

Energy Makes It Move

Aim – To provide children with opportunities to investigate the energy sources of toys.

Level C/E

Attainment Target: C	Attainment Target: E
Give examples of energy being converted from one form into another.	Describe some examples of the inter-conversion of potential and kinetic energy.

Introductory Lesson

Collect a wide variety of toys. (Ask the pupils to bring in a toy from home and try to bring one without a battery.) Emphasise toy and not a game.

Investigate the toys – 20 mins informal discussion about how the toys move.

Pupils then classify, sort and justify toy groupings. Make hoops available to sort into.

Make pupils aware that:

Each of these toys use energy.

These are: Sound, Light and Movement

Each of these toys have potential energy which is stored energy which is transferred to kinetic energy which produces sound, light, movement.

Energy Categories

Potential Energy (stored) – Energy that is available as a result of position, or composition.

Kinetic Energy (Movement) – Energy that is available as a result of objects moving.

Energy Changes (Conversions) – Changes between stored and movement energy results in the loss of some of the overall energy as heat or transferred to other objects around it causing them to move.

Pupils may then lead into the topic of energy or teacher may need to introduce this.

Lesson 2

Sound, Light and Movement Toys

Energy conversions can be observed by different end results – sound, light, and movement.

Toys can then be sorted onto sets using hoops.

(Children make an observational drawing of a toy and place it in the correct set).

Record using worksheet – to be made

Lesson 3

2 Penny Races or Early Learner Centre wind up helicopter and wind up train.

Investigation using two kinds of wind up/pull toy.

Discuss what makes the toys move and then set the following scenario.

Mr B has bought his twins two wind up toys of the same type but different models.

One child has complained that his toy does not travel as far as his brothers. He has written to you at the toy manufacturers demanding an explanation.

How will you deal with this?

You will need to test, record and respond to this complaint.

Why does this happen?

Discuss fair testing, i.e. the turns of the wind up will need to be the same or the pull back motion over the same distance. (A dot on the start stop area might help or hold the key steady and turn the toy through 180 degrees.)

Either table or spreadsheet record

Draw conclusions and give responses. (Answers will vary but accept all reasonable justifications: mass, friction, drag, subtle design differences.)

Write a letter answering complaint.

Extension to this lesson would be a discussion to record the energy conversions occurring in this lesson.

These toys have used energy, what else do we know uses energy?

Lesson 4

Now introduce toys with batteries.

Children are given opportunities to investigate the behaviour of these toys to observe the same conversions as in lesson 2.

Make pupils aware that:

Chemicals go into cells (a battery is a collection of cells) and the energy is stored. An energy transfer is provided when the circuit is completed.

Activity – Light bulb, buzzer or motor complete circuit.

Provide the pupils with a battery, wire and either a light bulb, buzzer or motor.

Can you make light bulb light, buzzer sound or motor run?

Why does it work or not?

Pupils should be aware:

Chemical energy is converting to light, sound or movement

Pupils should expect failures, check battery, bulb or wire by problem solving.

Draw a complete circuit to record.

Extension – ping pong ball

Drink lots of water before this activity.

Everyone joins hands with sweaty palms to light the ping pong light.

Why did this happen?

Where did the electricity come from?

(We all have stored electrical energy in our bodies)

Lesson 5

Activity in groups

Plan, design and make a toy which demonstrates any of the energy conversions encountered during previous lessons.

Resources:

Elastic bands

Lollipop sticks

Card

Batteries

Bulbs

Gears

Corruflute

Plasticine

Yo-yo

Slinky

Car that pulls back

Spinning top

Newton's Cradle