ACE Curriculum

The following are sample pages from various PACEs in the ACE curriculum, showing a range of subjects from Prep to Year 12.

Read.

The pŭp is a pĕt.
The pŭp is in the căn.
Căn the pŭp pŏp the tŏp?
Nŏ!
Yĕs!
The pŭp răn!

Fĭll ĭn the blănks.

The pŭp is a ___pet___.

The pŭp ĭs ĭn the _____.

Căn the pŭp pŏp the tŏp? _____

Dĭd the pŭp rŭn? _____

22

Learn.
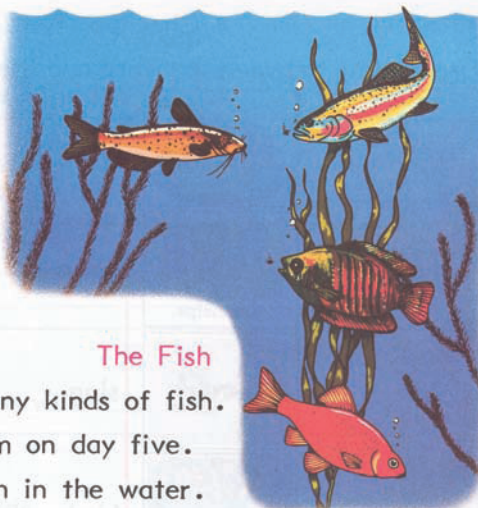
swim

The Fish

God made many kinds of fish.
He made them on day five.
Fish live down in the water.
God made the fish to live in the water.
They can swim in the water.
Fish swim in the lakes.
They swim in the rivers and oceans, too.
We like to see them swim in the water.
Fish eat food in the water.
See them eat in the water.
See the fish swim in the water.

17 Supervisor initial _____

Frŏggĭē ădds ŏn a nŭmber līne.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

3 + 4 = 7

How does Frŏggĭē ădd 3 + 4 = 7?
Frŏggĭē stărts ăt 0.
Hē hŏps to 3.
Hē hŏps 4 mōre hŏps.
Frŏggĭē stŏps ŏn 7.

Wrīte the nŭmber Frŏggĭē stŏps ŏn.

2 + 3 = 5

4 + 2 =

18

Literature & Creative Writing PACE 1027

Read Chapter 3 of *Summer Fun with Ace and Christi*.

An important part of every story is the "characters." The characters are the people in the story.

The main character is the most important person in the story.

After you read Chapter 3, answer these questions in complete sentences.

(1) Who is the main character in the story? _____

_____

Where and when the story takes place is called the "setting" of the story.

The "plot" is what happens in the story.

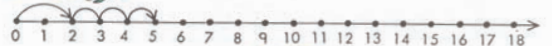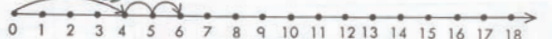(2) Where does the story take place? _____

_____

(3) What does Pudge do in the story? _____

_____

Read and fill in the blanks.

(4) _____ that _____ his _____

_____ prosper.

Proverbs 28:13

Score pages 19 and 20.		Are any of your answers different? They may be right. Talk with your supervisor.	Supervisor initial _____

20

Maths PACE 1017

Draw a line from each number to its box of hundreds, tens, and ones.

212

335

147

Subtract the ones, then the tens, then the hundreds. Take away.

700	868	958	900	759
− 500	− 418	− 802	− 200	− 423

268	800	736	589	400
− 137	− 100	− 232	− 134	− 100

Score this page.		Correct mistakes.		Rescore.	

Supervisor initial _____   Student should use Math Builder® and/or addition and subtraction flashcards for daily drill.

24

Science PACE 1030

Birds Have Beaks

The shape of a bird's beak or bill helps the bird eat its food. Some birds eat seeds. Seeds have a hard, outside coat. Birds that eat seeds need bills or beaks to break open the outside of the seeds.

Some fowls eat other animals. These birds need very strong bills or beaks because they eat other animals for food.

Some birds that live in very warm places eat fruit. These birds that eat fruit need big bills. Birds that eat fruit have special tongues to help them eat their meals.

Draw a line under the best answer.

(1) The (hair, shape, seed) of a bird's beak helps him eat food.

(2) Birds that eat (seeds, beads, deeds) need beaks to break them open.

(3) Birds need (weak, song, strong) bills to eat other animals.

(4) Birds that eat (hard, fruit, coats) need big bills.

(5) Birds that eat fruit have special (tongues, feet, arms).

Read and fill in the blanks.

(6) G r e a t e r   l o v e hath no man than . . . a man lay down h i s   l i f e for his _____ _____.

John 15:13

(ten) 10

English PACE 1023

Sometimes we put two words together with an apostrophe.

is + not
is + nǫt = isn't

Match the words that mean the same.

are not	isn't	do not	hasn't
is not	aren't	does not	doesn't
was not	didn't	has not	don't
did not	wasn't	have not	haven't

Write the words that mean the same.

are not	aren't	aren't	are not
is not		isn't	
was not		wasn't	
did not		didn't	
do not		don't	
does not		doesn't	
has not		hasn't	
have not		haven't	

Score this page.

Correct mistakes.

Rescore.

18

Social Studies PACE 1043

C. The Sahara Is in Africa.

"This encyclopedia says that much of Africa is desert," said Booker. "The Sahara is the largest desert in the world. The Sahara is in the northern part of Africa."

"We sometimes think it never rains in the desert," said Pastor Gentle. "However, rain falls in the Sahara. Sometimes the Sahara has heavy rains, but the water quickly goes down into the ground.

