

## SECTION 8

### PHYSICS

#### ÈKỌ NÍPA ÈDÁ

#### INTRODUCTION/ ỌRỌ ÀKỌSỌ

|  |   |
|--|---|
| <p><b>Physics:</b><br/>Physics is a natural science that involves the study of matter and its motion through spacetime, along with related concepts such as energy and force. More broadly, it is the general analysis of nature, conducted in order to understand how the universe behaves.</p> | <p><b>Èkọ nípa-ẹdá:</b><br/>Èkọ (nípa) ẹdá jẹ èkọ ìmọ-jinlẹ ayébayé tó wà fún kíkọ nípa ẹdá àti ipapòdà rẹ nínú àyé-ayé ọ̀un ìgbà-ayé, àti bí ó ẹ nfi agbára àti ipá rẹ han nínú àwọn yi. Èkọ (nípa) ẹdá jẹ èkọ tí a fi nse àtúpalẹ imo nipa ***, láti lè fi ní ọ̀ye bí àgbáyé ẹ rí àti bí ó ẹ n ẹ.</p> |
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#### VOCABULARY / ÌTÚMỌ - ỌRỌ

| English                  | Yoruba                | English         | Yoruba                  |
|--------------------------|-----------------------|-----------------|-------------------------|
| Physics                  | Èkọ (nípa) ẹdá        |                 |                         |
| Energy                   | Agbára                | Length          | Gígùn                   |
| Heat energy              | Agbára Okun-iná       | Breath          | Ìbú                     |
| Hotness                  | Ìgbóná                | Height          | Gíga                    |
| Temperature              | Ìgbóná                | Area            | Òrò                     |
| Temperature scale        | Ìdíwọ̀n ìgbóná        | Volume          | Aye                     |
| Solid                    | Adì                   |                 |                         |
| Liquid                   | Aṣàn                  |                 |                         |
| Gas                      | Ọ̀yì                  |                 |                         |
| Gas laws                 | Àwọn ofi-òyì          | Metric unitss   | Àwọn idíwọ̀n tí ìmọ-èrọ |
| Gas equation             | Ọ̀mì ọ̀yì             | Irregular solid | Adì aláìgún             |
| Fire                     | Iná                   | Time            | Àkókò                   |
| Gas volume               | Àyè ọ̀yì              | Instrument      |                         |
| Acceleration             | Ìdà-eré               | Ruler           | Rúlà                    |
| Air                      | Afẹ                   | Air pressure    | Èéfún afẹ               |
| Area                     | Òrò                   | Concave lens    | Awọ̀ye onínú            |
| Atom                     | Átòmù                 | Concave mirror  | Awọ̀ji onínú            |
| Atomic energy            | Agbára átòmù          | Convex lens     | Awọ̀ye oníkùn           |
| Celsius scale            | Ìdíwọ̀n tí Selsiosi   | Convex mirror   | Awọ̀ji oníkùn           |
| Farhenheit scale         | Ìdíwọ̀n tí Farinhaiti |                 |                         |
| Conductor                | Onipa (ipa: pathway)  |                 |                         |
| Conductor (of heat)      | Onípa okun-ina        |                 |                         |
| Conductor of electricity | Onípa okun-àrá        |                 |                         |
| Force                    | Ipá                   | Measurement     | Ìṣẹ̀wọ̀n                |
| Force of gravity         | Ipá ọ̀òfà-ilẹ         |                 |                         |

