
Morning Reading 晨读

Grade 11 · AS · 十一年级 · AS

Complete Volume · 18 Weeks

Morning Reading 晨读

Grade 11 · AS · Week 1

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Physics begins with careful language. A **physical quantity** has two parts: a number, its **magnitude**, and a **unit**. Saying "the mass is 5" means nothing until you add "kilograms". Scientists across the world share the same **SI units**, so a result measured in Shanghai can be checked in London. Before an experiment, a good physicist will **estimate** the answer first, at least to the right **order of magnitude**, so a silly result is spotted at once.

Chemistry looks inside matter. Every **atom** has a tiny, dense **nucleus** of **protons** and **neutrons**, with **electrons** arranged in shells around it. The **proton number** defines the element: change it, and you have a different substance entirely.

Economics begins from one hard fact: **scarcity**. Our **wants** are unlimited, but **resources** are not. Every choice therefore has an **opportunity cost**, the next best thing you gave up. Choosing two hours of gaming costs you the two hours of revision you did not do.

Talk about it 说一说:

1. Estimate the mass of this worksheet, with a unit. How could you check?
2. What was the opportunity cost of coming to school today?

Physics

Topic 1 · Physical quantities and units

 **physical quantity** 物理量

 **magnitude** 大小

 **unit** 单位

 **estimate** 估算

 **mass** 质量

 weight 重力			
 vacuum 真空			
 acceleration 加速度			
 free fall 自由落体			
 order of magnitude 数量级			
 SI units 国际单位制			
 base quantity 基本量			
 length 长度			
 current 电流			
 ampere 安培			
 temperature 温度			
 kelvin 开尔文			
 derived unit 导出单位			

Chemistry

Topic 1 · Atomic structure

 atom 原子			
 nucleus 原子核			
 proton 质子			
 neutron 中子			
 electron 电子			
 shell 壳层			
 relative charge 相对电荷			
 relative mass 相对质量			

— neutral 中性			
# proton number 质子数			
$_{\text{Z}}$ atomic number 原子序数			
Σ nucleon number 核子数			
A mass number 质量数			
$\odot$ nucleon 核子			
$\pm$ ion 离子			
$\hookrightarrow$ electric field 电场			
$\curvearrowright$ deflection 偏转			
$\odot$ atomic radius 原子半径			
$\bigcirc$ ionic radius 离子半径			

Biology

Topic 1 · Cell structure

$\hexagon$ cell 细胞			
microscope 显微镜			
light microscope 光学显微镜			
specimen 标本			
$\text{temporary preparation}$ 临时装片			
slide 载玻片			
stain 染色剂			
cover slip 盖玻片			
magnification 放大倍数			

 micrometre 微米			
 nanometre 纳米			
 chloroplast 叶绿体			
 photomicrograph 显微照片			
 electron micrograph 电子显微照片			
 eyepiece graticule 目镜测微尺			
 calibrate 校准			
 stage micrometer 载物台测微尺			
 resolution 分辨率			
 wavelength 波长			
 electron microscope 电子显微镜			
 electron 电子			
 scanning 扫描			
 transmission 透射			

Mathematics

Topic 1 · Pure Mathematics 1

 Pure Mathematics 纯数学			
 algebra 代数			
 calculus 微积分			
 quadratic 二次式			

×	coefficient	系数			
□	complete the square	配方			
△	vertex	顶点			
√	discriminant	判别式			
•	real roots	实根			
±	distinct	相异			

Further Mathematics

Topic 1 · Further Pure Mathematics 1

Σ	Further Pure Mathematics	进阶纯数学			
√	roots	根			
×	coefficients	系数			
↔	substitution	代换			
÷	rational function	有理函数			

Computer Science

Topic 1 · Information representation

田	number system	数制			
田	denary	十进制			
01	binary	二进制			
Ⓚ	byte	字节			
◎	bit	位			
⬡	hexadecimal	十六进制			
#	digit	数位			

 place value 位值			
 nibble 半字节			
 overflow 溢出			
 register 寄存器			
 two's complement 补码			
 most significant bit 最高有效位			
 sign bit 符号位			
 signed integer 有符号整数			
 unsigned 无符号			
 one's complement 反码			
 BCD 二进制十进数			
 7-segment display 七段显示器			
 memory address 内存地址			
 code point 码点			
 character set 字符集			
 encoding 编码			
 bitmap 位图			
 pixel 像素			

Economics

Topic 1 · Basic economic ideas and resource allocation

 scarcity 稀缺性			
--	--	--	--

 resources 资源			
 finite 有限的			
 scarce 稀缺			
 goods 物品			
 services 服务			
 wants 欲望			
 economic problem 经济问题			
 opportunity cost 机会成本			
 alternative 替代选择			
 consumer 消费者			
 producer 生产者			
 firm 企业			
 government 政府			
 social science 社会科学			

Morning Reading 晨读

Grade 11 · AS · Week 2

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Scientists and economists both build models. A **model** is a simplified picture of the world that keeps the important parts and drops the rest. A map is a model: it ignores every tree, and that is exactly why it is useful. Economists add the phrase **ceteris paribus**, "all other things equal", to study one change at a time. Be careful to separate a **positive statement**, which can be tested against facts, from a **normative statement**, which contains a **value judgement** about what ought to happen.

Mathematics gives models their shape. A **quadratic equation** draws a **parabola**, the curve a thrown ball follows. A **function** is a machine: for each input from its **domain**, it returns exactly one output.

In physics the model is often an equation linking quantities: **force** in **newtons**, **energy** in **joules**, **power** in **watts**, **pressure** in **pascals**. Each unit is built from the base units, and checking them catches many mistakes.

Talk about it 说一说:

1. "Petrol prices should be lower" and "petrol prices rose 5% last year": which is normative, which is positive?
2. A map ignores trees. What does a distance-time graph ignore about a real journey?

Physics

Topic 1 · Physical quantities and units

🌀 speed 速率

🌀 velocity 速度

→ force 力

🌀 newton 牛顿

 work 功			
 energy 能量			
 joule 焦耳			
 power 功率			
 watt 瓦特			
 pressure 压强			
 stress 应力			
 pascal 帕斯卡			
= homogeneous 量纲一致			
×₂ prefix 词头			
 measurement 测量			
 uncertainty 不确定度			
 systematic error 系统误差			
 zero error 零点误差			

Chemistry

Topic 1 · Atomic structure

 period 周期			
 nuclear charge 核电荷			
 shielding 屏蔽			
 group 族			
 cation 阳离子			
 anion 阴离子			
 repulsion 排斥			

 isotope 同位素			
 chemical properties 化学性质			
 physical properties 物理性质			
 density 密度			
 principal quantum number 主量子数			
 sub-shell 亚层			
 orbital 轨道			
 electronic configuration 电子排布			
 ground state 基态			
 noble gas 稀有气体			
 spin 自旋			

Biology

Topic 1 · Cell structure

 eukaryotic cell 真核细胞			
 nucleus 细胞核			
 organelle 细胞器			
 cytoplasm 细胞质			
 cell surface membrane 细胞膜			
 nuclear envelope 核膜			
 nucleolus 核仁			
 rough endoplasmic reticulum 粗面内质网			

 protein 蛋白质			
 antibody 抗体			
 smooth endoplasmic reticulum 滑面内质网			
 lipid 脂质			
 Golgi body 高尔基体			
 vesicle 囊泡			
 secretion 分泌			
 mitochondria 线粒体			
 respiration 呼吸作用			
 energy 能量			
 ribosome 核糖体			
 amino acid 氨基酸			
 synthesise 合成			
 lysosome 溶酶体			
 enzyme 酶			

Mathematics

Topic 1 · Pure Mathematics 1

= quadratic equation 二次方程			
<> quadratic inequality 二次不等式			
 parabola 抛物线			
 simultaneous equations 联立方程			

 **substitution** 代入

 **function** 函数

 **domain** 定义域

 **range** 值域

 **one-one** 一一对应

 **inverse function** 反函数

Further Mathematics

Topic 1 · Further Pure Mathematics 1

 **oblique asymptote** 斜渐
近线

 **method of differences** 差
分法

 **convergent** 收敛

 **sum to infinity** 无穷和

 **matrix** 矩阵

Computer Science

Topic 1 · Information representation

 **file header** 文件头

 **image resolution** 图像分
辨率

 **screen resolution** 屏幕分
辨率

 **colour depth** 颜色深度

 **bit depth** 位深度

 **vector graphic** 矢量图形

 drawing list 绘图列表			
 drawing object 绘图对象			
 primitive 图元			
 property 属性			
 render 渲染			
 analogue data 模拟数据			
 digital data 数字数据			
 sampling 采样			
 sampling rate 采样率			
 sampling resolution 采样分辨率			
 amplitude 振幅			
 quantisation 量化			
 compression 压缩			
 bandwidth 带宽			
 lossless 无损			
 lossy 有损			
 run-length encoding 行程编码			
 dictionary methods 字典编码			
 Huffman coding 霍夫曼编码			

Economics

Topic 1 · Basic economic ideas and resource allocation

 model 模型			
 ceteris paribus 其他条件不变			
 positive statement 实证表述			
 normative statement 规范表述			
 value judgement 价值判断			
 microeconomics 微观经济学			
 macroeconomics 宏观经济学			
 output 产出			
 factors of production 生产要素			
 reward 报酬			
 land 土地			
 rent 地租			
 labour 劳动			
 wages 工资			
 capital 资本			

Morning Reading 晨读

Grade 11 · AS · Week 3

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Two students measure the same pencil. One writes 14.32 cm, the other 14.29 cm. Who is right? **Accuracy** means being close to the true value; **precision** means getting almost the same reading every time. A ruler read from an angle gives a **parallax** error, and tiny hand movements cause **random error**. Repeating the measurement and taking the **mean** reduces random error. Serious laboratories also do **calibration**: they check their instruments against a known standard, and they quote a **percentage uncertainty** with every result.

Networks have their own quality measures. A **server** answers requests from many **client** machines; the delay before data starts to arrive is the **latency**. A school **local area network** connects nearby rooms, while the internet is a **wide area network** spanning the planet.

Adam Smith noticed that a pin factory with ten specialised workers made far more pins than ten generalists. **Specialisation** and the **division of labour** raise output, but workers then depend on trade with each other.

Talk about it 说一说:

1. Your three readings are 2.1 s, 2.4 s and 2.2 s. What do you report, and why?
2. Which school tasks would go faster with a division of labour? Which would not?