"There are people who live in the desert and who do not need to move around from place to place to find water," continued Pastor Gentle. "These people live around an oasis. An oasis is like an island of green in the desert. An island is land surrounded by water. We say an oasis is like an island because it is green land surrounded by desert. An oasis is a place where water comes out of the ground. An oasis is green because it has underground streams of water. Because of the underground water, the soil is very rich in an oasis and grows beautiful plants.

"It's hundreds and hundreds of miles, or kilometers, across the dry Sahara. However, men have crossed the huge Sahara by traveling from one oasis to another to get water. Remember that the Sahara in Africa is the largest desert in the world."

Fill in the blanks with the right answers.

(1) The _____ is the largest desert in the world.

(2) The Sahara is in the _____ part of Africa.

(3) An _____ is like an island of green in the desert.

(4) An oasis is green because it has underground streams of _____.

30

English PACE 1049

Equitable

Read each sentence and put a period or question mark after it. On the line, write what kind of sentence it is—declarative or interrogative.

(1) Solomon was the wisest man that ever lived _____

(2) The people were amazed at his wisdom _____

(3) Did they bring their problems to him _____

(4) Yes, the people brought their problems to Solomon _____

(5) Did they trust Solomon's judgment _____

(6) They surely did, and they listened when he spoke _____

(7) Why did they trust Solomon's judgment _____

(8) The people knew Solomon loved God _____

(9) They knew he was seeking to follow God _____

(10) Can you imagine a visit to Solomon's palace _____

Score pages 27, 28, 29, and 30. | Correct mistakes. | Rescore.

30

Maths PACE 1039

$2\overline{)6}$ means "6 divided by 2." Think: What number times 2 equals 6?

$N \times 2 = 6$
$3 \times 2 = 6$
So 6 divided by 2 equals 3.

$2\overline{)6}$ → $\dfrac{3}{2\overline{)6}}$

Divide by 1 or 2. Write the correct answer in the boxes.

(1) $2\overline{)12}^{\,?}$ $N \times 2 = 12$ $\boxed{6} \times 2 = 12$, so $\boxed{6}\,2\overline{)12}$

(2) $1\overline{)8}^{\,?}$ $N \times 1 = 8$ $\boxed{} \times 1 = 8$, so $1\overline{)8}$

(3) $2\overline{)18}^{\,?}$ $N \times 2 = 18$ $\boxed{} \times 2 = 18$, so $2\overline{)18}$

(4) $1\overline{)6}^{\,?}$ $N \times 1 = 6$ $\boxed{} \times 1 = 6$, so $1\overline{)6}$

(5) $2\overline{)10}^{\,?}$ $N \times 2 = 10$ $\boxed{} \times 2 = 10$, so $2\overline{)10}$

(6) $2\overline{)14}^{\,?}$ $N \times 2 = 14$ $\boxed{} \times 2 = 14$, so $2\overline{)14}$

(7) $1\overline{)9}^{\,?}$ $N \times 1 = 9$ $\boxed{} \times 1 = 9$, so $1\overline{)9}$

24

Literature & Creative Writing PACE 1032

Of course not all characters in a story are good. Some stories have a person who causes trouble.

Someone who fights a good hero and tries to defeat him is the hero's enemy.

In the next chapter of *Christians Courageous*, you will learn about another Christian hero and his enemies.

Circle "yes" or "no."

(1) A story sometimes has an enemy.   yes   no

(2) An enemy fights against the hero.   yes   no

(3) The enemy always wins the fight.   yes   no

(4) An enemy causes trouble.   yes   no

(5) Jedediah Smith was a famous enemy.   yes   no

Read and fill in the blanks.

(6) _____ _____ _____ from them to _____ it is _____, when it is in the _____ of thine _____ to do it.

Proverbs 3:27

Score pages 22 and 23. | Correct mistakes. | Rescore.

23

Maths PACE 1059

From the word box, choose the correct word(s) to complete the sentence or name the figure. Then write the word(s) in the crossword puzzle on the next page.

ACROSS

1. A __?__ figure takes up space and has depth.

4. An angle that forms a square corner is a __?__ angle.

6. A parallelogram with four right angles and four congruent sides is a __?__.

7. A __?__ is a polygon with three sides.

9. An octagon with congruent sides has __?__ lines of symmetry.

11. A cylinder has __?__ faces.

12. To see how much wire would be needed to make a fence around the chicken pen, we would measure the __?__.

14. A cube has __?__ faces.

17. To see if Sport's doghouse has more square feet than Wag's doghouse, we would measure the __?__.

18. Volume is measured in __?__ units.

21. A __?__ figure is the same shape but not the same size as another figure.

22. A polygon with four sides is a __?__.

DOWN

1.
2.
3.
5.
8.
10.
12.
13.
15.
16.
19.
20.

Word box:
- area
- cone
- cubic
- cylinder
- eight
- hexagon
- intersecting lines
- line
- octagon
- parallel lines
- parallelogram
- pentagon
- perimeter
- pyramid
- quadrilateral
- ray
- right
- similar
- six
- solid
- sphere
- square
- triangle
- two

25

Science PACE 1052

"Volcanologists have studied volcanoes in order to learn more about the earth. They have learned some things about volcanoes. However, in their studies, they have found that no two volcanoes are exactly alike.

"There are, however, three main types of volcanoes. There are active volcanoes, extinct volcanoes, and dormant volcanoes.

Active volcanoes are those which are erupting right now. Extinct volcanoes are thought of as those which have not been active for 1,000 years or more. Dormant volcanoes are those which are only sleeping but may erupt; however, they are not erupting right now."

