



The Government of the Republic of Trinidad and Tobago
MINISTRY OF EDUCATION

PRINCIPLES AND PRACTICES IN

TECHNOLOGY EDUCATION

for Trinidad and Tobago

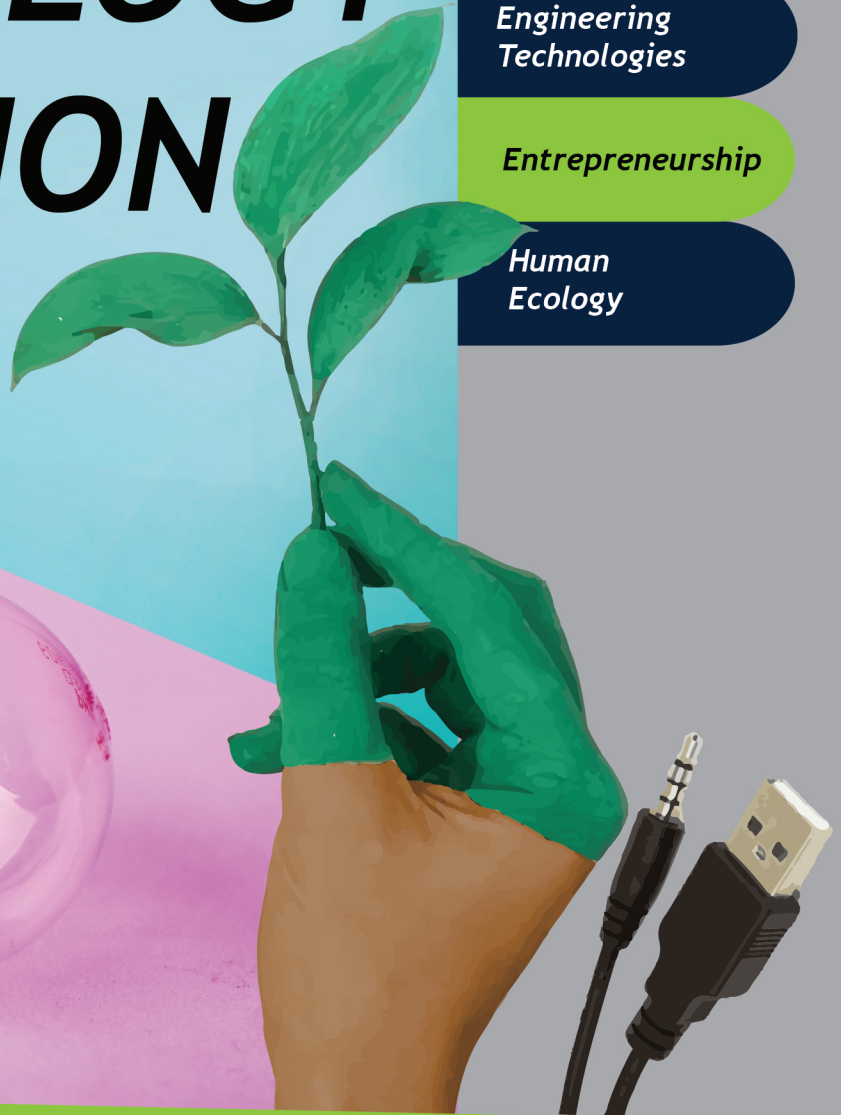
SECTION 3 - PAST PAPERS

*Biological
Technologies*

*Engineering
Technologies*

Entrepreneurship

*Human
Ecology*



Lower Secondary Forms 1-3

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Mc Bean
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Written by: Mrs. Eleanor Carrington Davis - Curriculum Officer
Reviewed by: Dr. Khalel Mohoyodeen - Curriculum Coordinator
Illustrated by: Ms. Donelia Richards



**THE GOVERNMENT OF THE REPUBLIC OF TRINIDAD AND TOBAGO
MINISTRY OF EDUCATION**

**NATIONAL CERTIFICATE OF SECONDARY
EDUCATION 2005-2018
(Level 1)**

TECHNOLOGY EDUCATION

CHALLENGES FOR 2005-2018

NCSE EXAMINATION 2005

CHALLENGE 1: Energy, Power & Transportation / Production / Communication **THE RETRIEVER ACTIVITY**

CONTEXT:

THE RETRIEVER ACTIVITYces have been constructed but there is still a need for a special one to aid the Visually Impaired.

