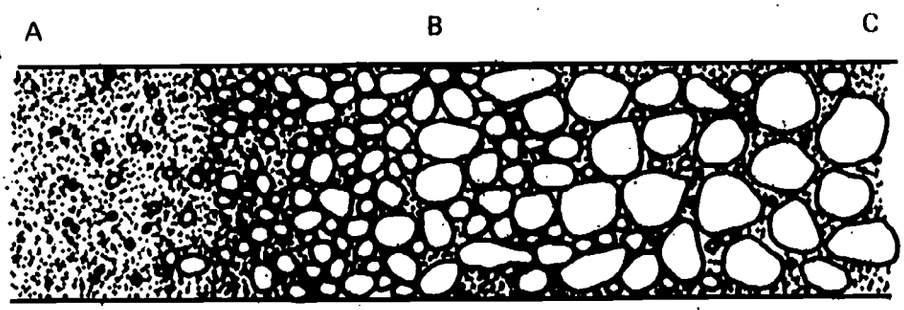
1. Select the maximum depth (v, w, x, y, or z) to which the channel will be cut.
2. Select the letter of the statement below which explains why you chose that depth.
   a. Channel depth is controlled by the bottom of the stream table.
   b. Channel depth is controlled by the rate of flow.
   c. Channel depth is controlled by the level of the lake.
   d. Channel depth is controlled by time.



CP
03-Res 32-1A

The diagram below shows a lengthwise section of the river bottom in a delta.

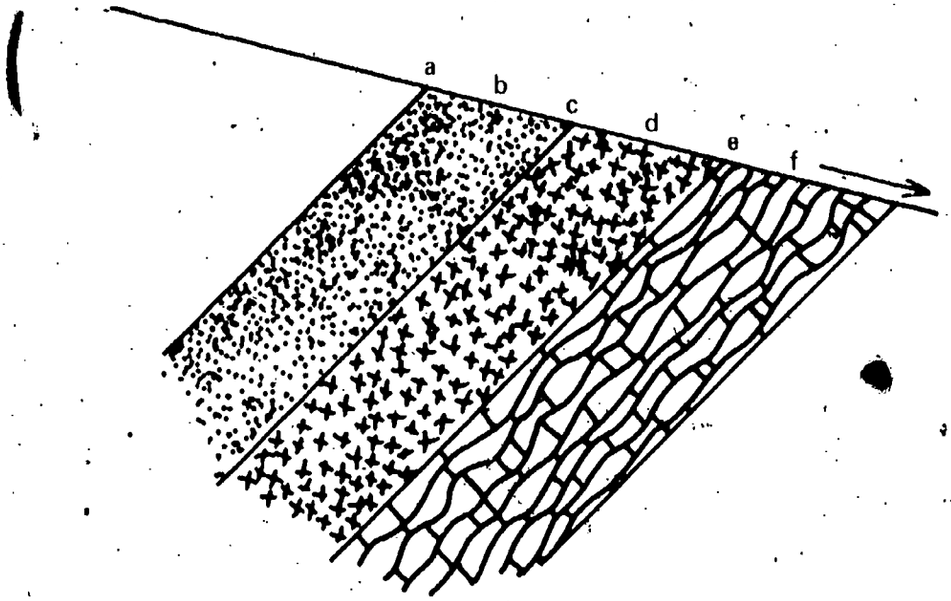
1. Did the river flow from A to B to C at the time of deposition?
2. Explain your answer.



CP
03-Res 33-1A

Study the diagram of the stream bed and its key below. The arrow shows the direction the water flows.

1. Write the letter of any place where a waterfall could form.
2. State the reason for your choice.

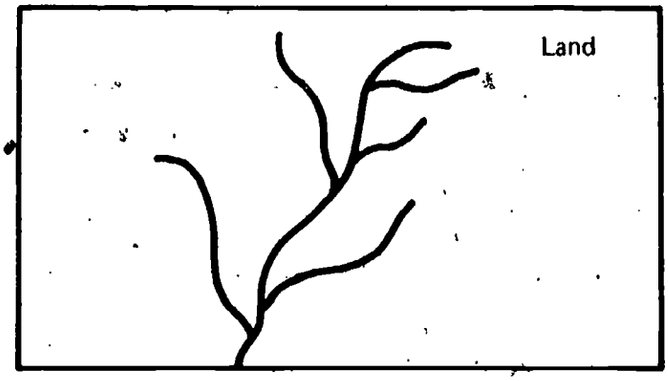


KEY	
Symbol	Rock
	sandstone
	granite
	limestone

CP
03-Res 34-1A

The map below shows the paths of several gullies. Copy this map onto your answer sheet or use the one provided by your teacher.