Three kinds of volcanoes

III. Katmai

Scientists once called Katmai in Alaska an extinct volcano. However, on June 6, 1912, in Alaska some strange things began happening. In a small village about 100 miles, or 160 kilometers, away from Katmai, a gray cloud hung in the sky during the middle of the day. About two hours later, a dark cloud seemed to come down and cover the little village in Alaska. By 5:00 in the afternoon, the sun could not be seen at all. That was really strange because in that part of the world the sun does not set for 24 hours during that certain time of the year. The villagers were expecting daylight around the clock, but instead there was darkness by 5:00 p.m."

Fill in the blanks with the right answers.

(1) Volcanologists have learned that no two volcanoes are _____.

(2) _____ volcanoes are those which are erupting right now.

(3) _____ volcanoes are those which have not been active for 1,000 years or more.

(4) _____ volcanoes are those which are sleeping but may erupt.

21 (twenty-one)

Social Studies PACE 1058

Read the word and its definition; then underline the sentence which best uses the word.

telegraph   tel'ə graf   (9)   Telegraph is a way of sending coded messages over wires by means of electrical impulses.
   (a) In 1877 Perth and Adelaide were able to exchange messages by way of telegraph.
   (b) Bill drew a line on the telegraph.

III. UNITED AUSTRALIA: A CHANGE OF THINKING

A dramatic change of thinking occurred by the last decade of the nineteenth century. For most of the 1800s little interest was shown in the idea of a united Australia. The colonies were far more concerned with developing their own settlements and retaining power over their own affairs. By the end of the century this thinking had changed. Many people felt that the federation of the colonies would be good. Earlier barriers to unity seemed to be disappearing.

The colonies were separated by great distances but new developments made it easier for people to travel across the continent. Railway lines were being constructed and the cities were being linked. Many old problems

A railway pier, Melbourne, 1880

still faced the construction of a national railway. The colonies could not agree on a common gauge (the distance between the rails). Passengers were forced to change trains at the border towns such as Albury on the New South Wales/Victorian border. Progress was being made despite these hurdles.

In 1883 Sydney and Melbourne became the first cities to be linked by rail. In 1887 Adelaide was linked to Melbourne. In 1889 Brisbane was linked to Sydney. Perth had been linked to the other cities by telegraph line since 1877. The people of Sydney had been able to communicate with the people of Melbourne by way of telephone since 1884.

The telegraph line reaches Tasmania in 1869

Thus communications had improved. The colonies knew of each other's affairs much more quickly now than had been the case before. Workers moved more freely between the colonies. Cattlemen, sheep-shearers, miners and other workers travelled from colony to colony. Unions and other organizations within the colonies often held conferences around the country. They discussed the conditions of workers in Australia as a whole. Sporting teams included members from all the colonies. Their success on the field was seen as a victory for Australia and made all Australians proud. The spirit of Australianness

18

Literature book

Patricia St. John

TREASURES OF THE SNOW

English PACE 1077

Indefinite Pronouns

An indefinite pronoun can do the job of a noun, . . .

. . . or an indefinite pronoun can come before a noun and do the job of an adjective.

Each prayed.
Both answered.

Each student prayed.
Both boys answered.

Noone?
Now I see why "no one" must be spelled as two words.

Learn these indefinite pronouns.

all	each	more	nothing	something
another	either	most	one	such
any	everybody	much	others	
anybody	everyone	neither	several	
anyone	everything	nobody	some	
anything	few	none	somebody	
both	many	no one	someone	

Underline the indefinite pronoun in each sentence. On the line write "pronoun" if it works alone in place of a noun; write "adjective" if it works as an adjective.

Study these examples.

Both believed that God would answer. *pronoun*
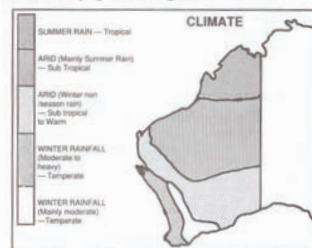
God did answer each girl's prayer. *adjective*

Our Friendliness Aids in the Conversion of Others (Acts 8:5–8; 26–40)

(1) In the early church, the Apostles could not do everything. _____

(2) The Apostles chose several men to help them. _____

(3) One of these chosen men was Philip. _____

(4) During this early time of the church, everyone stayed in Jerusalem. _____

(5) Then great persecutions came against the church, and many Christians left Jerusalem. _____

(6) One Christian who left was Philip. _____

(7) Philip went to Samaria and preached Christ to everyone. _____

(8) All of the people received Philip's message. _____

(9) Many miracles were done by Philip, also. _____

(thirty-four) 34

Australian Social Studies PACE 1079A

D. Climate

Because of its great land area, Western Australia has several climates. Over half of Western Australia lies south of the Tropic of Capricorn in the temperate zone. The northern part lies in the tropical zone. This northern part has hot, wet summers and warm, dry winters. The southern half of Western Australia has warm, dry summers, with cool, wet winters. However large areas of the inland receive very light and irregular rainfall.

CLIMATE

SUMMER RAIN — Tropical

ARID (Mainly Summer Rain) — Sub Tropical

ARID (Winter non season rain) — Sub tropical to Warm

WINTER RAINFALL (Moderate to heavy) — Temperate

WINTER RAINFALL (Mainly moderate) — Temperate

1. Temperature

Temperatures can vary greatly in Western Australia. The average annual temperature in the north is around 29°C, while in the south it is 15.5°C. However, temperatures tend to vary greatly according to season and location. The inland area varies from extremely hot conditions during summer with temperatures exceeding 40°C in the shade, to chilly winter nights when ice forms on exposed water surfaces.