CHALLENGE:

Today you are in a situation where the only key for your classroom has fallen into a hard to reach location. Your group is required to design, produce and test an electromagnetic device capable of attracting at least 20 paper clips. Apply this principle to build a device to retrieve your classroom key. You are also required to submit a flyer advertise this device.

RESOURCES:

Computer, internet, science texts, resource persons, solution kit.

Materials in solution kit:

Nails, pins, assortment of wires, plastic rod, palette sticks, 3 batteries (an assortment of sizes), copper wires, copper rod, p.v.c. pipes (varied lengths).

LEARNING OUTCOMES:

- Investigate and research relevant information.
- Prepare and present relevant information.
- Work cooperatively in a group.
- Safe manipulation of tools and equipment to accomplish task.
- Use problem solving method.
- Use technological method.

EVALUATION:

- Safety practices
- Team work.
- Design portfolio.
- Product.

CHALLENGE 2: Biological Technologies / Production / Communication

THE ALTERNATIVE ENERGY ACTIVITY

CONTEXT:

Petroleum based products have numerous applications. One of these applications is to provide fuel for cooking. This non-renewable resource cannot be expected to last forever.

CHALLENGE:

Your team is required to design and build a solar cooker/ oven. This oven should have the capacity to hold the cooking utensil provided. Present a flow chart illustrating the steps used to produce the item. ce to retrieve your classroom key. You are also required to submit a flyer advertise this device.

MATERIALS/RESOURCES:

- Internet
- Text
- Tools in the lab
- Wood, wire, foil etc.

LEARNING OUTCOMES:

student will be able to

1. Work cooperatively as a team
2. Adopt safe working practices
3. Design solar cooker/ oven
4. Build solar cooker/oven
5. Understand the principles involved in the use of solar energy
6. Produce a Design Portfolio

EVALUATION:

- | | |
|---------------------------|-----|
| 1. Team work | 10% |
| 2. Problem solving skills | 20% |
| 3. Product | 30% |
| 4. Design portfolio | 30% |
| 5. Safety Practices | 10% |

CHALLENGE 3: The Spy Ware Activity

CONTEXT:

When we view an object we see it because light is reflected off of it. Rays of light may be bent (refracted) or change direction so that objects can be seen.

CHALLENGE:

You are playing a game of hide and go-seek with your classmates. You would like to see them without being seen. Using the materials provided in the solution kit, you are required to design, develop and test a device capable of seeing around corners. Produce a flyer to advertise your innovation to your school community.

RESOURCES:

Computer, internet, science texts, resource persons and solution kit.

Materials in solution kit:

Paper, scotch tape, cardboard, cardboard rolls, reflective paper, aluminium foil, flexi glass, p.v.c. conduit.

LEARNING OUTCOMES:

- Investigate and research relevant information.
- Prepare and present relevant information.
- Work cooperatively in a group.
- Safe manipulation of tools and equipment to accomplish task.
- Use problem solving method.
- Use technological method.

EVALUATION:

- Portfolio entries.
- Group work.
- Safety practices.
- Designed solution.
- Testing of solution.

CHALLENGE 1: A Collapsible Device

CONTEXT:

People suffering from Visual Impairment encounter difficulties when moving around. Many innovative devices have been constructed but there is still a need for a special one to aid the Visually Impaired.

CHALLENGE:

Design and make a collapsible device, which can aid a Visually Impaired student in moving around. The device should be attractive, comfortable and safe to use.

Choose an appropriate advertising medium to present your product to a sponsor.

RESOURCES:

Internet, textbooks, workshop tools and equipment

MATERIALS:

- PVC pipe, fittings and adhesive
- Other materials subject to the approval of the teacher

CHALLENGE 2: Packaging

CONTEXT:

Fruits and vegetables are easily damaged during transportation resulting in high losses.

CHALLENGE:

Design and make a container for transporting ripe tomatoes.