Physics

Topic 1 · Physical quantities and units

🔧 **calibration** 校准

👁️ **parallax** 视差

📏 **accuracy** 准确度

◎ precision 精密度			
↯ random error 随机误差			
⌒ instrument 仪器			
— mean 平均值			
± absolute uncertainty 绝对不确定度			
% percentage uncertainty 百分比不确定度			
⬢ derived quantity 导出量			
— diameter 直径			
⬢ volume 体积			
# significant figures 有效数字			
# scalar 标量			
↗ vector 矢量			
≡ density 密度			
⊕ electric charge 电荷			
→ displacement 位移			

Chemistry

Topics 1–2 · Atomic structure, Atoms, molecules and stoichiometry

○ sphere 球形			
✦ free radical 自由基			
⊙ unpaired electrons 未成对电子			
⚡ first ionisation energy 第一电离能			

↗ successive ionisation
energies 逐级电离能

↔ spin-pair repulsion 自旋
成对排斥

⚖ unified atomic mass
unit 统一原子质量单位

⚖ relative atomic mass 相
对原子质量

🔗 relative isotopic mass 相
对同位素质量

⚖ relative molecular mass
相对分子质量

⬡ molecule 分子

⚖ relative formula mass 相
对式量

mole 摩尔

Σ Avogadro constant 阿伏
伽德罗常量

⚖ molar mass 摩尔质量

🧪 compound 化合物

± ionic compound 离子化合
物

oxidation number 氧化数

Biology

Topics 1–2 · Cell structure, Biological molecules

🌀 centriole 中心粒

⊙ microtubule 微管

≡ cilia 纤毛

⊙ microvilli 微绒毛			
⇓ absorption 吸收			
☀ photosynthesis 光合作用			
▣ cell wall 细胞壁			
▤ cellulose 纤维素			
⌘ plasmodesmata 胞间连丝			
💧 vacuole 液泡			
⊖ tonoplast 液泡膜			
⊖ prokaryotic cell 原核细胞			
🦠 bacterium 细菌			
○ unicellular 单细胞			
▤ peptidoglycan 肽聚糖			
🦠 virus 病毒			
🚫 non-cellular 非细胞			
🧬 nucleic acid 核酸			
🛡 capsid 衣壳			
✉ envelope 包膜			
💧 phospholipid 磷脂			
🏠 host 宿主			
⬡ molecule 分子			

Mathematics

Topic 1 · Pure Mathematics 1

📦 composition 复合			
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 reflection 反射			
 transformations 变换			
 translation 平移			
 stretch 伸缩			
 Coordinate geometry 坐标几何			
 gradient 斜率			
 equation of a straight line 直线方程			
 parallel 平行			
 perpendicular 垂直			

Further Mathematics

Topic 1 · Further Pure Mathematics 1

 zero matrix 零矩阵			
 identity matrix 单位矩阵			
 determinant 行列式			
 singular matrix 奇异矩阵			
 inverse matrix 逆矩阵			

Computer Science

Topics 1–2 · Information representation, Communication

 entropy 熵			
 spatial 空间			
 temporal 时间			
 network 网络			

 local area network 局域网			
 latency 延迟			
 wide area network 广域网			
 server 服务器			
 client 客户端			
 peer-to-peer 对等网络			
 thin client 瘦客户端			
 thick client 胖客户端			
 topology 拓扑			
 bus 总线			
 star 星形			
 mesh 网状			
 fault-tolerant 容错			
 cloud computing 云计算			
 scalability 可扩展性			
 Ethernet 以太网			
 twisted-pair 双绞线			
 fibre-optic 光纤			
 network interface card 网络接口卡			
 MAC address MAC 地址			
 switch 交换机			

Economics

Topic 1 · Basic economic ideas and resource allocation

% interest 利息

🏢 enterprise 企业家才能

↗️ profit 利润

🏠 non-renewable resources
不可再生资源

👤 entrepreneur 企业家

⌚ specialisation 专业化

👥 division of labour 劳动分
工

👤 worker 工人

↔️ mobility 流动性

🏠 occupational mobility 职
业流动性

🏠 geographical mobility 地
理流动性

👤 allocate 配置

🏠 market economy 市场经
济

🏠 planned economy 计划经
济

🏠 command economy 指令
经济

Morning Reading 晨读

Grade 11 · AS · Week 4

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Send a message to a friend abroad and it may cross the ocean in a tenth of a second. The message is split into **packets**, each stamped with the destination **IP address**. Every **router** on the way reads the address, consults its **routing table**, and forwards the packet towards its goal. At your school's edge, a **firewall** inspects the traffic and blocks anything dangerous. No single computer controls the journey; the network finds the way by itself.

In mechanics, motion in two dimensions becomes simple when you split a vector into a horizontal and a vertical **component**. Combine forces by adding them as vectors to get the **resultant**; a moving object's mass times velocity is its **momentum**.

No real country runs on markets alone. In a **mixed economy**, the **private sector** and the **public sector** work side by side. Prices act as the **price mechanism**: a rising price is both a signal and an **incentive**, telling producers where resources are wanted.

Talk about it 说一说:

1. Trace a message from your phone to a server abroad. Name each device it passes.
2. Petrol prices double. What signals and incentives does this send, and to whom?

Physics

Topics 1-2 · Physical quantities and units, Kinematics

⇒ momentum 动量	_____	_____	_____
□ coplanar 共面	_____	_____	_____
↗ resultant 合矢量	_____	_____	_____
+ perpendicular 垂直	_____	_____	_____
↖ component 分量	_____	_____	_____

↔ horizontal 水平			
↑ vertical 竖直			
∠ inclined plane 斜面			
↔ kinematics 运动学			
📏 distance 距离			
⏏ deceleration 减速度			
↗ gradient 斜率			
↗ tangent 切线			
⏏ uniform acceleration 匀加速			
⏏ trapezium 梯形			
↓ gravity 重力			
⇌ air resistance 空气阻力			
[:] symmetric 对称			

Chemistry

Topic 2 · Atoms, molecules and stoichiometry

⚖ balanced 配平			
◊ state symbols 状态符号			
💧 aqueous 水溶液			
= ionic equation 离子方程式			
👁 spectator ions 旁观离子			
÷ empirical formula 实验式			
⬡ molecular formula 分子式			

💧 **water of crystallisation**
结晶水

💧 **hydrated** 水合的

🔪 **anhydrous** 无水的

⚖️ **stoichiometry** 化学计量

% **percentage yield** 产率

⊖ **limiting reagent** 限量试剂

⊕ **excess reagent** 过量试剂

🔲 **hydrocarbons** 碳氢化合物

💧 **concentration** 浓度

⋮ **solute** 溶质

🧪 **solution** 溶液

Biology

Topic 2 · Biological molecules

🍷 **carbohydrate** 碳水化合物

🍷 **reducing sugar** 还原糖

☁️ **precipitate** 沉淀

🍷 **starch** 淀粉

🧪 **iodine** 碘

🌀 **emulsion** 乳浊液

🧪 **biuret** 双缩脲

📏 **semi-quantitative** 半定量

📏 **standardise** 标准化

💧 **concentration** 浓度

 **non-reducing sugar** 非还原糖

 **hydrochloric acid** 盐酸

 **neutralise** 中和

 **monomer** 单体

 **polymer** 聚合物

 **macromolecule** 大分子

 **monosaccharide** 单糖

 **glucose** 葡萄糖

 **disaccharide** 二糖

 **polysaccharide** 多糖

 **fructose** 果糖

 **maltose** 麦芽糖

 **sucrose** 蔗糖

Mathematics

Topic 1 · Pure Mathematics 1

 **circle** 圆

• **centre** 圆心

 **radius** 半径

 **tangent** 切线

— **diameter** 直径

 **radian** 弧度

 **arc** 弧

 **degrees** 度

 **sector** 扇形

— **chord** 弦

Further Mathematics

Topic 1 · Further Pure Mathematics 1

 **geometric transformation** 几何变换

• **invariant points** 不变点

— **invariant lines** 不变直线

 **polar coordinates** 极坐标

+ **Cartesian coordinates** 直角坐标

Computer Science

Topic 2 · Communication

 **hub** 集线器

 **wireless access point** 无线接入点

 **router** 路由器

 **packet** 数据包

 **IP address** IP 地址

 **routing table** 路由表

 **network address translation** 网络地址转换

 **DHCP** 动态主机配置协议

 **firewall** 防火墙

 **collision** 冲突

 **CSMA/CD** 载波侦听多路访问/冲突检测

 **full-duplex** 全双工

 **bit streaming** 流式传输

 **buffer** 缓冲

 **internet** 互联网

 **protocol** 协议

 **World Wide Web** 万维网

 **subnets** 子网

 **subnet mask** 子网掩码

 **ISP** 互联网服务提供商

 **URL** 统一资源定位符

 **domain name** 域名

 **Domain Name System**
域名系统

 **PSTN** 公共交换电话网

 **wireless network interface card** 无线网络接口卡

Economics

Topic 1 · Basic economic ideas and resource allocation

 **mixed economy** 混合经济

 **private sector** 私营部门

 **public sector** 公共部门

 **price mechanism** 价格机制

 signalling 信号传递			
 incentive 激励			
 rationing 配给			
 production possibility curve 生产可能性曲线			
 efficiency 效率			
 unemployment 失业			
 trade-off 取舍			
 economic growth 经济增长			
 technology 技术			
 economic decline 经济衰退			
 capital goods 资本品			

Morning Reading 晨读

Grade 11 · AS · Week 5

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Who pays for the streetlight? When it shines, it shines for everyone: my using it takes nothing from you. Economists call this **non-rivalry**. And nobody can be stopped from using it: **non-excludability**. Goods with both properties are **public goods**, and they create the **free-rider problem**: since people benefit without paying, no private firm wants to supply them. That is why street lighting and **national defence** are paid for by the state. A **merit good** like education is different: markets do supply it, but less than society would like.

Meanwhile, tiny computers hide all around you. An **embedded system** is a small computer inside another machine: a rice cooker, a lift, a traffic light. Its program, the **firmware**, is written once into memory. It reads a **sensor**, decides, and acts, millions of times without a screen or keyboard.

In mechanics, a thrown basketball is a **projectile**: gravity curves its path into a parabola. When two players collide, the total momentum just before equals the total just after; each **collision** obeys this law.

Talk about it 说一说:

1. Is a park a public good? Test it: non-rivalry, non-excludability.
2. Count the embedded systems you met before school this morning.

Physics

Topics 2-3 · Kinematics, Dynamics

[] **light gate** 光电门

⌚ **reaction-time** 反应时间

↕ **range** 射程

↗ projectile 抛体			
⇨ linear momentum 动量			
↗ resultant force 合力			
⌘ collision 碰撞			
⚡ impulse 冲量			
↔ kinetic energy 动能			
→ external force 外力			
⚡ electrostatic 静电			
↑ normal contact force 支持力			
🚀 thrust 推力			
⊕ gravitational field 重力场			
🌀 friction 摩擦力			
💧 viscous 黏性			
≡ drag 阻力			
💧 fluid 流体			

Chemistry

Topics 2-3 · Atoms, molecules and stoichiometry, Chemical bonding

🧪 titration 滴定			
# significant figures 有效数字			
🔗 electronegativity 电负性			
🔗 Pauling electronegativity 鲍林电负性			
🔗 ionic bonding 离子键			

 electrostatic attraction 静电引力			
 lattice 晶格			
 metallic bonding 金属键			
 delocalised electrons 离域电子			
 covalent bonding 共价键			
 expand the octet 扩展八隅体			
 coordinate bond 配位键			
 sigma bond σ 键			
 overlap 重叠			
 pi bond π 键			
 hybridisation 杂化			
 bond energy 键能			
 bond length 键长			

Biology

Topic 2 · Biological molecules

 covalent bond 共价键			
 glycosidic bond 糖苷键			
 condensation 缩合			
 hydrolysis 水解			
 amylose 直链淀粉			
 amylopectin 支链淀粉			
 glycogen 糖原			

 insoluble 不溶			
 water potential 水势			
 osmosis 渗透			
 hydrogen bond 氢键			
 microfibril 微纤丝			
 triglyceride 甘油三酯			
 non-polar 非极性			
 hydrophobic 疏水			
 glycerol 甘油			
 fatty acid 脂肪酸			
 ester bond 酯键			
 saturated 饱和			
 double bond 双键			
 unsaturated 不饱和			
 insulation 隔热			
 phosphate 磷酸			