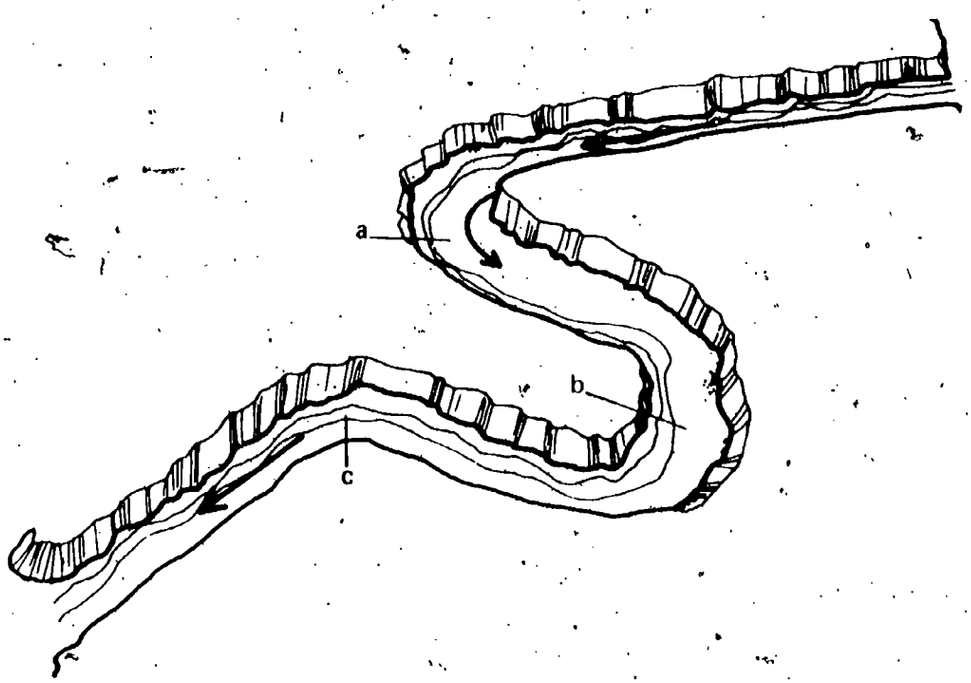
1. Use an arrow labeled *flow* to show the direction that water flows in one of the gullies.
2. Use an arrow labeled *growth* to show the direction in which one of the gullies will tend to grow.



The diagram below shows the path of a river and three lettered points along its course. Arrows mark the direction the water flows.

CP
03-Res 36-1A

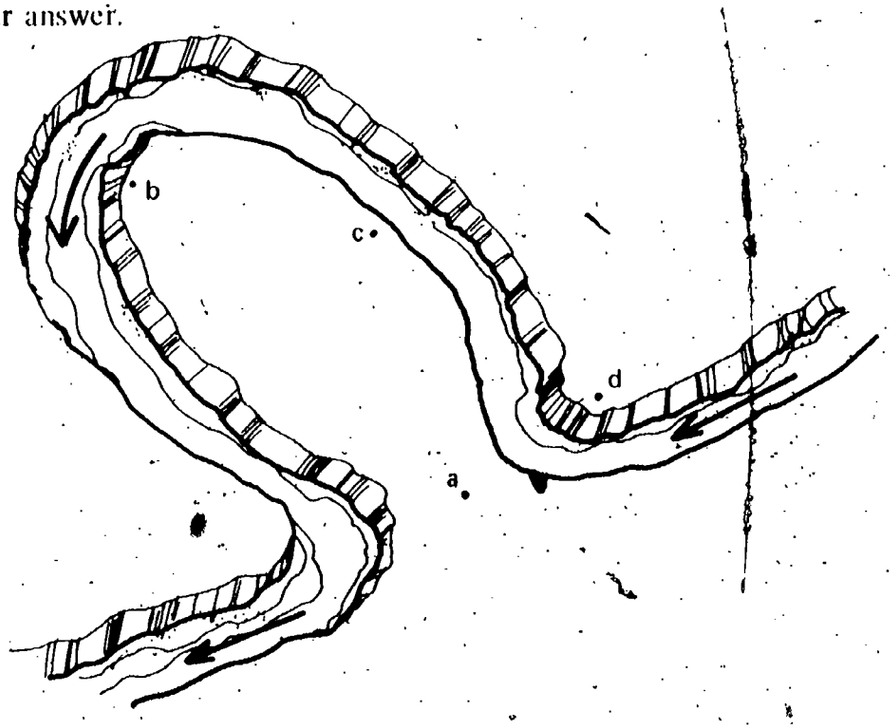
1. At which points is erosion likely to occur?
2. At which points is deposition likely to occur?
3. State the reason for your choices.



A section of a meandering stream is shown below.

CP
03-Res 36-2A

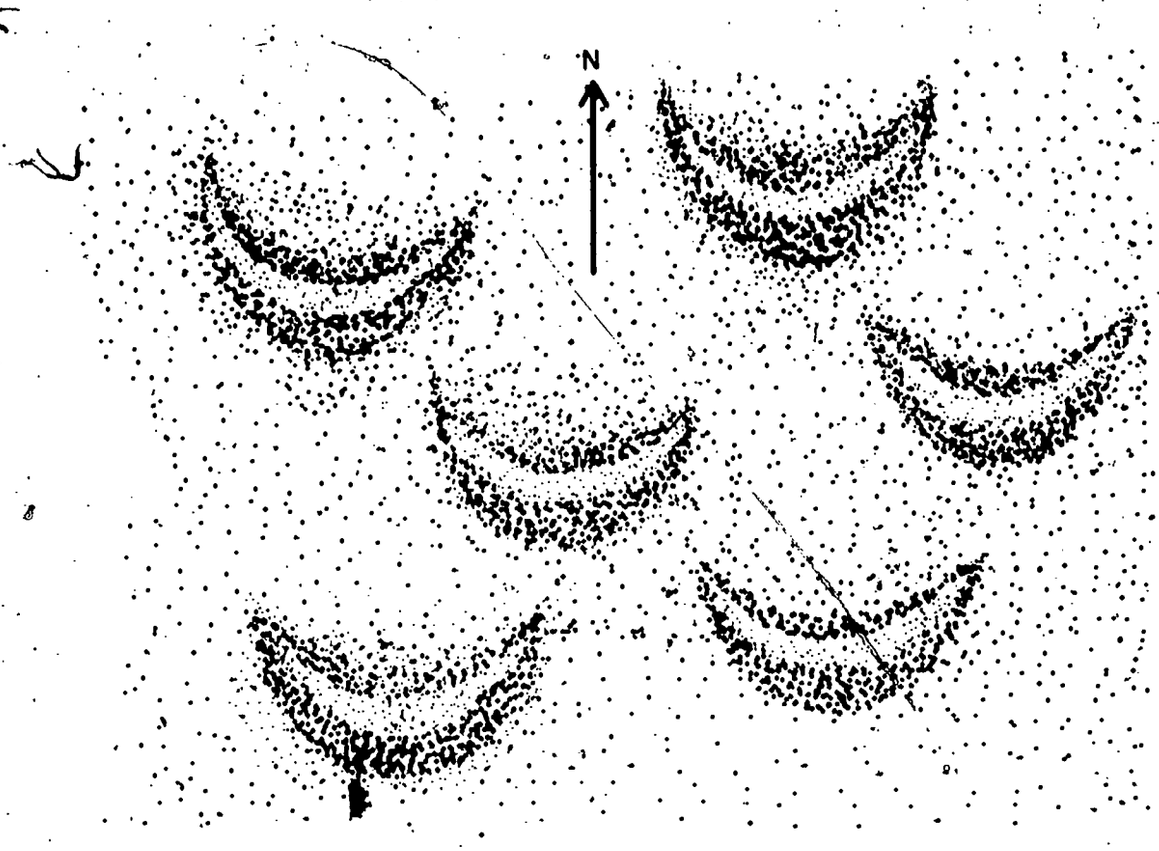
1. As the stream erodes the land surface, which of the four areas indicated by letters would be eroded first?
2. Explain the reason for your answer.