The container should:

- Be able to accommodate at least 3 Kg of ripe tomatoes
- Allow for multi-layer packaging
- Be attractive.
- Choose an appropriate advertising medium to present your product to a sponsor.

RESOURCES:

Internet, Textbooks

MATERIALS:

Cardboard, Glue, Paper, Chip Paper, Stapler, Paper, ½" Styrofoam, Wood

- Other materials subject to the approval of the teacher.

CHALLENGE 3: The Lift Activity

CONTEXT:

Very often in the construction industry, materials must be moved from one level to another. A simple gadget could make the process easier.

CHALLENGE:

Design and make a simple gadget used for moving materials up from one level to another. The device should be able to lift a mass of two (2) kilograms.

Choose an appropriate advertising medium to present your product to a sponsor.

RESOURCES:

Internet, Science texts, Resource persons

MATERIALS:

String, Pieces of wood ,Nails, Screws, Nuts and bolts, Carpentry tools, Grooved wheels ,Bobbins Hooks, Wire, Glue and glue gun

- Other materials subject to the approval of the teacher.

CHALLENGE 1: The Assistive Technologies Activity

CONTEXT:

Many homeowners find it challenging to reach high objects. Very often they climb onto chairs, boxes, buckets and other objects to increase their reach. These devices are generally unstable for climbing and can compromise the safety of individuals.

CHALLENGE:

Your group is required to design and produce a free standing device that will elevate a person at least 60cm above floor level. The device should be safe, attractive, easy to use, support a weight of at least 50kg, collapsible and allow for a reduction in size to at least 40cm.

RESOURCES:

Computer with internet access and printer, digital camera, library, telephone directory, telephone and fax machine, workshop tools and equipment.

MATERIALS:

Wood, PVC pipe, metal screws, adhesives, nails, paint/varnish, sandpaper and any other material subject to the approval of the teacher.

CHALLENGE 2: Spraying Device

CONTEXT:

Wasps often build their nests on the ceiling of homes and farm buildings. Their presence around homes and farms are considered a hazard particularly to individuals who are allergic to their stings. Homeowners and farm workers are often advised to get rid of wasps by spraying their nests with a soap solution.

CHALLENGE:

Your group is required to design and produce a device that will deliver 75mls of soap solution to a minimum height of 5 metres. The device should be safe, attractive, easy to use and cost less than \$20.00.

RESOURCES:

Computer with Internet access and printer, digital camera, library, telephone directory, telephone and fax machine, workshop tools and equipment.

MATERIALS:

PVC pipe and fitting, adhesive, leather sheet, wood, screws, rubber, paint/varnish, sandpaper and any other material subject to the approval of the teacher.

CHALLENGE 3: Keepsake**CONTEXT:**

An international sporting event is due to be held in the Caribbean later this year. To commemorate this event your company has been awarded a contract to design and produce an appropriate keepsake for this event.

CHALLENGE:

Your group is required to design and produce a keepsake for an international sporting event. The keepsake should be safe, attractive, fit in a gift box (12cm x 6cm x 2cm), cost less than \$20.00 and highlight some aspect of our Caribbean culture.

RESOURCES:

Computer with Internet access and printer, digital camera, library, telephone directory, telephone and fax machine, workshop tools and equipment.

MATERIALS:

Wood, iron / copper sheet, plastic sheet, potter's clay, fabric, screws, rubber, paint/varnish, sandpaper and / or any other material subject to the approval of the teacher.

CHALLENGE 4**CONTEXT:**

Diabetes is a major medical condition in children. If it is not controlled it can have serious consequences on the health of individuals. To control diabetes, individuals are often required to observe special dietary requirements.

CHALLENGE:

Your group is required to develop and produce a snack item for diabetic children. The snack should be safe for consumption, tasty, attractive, have a shelf life of at least 3 days and cost less than \$5.00 per serving.

RESOURCES:

Computer with internet access and printer, digital camera, library, telephone directory, telephone and fax machine, food preparation utensils, tools and equipment.

MATERIALS:

Grocery items, food ingredients, health products and any other material(s) subject to the approval of the teacher.

