

Morning Reading

Grade 11 · AS · Week 5

Read each word aloud, then copy the English word three times.

Reading

Read the passage aloud twice.

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 :

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

 kinetic energy <i>/kɪˈnetɪk ˈenədʒi/</i>			
 external force <i>/ekˈstɜːnl fɔːs/</i>			
 electrostatic <i>/ɪˌlektɹəʊˈstætɪk/</i>			
 normal contact force <i>/nɔːml ˈkɒntækt fɔːs/</i>			
 thrust <i>/θɹʌst/</i>			
 gravitational field <i>/ˌɡrævɪˈteɪʃənl fiːld/</i>			
 friction <i>/ˈfrɪkʃn/</i>			
 viscous <i>/ˈvɪskəs/</i>			
 drag <i>/dræg/</i>			
 fluid <i>/ˈfluːɪd/</i>			
 coefficient <i>/ˌkəʊɪˈfɪʃənt/</i>			
 terminal velocity <i>/ˈtɜːmɪnl vəˈləsɪti/</i>			
 parachutist <i>/ˈpærətʃuːtɪst/</i>			
 gravitational potential energy <i>/ˌɡrævɪˈteɪʃənl pəˈtenʃl ˈenədʒi/</i>			

 thermal energy			
<i>/ˈθɜːml̩ ˈenədʒi/</i>			
 conservation of momentum			
<i>/ˌkɒnsəˈveɪʃn ɒv məʊˈmentəm/</i>			
 explosion			
<i>/ekˈspləʊʒn/</i>			
 recoil			
<i>/rɪˈkɔɪl/</i>			
 elastic collision			
<i>/ɪˈlæstɪk kəˈlɪʒn/</i>			
 relative speed			
<i>/ˈrelatɪv spiːd/</i>			

Chemistry

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

 titration			
<i>/taɪˈtreɪʃn/</i>			
 significant figures			
<i>/sɪɡˈnɪfɪkənt ˈfɪɡəz/</i>			
 electronegativity			
<i>/ɪˌlektɹəŋɡəˈtɪvɪti/</i>			
 Pauling electronegativity			
<i>/ˈpɔːlɪŋ ɪˌlektɹəŋɡəˈtɪvɪti/</i>			
 ionic bonding			
<i>/aɪˈɒnɪk ˈbɒndɪŋ/</i>			
 electrostatic attraction			
<i>/ɪˌlektɹəʊˈstætɪk əˈtrækʃn/</i>			
 lattice			
<i>/ˈlætɪs/</i>			
 metallic bonding			
<i>/məˈtæɪlɪk ˈbɒndɪŋ/</i>			

 delocalised electrons			
<i>/dɪˈləkəlaɪzd ɪˈlektɹonz/</i>			
 covalent bonding			
<i>/ˈkəʊvələnt ˈbɒndɪŋ/</i>			
 expand the octet			
<i>/ekˈspænd ðɪ ɒkˈtɛt/</i>			
 coordinate bond			
<i>/kəʊˈɔːdɪnət bɒnd/</i>			
 sigma bond σ			
<i>/ˈsɪgmə bɒnd/</i>			
 overlap			
<i>/ˌəʊvəˈlæp/</i>			
 pi bond π			
<i>/paɪ bɒnd/</i>			
 hybridisation			
<i>/ˌhaɪbrɪdaɪˈzeɪʃn/</i>			
 bond energy			
<i>/bɒnd ˈenədʒi/</i>			
 bond length			
<i>/bɒnd leŋθ/</i>			

Biology

Topic 2 · Biological molecules

 covalent bond			
<i>/ˈkəʊvələnt bɒnd/</i>			
 glycosidic bond			
<i>/ˌɡlaɪkəˈsɪdɪk bɒnd/</i>			
 condensation			
<i>/kɒndənˈseɪʃn/</i>			
 hydrolysis			
<i>/haɪˈdrɒləsɪs/</i>			

 amylose <i>/ˈæmɪləʊs/</i>			
 amylopectin <i>/ˈæmɪləʊpktɪn/</i>			
 glycogen <i>/ˈglʌɪkədʒn/</i>			
 insoluble <i>/ɪnˈsɒljʊːbl/</i>			
 water potential <i>/ˈwɔːtə pəˈtenʃl/</i>			
 osmosis <i>/ɒzˈməʊsɪs/</i>			
 hydrogen bond <i>/ˈhaɪdrədʒn bɒnd/</i>			
 microfibril <i>/ˈmaɪkrəʊfɪbrəl/</i>			
 triglyceride <i>/ˈtrɪglɪsəraɪd/</i>			
 non-polar <i>/nɒn ˈpəʊlə/</i>			
 hydrophobic <i>/ˈhaɪdrəˈfəʊbɪk/</i>			
 glycerol <i>/ˈglɪsəʊl/</i>			
 fatty acid <i>/ˈfæti ˈæsɪd/</i>			
 ester bond <i>/ˈestə bɒnd/</i>			
 saturated <i>/ˈsætʃəreɪtɪd/</i>			
 double bond <i>/ˈdʌbl bɒnd/</i>			
 unsaturated <i>/ʌnˈsætʃəreɪtɪd/</i>			