The hottest region in Western Australia is near Marble Bar in the north-west where the daily maximum exceeds 38°C for weeks at a time. This area has recorded the longest heat waves. Marble Bar is the only station in the world where temperatures of more than 37.8°C have been recorded on as many as 161 days in a row. The Kimberley district is the consistently hottest part of Australia. The highest temperature ever recorded in Western Australia was 50.7°C at Eucla on the south coast in 1906. Even though Eucla is located in the extreme south of the state, the hot north-west winds which blow over land from the Marble Bar area have caused these high temperatures. The highest temperature ever recorded in Perth was 45.8°C on January 31, 1991.

The coolest region in Western Australia is in the

23

south-west corner, where most of the population lives. The summer months average 24°C to 26.5°C and the winter months 10°C to 15°C. The lowest temperature ever recorded in Western Australia was -6.7°C at Booylgoo.
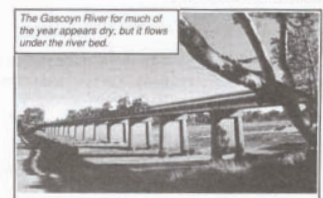
2. Rainfall

Rainfall also varies greatly according to season and location. Winter rains fall in the south mostly from May to October. The summer rains of the north fall from November to April. The enormous interior region receives very little rain. This dry region stretches from Kalgoorlie to Shark Bay to Broome and to Hall's Creek. The area from Port Hedland to the Hammersley Range may receive two tropical cyclones in a year. These cyclones usually occur between December and May. The average rainfall for this area is 250 mm to 380 mm. However, these figures mean very little because 250 mm may fall in

RAINFALL

1200 - 1600 mm
800 - 1200 mm
600 - 800 mm
400 - 600 mm
300 - 400 mm
200 - 300 mm
0 - 200 mm
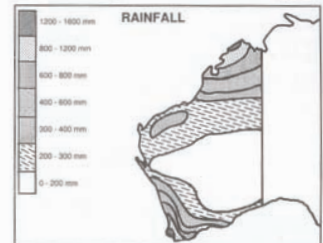
two days and there may be a drought lasting up to two years.

Seventy-three percent of Western Australia receives less than 300 mm of rain annually. Only nine percent receives more than 600 mm. Those areas that do receive more than 600 mm annually

The Gascoyn River for much of the year appears dry, but it flows under the river bed.

Maths PACE 1086

Score problems 20-31.

Correct mistakes.

Rescore.

Let's combine these two procedures.

The same procedures are followed: the numbers are moved to one side of the equation and the unknown terms to the other side of the equation.

$4x - 8 = 20 - 3x$ ⟵ Move like terms to the same side of the equation.

$4x + 3x = 20 + 8$ ⟵ Add like terms.

$7x = 28$

$x = \frac{28}{7} = 4$

The problem can be checked by putting the value of x into the original equation in place of the x.

$4x - 8 = 20 - 3x$ ⟵ Substitute 4 for x.

$4(4) - 8 = 20 - 3(4)$ ⟵ Simplify both sides of the equation.

$16 - 8 = 20 - 12$ ⟵ Both sides are equal so 4 is a correct answer.

$8 = 8$

Solve and check the following equations. Reduce all fractions to simplest terms.

$6x + 10 = 37 - 3x$

$6x + 3x = 37 - 10$ $6(3) + 10 = 37 - 3(3)$

$9x = 27$ $18 + 10 = 37 - 9$

$x = \frac{27}{9} = 3$ $28 = 28$

(32) $3x + 14 = 38 - 5x$

15

Music PACE 1

violin   viola   cello   double bass

The String Family

When the Bible mentions stringed instruments, it is referring to a family of instruments rather than to a specific instrument. Although there were many different kinds of stringed instruments in Bible times, we will look at just four: the harp, the asor, the dulcimer, and the psaltery.

Harps were used for both worship and entertainment. Genesis 4:21 records that Jubal played harps. Scripture calls Jubal the "father of all such as handle the harp and organ."

David, probably the most well-known harpist, used his musical ability to glorify the Lord. He often played his harp on the grassy Judean hillsides while caring for his father's sheep. David's five-string harp resembled an Egyptian skin bottle. The body of the harp was rounded out and covered with animal skin.

An asor was an instrument like the harp. Because the word asor in Hebrew means "ten," the asor was probably a harplike instrument with ten strings. The Bible mentions a ten-stringed instrument in
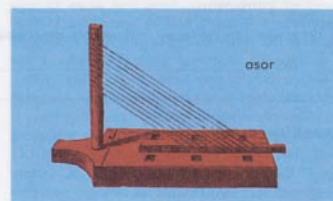
asor

Psalm 33:2 and Psalm 92:3. Some people think the asor was like today's zither, but most music historians believe it was more like a ten-stringed harp.

In Daniel 3:5 the dulcimer is mentioned as one of the instruments in King Nebuchadnezzar's orchestra. A dulcimer is a shallow, closed box upon which are stretched wires that a player strikes with small, wooden hammers. Most music historians believe dulcimers are the forerunners of the modern piano.

The psaltery was another instrument in King Nebuchadnezzar's orchestra. Many of the Psalms also make mention of this stringed instrument. Although a psaltery looked much like the dulcimer, this instrument was plucked with the fingers rather than struck. The psaltery was used only for worship.

5

do not change easily—generally very little mixing of air occurs between two air masses.