Mathematics

Topic 1 · Pure Mathematics 1

 segment 弓形			
 sine 正弦			
 cosine 余弦			
 tangent function 正切			
 principal value 主值			

= identity 恒等式			
∧ trigonometric equation 三角方程			
[] binomial expansion 二项 展开式			
⊞ binomial coefficient 二项 式系数			
≡ progression 数列			

Further Mathematics

Topic 1 · Further Pure Mathematics 1

⌒ polar curves 极坐标曲线			
□ plane 平面			
× vector product 向量积			
↗ vectors 向量			
∞ skew lines 异面直线			

Computer Science

Topic 3 · Hardware

→] input devices 输入设备			
[→ output devices 输出设备			
💻 primary memory 主存储 器			
🖨 processor 处理器			
💾 secondary storage 辅助存 储器			
🖥 embedded system 嵌入式 系统			

 firmware 固件			
 laser printer 激光打印机			
 drum 感光鼓			
 toner 墨粉			
 3D printer 3D 打印机			
 microphone 麦克风			
 capacitor 电容器			
 analogue-to-digital converter 模数转换器			
 hard disk 硬盘			
 tracks 磁道			
 sectors 扇区			
 read/write head 读写头			
 solid-state drive 固态硬盘			
 transistors 晶体管			
 optical disc 光盘			
 touchscreen 触摸屏			
 resistive 电阻式			
 capacitive 电容式			
 virtual reality 虚拟现实			

Economics

Topics 1–2 · Basic economic ideas and resource allocation, The price system and the microeconomy

 consumer goods 消费品			
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 free good 免费物品			
 economic good 经济物品			
 private good 私人物品			
 rivalry 竞争性			
 excludability 排他性			
 public good 公共物品			
 non-rivalry 非竞争性			
 non-excludability 非排他性			
 free-rider problem 搭便车问题			
 national defence 国防			
 merit good 优值品			
 demerit good 劣值品			
 information failure 信息失灵			
 demand 需求			

Morning Reading 晨读

Grade 11 · AS · Week 6

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

A skydiver 跳伞员 steps out of the plane. At first she accelerates: gravity wins. But as she speeds up, air resistance grows, until it exactly balances her weight. From then on she falls at a steady **terminal velocity**. Opening the parachute increases the air resistance enormously, so she slows to a new, safe terminal velocity. When she lands softly, bending her knees, she is using **deformation** to extend the stopping time and reduce the force.

Computers make a similar trade between speed and safety. **RAM** is fast but **volatile**: switch off the power and everything in it is gone. **ROM** is **non-volatile**, keeping its contents forever, so the start-up program lives there. The **cache** keeps the busiest data closest to the processor.

Why does the third slice of pizza taste worse than the first? Economists say the extra satisfaction from each unit, the **marginal utility**, falls as you consume more. This law of **diminishing marginal utility** helps explain why the **demand curve** slopes downwards.

Talk about it 说一说:

1. Why does a parachute have to be large? Explain using forces.
2. Give your own example of diminishing marginal utility from this week.

Physics

Topics 3-4 · Dynamics, Forces, density and pressure

× **coefficient** 系数

↓ **terminal velocity** 收尾速度

☯ **parachutist** 跳伞者

 gravitational potential
energy 重力势能

 thermal energy 热能

 conservation of
momentum 动量守恒

 explosion 爆炸

 recoil 反冲

 elastic collision 弹性碰撞

 relative speed 相对速率

 inelastic collision 非弹性
碰撞

 deformation 形变

 head-on 正面

 stationary 静止

 mass-flow rate 质量流率

 centre of gravity 重心

 centre of mass 质心

 free-body diagram 受力
图

Chemistry

Topic 3 · Chemical bonding

 VSEPR theory 价层电子
对互斥理论

 lone pair 孤对电子

 bonding pair 成键电子对

 bond angle 键角

— linear 直线形			
△ trigonal planar 平面三角形			
⬠ tetrahedral 四面体形			
△ pyramidal 三角锥形			
↷ bent 角形			
◇ trigonal bipyramidal 三角双锥形			
⬡ octahedral 八面体形			
↻ intermolecular forces 分子间作用力			
⚡ polarity 极性			
↔ dipole 偶极			
→ dipole moment 偶极矩			
↻ van der Waals' forces 范德华力			
⚡ London dispersion forces 伦敦色散力			
⚡ instantaneous dipole 瞬时偶极			

Biology

Topic 2 · Biological molecules

💧 hydrophilic 亲水			
⚡ polar 极性			
⊕ amino group 氨基			
⚡ carboxyl group 羧基			

 side chain 侧链			
 peptide bond 肽键			
 polypeptide 多肽			
— primary structure 一级结构			
 secondary structure 二级结构			
 helix 螺旋			
 pleated sheet 折叠片			
 tertiary structure 三级结构			
 quaternary structure 四级结构			
 hydrophobic interactions 疏水作用			
 ionic bond 离子键			
 disulfide bond 二硫键			
 globular protein 球状蛋白质			
 soluble 可溶			
 fibrous protein 纤维状蛋白质			
 haemoglobin 血红蛋白			
 oxygen 氧气			
 haem group 血红素			
 iron 铁			

Mathematics

Topic 1 · Pure Mathematics 1

+ arithmetic progression

等差数列

— common difference 公差

◇ term 项

× geometric progression

等比数列

÷ common ratio 公比

∞ converges 收敛

∞ sum to infinity 无穷和

∇ Differentiation 微分

↷ gradient of a curve 曲线
斜率

→| limit 极限

Further Mathematics

Topic 1 · Further Pure Mathematics 1

↷ mathematical induction

数学归纳法

💡 conjecture 猜想

✓ inductive proof 归纳证明

[:] symmetric functions 对
称函数

√ discriminant 判别式

Computer Science

Topics 3–4 · Hardware, Processor Fundamentals

 accelerometer 加速度计			
 gyroscope 陀螺仪			
 RAM 随机存取存储器			
 volatile 易失性			
 ROM 只读存储器			
 non-volatile 非易失性			
 SRAM 静态 RAM			
 flip-flop 触发器			
 cache 高速缓存			
 DRAM 动态 RAM			
 refreshed 刷新			
 monitoring 监控			
 control system 控制系统			
 sensor 传感器			
 thermistor 热敏电阻			
 actuator 执行器			
 feedback 反馈			
 logic gate 逻辑门			
 Boolean 布尔			
 truth table 真值表			
 logic circuit 逻辑电路			
 Von Neumann architecture 冯·诺依曼体系结构			
 stored program 存储程序			

 **arithmetic and logic**
unit 算术逻辑单元

 **control unit** 控制单元

Economics

Topic 2 · The price system and the microeconomy

 **price** 价格

quantity demanded 需求
量

 **demand curve** 需求曲线

 **shift** 移动

 **determinants** 决定因素

 **income** 收入

 **substitute** 替代品

 **complement** 互补品

 **market demand** 市场需求

 **utility** 效用

+ **marginal utility** 边际效用

 **diminishing marginal**
utility 边际效用递减

 **supply** 供给

quantity supplied 供给量

 **supply curve** 供给曲线

Morning Reading 晨读

Grade 11 · AS · Week 7

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Why is the door handle far from the hinge? Because a force turns an object more easily when it acts far from the **pivot**. The turning effect, the **moment**, equals the force times the **perpendicular distance** from the pivot to its **line of action**. Scissors, spanners and wheelbarrows are all machines built around this idea. Two equal and opposite forces that do not share a line form a **couple**, producing pure rotation, which is how you turn a steering wheel. A body at rest with no net force and no net moment is in **equilibrium**.

Inside the processor, special registers keep order. The **Program Counter** holds the address of the next instruction; the **Accumulator** holds the value being worked on. Instructions and data travel on the **address bus** and **data bus**, and the **clock speed** sets the rhythm.

Back in economics: if the metro fare rises 10% and passenger numbers barely change, demand is **inelastic**, and the operator's **total revenue** rises. For a **luxury** with many alternatives, the same rise would drive customers away.

Talk about it 说一说:

1. Why is it easier to open a door by pushing its edge, not its middle?
2. Metro fares rise 10%. Predict what happens to revenue, and explain.

Physics

Topic 4 · Forces, density and pressure

⌚ **moment** 力矩

📏 **perpendicular distance**
垂直距离

— **line of action** 作用线

 lever arm 力臂			
 pivot 支点			
 clockwise 顺时针			
 anticlockwise 逆时针			
 couple 力偶			
 torque 力偶矩			
 translation 平动			
 equilibrium 平衡			
 angular acceleration 角 加速度			
 principle of moments 力 矩原理			
 vector triangle 矢量三角 形			
 sine rule 正弦定理			
 cosine rule 余弦定理			
 cross-sectional area 横截 面积			
 hydrostatic pressure 流 体静压强			

Chemistry

Topics 3–4 · Chemical bonding, States of matter

 induced dipole 诱导偶极			
 permanent dipole 永久偶 极			
 hydrogen bonding 氢键			

🌡 boiling point 沸点

💧 surface tension 表面张力

⊞ dot-and-cross diagram
点叉图

⚡ collide 碰撞

↓ pressure 压强

⇌ ideal gas 理想气体

☁ real gas 实际气体

= ideal gas equation 理想
气体方程

🌡 kelvin 开尔文

🔑 gas constant 气体常量

💎 crystalline solid 晶体

⊞ giant ionic 离子晶体

⬡ simple molecular 分子晶
体

⊙ fullerene 富勒烯

⊞ giant molecular 原子晶体

Biology

Topics 2–3 · Biological molecules, Enzymes

🍍 collagen 胶原蛋白

🦵 tendon 肌腱

🍍 fibre 纤维

💧 solvent 溶剂

🔥 specific heat capacity 比
热容

☁ latent heat of
vaporisation 汽化潜热

☁ evaporate 蒸发

⚡ catalyse 催化

🏠 intracellular 细胞内

✂ catalase 过氧化氢酶

🏠 extracellular 细胞外

💧 secrete 分泌

✂ amylase 淀粉酶

🍴 digest 消化

🔗 active site 活性位点

🔑 substrate 底物

🔗 enzyme-substrate
complex 酶底物复合物

📦 product 产物

🔗 complementary 互补

🔑 specificity 专一性

🔑 lock-and-key hypothesis
锁钥学说

👉 induced-fit hypothesis
诱导契合学说

⚡ activation energy 活化能

Mathematics

Topic 1 · Pure Mathematics 1

↗ derivative 导数

 chain rule 链式法则			
 second derivative 二阶导数			
 normal 法线			
 increasing function 增函数			
 decreasing function 减函数			
 rate of change 变化率			
 stationary point 驻点			
 minimum point 极小值点			
 maximum point 极大值点			

Further Mathematics

Topic 1 · Further Pure Mathematics 1

 turning points 驻点			
 partial fractions 部分分式			
 rotation 旋转			
 reflection 反射			
 enlargement 放大			

Computer Science

Topic 4 · Processor Fundamentals

 clock speed 时钟频率			
 Program Counter 程序计数器			

 Memory Address Register 内存地址寄存器			
 Memory Data Register 内存数据寄存器			
 Current Instruction Register 当前指令寄存器			
+ Accumulator 累加器			
 Status Register 状态寄存器			
 flags 标志			
# Index Register 变址寄存器			
 general-purpose registers 通用寄存器			
 buses 总线			
 address bus 地址总线			
 data bus 数据总线			
 control bus 控制总线			
 cores 核心			
 word size 字长			
 page 页			
 port 端口			
 peripheral 外围设备			
 fetch-execute cycle 取指-执行周期			
 interrupt 中断			
 interrupt service routine 中断服务程序			

 machine code 机器码

 assembly language 汇编语言

 mnemonics 助记符

Economics

Topic 2 · The price system and the microeconomy

 costs of production 生产成本

 subsidy 补贴

 market supply 市场供给

 price elasticity of demand 需求价格弹性

 elastic 富有弹性

 inelastic 缺乏弹性

= unit elastic 单位弹性

— perfectly inelastic 完全无弹性

↔ perfectly elastic 完全有弹性

♥ necessity 必需品

💎 luxury 奢侈品

 total revenue 总收益

 income elasticity of demand 需求收入弹性

 normal good 正常品

 inferior good 低档品

Morning Reading 晨读

Grade 11 · AS · Week 8

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

A steel ship weighs thousands of tonnes. Why does it float when a steel coin sinks? A body in water feels an upward force, the **upthrust**, equal to the weight of the water it has **displaced**. This is **Archimedes' principle**. The ship's hull is shaped to push aside an enormous volume of water, so the upthrust can match its huge weight. The coin displaces almost nothing, so it sinks. Even the air pushes on us: **atmospheric pressure** at sea level is about 100,000 pascals, though we never notice it.