CP
03-Res 37-1A

The features on the map below are sand dunes.

1. What is the direction of the prevailing winds in this area?
2. How can you tell from the map?



Study the two diagrams below. CP 04-Core-1A

1. Which diagram represents a shoreline which is the result of high-energy waves attacking the beach?
2. What evidence supports your answer?

Diagram a.

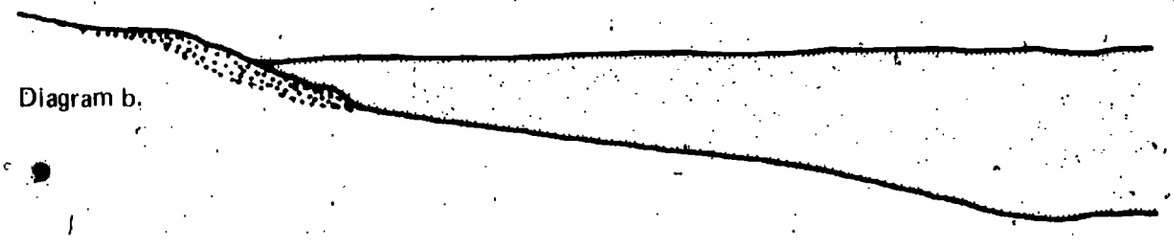
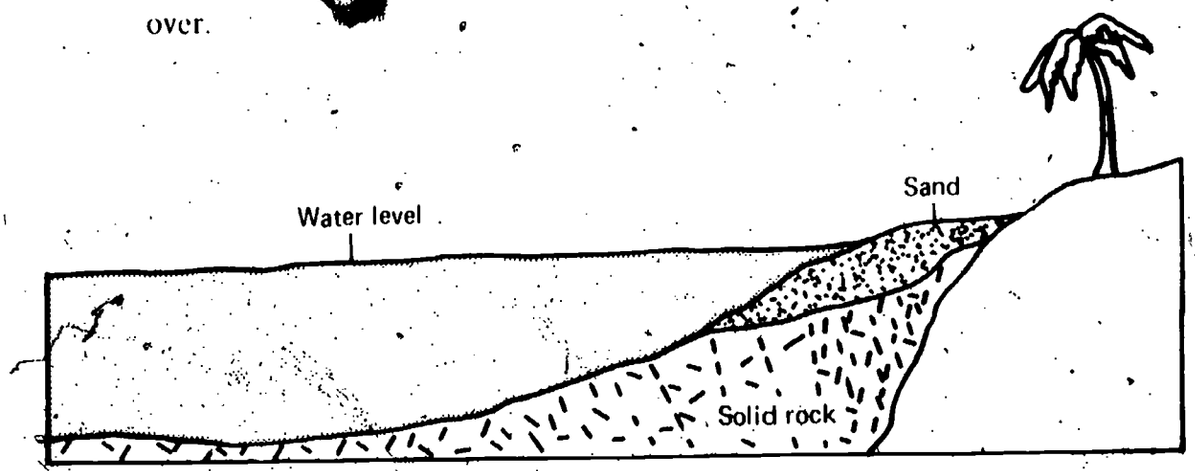


Diagram b.

The diagram below shows a shoreline with a sand beach and the water level at low tide. Suppose a severe hurricane with high winds and waves pounded against the beach for four hours. CP 04-Core-2A

1. What do you think would happen to this beach and its sand?
2. Include a [illegible]m on your answer sheet of the area after the hurricane is over.



Study the three changes along a shoreline listed below. For each change, state whether it is evidence of high-energy wave action or low-energy wave action. CP 04-Core-3A

1. Gravel and solid rock exposed where sand was once located
2. Accumulation of sand offshore, a bench
3. Gravel and solid rock covered by sand

CP
04-Core-4A

Diagram A below shows a stream table set up to produce waves. Diagram B shows the stream table after the waves ceased.

1. How were these waves produced in the stream table?
2. What is an important variable in the formation of the beach?

Diagram A.