"Air masses are usually moving. The movement of an air mass, in addition to its temperature and humidity, determines the kind of front that forms on its leading edge. When a moving cold air mass meets a weaker warm air mass, a cold front is formed. Cold air masses move at a speed of about 20 miles per hour (32 km/h), which is faster than the movement of warm air masses. Because cold fronts move faster than warm fronts, they cause sharper, more rapid changes in weather. Rain, usually in the form of brief but violent thunderstorms, occurs on both sides of the front. Cold air is more dense than warm air and tends to sink, creating high pressure and bringing a period of cooler, sunny weather as it moves into a region."

direction of frontal movement
cold front
cold air
rain
warm air
0 mi (0 km)   895 mi (1,440 km)
Cold front
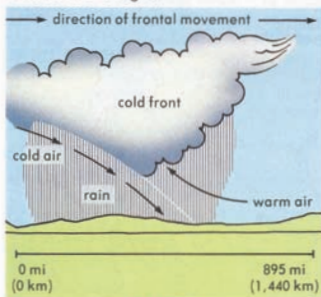
"When a moving warm air mass meets a weaker cold air mass, a warm front forms. The warm air is forced upward and over the cold air mass, producing heavy but not violent precipitation. Warm front rains are steady, covering large areas and sometimes extending hundreds of miles ahead of the front. A warm front is preceded by much cloudiness. Sometimes high wispy clouds precede the front for a thousand miles (1,600 km). Gradually, the clouds become thicker and lower until the rain arrives. This precipitation is usually followed by warmer weather."

warm front
warm air   cold air
rain
0 mi (0 km)   895 mi (1,440 km)
Warm front
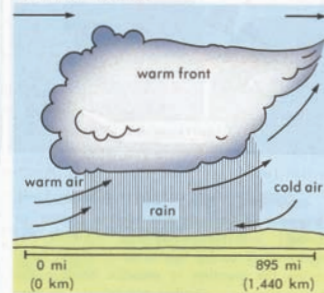
"Sometimes cold and warm air masses are equal in strength, preventing either mass from moving for several days. These masses form a front that does not move, called a 'stationary front.' A stationary front generally produces the same kind of weather as a warm front."

cool air
warm, moist air
Stationary front
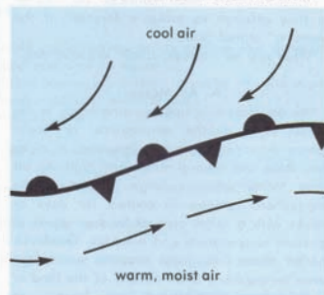
"Approaching cold and warm fronts can be predicted by a drop in atmospheric pressure because both move from high-pressure areas

13 (thirteen)

C. Strike!

During the early depression years, labour (the workers) and capital (the owners) fought it out on a national scale. In 1889, the Queensland Shearers' Union demanded that pastoralists employ union members only. When the pastoralists refused and brought in non-union ('scab') labour, the waterside workers refused to load the wool from the Jondaryan station. The pastoralists were forced to give in.

The Jondaryan woolshed

The victory of the Queensland Shearers' Union encouraged the Australian Shearers' Union, which covered the southern colonies. The pastoralists and shipowners were determined to resist the union demands, however, and formed their own unions of employers. The showdown came in August 1890 when shipowners told the recently formed Marine Officers' Association that, before its wage claims could be discussed, its Victorian members must cut their ties (affiliation) with the Melbourne Trades Hall Council (a trade union organisation). The marine officers walked off their ships, the waterside workers refused to load them, coalminers were locked out when they refused to supply coal to the ships, and pastoralists broke off their negotiations with the shearers.

The Maritime Strike spread further. Mine owners at Broken Hill locked out their workers, transport workers were brought out on strike by the Labour Defence Committee and gas stokers refused to work with coal cut by non-union labour.

Alfred Deakin, the chief secretary of Victoria, called out the local defence force to clear union pickets at the port of Melbourne. In Sydney, armed police, sent by the government of Henry Parkes, cleared a path for wool-carts through a hostile crowd on Circular Quay. When missiles were thrown, the Riot Act was read and the crowd was dispersed by force. In Queensland, Premier Samuel Griffith also called out the defence force and read the Riot Act. Pastoralists used the opportunity to go back on their earlier agreement with the shearers, while union leaders were arrested, charged with illegal plotting (conspiracy) and sentenced to long terms in gaol.

By the end of 1890, the great Maritime Strike had been broken. In the depression of the 1890s, the employers had the upper hand. Further attempts at industrial action by shearers and mine workers ended in disaster. By 1896, scarcely one in twenty wage-earners belonged to a union. The conflict between the union demand for a 'closed shop' (that is, the employment of only those who belonged to a union), and the employers' insistence on their right to employ whomsoever they liked ('freedom of contract'), had ended with a decisive victory for the latter.

The Maritime Strike. Employers protected by police drive their own wool to Circular Quay in Sydney. Sydney Mail, 27 September 1890.
17

Look again at page 28, and complete the following statements.

(1) An outline is a step-by-step _____ to organize the ideas about a topic.

(2) Before we attempt to write a composition, we should compile an _____ and write from it.

(3) The title of the example outline is _____

(4) The _____ is centered above the outline.

(5) The example outline:

Has _____ (how many?) main topics.

Has _____ (how many?) subtopics.

Has _____ (how many?) points.

(6) Each Roman numeral, capital letter, or number is followed by a _____ (mark of punctuation).

(7) The subtopics are indented under _____

(8) The points are _____ under subtopics.

(9) Each line is a complete _____

(10) Because each line is a sentence, each line ends with a _____

(11) When writing an outline, we use _____ and _____

(12) If subtopics or points are used under the main topics, we must have at least _____ (how many?).

(13) Place a check (✔) before the statement that gives the meaning of I Peter 3:8.

_____ Our church deacons put a new roof on a widow's house.

_____ Our pastor is never late for an appointment.

Score pages 27, 28, and 29.		Correct mistakes.		Rescore.	