Chemists this week met energy in reactions. An **exothermic** reaction releases heat, like the hand warmers 暖手宝 sold in winter; an **endothermic** one absorbs it, like the instant cold packs used for sports injuries. Every reaction must first climb over its **activation energy**.

In the market diagram, the crossing point of demand and supply gives the **equilibrium price**. Below it there is **excess demand**: a **shortage**, queues, and pressure for the price to rise.

Talk about it 说一说:

1. A ship floats but a coin sinks. Explain the difference in one sentence.
2. Ice-cream sellers cut prices every evening. What does this say about equilibrium?

Physics

Topics 4-5 · Forces, density and pressure, Work, energy and power

↓ **depth** 深度

☁ **atmospheric pressure** 大气压强

👁 **submerged** 浸没

↑ upthrust 浮力			
→ displaced 排开			
⚖ Archimedes' principle 阿基米德原理			
⚖ floating 漂浮			
↕ tension 张力			
⌒ newton meter 弹簧测力计			
🔒 incompressible 不可压缩			
🔒 closed system 封闭系统			
⚡ conservation of energy 能量守恒			
🔄 elastic potential energy 弹性势能			
🔌 electrical energy 电能			
🔥 chemical energy 化学能			
✂ frictionless 无摩擦			
📐 ramp 斜坡			
% efficiency 效率			

Chemistry

Topics 4-5 · States of matter, Chemical energetics

🔗 covalent bonds 共价键			
📦 silicon(IV) oxide 二氧化硅			
📖 graphite 石墨			
💎 diamond 金刚石			

⋮ giant metallic 金属晶体			
🔥 melting point 熔点			
⚡ electrical conductivity 导电性			
💧 solubility 溶解度			
🔥 enthalpy change 焓变			
🔥 exothermic 放热			
❄️ endothermic 吸热			
🔄 reaction pathway diagram 反应路径图			
⚡ activation energy 活化能			
📏 standard conditions 标准 条件			
🔥 enthalpy change of reaction 反应焓变			
🔥 enthalpy change of formation 生成焓变			
🔥 enthalpy change of combustion 燃烧焓变			
🔥 enthalpy change of neutralisation 中和焓变			

Biology

Topics 3-4 · Enzymes, Cell membranes and transport

🌡️ temperature 温度			
👁️ colorimeter 比色计			
🕒 rate of reaction 反应速率			
⚡ kinetic energy 动能			

 collide 碰撞			
 optimum temperature 最适温度			
 denature 变性			
 buffer solution 缓冲液			
 inhibitor 抑制剂			
 Michaelis–Menten constant 米氏常数			
 affinity 亲和力			
 reversible 可逆			
 competitive inhibitor 竞 争性抑制剂			
 non-competitive inhibitor 非竞争性抑制剂			
 immobilised enzyme 固 定化酶			
 alginate 海藻酸盐			
 fluid mosaic model 流动 镶嵌模型			
 bilayer 双层			
 carrier protein 载体蛋白			
 channel protein 通道蛋白			
 cholesterol 胆固醇			
 fluidity 流动性			
 glycolipid 糖脂			

Mathematics

Topics 1–2 · Pure Mathematics 1, Pure Mathematics 2

 Integration 积分			
+ constant of integration 积分常数			
[] definite integral 定积分			
 region 区域			
 volume of revolution 旋转体体积			
 composition of functions 复合函数			
 logarithms 对数			
 exponential function 指数函数			
[] modulus 绝对值			
x² polynomial 多项式			

Further Mathematics

Topics 1–3 · Further Pure Mathematics 1, Further Mechanics

 stretch 拉伸			
 shear 切变			
 Further Mechanics 进阶力学			
 projectile 抛射体			
 constant acceleration 匀加速			

Computer Science

Topics 4–5 · Processor Fundamentals, System Software

 assembler 汇编器			
--	--	--	--

 symbol table 符号表			
 label 标签			
 forward references 前向引用			
 addressing mode 寻址方式			
 immediate addressing 立即寻址			
 direct addressing 直接寻址			
 indirect addressing 间接寻址			
 indexed addressing 变址寻址			
 relative addressing 相对寻址			
 logical shift 逻辑移位			
 mask 掩码			
 cache memory 高速缓存			
 Immediate Access Store 立即存取存储器			
 special purpose registers 专用寄存器			
 register transfer 寄存器传送			
 cyclic shift 循环移位			
 operating system 操作系统			
 process management 进程管理			

 process 进程			
 memory management 内存管理			
 virtual memory 虚拟内存			
 paging 分页			
 device driver 设备驱动			
 utility program 实用程序			

Economics

Topic 2 · The price system and the microeconomy

 cross elasticity of demand 需求交叉弹性			
 price elasticity of supply 供给价格弹性			
 spare capacity 闲置产能			
 stocks 库存			
 momentary 瞬时			
 short run 短期			
 long run 长期			
 equilibrium 均衡			
 equilibrium price 均衡价格			
 equilibrium quantity 均衡数量			
 disequilibrium 非均衡			
 excess demand 超额需求			
 shortage 短缺			

↗ **excess supply** 超额供给

🏠 **product market** 产品市场

Morning Reading 晨读

Grade 11 · AS · Week 9

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Stretch a spring gently and it returns to its original length when you let go: the behaviour is **elastic**. **Hooke's law** says the **extension** is proportional to the **load**, and the **spring constant** measures the stiffness. Pull too far, past the **limit of proportionality**, and finally the spring deforms permanently: it has become **plastic**. Springs hide everywhere: in pens, mattresses, keyboards and car suspensions.

A factory beside a river makes cheap paint but releases waste into the water. The firm counts only its **private cost**; the fishermen downstream carry the **external cost**. Economists call the fishermen a **third party**, and the pollution a **negative externality**. Add private and external together and you get the true **social cost** of the paint, which the market price ignores. This is why governments tax pollution.

Programmers met translators this week. A **compiler** converts the whole program into machine code once, producing a fast **executable**; an **interpreter** translates line by line, which is slower but easier for testing.

Talk about it 说一说:

1. Name three objects you used today that contain a spring.
2. A neighbour plays loud music at midnight. Explain this as an externality.

Physics

Topics 5–6 · Work, energy and power, Deformation of solids

⚡ **voltage** 电压

🌀 **spring** 弹簧

✕ **compression** 压缩

 spring constant 劲度系数			
 tensile 拉伸			
 extension 伸长量			
 load 负载			
 Hooke's law 胡克定律			
 limit of proportionality 比例极限			
 elastic 弹性			
 plastic 塑性			
 series 串联			
 parallel 并联			
 strain 应变			
 Young modulus 杨氏模量			
 pulley 滑轮			
 micrometer 螺旋测微器			
 elastic limit 弹性极限			

Chemistry

Topics 5–7 · Chemical energetics, Electrochemistry, Equilibria

 specific heat capacity 比热容			
 Hess's law 盖斯定律			
 energy cycle 能量循环			
 redox 氧化还原			
 oxidation 氧化			

↓ reduction 还原			
↔ electron transfer 电子转移			
↗ disproportionation 歧化			
↑ oxidising agent 氧化剂			
↓ reducing agent 还原剂			
↔ reversible reaction 可逆反应			
→ forward reaction 正反应			
← reverse reaction 逆反应			
🔒 closed system 封闭系统			
⚖️ dynamic equilibrium 动态平衡			
⚖️ Le Chatelier's principle 勒夏特列原理			
⚖️ equilibrium 平衡			
⚡ catalyst 催化剂			

Biology

Topic 4 · Cell membranes and transport

🍬 glycoprotein 糖蛋白			
🚩 antigen 抗原			
🛡️ stability 稳定性			
🚰 permeability 通透性			
🚰 partially permeable membrane 半透膜			
📡 cell signalling 细胞信号传递			

🔑 ligand 配体			
⚡ hormone 激素			
🎯 target cell 靶细胞			
👂 receptor 受体			
🚫 passive 被动			
⇌ diffusion 扩散			
⇌ simple diffusion 简单扩散			
↘ concentration gradient 浓度梯度			
☁ carbon dioxide 二氧化碳			
± ion 离子			
🚪 facilitated diffusion 易化 扩散			
⬆ active transport 主动运 输			
📦 endocytosis 胞吞作用			
📤 exocytosis 胞吐作用			
📦 volume 体积			
📐 surface area 表面积			
◯ agar 琼脂			

Mathematics

Topic 2 · Pure Mathematics 2

× ² degree 次数			
÷ quotient 商			
% remainder 余数			

% remainder theorem 余数定理

× factor theorem 因式定理

×² indices 指数

laws of logarithms 对数定律

f natural logarithm 自然对数

— linear form 线性形式

secant 正割

Further Mathematics

Topic 3 · Further Mechanics

+ Cartesian equation 直角坐标方程

trajectory 轨迹

moment 力矩

centre of mass 质心

[:] symmetry 对称

Computer Science

Topics 5–6 · System Software, Security, privacy and data integrity

disk defragmenter 碎片整理

backup 备份

antivirus 杀毒软件

program library 程序库

 subroutines 子程序			
 static library 静态库			
 dynamic library 动态库			
 translator 翻译器			
 compiler 编译器			
 executable 可执行文件			
 interpreter 解释器			
 bytecode 字节码			
 virtual machine 虚拟机			
 just-in-time compilation 即时编译			
 integrated development environment 集成开发环境			
 syntax highlighting 语法高亮			
 auto-complete 自动补全			
 debugger 调试器			
 breakpoints 断点			
 version control 版本控制			
 refactoring 重构			
 unit test 单元测试			
 security 安全			
 unauthorised 未授权			

Economics

Topics 2–3 · The price system and the microeconomy, Government microeconomic intervention

 factor market 要素市场			
 wage 工资			
 foreign exchange market 外汇市场			
 exchange rate 汇率			
 consumer surplus 消费者 剩余			
 producer surplus 生产者 剩余			
 welfare 福利			
 market failure 市场失灵			
 externality 外部性			
 third party 第三方			
 negative externality 负 外部性			
 external cost 外部成本			
 social cost 社会成本			
 private cost 私人成本			
 positive externality 正外 部性			

Morning Reading 晨读

Grade 11 · AS · Week 10

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Pluck a guitar string and the sound you hear left the string as a **progressive wave** through the air. Its **frequency**, measured in **hertz**, sets the pitch; its **amplitude** sets the loudness. The air is pushed back and forth along the direction of travel, so sound is a **longitudinal wave**; light, vibrating across its direction of travel, is a **transverse wave**.