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|                     |   |  |  |
|---------------------|---|--|--|
| Force measurement   | <b>Ìwọn ipá</b>                                   |  |  |
| Friction            | <b>Imule</b>                                      | Electricity  | <b>Okun-àrá</b>                                    |
| Heat                | <b>Okun-iná</b>                                   | Static electricity                                       |  |
| Magnet              | <b>Òòfà</b>                                       | Conductors   |  |
| Mass                | <b>Ìwọn-okun</b>                                  | Non-conductors   |  |
| Weight              | <b>Ìwọn-ìwúwo</b>                                 | Battery  | <b>Bátìrì</b>                                      |
| Measurement         | <b>Ìwọn</b>                                       | Current  | <b>Isán-àrá</b>                                    |
| Prism               |   | Voltage:   |  |
| Pulley              | <b>Afàwọn</b>                                     | Resistance   | <b>Atako***</b>                                    |
| Lever               | <b>Egbé</b>                                       | Resistor   | <b>Atako</b>                                       |
| Inclined Plane      | <b>Pepẹ dídà</b>                                  | Switch   |  |
| Sound               | <b>Ìró</b>  | Fuse   |  |
| Sound energy        | <b>Agbára ìró</b>                                 | Circuit  | <b>Ìrìnpo (rín pọ: complete a circle) okun-àrá</b> |
| Steel               | <b>Qtarin</b>                                     | Switch   |  |
| Sunlight            | <b>Ìtàn-oòrùn</b>                                 | Pressure   |  |
| Thermometer         | <b>Awòngbóná</b>                                  | Weight   | <b>Ìwọn-ìwúwo</b>                                  |
| Temperature         | <b>Ìgbóná</b>                                     | Surface area   | <b>Òrò</b>   |
| Temperature scale   | <b>Ìdíwọn Ìgbóná</b>                              | Force  | <b>Ipá</b>   |
| Velocity            | <b>Ìdà-ipò; Ìyásí-ìpapòdà</b>                     | Substance  | <b>Nkan, Ẹdà</b>                                   |
| Torque              | <b>Ipá-ẹlọ (lọ: to twist)</b>                     |  |  |
| Celsius scale       | <b>Ìdíwọn tí Sẹ́lsíọ̀sì</b>                       | Frequency  | <b>Ìyásí (ìsẹ̀lẹ̀, ìyípo, agbọn)</b>               |
| Farhenheit scale    | <b>Ìdíwọn tí Fàrínháítì</b>                       | Wavelength   | <b>Ìgbọn agbọn</b>                                 |
| Conductor (of heat) |   | Amplitude (of a wave)                                    | <b>Ìjì (agbọn)</b>                                 |
| Thermometer         | <b>Awòngbóná</b>                                  | Microphone   | <b>Ẹrọ ****</b>                                    |
| Temperature         | <b>Ìgbóná</b>                                     | Loudspeaker  | <b>Ẹrọ Ifẹ-òun</b>                                 |
| Temperature scale   | <b>Ìdíwọn ìgbóná</b>                              | Hertz  | <b>Háàtìsì</b>                                     |
| Heat energy         | <b>Agbára okun-iná</b>                            | Wave   | <b>Agbọn</b>                                       |
| Hotness             | <b>Ìgbóná</b>                                     | Electricity  | <b>Okun-àrá</b>                                    |
| Magnet              | <b>Òòfà</b>                                       | Static electricity                                       |  |
| Magnetic Field      | <b>Ìtẹ òòfà</b>                                   | Conductors   |  |
| Magnetic disk       | <b>Àwo Kọ-mputà</b>                               | Non-conductors   |  |
| Magnetism           | <b>Ẹkọ (nípà) Òòfà</b>                            | Battery:   | <b>Bátìrì</b>                                      |
| Magnetize           | <b>Látí sọ nkan di òòfà; Látí fí òòfà fà nkan</b> | Current  | <b>Isán-àrá (sàn: to move rapidly)</b>             |
| Resistor            |   | Voltage<br>(Difference in potentials expressed in volts) | <b>Ìgbóra-àrá***</b>                               |
|                     |   | Resistance   |  |

## ÌWÉ-ÌLÉWỌ ẸKỌ ÌMỌ-JÌNLÈ ÀTÌ ÌMỌ-ẸRỌ

### KINDS OF FORCES / ÀWỌN ORÍȘÌ IPÁ

| English             | Yoruba       | English        | Yoruba         |
|---------------------|--------------|----------------|----------------|
| Force               | Ipá          | Magnetic force | Ipá Òòfà       |
| Muscular force      | Ipá Iṣan     | Friction force | Ipá (ti) ìmúlẹ |
| Gravitational force | Ipá òòfà-ilẹ | Electric force | Ipá (ti) àrá   |

### KINDS OF ENERGY / ÀWỌN ORÍȘÌ AGBÁRA

| English           | Yoruba          | English           | Yoruba                 |
|-------------------|-----------------|-------------------|------------------------|
| Electrical Energy | Agbára Àrá      | Chemical energy   | Agbára Èlà             |
| Light Energy      | Agbára Ìtàná    | Solar energy      | Agbára Ìtàn-oòrùn      |
| Heat Energy       | Agbára Okun-iná | Nuclear energy    | Agbára àgọ (ínú átòmù) |
| Magnetic energy   | Agbára Òòfà     | Mechanical energy | Agbára ẹrọ             |
| Sound energy      | Agbára Ìró      |                   |                        |

### SOURCES OF ENERGY / ÌȘÈDÁ ÀWỌN AGBÁRA

| English   | Yoruba      | English | Yoruba |
|-----------|-------------|---------|--------|
| Sun       | Oòrùn       | Waves   | Ìjì    |
| Fuels     | Ohun-ìdáná  | Wind    | Afẹfẹ  |
| Tide      | Ìṣa òun iyọ | Water   | Omi    |
| Chemicals | Èlà         |         |        |