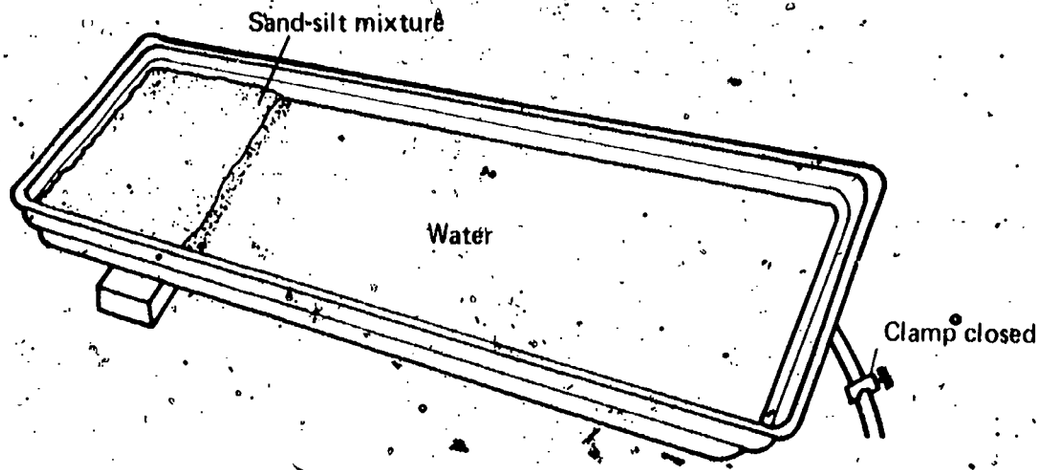
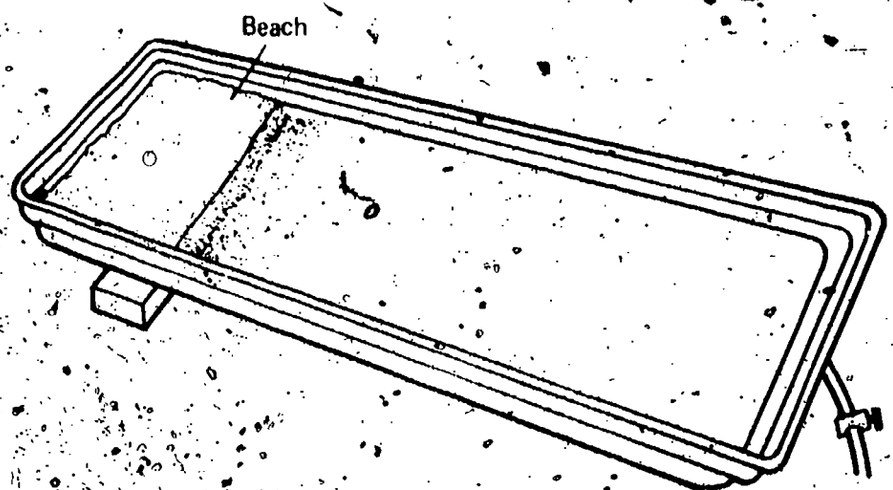


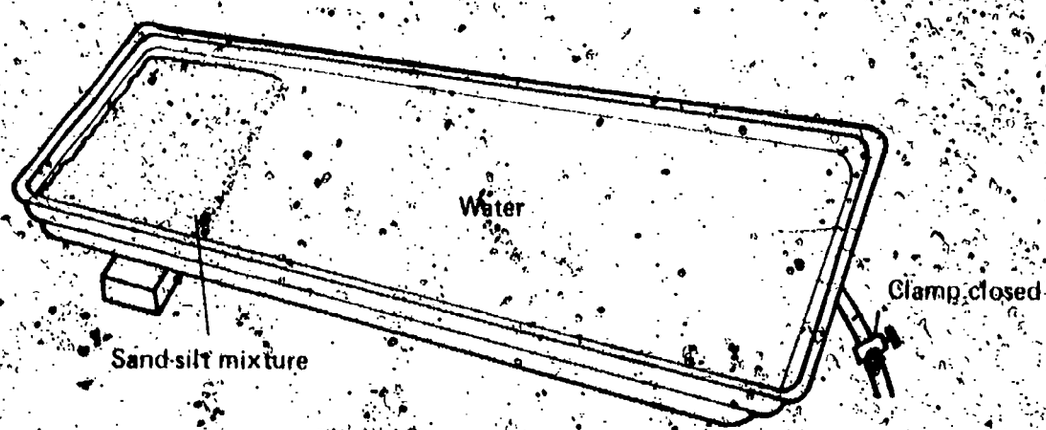
Diagram B.



CP
04-Core-5A

Set up a stream table as shown below. Secure any additional equipment you may need.