Malicious software comes in families, and the names matter. A **virus** attaches itself to a real program and spreads when the program runs; a **worm** travels through **networks** on its own. A **Trojan horse** pretends to be something useful. **Spyware** quietly watches what you type, and **ransomware** locks your files and demands payment. Most attacks still begin with **phishing**, a fake message that harvests passwords from busy people.

When one firm controls a market, it is a **monopoly**, and it may raise prices above the competitive level. Governments answer with **regulation** or, for essentials, a legal **maximum price**.

Talk about it 说一说:

1. Which is more dangerous: a virus or a phishing email? Argue your case.
2. Your city has one water company. Why might the government watch its prices?

Physics

Topics 6–7 · Deformation of solids, Waves

 **trapezia** 梯形

 **wave** 波

 **medium** 介质

 oscillate 振动			
 transverse wave 横波			
 longitudinal wave 纵波			
 progressive wave 行波			
 amplitude 振幅			
 wavelength 波长			
 in phase 同相			
 crest 波峰			
 period 周期			
 frequency 频率			
 hertz 赫兹			
 phase difference 相位差			
 radian 弧度			
 propagate 传播			
 cathode-ray oscilloscope 示波器			

Chemistry

Topic 7 · Equilibria

 equilibrium constant 平 衡常数			
 partial pressure 分压			
 mole fraction 摩尔分数			
 Haber process 哈伯法			
 Contact process 接触法			

 acid 酸			
+ proton donor 质子供体			
 base 碱			
— proton acceptor 质子受体			
 strong acid 强酸			
 strong base 强碱			
 dissociated 解离			
 weak acid 弱酸			
 weak base 弱碱			
 universal indicator 通用指示剂			
 Neutralisation 中和			
 salt 盐			
 titration curve 滴定曲线			

Biology

Topics 4–5 · Cell membranes and transport, The mitotic cell cycle

 dialysis tubing 透析袋			
 solute 溶质			
 distilled water 蒸馏水			
 turgid 膨胀			
 plasmolysis 质壁分离			
 haemolysis 溶血			
 chromosome 染色体			
 histone 组蛋白			

 replication 复制			
 sister chromatids 姐妹染色单体			
• centromere 着丝粒			
 telomere 端粒			
 mitosis 有丝分裂			
 daughter cell 子细胞			
 gene 基因			
 multicellular 多细胞			
 organism 生物体			
 tissue 组织			
 asexual reproduction 无性生殖			
 cell cycle 细胞周期			
 interphase 间期			
 cytokinesis 胞质分裂			
 stem cell 干细胞			

Mathematics

Topic 2 · Pure Mathematics 2

 cosecant 余割			
 cotangent 余切			
= trigonometric identities 三角恒等式			
+ compound angle 复合角			
 double angle 二倍角			

 **R-formula** 辅助角公式

 **product rule** 乘积法则

 **quotient rule** 商法则

 **parametric equations** 参数方程

 **implicitly** 隐式

Further Mathematics

Topic 3 · Further Mechanics

 **equilibrium** 平衡

 **toppling** 翻倒

 **sliding** 滑动

 **angular speed** 角速度

 **centripetal acceleration**
向心加速度

Computer Science

Topic 6 · Security, privacy and data integrity

 **privacy** 隐私

 **integrity** 完整性

 **malware** 恶意软件

 **virus** 病毒

 **worm** 蠕虫

 **networks** 网络

 **Trojan horse** 木马

 **spyware** 间谍软件

 ransomware 勒索软件			
 adware 广告软件			
 phishing 网络钓鱼			
 hacking 黑客入侵			
 denial of service 拒绝服务			
 eavesdropping 窃听			
 man-in-the-middle 中间人攻击			
 social engineering 社会工程			
 encryption 加密			
 audit logs 审计日志			
 VPN 虚拟专用网			
 authentication 身份验证			
 two-factor authentication 双因素认证			
 authorisation 授权			
 least-privilege 最小权限			
 plaintext 明文			

Economics

Topic 3 · Government microeconomic intervention

 external benefit 外部收益			
 monopoly 垄断			
 monopoly power 垄断势力			

 inequality 不平等			
 asymmetric information 信息不对称			
 indirect tax 间接税			
 incidence of a tax 税收归宿			
 maximum price 最高限价			
 minimum price 最低限价			
 buffer stock 缓冲库存			
 regulation 管制			
 state provision 政府提供			
 tradable permits 可交易 许可证			
 government failure 政府 失灵			
 black market 黑市			

Morning Reading 晨读

Grade 11 · AS · Week 11

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

How big is an economy? Add up the value of everything produced inside the country in a year and you get the **gross domestic product**. But be careful with rising prices: **nominal** GDP can grow while the country actually makes no more than before. **Real** GDP removes the effect of inflation, and dividing by the population gives GDP **per capita**, a rough measure of the average person's income. Rough, because it says nothing about how income is shared, or about unpaid work at home.

An ambulance races past and its siren drops in pitch as it passes. This is the **Doppler effect**: waves from an approaching **source** reach the **observer** squeezed together, at higher frequency; as the source leaves, the waves stretch out. Astronomers use exactly this to show distant galaxies rushing away from us.

To keep data honest on its journey, computers add checks: a **parity check** counts ones, a **checksum** sums the bytes, and **encryption** with a **public key** and a **private key** keeps the content secret.

Talk about it 说一说:

1. Nominal GDP rose 5%, inflation was 5%. Did the economy really grow?
2. Where else have you heard the Doppler effect? Describe the sound.

Physics

Topic 7 · Waves

 **time-base** 时基

 **y-gain** 垂直增益

 **intensity** 强度

• point source 点源			
» wavefront 波前			
<> rarefaction 稀疏			
≈ sine curve 正弦曲线			
↑ source 波源			
☉ observer 观察者			
(••) Doppler effect 多普勒效应			
(••) electromagnetic wave 电磁波			
☞ electromagnetic spectrum 电磁波谱			
☐ microwaves 微波			
☹ infrared 红外线			
☼ ultraviolet 紫外线			
[] X-rays X 射线			
☸ gamma-rays γ 射线			
≡ polarisation 偏振			

Chemistry

Topics 7–10 · Equilibria, Reaction kinetics, The Periodic Table: chemical periodicity, Group 2

☹ indicator 指示剂			
☹ rate of reaction 反应速率			
☹ collision frequency 碰撞频率			
✓ effective collision 有效碰撞			

✕ non-effective collision 无效碰撞

⌋ Boltzmann distribution 玻尔兹曼分布

⚡ catalysis 催化作用

⚙ reaction mechanism 反应机理

⊗ homogeneous catalyst 均相催化剂

≡ heterogeneous catalyst 多相催化剂

↔ periodicity 周期性

○ valence shell 价层

⊗ oxide 氧化物

↔ amphoteric 两性

💧 hydroxide 氢氧化物

💧 hydrolysis 水解

⚡ reactivity 反应活性

⊗ sulfate 硫酸盐

Biology

Topics 5–6 · The mitotic cell cycle, Nucleic acids and protein synthesis

♂ differentiate 分化

⊙ tumour 肿瘤

○ prophase 前期

♀ spindle 纺锤体

≡ metaphase 中期

— equator 赤道			
↔ anaphase 后期			
↗ telophase 末期			
□ nucleotide 核苷酸			
⊙ base 碱基			
□ adenine 腺嘌呤			
⬡ ribose 核糖			
⬡ purine 嘌呤			
□ guanine 鸟嘌呤			
⊙ pyrimidine 嘧啶			
□ cytosine 胞嘧啶			
⊙ thymine 胸腺嘧啶			
□ uracil 尿嘧啶			
↻ double helix 双螺旋			
— strand 链			
⬡ deoxyribose 脱氧核糖			
⌘ phosphodiester bond 磷酸二酯键			
⌘ complementary base pairing 碱基互补配对			

Mathematics

Topics 2–4 · Pure Mathematics 2, Mechanics

⬡ trapezium rule 梯形法则			
√ root 根			

↕ sign change 变号

↺ iteration 迭代

↺ iterative formula 迭代公式

∞ converge 收敛

∫ substitution integration by 换元积分

⚙ Mechanics 力学

→ force 力

↗ components 分量

Further Mathematics

Topic 3 · Further Mechanics

○ horizontal circle 水平圆

○ vertical circle 竖直圆

↔ Hooke's law 胡克定律

↗ modulus of elasticity 弹性模量

↪ elastic potential energy 弹性势能

Computer Science

Topics 6–7 · Security, privacy and data integrity, Ethics and Ownership

🔒 ciphertext 密文

🔑 Symmetric encryption 对称加密

🔑 asymmetric encryption 非对称加密

 public key 公钥			
 private key 私钥			
 access control 访问控制			
 Validation 验证			
 check digit 校验位			
 Verification 核对			
 parity check 奇偶校验			
 checksum 校验和			
 cyclic redundancy check 循环冗余校验			
 pharming 域名欺骗			
 hackers 黑客			
 user accounts 用户账户			
 digital signatures 数字签名			
 anti-spyware 反间谍软件			
 access rights 访问权限			
 biometrics 生物识别			
 ethics 伦理			
 confidentiality 保密性			
 conflicts of interest 利益冲突			
 intellectual property 知识产权			
 copyright 版权			

Economics

Topics 3-4 · Government microeconomic intervention, The macroeconomy

≡ flow 流量

💎 wealth 财富

📦 stock 存量

↗️ progressive tax 累进税

% percentage 百分比

💰 benefits 福利金

↔️ transfer payments 转移支付

↕️ redistribution 再分配

🏠 national income 国民收入

⊕ gross domestic product
国内生产总值

⊕ gross national income 国民总收入

🏷️ nominal 名义

⊙ real 实际

👤 per capita 人均

🏠 standard of living 生活水平

Morning Reading 晨读

Grade 11 · AS · Week 12

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

A student asks an image generator for a painting "in the style of a famous artist", and in seconds it appears. **Artificial intelligence** systems learn patterns from millions of examples; this is **machine learning**, and the deepest versions use **neural networks** loosely inspired by the brain. But who owns the picture? The artists whose work trained the model were never asked. **Copyright** law protects creative work, and **intellectual property** in general, yet it was written long before **deep learning** existed. Some programmers choose **open-source** licences that invite sharing; others sell **proprietary** software and guard the code.

In physics, two waves meeting on a string add together: this is **superposition**. Send waves down a rope tied at one end and the reflections combine into a **stationary wave**, with still points called **nodes** and wildly moving points called **antinodes**, the physics behind every guitar note.

Economists picture money moving in a **circular flow of income** between households and firms. **Injections** such as **investment** enlarge the flow; **leakages** such as **saving** shrink it.

Talk about it 说一说:

1. Should an AI image trained on an artist's work need the artist's permission?
2. Press a guitar string at its middle. Predict what happens to the note.