CHALLENGE 1: Transport System

CONTEXT:

In many countries including Trinidad and Tobago, farmers have to cross rivers and streams to conduct their agricultural activities. For example, they have to transport seedlings, fertilizers, pesticides and tools as well as agricultural produce from one side of the river to the other side. Carrying agricultural supplies and produce from one side of the waterway to the other can be very challenging.

CHALLENGE:

Your group is required to build a model of a device that is capable of transporting agricultural supplies and produce across a waterway, six (6) meters wide. The device should:

- i) be able to support a weight of 2 kgs
- ii) be safe and durable
- iii) cost less than \$30.00

RESOURCES:

- strips of board
- craft sticks
- wood glue/sieves
- spray paint
- varnish
- screws
- nails
- staples
- cable
- PVC material
- wire
- hand saw
- sand paper
- hand tools
- digital camera
- computer
- colour printer
- access to information such as library, internet etc.
- any other material and resources

CHALLENGE 2: Breakfast Item

CONTEXT:

Many students do not have breakfast and attend school hungry. One of the main reasons for them missing breakfast is the relatively long time it takes to prepare. Breakfast is an important meal and not having this meal is likely to affect the performance of students.

CHALLENGE:

Your group is required to design and prepare a food item which can be substituted for a local breakfast.

The item should be:

- i) nutritious and tasty
- ii) relatively easy to prepare
- iii) made from tropical agricultural produce

MATERIALS AND RESOURCES:

- local agricultural produce or products
- common kitchen equipment and utensils
- digital camera
- computer
- colour printer
- access to information such as library, internet etc
- any other materials and resources approved by the teacher

CHALLENGE 3: The Game

CONTEXT:

The August vacation is a relatively long period when students are away from school. Many children are bored and parents often find difficulty entertaining them. One of the ways of entertaining children is through games. However, the number of games available is limited and relatively costly.

CHALLENGE:

Your group is required to design and produce a game. The game should:

- (i) allow at least four persons to play at one time
- (ii) be entertaining and attractive
- (iii) cost less than \$30.00 to produce

MATERIALS AND RESOURCES:

- wood
- paper
- cardboard
- plastic sheets
- markers
- crayons
- water colors
- pvc material
- batteries
- LEDs
- small motors
- wire
- digital camera
- computer
- colour printer
- access to information such as library, internet etc.
- any other materials and resources approved by the teacher

CHALLENGE 4: Storage Item**CONTEXT:**

Persons involved in the Garment Industry normally have a lot of scrap materials. This may be considered waste and thrown away. However, some scrap materials are recyclable and can be used to make useful products.

CHALLENGE:

Your group is required to design and make an item to store an MP3 player and a cell phone. The item should:

- i) be designed using at least 4 different types of scrap materials
- ii) allow for easy access and retrieval of MP3 Player and cell phone
- iii) be attractive and safe

MATERIALS AND RESOURCES:

- pieces of cloth
 - fabric glue
 - fasteners e.g. button, zipper, Velcro
 - beltin
 - ¼ inch thick foam
 - scissors
 - needles
 - thread
 - sewing machine
 - digital camera
 - computer
 - color printer
- access to information such as library, internet etc.
any other materials and resources approved by the teacher

CHALLENGE 5: Aids Awareness**CONTEXT:**

As part of the World HIV/AIDS Day observances, your school wants to highlight its concerns about the number of young people age 15 to 25 who are at risk of contracting HIV/AIDS. Your school will, be having an HIV/AIDs display and will like students to participate and contribute to the event.

CHALLENGE:

Your group is required to design and produce an item for communicating information about HIV/AIDS to students of your schools using any communication media. The information should be:

- i) factual and relevant to Trinidad and Tobago
- ii) creatively presented
- iii) effective, reaching at least sixty(60) percent of the intended audience.

MATERIALS AND RESOURCES:

- markers, water colors, crayon, spray paint, Bristol board, stencil set, pencils, pens, glue stick, scissor, ruler, CDs, DVDs, sound recorder, camcorder, digital camera, computer, colour printer,
- access to information such as library, internet etc.
 - any other materials and resources approved by the teacher

CHALLENGE 1

CONTEXT:

A manufacturer of canned beans receives its deliveries of bags of beans by truck. These beans are then carried by workers to the processing plant which is on the ground floor. These beans are then poured into large utensils for processing. Workers frequently complain of strains from carrying heavy bags of beans.