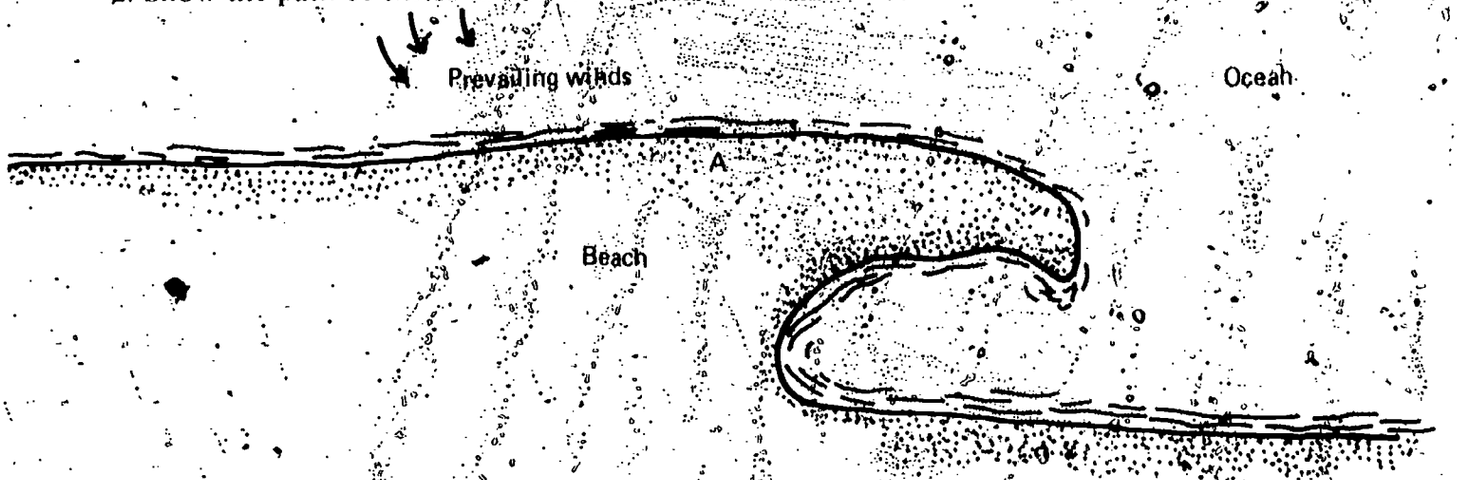
1. Produce waves that will result in the production of a sand bench. Show your teacher how you do this.
2. What important variable is needed to produce the sand bench?



Copy the diagram below, or get a copy of it from your teacher. Suppose waves erode sand at point A.

CP
04-Core-6A

1. Shade in the place most of the sand is likely to be deposited.
2. Show the path of the sand with arrows.



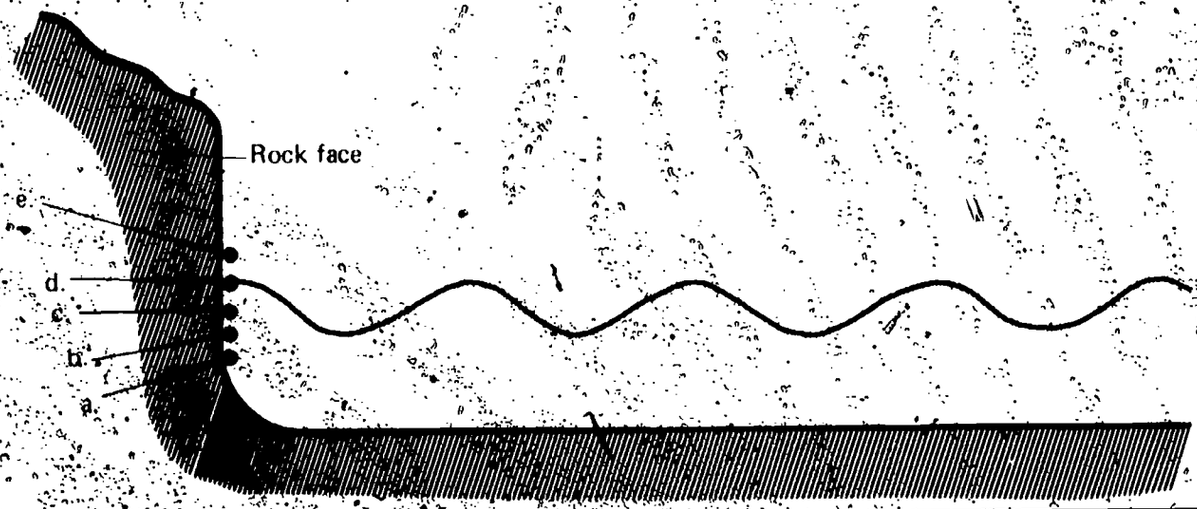
Tracy Arm, a fiord in Alaska, looks like a lake between two mountains. The Hudson River on the East Coast of the United States is an estuary. What is the difference between a fiord and an estuary?

CP
04-Core-7A

The diagram below shows waves hitting a rocky coastline.

CP
04-Res 38-1A

1. Where will erosion of the rock face by these waves be greatest?
2. Explain your answer.



The following are features that are formed along shorelines. Select any of the features which are commonly associated with rocky or steeply inclined shorelines.