Physics

Topics 7-8 · Waves, Superposition

≡ **plane-polarised** 平面偏振

∇ **polarising filter** 偏振片

— **transmission axis** 透光轴

% **Malus's law** 马吕斯定律

↗ **vector sum** 矢量和

≡ **superposition** 叠加

+ **constructive interference** 相长干涉

∨ **trough** 波谷

— **destructive interference**
相消干涉

Λ **stationary wave** 驻波

[:] **reflected** 反射

• **node** 波节

○ **antinode** 波腹

↔ **antiphase** 反相

□ **resonance tube** 共鸣管

— **fundamental** 基频

⊞ **diffraction** 衍射

□ **obstacle** 障碍物

Chemistry

Topics 10–12 · Group 2, Group 17, Nitrogen and sulfur

△ **carbonate** 碳酸盐

↗ **thermal decomposition**
热分解

⊗ **nitrate** 硝酸盐

☑ **thermal stability** 热稳定性

 halogen 卤素			
 volatility 挥发性			
 hydrogen halide 卤化氢			
 halide ion 卤离子			
 ammonia 氨			
 precipitate 沉淀			
 water purification 水净化			
 bacteria 细菌			
= triple bond 三键			
 basicity 碱性			
 ammonium ion 铵离子			
→ displacement 置换			
 internal combustion engine 内燃机			
 catalytic converter 催化转化器			

Biology

Topics 6–7 · Nucleic acids and protein synthesis, Transport in plants

 base pair 碱基对			
↕ antiparallel 反平行			
 semi-conservative replication 半保留复制			
 polymerase 聚合酶			
→ leading strand 前导链			
← lagging strand 后随链			

 ligase 连接酶			
{ } triplet 三联体			
{ } codon 密码子			
 transcription 转录			
 template strand 模板链			
 non-transcribed strand 非转录链			
 primary transcript 初级 转录本			
✓ exon 外显子			
✂ intron 内含子			
↔ translation 翻译			
{ } anticodon 反密码子			
↯ mutation 突变			
 substitution 替换			
 deletion 缺失			
+ insertion 插入			
↑ xylem 木质部			
 mineral ion 矿物离子			

Mathematics

Topic 4 · Mechanics

↗ resultant 合力			
⚖ equilibrium 平衡			
↑ contact force 接触力			

↑ **normal reaction** 法向反作用力

🔥 **friction** 摩擦力

⚠️ **limiting friction** 最大静摩擦力

✖ **coefficient of friction** 摩擦系数

↔ **Newton's third law** 牛顿第三定律

📏 **distance** 距离

🏎️ **speed** 速率

Further Mathematics

Topic 3 · Further Mechanics

📐 **differential equation** 微分方程

⚖️ **variable force** 变力

↔ **conservation of momentum** 动量守恒

🍏 **Newton's experimental law** 牛顿实验定律

% **coefficient of restitution** 恢复系数

Computer Science

Topics 7-8 · Ethics and Ownership, Databases

👤 **patent** 专利

🔒 **software licence** 软件许可证

🔑 **proprietary** 专有

 open-source 开源			
 copyleft 著佐权			
 freeware 免费软件			
 shareware 共享软件			
 artificial intelligence 人工智能			
 machine learning 机器学习			
 deep learning 深度学习			
 neural networks 神经网络			
 speech recognition 语音识别			
 image recognition 图像识别			
 machine translation 机器翻译			
 recommendation systems 推荐系统			
 autonomous vehicles 自动驾驶汽车			
 optical character recognition 光学字符识别			
 text-to-speech 文本转语音			
 bias 偏见			
 flat files 平面文件			
 data redundancy 数据冗余			

⚠ **data inconsistency** 数据
不一致

🗄 **relational database** 关系
数据库

📊 **table** 表

Economics

Topic 4 · The macroeconomy

📈 **distribution** 分配

🔄 **informal economy** 非正规
经济

🔄 **circular flow of income**
收入循环流

🏠 **household** 家庭

💧 **leakages** 漏出

🐷 **saving** 储蓄

💰 **taxation** 税收

⚓ **imports** 进口

💉 **injections** 注入

📈 **investment** 投资

🏛 **government spending** 政
府支出

🚚 **exports** 出口

🔒 **closed economy** 封闭经济

🔓 **open economy** 开放经济

👤 **aggregate demand** 总需
求

Morning Reading 晨读

Grade 11 · AS · Week 13

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Your school runs on a **relational database**, even if you never see it. One **table** stores students, another stores classes. Each row is a **record**; each column, such as name or birthday, is a **field**. Every student has a unique **primary key**, and the class table points to it with a **foreign key**. That link is what makes the database relational: information is stored once and connected, never copied. When the office prints your timetable, a query joins the tables in milliseconds.

Physics this week showed light behaving strangely. Shine one small light through two narrow slits and the screen shows dark and bright stripes. The waves from the two slits show **interference**: where crest meets crest the light is bright; where crest meets trough, darkness. This **double-slit** experiment convinced physicists that light travels as a wave.

Economies swing through the **business cycle**. In a **boom**, jobs are easy to find and firms invest; then demand cools and growth slows, until a **recovery** starts the cycle again.

Talk about it 说一说:

1. Why store a student's name once, in one table, instead of in every class list?
2. Two waves meet and produce darkness. Explain how this is possible.

Physics

Topics 8–9 · Superposition, Electricity

🌀 **ripple tank** 水波槽

📶 **interference** 干涉

= **coherent** 相干

— **slit** 狭缝

= double-slit 双缝			
 path difference 路程差			
 fringe spacing 条纹间距			
 fringe 条纹			
^ maximum 极大			
v minimum 极小			
 diffraction grating 衍射光栅			
+ normal 法线			
 slit spacing 缝间距			
 order 级次			
 electric current 电流			
 charge carrier 载流子			
 electron 电子			
 electrolyte 电解质			

Chemistry

Topics 12–13 · Nitrogen and sulfur, An introduction to AS Level organic chemistry

 exhaust gases 尾气			
 photochemical smog 光化学烟雾			
 acid rain 酸雨			
 sulfur dioxide 二氧化硫			
 hydrocarbon 碳氢化合物			
 alkane 烷烃			

 functional group 官能团			
Σ general formula 通式			
 structural formula 结构式			
 displayed formula 展开式			
 skeletal formula 骨架式			
T nomenclature 命名法			
 homologous series 同系列			
 saturated 饱和			
 unsaturated 不饱和			
 homolytic fission 均裂			
 heterolytic fission 异裂			
 nucleophile 亲核试剂			

Biology

Topic 7 · Transport in plants

 phloem 韧皮部			
 assimilate 同化物			
 transverse section 横切面			
 dicotyledonous plant 双子叶植物			
 vessel 导管			
 lignin 木质素			
 sieve tube 筛管			
 sieve plate 筛板			

 companion cell 伴胞			
 vascular bundle 维管束			
 root hair cell 根毛细胞			
 apoplast pathway 质外体途径			
 symplast pathway 共质体途径			
 endodermis 内皮层			
 Casparian strip 凯氏带			
 suberin 木栓质			
 transpiration 蒸腾作用			
 evaporation 蒸发			
 water vapour 水蒸气			
 diffuse 扩散			
 stomata 气孔			
 atmosphere 大气			

Mathematics

Topic 4 · Mechanics

 displacement 位移			
 velocity 速度			
 acceleration 加速度			
 velocity-time graph 速度时间图			
 constant acceleration 匀加速			

 momentum 动量			
 conservation of momentum 动量守恒			
 Newton's laws of motion 牛顿运动定律			
 mass 质量			
 weight 重力			

Further Mathematics

Topic 3 · Further Mechanics

 bounding parabola 包络抛物线			
 lamina 薄片			
 coplanar forces 共面力			
 conical pendulum 圆锥摆			
 normal contact force 法向接触力			

Computer Science

Topic 8 · Databases

 entity 实体			
 record 记录			
 field 字段			
 primary key 主键			
 foreign key 外键			
 composite key 复合键			
 candidate key 候选键			

 **referential integrity** 参照完整性

 **entity-relationship diagram** 实体关系图

cardinality 基数

 **one-to-many** 一对多

 **link table** 连接表

 **normalisation** 规范化

 **normal forms** 范式

 **atomic** 原子

→ transitive dependency
传递依赖

 **DBMS** 数据库管理系统

 **data dictionary** 数据字典

 **concurrent access** 并发访问

 **transactions** 事务

 **views** 视图

 **SQL** 结构化查询语言

 **Data Definition Language** 数据定义语言

 **Data Manipulation Language** 数据操纵语言

Economics

Topic 4 · The macroeconomy

 **consumption** 消费

 net exports 净出口			
 aggregate supply 总供给			
 short-run aggregate supply 短期总供给			
 long-run aggregate supply 长期总供给			
 productive capacity 生产能力			
 macroeconomic equilibrium 宏观经济均衡			
 price level 价格水平			
 real output 实际产出			
 actual growth 实际增长			
 potential growth 潜在增长			
 productivity 生产率			
 business cycle 经济周期			
 boom 繁荣			
 recession 衰退			

Morning Reading 晨读

Grade 11 · AS · Week 14

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

What actually flows in a wire? Electrons, each carrying a tiny negative charge. Charge is measured in **coulombs**, and one ampere of current means one coulomb passing every second. Surprisingly, the electrons themselves creep along at a **drift velocity** of less than a millimetre per second; the electric field that pushes them, however, spreads at nearly the speed of light, which is why the lamp lights instantly. A battery provides the push: its **electromotive force** drives charge around the circuit, and the **potential difference** across a component, in **volts**, tells you the energy transferred per coulomb. A **semiconductor** sits between conductor and insulator, and its special behaviour built the modern world.

The labour market has its own flow. **Frictional unemployment** is people between jobs; **structural unemployment** follows when whole industries change and skills no longer match; **seasonal unemployment** comes and goes with harvests and holidays. Meanwhile **inflation** eats quietly at the **purchasing power** of every yuan saved.

Talk about it 说一说:

1. The light comes on instantly, yet electrons crawl. Explain the difference.
2. Which type of unemployment worries you most for your own future? Why?

Physics

Topic 9 · Electricity

± ion 离子

☐ semiconductor 半导体

○ hole 空穴

→ conventional current 常规电流

田 quantised 量子化

⊕ elementary charge 基本电荷

⊕ coulomb 库仑

⋮ number density 数密度

→ drift velocity 漂移速度

⚡ potential difference 电势差

四 volt 伏特

⌚ electromotive force 电动势

☑ resistance 电阻

Ω ohm 欧姆

⚡ Ohm's law 欧姆定律

💡 filament lamp 灯丝灯泡

△ diode 二极管

⚡ resistivity 电阻率

Chemistry

Topic 13 · An introduction to AS Level organic chemistry

⊕ electrophile 亲电试剂

⊕ addition 加成

🔄 substitution 取代

— elimination 消去

 condensation 缩合			
 initiation 引发			
 propagation 增长			
 termination 终止			
 free-radical substitution 自由基取代			
 electrophilic addition 亲 电加成			
 nucleophilic substitution 亲核取代			
 nucleophilic addition 亲 核加成			
 curly arrow 弯箭头			
 cyclic 环状			
 planar 平面			
 isomerism 异构			
 structural isomerism 结 构异构			
 chain isomerism 链异构			

Biology

Topics 7–8 · Transport in plants, Transport in mammals

 cohesion 内聚力			
 tension 张力			
 adhesion 附着力			
 xerophyte 旱生植物			
 adapted 适应			

 cuticle 角质层			
 source 源			
 sink 库			
 proton pump 质子泵			
 cotransporter protein 协同运输蛋白			
 hydrostatic pressure 静水压			
 mass flow 集流			
 blood vessel 血管			
 heart 心脏			
 double circulation 双循环			
 circulatory system 循环系统			
 pulmonary circulation 肺循环			
 systemic circulation 体循环			
 artery 动脉			
 arteriole 小动脉			
 capillary 毛细血管			
 venule 小静脉			