29

Using the root "pulse," "pel," or "peal" and the meanings and functions of prefixes and suffixes, write the correct word on each line. (If you need help, refer to your dictionary.)

pulse	repulse	pulsate	expel	propel
compel	impulse	propeller	impulsive	propulsion

(1) to drive or push forward
_____

(6) to push back or drive back
_____

(2) to cause something to beat
_____

(7) tending to push or drive into
_____

pulse
(Latin–pellere)
"to drive; to push; to beat"

(3) the act of pushing forward
_____

(8) a beat
_____

(4) to push out
_____

(9) to push or drive with force
_____

(5) a sudden driving force that comes on someone
_____

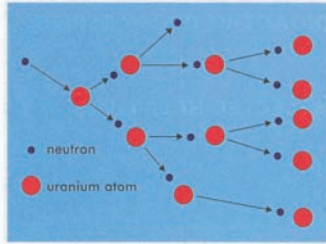(10) something that pushes or drives another thing forward
_____

(11) What does the root "pulse," "pel," or "peal" mean? _____

7

Physical Science PACE 1120

source could be generated. A continuous fission reaction is called a chain reaction.

Chain reaction

There was also another motivation to discover a means of continuous nuclear fission. The world was involved in a devastating world war. Scientists in Germany and the United States knew that a weapon of inconceivable magnitude could be created using nuclear fission. Both sides also knew that the country that first developed a nuclear weapon would win the war. The United States *detonated* the first nuclear fission bomb on July 16, 1945, in the desert near Alamogordo (ăl´·mə·gôrd´ō), New Mexico. This first nuclear bomb had as much explosive force as 20,000 tons of TNT.

Detonation of nuclear fission bomb

The only two nuclear bombs used during World War II were dropped on Hiroshima and Nagasaki, two industrial cities in Japan. Less than two weeks later, the war was over.

Although nuclear fission was first used as a weapon, it is also an efficient source of energy to power electric generating plants. One kilogram of uranium fuel may produce as much electric power as 3,000,000 kg of coal or 12,000,000 kg of oil used in a conventional power plant.

A nuclear reactor is a device that allows nuclear fission to proceed at a controlled rate. Reactors today still function much like the first nuclear "pile" in Chicago. The four major parts of a nuclear fission reactor are the core, the moderator, the control rods, and the pressure vessel.

The reactor core contains the uranium fuel needed for fission. Before uranium can be used as fuel, it must be enriched. Uranium-235, which is necessary for fission in a nuclear reactor, always occurs in small quantities mixed with uranium-238. Enrichment is the process that increases the concentration of U-235. Pellets of enriched uranium are placed in steel rods called fuel rods. As many as 300 fuel rods are bound together to form a fuel assembly. Fuel assemblies are held in place by support plates in the core.

A moderator is a substance that slows down neutrons. Neutrons emitted at normal speeds travel too fast to bombard other U-235 nuclei. A moderator, such as graphite, carbon dioxide, or water, slows down the neutrons and increases the chance that they will bombard other U-235 nuclei and continue the fission reaction. Water is used as a moderator in most nuclear fission reactors since it also acts as a coolant and as a heat exchanger.

Control rods are necessary to regulate the rate of the fission reaction. Rods or plates of either cadmium or boron placed between fuel assemblies absorb the emitted neutrons and prevent them from causing other nuclei to split. If the rods are raised, neutrons are released and the reaction proceeds. The higher the rods are raised, the faster the reaction proceeds.

28

English PACE 1131

A list of main points related to starting a school using School of Tomorrow curriculum is given below. A logical arrangement of the main points is necessary if the research paper is to have coherence.

NOTE HOW THE RANDOM ARRANGEMENT OF MAIN POINTS ON THE LEFT BELOW HAS BEEN PLACED IN LOGICAL ORDER ON THE RIGHT. A ROMAN NUMERAL HAS BEEN PLACED BEFORE EACH MAIN POINT.

Organizing the leadership	I. Organizing the leadership
Preparing to obtain a staff	II. Promoting the school
Adapting a facility	III. Financing the school
Financing the school	IV. Adapting a facility
Finalizing for opening day	V. Preparing to obtain a staff
Promoting the school	VI. Finalizing for opening day

A question may arise asking why organization of the main points listed above must follow the arrangement given. A reasonable explanation would be that initially no institution can begin without leadership. Before public interest can be generated, promotional information must be released to the public. There must be reasonable planning for financing in order for a facility to be adapted and maintained. Having laid the proper groundwork, a staff could be sought and trained, and all could then work toward opening day.

Before we develop the main points above with supporting points, we will practice arranging main points in logical order.

On the lines below, arrange the topics in logical sequence. On the first line, write the statement that would be considered an appropriate title for the paper.

Learning obedience

Receiving Christ into your heart

Getting a quality education

Being faithful to church

Associating with believers

Choosing a lifework

Marrying a believer of like faith

Preparing for life

I. _____

II. _____

III. _____

IV. _____

V. _____

VI. _____

VII. _____

Score pages 11 and 12.		Correct mistakes.		Rescore.	

12

Algebra PACE 1104

Negative Exponents

OBJECTIVE
To eliminate negative exponents from algebraic expressions

The *reciprocal* (or *multiplicative inverse*) of a number is the number that, when multiplied by another number, equals 1.

The reciprocal of 4 is $\frac{1}{4}$, because $4 \cdot \frac{1}{4} = 1$.

The reciprocal of x is $\frac{1}{x}$, because $x \cdot \frac{1}{x} = 1$.

The reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$, because $\frac{2}{3} \cdot \frac{3}{2} = 1$.

The reciprocal of a number can be found by simply inverting the number.