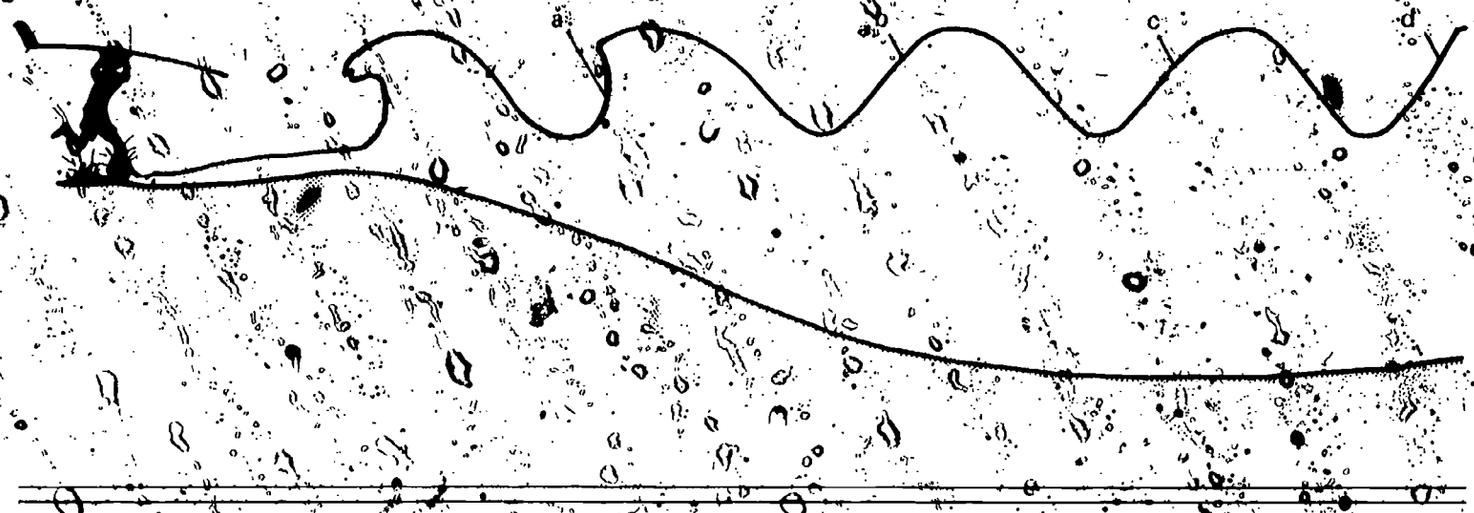
CP
04-Res 38-2A

a. Spits
b. Arches
c. Deltas
d. Caves
e. Benches

CP
04-Res 39-1A

Suppose you were the surfer in the diagram below.

1. At which of the four lettered spots should you begin to ride the waves to get the best ride?
2. Explain your choice, and indicate why you did not select the other waves.



CP
04-Res 40-1A

Study the three diagrams below of ocean waves approaching different shorelines.

1. Write the letter of any diagram which shows conditions for the bending of waves by refraction.
2. Write the letter of any diagram which shows conditions for the bending of waves by diffraction.
3. Explain your answers to parts 1 and 2.

Diagram a

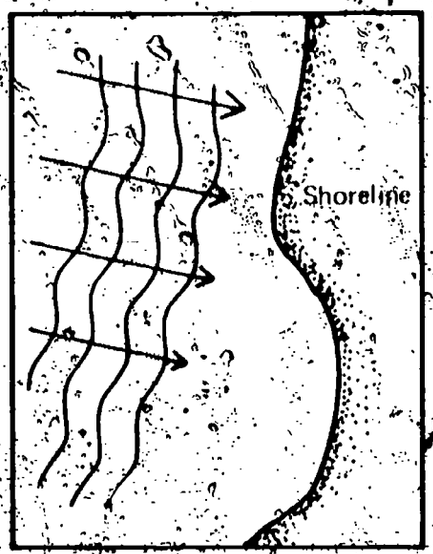


Diagram b

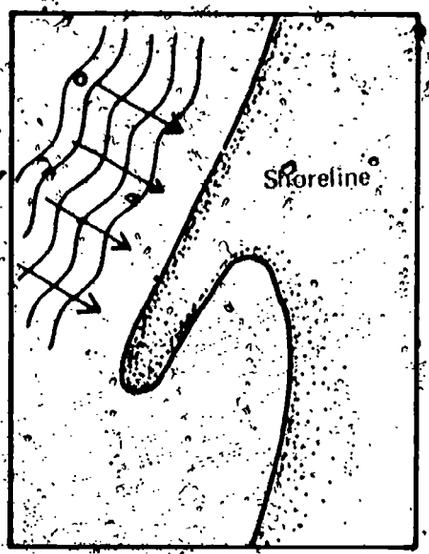
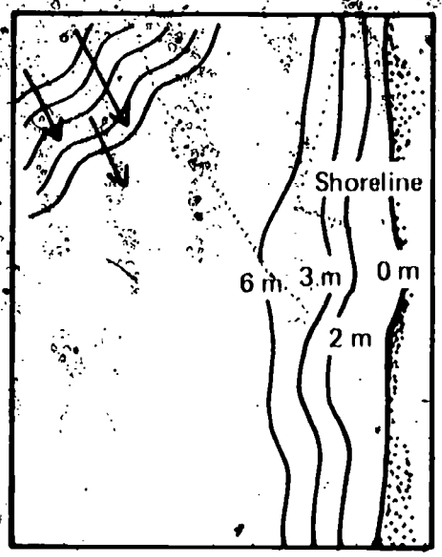


Diagram c



Copy the diagrams below, or get copies of them from your teacher. Diagram 1 shows wave fronts approaching a bay. Diagram 2 shows wave fronts approaching a headland. Draw more wave fronts on each diagram to show any probable changes in the shape of the fronts as they move shoreward.

CP
04-Res 40-2A

Diagram 1.

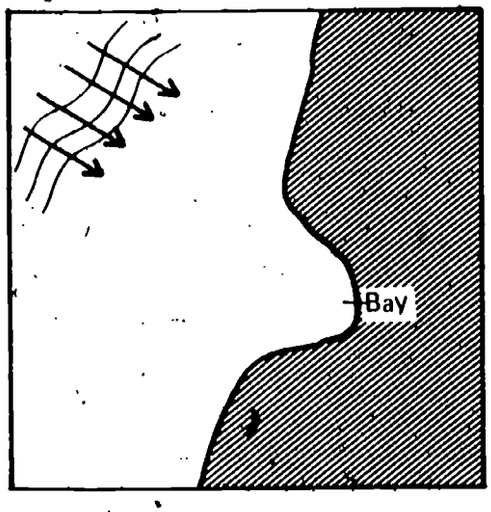
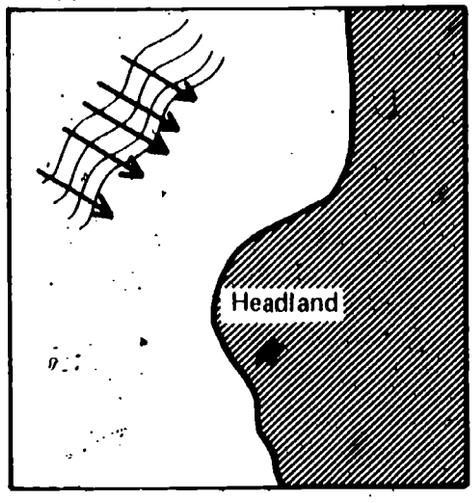


Diagram 2.