Mathematics

Topic 4 · Mechanics

 tension 张力			
---	--	--	--

 inclined plane 斜面			
 connected particles 连接质点			
 work done 功			
 kinetic energy 动能			
 gravitational potential energy 重力势能			
 conservation of energy 能量守恒			
 power 功率			
 limiting equilibrium 极限平衡			
 deceleration 减速度			

Further Mathematics

Topics 3–4 · Further Mechanics, Further Probability & Statistics

 oblique impact 斜碰撞			
 Further Probability & Statistics 进阶概率统计			
 probability density function 概率密度函数			
 cumulative distribution function 累积分布函数			

Computer Science

Topics 8–9 · Databases, Algorithm Design and Problem-solving

 query 查询			
 join 连接			

 aggregate functions 聚合函数			
 tuple 元组			
 attribute 属性			
 secondary key 次键			
 indexing 索引			
 data management 数据管理			
 data modelling 数据建模			
 logical schema 逻辑模式			
 data integrity 数据完整性			
 data security 数据安全			
 query processor 查询处理器			
 developer interface 开发者接口			
 computational thinking 计算思维			
 abstraction 抽象			
 decomposition 分解			
 algorithm 算法			
 unambiguous 无歧义			
 deterministic 确定性			
 identifier table 标识符表			
 variable 变量			
 data type 数据类型			

 pseudocode 伪代码

Economics

Topic 4 · The macroeconomy

↓ slump 萧条

↗ recovery 复苏

 claimant count 申领救济人数

 labour force survey 劳动力调查

 labour force 劳动力

↔ frictional unemployment 摩擦性失业

 structural unemployment 结构性失业

↺ cyclical unemployment 周期性失业

☀ seasonal unemployment 季节性失业

↗ inflation 通货膨胀

 purchasing power 购买力

↘ deflation 通货紧缩

↘ disinflation 反通货膨胀

 consumer price index 消费者价格指数

 weight 权重

Morning Reading 晨读

Grade 11 · AS · Week 15

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Before writing code, a programmer writes a plan. **Pseudocode** looks like simple English but has the shape of a program: INPUT the marks, IF a mark is over 50 THEN count it, OUTPUT the total. Every program is built from just three shapes: **sequence** (one step after another), **selection** (choosing a path), and **iteration** (a **loop** repeating steps). Complex problems are cut into smaller pieces first, a method called **stepwise refinement**: plan the trip, then plan each day, then each morning. Choosing the right **data type** matters too: whole numbers, decimals, text, or true/false.

In the electronics lab you built a **potential divider**: two resistors sharing a voltage. Replace one with a **thermistor** and the output voltage changes with temperature, the heart of a thermostat. Replace it with a **light-dependent resistor** and you have built the sensor that switches streetlights on at dusk.

Governments plan too. **Fiscal policy** sets taxes and spending; spend more than you collect and there is a **budget deficit**, which adds to the **national debt**.

Talk about it 说一说:

1. Write pseudocode, three lines or more, for making instant noodles.
2. A streetlight turns on at dusk by itself. Explain the chain: light, sensor, switch.

Physics

Topics 9–10 · Electricity, D.C. circuits

🛡 **insulator** 绝缘体

🧱 **lattice vibration** 晶格振动

🔄 **scatters** 散射

☀ light-dependent resistor
光敏电阻

☀ light intensity 光强

⌋ thermistor 热敏电阻

↘ negative temperature
coefficient 负温度系数

↕ potential divider 分压器

☐ breadboard 面包板

⌚ multimeter 万用表

⊕ internal resistance 内阻

☐ cell 电池

☐ terminal p.d. 端电压

⌘ open circuit 开路

⚡ short circuit 短路

⌚ ammeter 电流表

⌚ voltmeter 电压表

Chemistry

Topics 13–14 · An introduction to AS Level organic chemistry, Hydrocarbons

⦿ positional isomerism 位
置异构

⦿ functional group
isomerism 官能团异构

⦿ stereoisomerism 立体异
构

⦿ geometrical isomerism
几何异构

 **restricted rotation** 受限
旋转

↑ **cis** 顺式

↑↓ **trans** 反式

 **optical isomerism** 旋光异
构

 **chiral** 手性

 **chiral centre** 手性中心

 **enantiomers** 对映体

⊕ **hydrogenation** 氢化

 **alkene** 烯烃

↗ ↘ **cracking** 裂化

 **combustion** 燃烧

 **complete combustion** 完
全燃烧

 **incomplete combustion**
不完全燃烧

 **carbon monoxide** 一氧化
碳

Biology

Topic 8 · Transport in mammals

 **vein** 静脉

 **pulmonary artery** 肺动脉

 **pulmonary vein** 肺静脉

♥ **aorta** 主动脉

 **vena cava** 腔静脉

 muscle 肌肉			
 elastic 弹性			
 lumen 管腔			
 valve 瓣膜			
 red blood cell 红细胞			
 monocyte 单核细胞			
 neutrophil 中性粒细胞			
 lymphocyte 淋巴细胞			
 plasma 血浆			
 tissue fluid 组织液			
 oxygen dissociation curve 氧解离曲线			
 saturation 饱和度			
 partial pressure 分压			
 Bohr shift 波尔位移			
 carbonic anhydrase 碳酸酐酶			
 hydrogencarbonate ion 碳酸氢根离子			
 chloride ion 氯离子			

Mathematics

Topics 4–5 · Mechanics, Probability & Statistics 1

 thrust 推力			
 air resistance 空气阻力			
 Probability & Statistics 概率统计			

 **stem-and-leaf diagram** 茎叶图

 **box-and-whisker plot** 箱线图

 **histogram** 直方图

 **cumulative frequency** 累积频数

 **central tendency** 集中趋势

 **mean** 平均数

 **median** 中位数

Further Mathematics

Topic 4 · Further Probability & Statistics

 **percentiles** 百分位数

 **median** 中位数

 **hypothesis test** 假设检验

 **confidence interval** 置信区间

Computer Science

Topics 9–10 · Algorithm Design and Problem-solving, Data Types and Structures

 **sequence** 顺序

 **selection** 选择

 **iteration** 迭代

 **loop** 循环

 **assignment** 赋值

 **concatenation** 拼接

 **structured English** 结构化英语

 **flowchart** 流程图

 **stepwise refinement** 逐步求精

() **logic statement** 逻辑语句

 **precedence** 优先级

 **De Morgan's law** 德摩根定律

 **procedure** 过程

[] **array** 数组

**index** 索引

• **element** 元素

[] **bounds** 边界

 **dimension** 维度

→ **linear search** 线性查找

 **file** 文件

 **text file** 文本文件

 **end of file** 文件结束

 **abstract data type** 抽象数据类型

 **stack** 栈

Economics

Topics 4–5 · The macroeconomy, Government macroeconomic intervention

 **demand-pull inflation** 需求拉动型通货膨胀

↑ **cost-push inflation** 成本推动型通货膨胀

⚖ **price stability** 物价稳定

👥 **full employment** 充分就业

⊕ **balance of payments** 国际收支

↕ **redistribution of income** 收入再分配

⚔ **conflict** 冲突

👉 **demand-side policies** 需求侧政策

🏛 **fiscal policy** 财政政策

📅 **budget** 预算

↘ **budget deficit** 预算赤字

📁 **national debt** 国债

↗ **budget surplus** 预算盈余

💵 **direct tax** 直接税

= **proportional tax** 比例税

Morning Reading 晨读

Grade 11 · AS · Week 16

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Look at the canteen at noon: the first student in the line is served first. Computer scientists call this structure a **queue**: first in, first out, or **FIFO**. New people **enqueue** at the back; the server **dequeues** from the front. Now look at the clean plates: the last plate placed on the pile is the first one taken. That is a **stack**: last in, first out, **LIFO**. You **push** a plate on top and **pop** it off again. Your browser's back button is a stack of pages; a printer's waiting list is a queue. Choosing the right structure is half of programming.

In the circuits lab you used **Kirchhoff's first law**: the current flowing into a **junction** equals the current flowing out, because charge is never lost. A **capacitor** stores charge briefly, smoothing the flow.

When inflation rises, the **central bank** tightens **monetary policy**: a higher **interest rate** makes borrowing dearer, cooling spending. **Supply-side policy** works slower but deeper, through training, technology and **infrastructure**.

Talk about it 说一说:

1. Find two queues and two stacks in your daily life.
2. Why does raising the interest rate slow down price rises? Trace the steps.

Physics

Topic 10 · D.C. circuits

💡 LED 发光二极管

🔋 capacitor 电容器

⚡ fuse 保险丝

 junction 节点			
 conservation of charge 电荷守恒			
 loop 回路			
 Kirchhoff's first law 基尔霍夫第一定律			
 Kirchhoff's second law 基尔霍夫第二定律			
 rheostat 变阻器			
 sensor 传感器			
 transistor 晶体管			
 comparator 比较器			
 threshold 阈值			
 potentiometer 电位差计			
 jockey 滑动触头			
 galvanometer 检流计			
 null method 零点法			

Chemistry

Topics 14–15 · Hydrocarbons, Halogen compounds

 ultraviolet light 紫外线			
 crude oil 原油			
 fraction 馏分			
 halogenoalkane 卤代烷			
 dehydration 脱水			
 alcohol 醇			

☁ steam 水蒸气			
🍷 diol 二醇			
🧴 bromine water 溴水			
🔗 addition polymerisation 加成聚合			
🔗 polymer 聚合物			
⊕ carbocation 碳正离子			
→ inductive effect 诱导效应			
🏠 Markovnikov's rule 马氏 规则			
⊙ primary 伯			
⊖ secondary 仲			
○ tertiary 叔			
📦 nitrile 腈			

Biology

Topics 8-9 · Transport in mammals, Gas exchange

↔ chloride shift 氯转移			
🩸 haemoglobin acid 血红 蛋白酸			
🩸 carbaminohaemoglobin 氨基酰血红蛋白			
🏠 atrium 心房			
❤ ventricle 心室			
↺ cardiac cycle 心动周期			
✂ systole 收缩期			

[] diastole 舒张期			
⚡ sinoatrial node 窦房结			
⚡ atrioventricular node 房室结			
🌀 Purkyne tissue 浦肯野组织			
↔ gas exchange 气体交换			
⇒ trachea 气管			
🌫 bronchus 支气管			
🌫 bronchiole 细支气管			
⋮ alveoli 肺泡			
⇒ lungs 肺			
📦 cartilage 软骨			
⇒ ciliated epithelium 纤毛上皮			
💧 mucus 黏液			
💧 goblet cell 杯状细胞			
💧 mucous gland 黏液腺			

Mathematics

Topic 5 · Probability & Statistics 1

↗ mode 众数			
↑ variation 离散程度			
↔ range (of data) 极差			
[] interquartile range 四分位距			

 standard deviation 标准差			
 variance 方差			
 permutation 排列			
 combination 组合			
 mutually exclusive events 互斥事件			
 independent events 独立事件			

Further Mathematics

Topic 4 · Further Probability & Statistics

 pooled estimate 合并估计			
 chi-squared test 卡方检验			
 theoretical distribution 理论分布			
 degrees of freedom 自由度			

Computer Science

Topics 10–11 · Data Types and Structures, Programming

 LIFO 后进先出			
 push 入栈			
 pop 出栈			
 queue 队列			
 FIFO 先进先出			
 enqueue 入队			
 dequeue 出队			

 linked list 链表			
 node 节点			
 pointer 指针			
 traverse 遍历			
 underflow 下溢			
 circular array 循环数组			
 free list 空闲列表			
 record structure 记录结构			
 bubble sort 冒泡排序			
 variables 变量			
 data types 数据类型			
 constant 常量			
 operators 运算符			
 library routines 库例程			
 nested 嵌套			
 count-controlled loop 计数循环			
 pre-condition loop 前测循环			

Economics

Topics 5–6 · Government macroeconomic intervention, International economic issues

 regressive tax 累退税			
 expansionary 扩张性			
 contractionary 紧缩性			

 crowding out 挤出效应			
 monetary policy 货币政策			
 central bank 中央银行			
% interest rate 利率			
 money supply 货币供给			
 transmission mechanism 传导机制			
 supply-side policy 供给侧政策			
 privatisation 私有化			
 deregulation 放松管制			
 training 培训			
 infrastructure 基础设施			
 international trade 国际贸易			

Morning Reading 晨读

Grade 11 · AS · Week 17

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

Why does China build high-speed trains while another country grows coffee? Because countries, like people, gain when they **specialise**. A country has an **absolute advantage** when it can make something using fewer resources than others. But the deeper idea is **comparative advantage**: even a country that is worse at everything should make what it gives up least to produce, and trade for the rest. Trade makes both sides better off, which is why economists frown when **protectionism** returns: a **tariff** taxes imports, a **quota** limits them, and consumers quietly pay the bill. Defenders reply that a young **infant industry** may need shelter before it can compete.