A negative exponent can be changed to a positive exponent by inverting the base and changing the sign of the exponent.

$$x^{-3} = \frac{1}{x^3}$$

$$\frac{1}{x^{-2}} = \frac{x^2}{1} = x^2$$

$$3x^{-3} = \frac{3}{x^3}$$

$$\left(\frac{1}{2}\right)^{-2} = \left(\frac{2}{1}\right)^2 = 4$$

Exponential expressions with negative exponents must be changed to equivalent expressions with positive exponents before they can be simplified. Study the following examples carefully.

$$\frac{2x^3 y^0}{3} \cdot \left(\frac{2x^2}{y}\right)^{-3} = \frac{2x^3(1)}{3} \cdot \left(\frac{y}{2x^2}\right)^3 = \frac{2x^3}{3} \cdot \frac{y^3}{(2^3 x^{3\cdot2})} = \frac{2x^3}{3} \cdot \frac{y^3}{8x^6} = \frac{y^3}{12x^3}$$

$$\left(-\frac{2}{3}\right)^{-3} = \left(-\frac{3}{2}\right)^3 = -\frac{27}{8} = -3\frac{3}{8}$$

Simplify these expressions after eliminating any negative exponents.

1. $8^{-2} =$

2. $10^3 =$

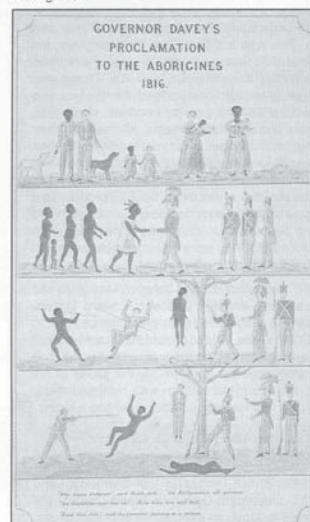3. $\left(-\frac{3}{4}\right)^3 =$

4. $2^{-3} =$

5. $8^{-1} =$

11

Senior Modern History PACE 20

were hung for crimes against British law, there is no evidence that a European was ever hung for killing Aborigines.

GOVERNOR DAVEY'S PROCLAMATION TO THE ABORIGINES 1816

This poster was circulated by Thomas 'Mad Tom' Davey, who was Lieutenant-Governor of Van Diemen's land between 1813 and 1817. A version of the poster is also attributed to Governor George Arthur
NLA no. 7878675

An 1830 committee of investigation into the treatment of the Aborigines found evidence that Aborigines were being shot on sight and subjected to horrific cruelties. Arthur, therefore, conceived the idea of the 'Black Line'. Over two thousand men were to form a cordon and drive the remaining Aborigines in the areas of European settlement on to a narrow peninsula, where they could be captured and sent to a safe location. As it turned out, the operation was an expensive failure.

Governor George Arthur

It was left to another Christian, George Augustus Robinson, to achieve the seemingly impossible. Revisionist historians have branded him a traitor who tricked the Aborigines into surrendering, but it is more likely that he had a genuine interest in their welfare. Certainly, his ideas, which included racial equality, justice and Aboriginal land rights, were well ahead of their time. Robinson, who was on friendly terms with the Tasmanian Aborigines and spoke their language fluently, believed that they could be persuaded to give themselves up if they believed that it was in their own best interests.

His plan was surprisingly successful, and by 1834, most of the surviving Aborigines had been sent, not to a place where they could happily pursue their traditional lifestyle, as they thought, but to the desolate Flinders Island off the island's northeast coast. Although they were generally well treated, "They simply pined away, disillusioned, powerless, longing for a past that was gone forever".[16] A number of Church of England catechists and a Presbyterian minister attempted to minister to the Aborigines, but only one, Robert Clark, appears to have won their genuine affection. Clark's concentration on Christian teaching seems to have made him unpopular with the later Flinders Island officials, but at least he stayed with them for life.


*George Augustus Robinson.
Lithograph by P. Gauci.
NLA no. 1991536*

14

Senior Maths PACE 13b

2. The distributor of vegetables uses a conveyor belt to pack tomatoes into boxes. The vegetables are placed in a silo so that they are loaded automatically on to the conveyor, and then move with a speed of 5 m/s. At the end of the conveyor the vegetables drop into a box. The process is shown in the figure below.
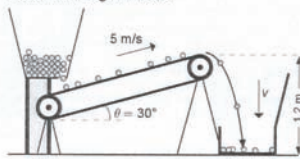
The function to calculate the vertical velocity of a vegetable when it drops into the box is given by:

$$v = v_0 \sin(\theta) - 9.8t$$

The function to calculate the height is given by:

$$h = 1.2 + v_0 \cos(\theta)\, t - 4.9t^2$$

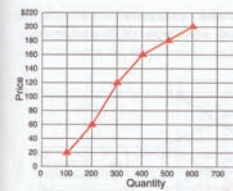where v_0 = initial velocity, i.e. velocity at the drop off is 5 m/s at angle θ
t = time

(a) Tabulate the velocity for $0 \le t \le 1.10$ for a time step of 0.10 s.

(b) Tabulate the height, for $0 \le t \le 1.10$ for a time step of 0.10 s.

(c) Plot the data from part (a) and (b) on the same graph and interpolate, i.e. connect the points. Use time vs vertical velocity and time vs height above the box.

Economics PACE 1140

On the left is an elastic supply curve. In this case, quantity increases rapidly as price increases slowly. The units offered for sale increase from 100 to 600 as the price increases from $20 to $200.

Price

How are market prices actually determined? Producers offer products for sale when they anticipate demand, and consumers can purchase goods only if there is a supply. Supply and demand become significant when they are combined to determine the market prices of goods and services.

Let's go back to our example of lemonade and incorporate the supply and demand schedules into one chart.