Copy the diagrams below, or get copies of them from your teacher. Diagram 1 shows wave fronts approaching an opening between two barriers. Diagram 2 shows wave fronts approaching a single barrier. Draw more wave fronts toward the land to show any probable changes in their direction as they move shoreward past the barriers.

CP
04-Res 40-3A

Diagram 1.

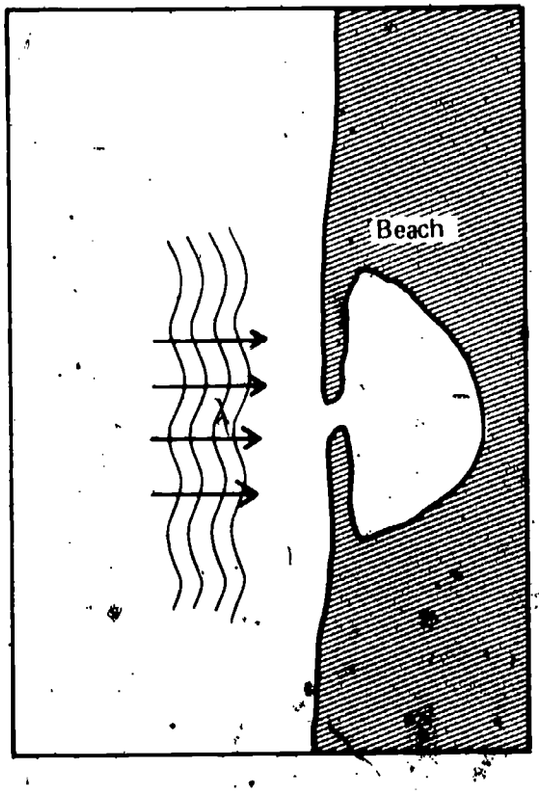
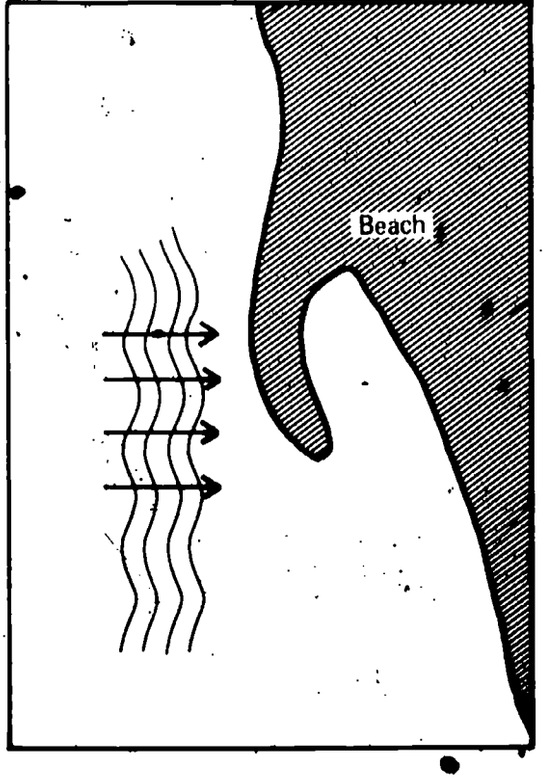


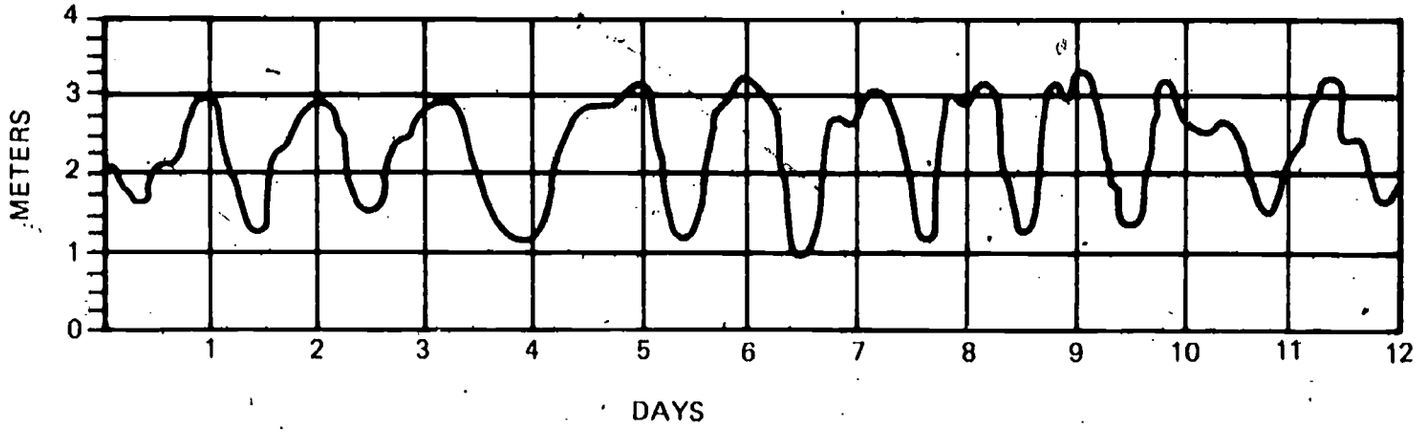
Diagram 2.