Programmers use the same principle: divide the work. A **function** is a small, named piece of a program that does one job well. You call it with **arguments**, it works with its own **local variables**, and it hands back a result. Big programs are built from small functions, each written once and reused everywhere, the code version of specialisation.

Talk about it 说一说:

1. Your friend is faster than you at both maths and English homework. Can trading tasks still help you both?
2. Name three things a function and a factory worker have in common.

Physics

Topic 11 · Particle physics

⊙ **alpha particle** α 粒子

↷ **deflection** 偏转

⊙ **nucleus** 原子核

+ **proton** 质子

○ neutron 中子			
⊗ nuclide 核素			
# proton number 质子数			
Σ nucleon number 核子数			
⊙ nucleon 核子			
↯ isotope 同位素			
⚖ unified atomic mass unit 统一原子质量单位			
☞ radiation 辐射			
☞ radioactive 放射性			
⚡ ionising 电离			
⊞ discrete 分立			
☁ cloud chamber 云室			
— beta particle β 粒子			

Chemistry

Topics 14–18 · Hydrocarbons, Halogen compounds, Hydroxy compounds, Carbonyl compounds, Carboxylic acids and derivatives

⬡ amine 胺			
⌋ silver nitrate 硝酸银			
⚡ transition state 过渡态			
↪ aldehyde 醛			
≡ ketone 酮			
⚗ carboxylic acid 羧酸			
⊞ ester 酯			

 distillation 蒸馏			
 reflux 回流			
 tri-iodomethane 三碘甲烷			
 acidity 酸性			
 carbonyl compound 羰基化合物			
 carbonyl 羰基			
 hydrogen cyanide 氰化氢			
 hydroxynitrile 羟基腈			
 Fehling's reagent 斐林试剂			
 Tollens' reagent 托伦试剂			
 esterification 酯化			

Biology

Topics 9–10 · Gas exchange, Infectious diseases

 microbe 微生物			
 smooth muscle 平滑肌			
 elastic fibre 弹性纤维			
 squamous epithelium 扁平上皮			
 infectious disease 传染病			
 pathogen 病原体			
 transmit 传播			
 cholera 霍乱			

☣ contaminated 污染

🗑 faeces 粪便

🦟 malaria 疟疾

🔬 protist 原生生物

🦟 mosquito 蚊子

🦟 vector 媒介

☞ tuberculosis 结核病

💧 droplet 飞沫

☣ AIDS 艾滋病

🛡 immune system 免疫系统

💉 vaccine 疫苗

🐛 insecticide 杀虫剂

💊 antibiotic 抗生素

💊 penicillin 青霉素

Mathematics

Topic 5 · Probability & Statistics 1

🔗 conditional probability
条件概率

📊 discrete random
variable 离散型随机变量

📊 probability distribution
table 概率分布表

🎯 expectation 期望

📊 binomial distribution 二
项分布

↘ **geometric distribution**
几何分布

🔔 **normal distribution** 正态
分布

≈ **continuous random
variable** 连续型随机变量

❓ **approximation** 近似

Further Mathematics

Topic 4 · Further Probability & Statistics

✓ **goodness of fit** 拟合优度

🔗 **independence** 独立性

📊 **contingency table** 列联表

🔍 **non-parametric test** 非参
数检验

Computer Science

Topics 11–12 · Programming, Software Development

↓ **post-condition loop** 后测
循环

≡ **structured
programming** 结构化编程

() **parameters** 参数

f **function** 函数

() **arguments** 实参

📄 **pass by value** 传值

🔗 **pass by reference** 传引用

□ **local variable** 局部变量

 global variable 全局变量			
 scope 作用域			
 signature 签名			
 invariant 不变量			
 development life cycle 开发生命周期			
 requirements 需求			
 waterfall 瀑布模型			
 iterative model 迭代模型			
 rapid application development 快速应用开发			
 prototype 原型			
 agile 敏捷			
 implementation 实现			
 maintenance 维护			
 structure chart 结构图			
 state-transition diagram 状态转换图			
 states 状态			

Economics

Topic 6 · International economic issues

 specialise 专业化			
 absolute advantage 绝对优势			
 comparative advantage 比较优势			

↔	terms of trade	贸易条件			
🛡️	protectionism	贸易保护主义			
💰	tariff	关税			
🏷️	quota	配额			
🚫	embargo	禁运			
🏢	administrative barriers	行政壁垒			
👶	infant industry	幼稚产业			
📉	dumping	倾销			
⚔️	retaliation	报复			
👤	stakeholder	利益相关者			
📊	current account	经常账户			

Morning Reading 晨读

Grade 11 · AS · Week 18

Read each word aloud, then copy the English word three times. 朗读每个单词，然后把英语单词抄写三遍。

Reading 阅读

Read the passage aloud twice. 把短文朗读两遍。

How do you know your program is correct? You hunt for errors, and they come in kinds. A **syntax error** breaks the language rules, and the translator refuses to run at all. A **run-time error** appears while the program runs, like dividing by zero. The most dangerous is the **logic error**: the program runs happily and gives the wrong answer. To catch them, testers do a **dry run** on paper, use **white-box testing** to exercise every path inside the code, and **black-box testing** to check inputs against expected outputs without looking inside. Before release come **alpha testing** in the company and **beta testing** with real users.

Chemists identify unknown substances with the same detective spirit. **Infrared spectroscopy** shines light through a sample: each bond absorbs its own frequencies, leaving a fingerprint. **Mass spectrometry** weighs the fragments of a molecule.

One last economic idea for the term: under a **floating exchange rate**, a currency's **appreciation** makes imports cheaper but exports harder to sell. The whole year connects: measure, model, test, and question everything.

Talk about it 说一说:

1. Find the logic error: a program to average two numbers computes $a + b / 2$.
2. Which subject taught you the most surprising idea this term? Explain it in two sentences.

Physics

Topic 11 · Particle physics

+ **positron** 正电子

— **continuous** 连续

✦ photon 光子			
↘ attenuated 衰减			
☸ gamma ray γ 射线			
☒ daughter nucleus 子核			
⚡ excited state 激发态			
± antiparticle 反粒子			
⊖ antineutrino 反中微子			
○ neutrino 中微子			
☒ quark 夸克			
☺ flavours 味			
☒ antiquark 反夸克			
⊙ hadrons 强子			
⊙ baryons 重子			
○ mesons 介子			
✦ leptons 轻子			

Chemistry

Topics 20–22 · Polymerisation, Organic synthesis, Analytical techniques

○ monomer 单体			
↺ repeat unit 重复单元			
☞ poly(ethene) 聚乙烯			
☞ poly(chloroethene) 聚氯乙烯			
⊖ non-biodegradable 不可生物降解			

 synthetic route 合成路线			
 reagent 试剂			
 by-product 副产物			
 infrared spectroscopy 红外光谱			
 absorption 吸收			
 wavenumber 波数			
 mass spectrometry 质谱			
 mass-to-charge ratio 质荷比			
 isotopic abundance 同位素丰度			
 molecular ion 分子离子			
 molecular ion peak 分子离子峰			
 fragmentation 碎裂			
 fragment 碎片			

Biology

Topics 10–11 · Infectious diseases, Immunity

 resistance 耐药性			
 phagocyte 吞噬细胞			
 macrophage 巨噬细胞			
 phagocytosis 吞噬作用			
 self antigen 自身抗原			
 non-self antigen 非自身抗原			

 immune response 免疫反应			
 T-helper cell 辅助性 T 细胞			
 plasma cell 浆细胞			
 memory cell 记忆细胞			
 T-killer cell 杀伤性 T 细胞			
 antigen-binding site 抗原结合位点			
 variable region 可变区			
 monoclonal antibody 单克隆抗体			
 hybridoma 杂交瘤			
 diagnosis 诊断			
 active immunity 主动免疫			
 passive immunity 被动免疫			
 natural immunity 天然免疫			
 artificial immunity 人工免疫			
 vaccination 疫苗接种			
 herd immunity 群体免疫			

Mathematics

Topics 1–5 · Pure Mathematics 1, Probability & Statistics 1

 continuity correction 连续性校正			
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 standardisation 标准化			
coefficients 系数			
point of inflexion 拐点			
improper integral 广义积分			
back-to-back 背靠背			
measure of central tendency 集中趋势			
Coding 编码			
assumed mean 假定平均数			

Further Mathematics

Topic 4 · Further Probability & Statistics

± sign test 符号检验			
⋮ Wilcoxon signed-rank test 威尔科克森符号秩检验			
Σ Wilcoxon rank-sum test 威尔科克森秩和检验			
f probability generating function 概率母函数			

Computer Science

Topics 6–12 · Security, privacy and data integrity, Software Development

⊗ syntax error 语法错误			
⚠ run-time error 运行时错误			
⚡ logic error 逻辑错误			
👁 dry run 手工跟踪			

 **walkthrough** 走查

 **white-box testing** 白盒测试

 **black-box testing** 黑盒测试

 **integration testing** 集成测试

 **alpha testing** α 测试

 **beta testing** β 测试

 **acceptance testing** 验收测试

 **stub** 桩

 **test strategy** 测试策略

 **test plan** 测试计划

 **normal data** 正常数据

 **abnormal data** 异常数据

 **boundary data** 边界数据

 **perfective maintenance**
完善性维护

 **adaptive maintenance** 适应性维护

 **corrective maintenance**
纠正性维护

 **regression testing** 回归测试

 **extreme data** 极端数据

1. Malware 恶意软件

parity block check 奇偶块校验

Economics

Topic 6 · International economic issues

 trade in goods 货物贸易			
 trade in services 服务贸易			
 primary income 初次收入			
 secondary income 二次收入			
 current account deficit 经常账户赤字			
 current account surplus 经常账户盈余			
 floating exchange rate 浮动汇率			
 fixed exchange rate 固定汇率			
 managed exchange rate 管理浮动汇率			
 appreciation 升值			
 depreciation 贬值			
 expenditure-reducing 支出减少			
 expenditure-switching 支出转换			
 competitiveness 竞争力			