### MECHANICAL ENERGY / AGBÁRA ẸRỌ

| English   | Yoruba  |
|---|---|
| Energy: Energy is the capacity of a physical system to perform work.  | Agbára: Agbára jẹ okun fún ètò ẹdá kan láti le ẹ ẹ́   |
| Mechanical Energy: the sum of potential energy and kinetic energy present in the components of a mechanical system  | Agbára ẹrọ: Àpapọ agbára (nípa) ipò àti agbára (nípa) ìmíra tó wà ní ètò ẹyọ-inu ètò-ẹrọ kan  |
| Potential energy energy stored in a body or in a system due to its position.  | Agbára (nípa) Ipò: Agbára tí a pamọ sí inú ẹdá kan tàbí ètò kan nípa ipò tí nkan yí wà  |
| Kinetic energy: energy in motion:<br>1. Vibrational motion: the energy due to vibrational motion<br>2. Rotational energy: the energy due to rotational motion<br>3. Translational energy: the energy due to motion from one location to another | Agbára (nípa) ìmíra:<br>1. Agbára ẹgbọn: agbára nípa ìmíra tí gbígbọn<br>2. Agbára ipòyì: agbára nípa tí ìmíra tí pípòyì<br>3. Agbára ipapòda: agbára nípa tí ipapòdà láti ibi kan sí ibi míràn |
| Force: any influence that causes an object to undergo a change in speed, a change in direction, or a change in shape.<br>Force has direction  | Ipá: Òkùnfà tó le mú kí ẹdà kan kí ó pa eré dà, tàbí kí ó yà lònà rẹ, tàbí kí ó tilẹ pa iri ara rẹ dà<br>Ipá (force) ní ipa (direction)   |
| Work: is a scalar quantity that can be described as the product of a force times the distance through which it acts   | Ìşẹ: jẹ oun ànínpa (no direction) tí a sì lè rí gégẹbí ẹsún ipá (force) àti ìjìn (distance) tí ipá yí sà (sa ipá: to use force)   |
| Power: the rate at which work is performed or energy is converted   | Ìgbóra: Ìyásí bí ịşẹ ẹ nşẹ tàbí tí agbára fi ndà lílò   |

**TYPES OF SIMPLE MACHINES/ ÀWỌN ORÍŞÌ ÈRỌ ÀTILÈWÁ**

| English   | Yoruba   |
|---|--|
| <b>Lever</b><br>A lever is a simple machine that consists of a rigid object (often a bar of some kind) and a fulcrum (or pivot).<br>Types of levers: <ol style="list-style-type: none"> <li>1. First order lever: Fulcrum in the middle</li> <li>2. Second order lever: Load in the middle</li> <li>3. Third order lever: Effort in the middle</li> </ol> | <b>Egbé</b><br>Egbé jẹ ẹrọ ayébéyé. Ó ní àwọn nkan líle (opo tàbí nkan bí òógbó) àti nkan tí a npè ní Àtàrí (fulcrum)<br>Àwọn oríşì Egbé: <ol style="list-style-type: none"> <li>1. Egbé eléto kini: Àtàrí (fulcrum) wà láarín iwọ̀n tí a fẹ̀ gbé (weight) àti òòfà-iwọ̀n (force)</li> <li>2. Egbé eléto kejì: Iwọ̀n wà láarín àtàrí àti òòfà-iwọ̀n</li> <li>3. Egbé eléto kẹta: Òòfà-iwọ̀n wà láarín àtàrí àti iwọ̀n</li> </ol> |
| <b>Wheel and Axle:</b> a circular device that is attached to a rigid bar in its center.   | <b>Ayíra òun òógbó-ayíra:</b> nkan tó nýí tí a sì so òógbó mọ̀ láarín  |
| <b>Inclined Plane:</b> a plane surface set at an angle to another surface. This results in doing the same amount of work by applying the force over a longer distance. Example: A ramp  | <b>Pẹpẹ dídà:</b> eléyí jẹ pẹpẹ tó dà sí ègbé kan lórí pẹpẹ miran. Ò já sí pé a nse iwọ̀n isẹ kan náà nípa lílo ipá ní ọ̀nà tó jin.<br><b>Fún àpẹrẹ:</b> Ìdàgèrẹ   |
| <b>Wedge:</b> a double-inclined plane (both sides are inclined)<br>Examples: Axe, Knife   | <b>Òòlà:</b> Onípẹpẹ dídà méjì (ègbé méjèèjì ló dà)<br><b>Àpẹrẹ:</b> ẹ̀dùn-àáké, ọ̀bẹ  |
| <b>Screw</b><br>A screw is a shaft that has an inclined groove along its surface.   | <b>Ìdè</b><br>Ìdè jẹ ọ̀pá tó ní yàrà dídà tó yí ara rẹ kiri  |
| <b>Pulley:</b> a wheel with a groove along its edge, where a rope or cable can be placed.<br>Types of pulleys: <ol style="list-style-type: none"> <li>1. Fixed pulley</li> <li>2. Movable pulley</li> </ol>   | <b>Afàwọ̀n:</b> Ayíra tó ní yàrà tó yí etí rẹ kiri. A sì lè fi okùn tàbí okùn-irin sínú yàrà yí.<br><b>Àwọn oríşì Afàwọ̀n:</b> <ol style="list-style-type: none"> <li>1. Afàwọ̀n alásoṣọ</li> <li>2. Afàwọ̀n apapòdà</li> </ol>  |