CP
04-Res 42-1A

The graph below shows the tidal record for 12 days at a tide gauging station.

1. What would you estimate the mean sea level to be at this station? (Estimate it; do not calculate it.)
2. Which group of readings did you consider to estimate the mean sea level?



CP
04-Res 43-1A

Which diagram below shows the relationship among the earth, the moon, and the sun which would cause the highest tides on the earth?

Diagram a.

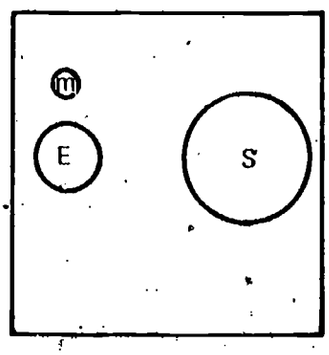


Diagram b.

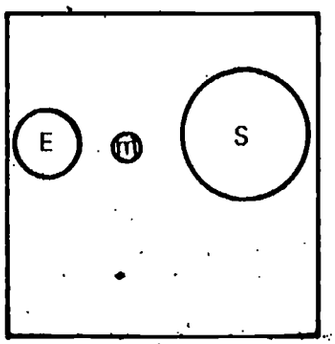
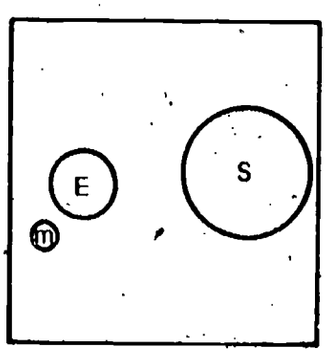
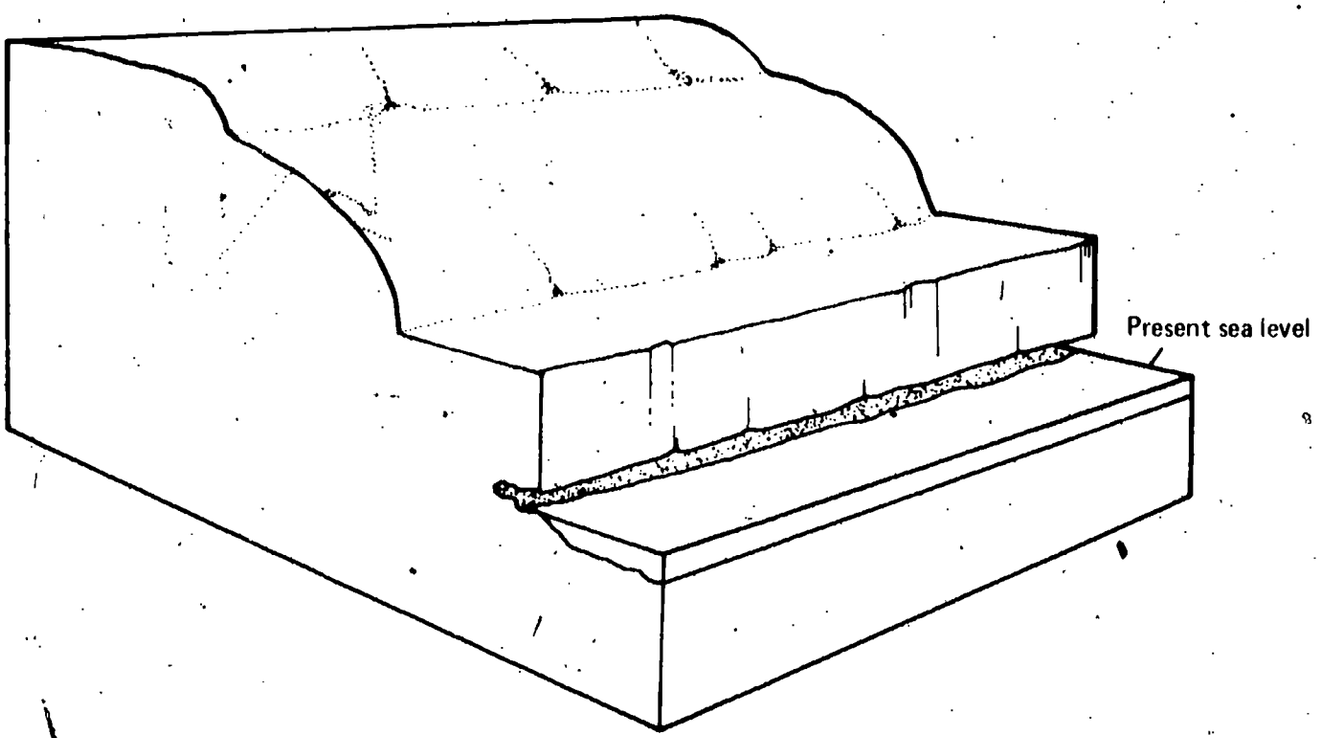


Diagram c.



Examine the coastline and the series of benches (steps) shown in the diagram below. CP
04-Res 44-1A

1. How were these benches formed?
2. How can you explain the fact that there are several benches?



The diagram below shows a coastline of sedimentary sandstone with the direction of an ocean current marked. The material at X will be eroded. CP
04-Res 46-1A

1. Write the letter of the arrow showing the path of the eroded material.
2. What feature will the deposited sand form?