 insulation <i>/ˌɪnsjuːˈleɪʃn/</i>			
 phosphate <i>/ˈfɒsfet/</i>			

Mathematics

Topic 1 · Pure Mathematics 1

 segment <i>/ˈsegment/</i>			
 sine <i>/saɪn/</i>			
 cosine <i>/ˈkəʊsaɪn/</i>			
 tangent function <i>/ˈtændʒənt ˈfʌŋkʃn/</i>			
 principal value <i>/ˈprɪnsɪpl ˈvæljuː/</i>			
 identity <i>/aɪˈdentɪti/</i>			
 trigonometric equation <i>/ˌtrɪɡənəʊˈmetrɪk iˈkweɪʒn/</i>			
 binomial expansion <i>/baɪˈnəʊmɪəl ekˈspænjən/</i>			
 binomial coefficient <i>/baɪˈnəʊmɪəl ˌkəʊˈfɪʃənt/</i>			
 progression <i>/prəˈɡreʃn/</i>			

Further Mathematics

Topic 1 · Further Pure Mathematics 1

 polar curves			
/ˈpəʊlə kɜːvz/			
 plane			
/pleɪn/			
 vector product			
/ˈvektə ˈprɒdʌkt/			
 vectors			
/ˈvektəz/			
 skew lines			
/skjuː laɪnz/			

Computer Science

Topics 3–4 · Hardware, Processor Fundamentals

 transistors			
/trænˈzɪstəz/			
 optical disc			
/ˈɒptɪkl dɪsk/			
 touchscreen			
/ˈtʌtʃskriːn/			
 resistive			
/rɪˈzɪstɪv/			
 capacitive			
/kəˈpæsɪtɪv/			
 virtual reality			
/ˈvɜːtʃuəl rɪˈælɪti/			
 accelerometer			
/əkˌseləˈrɒmɪtə/			
 gyroscope			
/ˈdʒaɪrəskəʊp/			
 RAM			
/ræm/			

 volatile			
/ˈvɒlətaɪl/			
 ROM			
/rɒm/			
 non-volatile			
/nɒn ˈvɒlətaɪl/			
 SRAM			
/ˈesræm/			
 flip-flop			
/flɪp flɒp/			
 cache			
/kæʃ/			
 DRAM			
/ˈdiːræm/			
 refreshed			
/rɪˈfreʃt/			
 monitoring			
/ˈmɒnɪtərɪŋ/			
 control system			
/kənˈtrəʊl ˈsɪstəm/			
 sensor			
/ˈsensə/			
 thermistor			
/ˈθɜːmɪstə/			
 actuator			
/ˈæktʃuːeɪtə/			
 feedback			
/ˈfiːdbæk/			
 logic gate			
/ˈlɒdʒɪk geɪt/			
 Boolean			
/ˈbuːliən/			
 truth table			
/truːθ ˈteɪbl/			

 **logic circuit**

/ˈlɒdʒɪk ˈsɜːkɪt/

 **Von Neumann architecture**

/vɒn ˈnɔɪmən ˈɑːkɪtektʃə/

Economics

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

 **rivalry**

/ˈraɪvəlri/

 **excludability**

/eksˌkluːdəˈbɪlɪti/

 **public good**

/ˈpʌblɪk ɡʊd/

 **non-rivalry**

/nɒn ˈraɪvəlri/

 **non-excludability**

/nɒn eksˌkluːdəˈbɪlɪti/

 **free-rider problem**

/friː ˈraɪdə ˈprɒbləm/

 **national defence**

/ˈnæʃənəl dɪˈfens/

 **merit good**

/ˈmerɪt ɡʊd/

 **demerit good**

/ˈdemərɪt ɡʊd/

 **information failure**

/ˌɪnfəˈmeɪʃn ˈfeɪlɪə/

 **demand**

/dɪˈmænd/

 **price**

/praɪs/

 **quantity demanded**

/ˈkwɒntəntɪ dɪˈmændɪd/

 **demand curve**

/dɪˈmænd kɜːv/

 **shift**

/ʃɪft/

 **determinants**

/dɪˈtɜːmɪnənts/