Supply and demand schedules for glasses of lemonade for one week				
Supply	Price	Demand	Surplus (+) or shortage (−)	Pressure on price
900	$4.50	100	+800	↓
800	4.00	200	+600	↓
700	3.50	300	+400	↓
600	3.00	400	+200	↓
500	2.50	500	0	
400	2.00	600	−200	↑
300	1.50	700	−400	↑
200	1.00	800	−600	↑
100	0.50	900	−800	↑

At prices above $2.50, more glasses of lemonade are available for sale than consumers are willing to purchase at the asking price. This situation pressures prices to decrease. At prices below $2.50, more consumers are willing to purchase lemonade than there are glasses available. In this situation, prices are pressured to increase. Only at $2.50 do the glasses of lemonade equal the number of consumers who wish to purchase lemonade. When supply and demand equal each other, the market is at equilibrium, and the price at that point is the equilibrium price.

Equilibrium is the point at which supply and demand are equal. Equilibrium will continue unless or until some factor upsets this balance.
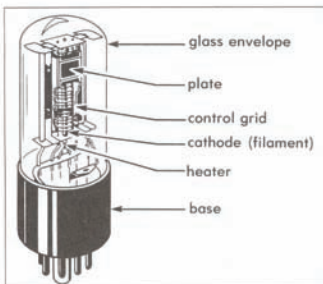
The monopolists, by keeping the market constantly understocked, by never fully supplying the effectual demand, sell their commodities much above the natural price, and raise their . . . wages or profit . . . greatly above their natural rate.

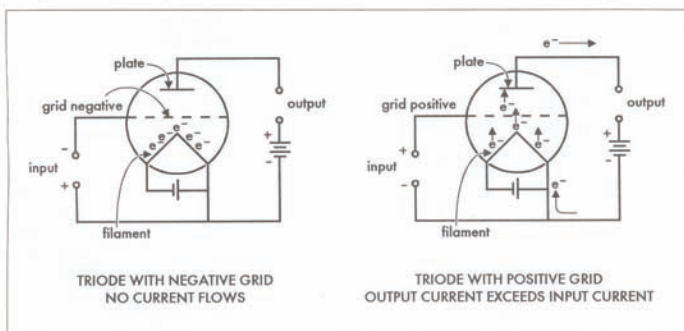Adam Smith, *Wealth of Nations*

Physics PACE 1142

A triode

In a triode, electrons emitted from the heated filament pass through holes in the grid before they reach the plate. If voltage is applied to make the grid negative with respect to the filament, some electrons will be repelled back to the filament, thus reducing the flow of electrons to the plate. As the negative charge of the grid is increased, the current passing to the plate is decreased. This decrease in current causes an increase in voltage. Since the grid is closer to the filament than the plate, a small grid voltage has more effect on the electron flow than a much larger plate voltage. Therefore, a small voltage change applied to the input of a triode will result in a much larger voltage change at the output. This effect is known as amplification.

The output voltage of a triode circuit is commonly 50 times larger than the input voltage. If more amplification is needed, the output of the first triode circuit can be connected to a second triode circuit. If both triodes provide an amplification of 50, then the overall amplification will be 50 × 50 = 2500. We can begin to see the importance of Lee De Forest's invention. A radio signal, which has a very tiny voltage; can be received by an antenna and then amplified enough to drive a loudspeaker.

Semiconductor Devices

A semiconductor is a substance intermediate in conductivity between a good insulator and a good conductor. Semiconductors conduct electricity better than true insulators like sulfur, but semiconductors do not conduct electricity as well as true conductors like copper.

TRIODE WITH NEGATIVE GRID
NO CURRENT FLOWS

TRIODE WITH POSITIVE GRID
OUTPUT CURRENT EXCEEDS INPUT CURRENT

Triode diagram

Life of Christ PACE 140

II. TEACHING IN PARABLES CONTINUED

In this section, our study of Jesus' teaching in parables continues with "The Pharisee and the Publican" (Luke 18:9-14) and "The Laborers in the Vineyard" (Matthew 19:27-20:16).

The Pharisee and the Publican

Read Luke 18:9-14:

Jesus continued His attack upon self-righteousness. He did not like it in the Pharisees who exhibited so much of it in His day, and He does not like it in us. His attack again took the form of a story.

Two men went up to the temple to pray. One was a Pharisee, the other a tax-collector (a publican). The Pharisee did not ask for anything. Instead, he appeared to give thanks. He thanked God for what a fine fellow he (the Pharisee) was. The Pharisee listed his virtues in two ways. First, he told what he did not do. Second, he told what he did do. He neither extorted money, supported injustice, lived immorally, nor acted like a publican. He did fast twice a week, and he did give a tithe of everything that he received. What more could God ask?

The publican came before God on an entirely different basis. He really had nothing to boast about--and he felt that fact keenly! He prayed (18:13): ". . . God be merciful to me a sinner." Instinctively he struck his chest as he prayed, showing the depth of his own emotion. Jesus closed the story by saying (18:14): "I tell you, this man went down to his house justified rather than the other . . . ." Jesus gave a familiar reason for this judgment (18:14): ". . . for every one that exalteth himself shall be abased; and he that humbleth himself shall be exalted."

Why then did God justify the tax-collector and ignore the virtues of the Pharisee? The publican had a sense of need. He was penitent. The Pharisee was not. God, Who looks beyond our outward acts and manners, sees us all as rebels against His law and Himself; therefore, God looks not for self-esteem and self-conceit, but for repentance. The idea of repentance was foreign to the Pharisee because he could not see how any fault could be found with his life; but the publican, in his own eyes, had no virtues to commend him to God. What else could he do except repent and cry for mercy? He abased himself before God. That heartfelt self-abasement was precious in God's eyes.

On the blank, write the correct answer:

(1) In the parable of "The Pharisee and the Publican," Jesus continued His attack upon _____.

(2) The Pharisee listed his virtues in the form of (a) _____
    and (b) _____.

(3) The Pharisee did _____ twice a week.