**HEAT ENERGY / AGBÁRA OKUN-INÁ**

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| <b>Heat energy:</b> a form of energy which transfers among particles in a substance (or system) by means of kinetic energy of those particles. | <b>Agbára Okun-iná:</b> oríşì agbára kan tí a lè şí ní ipò láarín àwọn átómù inú ẹ̀dá kan nípa lílo agbára ipapòdà àwọn átómù yí |
| The energy transferred from a high-temperature system to a lower-temperature system is called heat   | Agbára tí a şí ní ipò láti ibi ọ̀pọ̀ ìgbóná lọ sí ibi ìgbóná kékeré ní a npè ní okun-iná   |
| <b>Calorie:</b> Amount of heat required to raise the temperature of one gram of water from 14.5°C to 15.5 degrees Celsius                      | <b>Kálórì:</b> Iye okun-iná tí a nílò láti gbé grámù omi kan gbóna láti 14.5°C dé 15.5<br><b>Àlẹ́fà tí Sẹ́lşíşì.</b>             |
| Latent heat is the heat released or absorbed by a chemical substance or a  | <b>Okun-iná wíwàba (wọ̀ ẹ̀ba: to be latent):</b> Ó jẹ okun-iná tí a tú sílẹ̀ tàbí tí ẹ̀dá kan fà mun                             |

## ÌWÉ-ÌLÉWỌ ÈKỌ ÌMỌ-JÌNLÈ ÀTÌ ÌMỌ-ÈRỌ

|   |   |
|---|---|
| thermodynamic system during a change of state that occurs without a change in temperature   | nígbatí ó bá npa ìrírẹ dà láìjẹ wípé ó ní ìgbéga nínú ìgbóná ara rẹ   |
| Specific heat, also called specific heat capacity, is defined as the amount of energy that has to be transferred to or from one unit of mass (kilogram) or amount of substance (mole) to change the system temperature by one degree. | <b>Okun-iná iwònkàn:</b> A ẹ̀ ̀àlàyé eléyí gégẹ́bí agbára tí a nílátí ̀́nínipò láti, tàbí sí, iwòn ̀̀kẹ́grámù ̀̀dà kan kí ó lè gbóná fún iwòngbóná kan. A sì lè rí i bí agbára tí a nílátí ̀́nínipò láti, tàbí sí, móòlù ̀̀dà kan kí ó lè gbóná fún iwòngbóná kan |

### LIGHT ENERGY / AGBÁRA ÌTÀNNÁ

|   |  |
|---|--|
| Light is a form of <i>radiant energy</i> that you can detect with your eyes. Light energy comes from chemical energy, electrical energy and nuclear energy.   | Agbára ìtánná jẹ́ ìrú agbára atàn kan tí a lè fí ojú rí. Agbára ìtánná lè ẹ̀ wá láti inú agbára ẹ̀là, agbára àrà, àti agbára àgò-átòmù.  |
| Luminous light: from objects that emit their own light  | Ìtánká Àfójúrí: láti ara àwọn ̀̀dà tí wòn ntan iná tiwòn   |
| Non-luminous light: from object that do not emit their own light  | Ìtánká Àifójúrí: láti ara àwọn ̀̀dà tí wòn kò ní agbára láti tan iná tiwòn   |
| Visible light: light emitted by the sun and visible to the eye  | Ìtánná àfójúrí: Ìtánná tó ẹ̀ látí oòrùn tí a sì lè fí ojú rí   |
| Colours of the spectrum of light - ROYGBIV  | Àwọn àwọ̀ àádí-ìtánná: <b>Pupa, Ọsàn, Èsẹ̀, Ewé, Àyínrín, Èlú, Aró</b>   |
| Wave :<br>1. Crest:<br>2. Trough<br>3. Frequency: number of wavelengths that pass through a given point in one second<br>4. Wavelength: distance between two crests or two troughs<br>5. Amplitude: a measure of how much energy a wave has | Agbòṅ:<br>1. Gegele:<br>2. Àfo:<br>3. Ìyásí: Iye ìgbòṅ (agbòṅ) tó kojá ojú kan láarín ìṣẹ́jú kan<br>4. Ìgbòṅ agbòṅ: Ìjìn láarín Àfo agbòṅ méjì tàbí gegele agbòṅ méjì<br>5. Ìwòṅ-ìjì (agbòṅ): Ìwòṅ agbara ti agbòṅ kan ni. |
| Reflection: Ray emanating from a shadow   | Ìtàn òjìjì (òjìjì: shadow): Ìtánná tó ti ara òjìjì wá  |
| Refraction: Change in direction of light rays from one medium to another  | Ìṣẹ́-ìtánná***   |

### COLOURS / ÀWỌN ÀWỌ

|                   |                          |                  |               |
|-------------------|--------------------------|------------------|---------------|
| Blue colour       | Àwọ̀ Ayinrin             | Lilac colour     | Àwọ̀ ???      |
| Black colour      | Àwọ̀ dúdú                | Orange colour    | Àwọ̀ ọsàn     |
| Brown colour      | Àwọ̀ ara                 | Purple colour*** | Àwọ̀ ???      |
| Gray colour       | Àwọ̀ èèrú                | Red colour       | Àwọ̀ pupa     |
|                   |                          | Scarlet colour   | Àwọ̀ pupayòyò |
| Green colour      | Àwọ̀ ewé                 | Violet colour*** | Àwọ̀ osùn     |
| Indigo colour     | Àwọ̀ ẹ̀lú                | White colour     | Àwọ̀ funfun   |
| Light blue colour | Àwọ̀ òfẹ́fẹ́, àwọ̀ sánmà | Yellow colour    | Àwọ̀ èsẹ̀     |

**SOUND ENERGY / AGBÁRA ÌRÓ**

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|--|--|
| Sound energy is energy produced by sound vibrations. It is a wave that is an oscillation of pressure transmitted through a solid, liquid or gas, and composed of frequencies within the range of hearing | Agbára Ìró jẹ agbára tó sẹ wá láti gbígbòn àwọn nkan tó ndún. Ó jẹ irú agbòn tó sẹ wá nípa mímì (látí m̀: to oscilate) àwọn èúfún, tí ó sì tàn káàkiri inú àwọn adì, aṣon tàbí àwọn òyì. Ó sì ní àwọn iyásí-iyípo tí a lè fí etí gbò |
| Longitudinal waves: waves of alternating pressure deviations from the equilibrium pressure   | Àwọn Agbòn olóòró (oní òòró): Àwọn agbòn tó nṣe iyèná lóṣunlòsì kúrò ní ibi agbede èéfun.  |
| Transverse waves: waves of alternating shear stress at right angle to the direction of propagation   | Àwọn agbòn onibu (oní ibu): àwọn agbòn tó ntan nipa ***  |
| Acoustics: science that deals with the study of all mechanical waves in gases, liquids or solids   | Èkọ nípa àwọn agbòn, yálá èyí tí ó tàn káàkiri àwọn adì, àwọn aṣon tàbí àwọn òyì   |
| Noise: Unwanted sound  | Aruwo: Àwọn iró tí kò ṣe ènìyàn ní ànfàní  |
| Hertz: a unit of frequency equal to one cycle per second   | Haatisi: Ìdíwọ̀n iyásí-iyípo tó jẹ iyípo kan ní ìsìsẹ̀ kan (ìsìsẹ̀: second)  |

**MAGNETIC ENERGY/ AGBÁRA ÒÒFÀ**

|   |   |
|---|---|
| Magnetic energy: The energy required to set up a magnetic field | Agbara Òòfà: Agbára tí a ní ilò láti ṣedá itẹ̀-òòfà |
|   |   |
|   |   |

**ELECTRICAL ENERGY / AGBÁRA OKUN-ARÁ**

|   |  |
|---|--|
| Electrical energy: energy made available by the flow of electric charge through a conductor | Agbára Okun-ará: agbára tó di wíwà nípa ìṣon iye-àrá kan nínú òpó ìṣon-àrá |
| Electricity:  | Okun-àrá   |
|   |  |