CHALLENGE:

Your group is required to design and make a working model that will transport a bag of beans $\frac{1}{2}$ kg in weight, a distance of $\frac{1}{2}$ meter to a container. The model has to be

- free standing
- sturdy
- powered appropriately
- easy to use

MATERIALS AND RESOURCES:

- wood or other suitable material - DC motor, pulleys -crank handle, gear wheels, worm gears -dowels -PVC pipes and fittings -string -access to information such a library Internet etc. -any other materials and resources approved by the teacher -container –beans.

CHALLENGE 2

CONTEXT:

Children love candy, however, candy may have a very high sugar content and is very unhealthy due to its low nutritional value. Candy may contribute to life style diseases in children.

CHALLENGE: Your group is required to develop a recipe and make a candy which utilizes LOCAL FRUIT. It should:

- be innovative
- have an acceptable sugar content
- have a shelf life of at least three (3) days

MATERIALS AND RESOURCES:

Sugar, spices, flavoring -local fruit -kitchen utensils - access to information such as library, Internet etc. -any other materials and resources approved by the teacher.

CHALLENGE 3

CONTEXT:

Your school has a House System and the houses are named after fauna found in the forests of Trinidad and/Tobago. At this year's sports day, each house is asked to produce a mascot from which the best House Mascot will be chosen.

CHALLENGE: Your group is required to choose an appropriate name for your house and design a mascot's costume. The costume should:

- reflect the animal after which the house is named
- use scrap material
- cost no more than \$30.00
- be safe to use

MATERIALS AND RESOURCES:

Fabric and other sewing materials, stuffing material -glue gun with glue sticks -sewing machine and accessories - access to information such as library, Internet etc. - any other materials and resources approved by the teacher 9

CHALLENGE 4

CONTEXT:

Students often fail to place their trash in the bins provided, instead they leave it in their desk or throw it on the floor. This is also reflected in the wider society where improper disposal of garbage has many negative effects. Media campaigns are useful in changing such behaviors.

CHALLENGE:

Your group is required to:

1. Describe a suitable media campaign that would communicate and motivate your peers to properly dispose of their garbage. Your description must:
 - include at least two modes of communication
 - be no more than 150 words

2. Design and produce one (1) item that is part of your campaign. Your item must:

communicate two (2) pieces of key information about negative effects of littering

be directed to the appropriate audience

MATERIALS AND RESOURCES:

Markers, water colors, crayons -spray paint -bristol board -stencil set -pencils, pens -scissor, ruler -CDs DVDs -sound recorder -camcorder -digital camera -computer -colour printer - access to information such as library, Internet etc. - any other materials and resources approved by the teacher 10

CHALLENGE 5

CONTEXT:

Trinidad and Tobago produces several herbs valued for their unique qualities and for their variety of uses. There is great potential for export trade as exotic seasoning herbs. Herbs can become unusable soon after harvesting and can also be an expensive item in the market at certain times of the year.

CHALLENGE:

Your group is required to:

1. Produce a report of no more than 150 words describing three uses of any herb of your choice and three conditions needed for commercial farming of this herb.
2. Produce an item that can be sold based on the chosen herb.

The product should:

have a two (2) week shelf life

have good color and consistency

be properly labeled and packaged

MATERIALS AND RESOURCES:

-herb leaves -bottle/s or appropriate containers - kitchen equipment and utensils - access to information such as library, Internet etc. - any other materials and resources approved by the teacher

CHALLENGE 1: Advertisement

CONTEXT:

When starting a new business it is extremely important that clients are informed about what the business has to offer. Businesses often choose from a wide range of communication media to present their information. The media they choose depends on the type of business, the clients, and the cost.

CHALLENGE:

Your group is required to choose a business in or around your school community and design and produce an advertisement, using any one communication medium to inform students about the business. The advertisement you produce should be:

- Attractive
- Informative
- Effective in reaching at least 60% of the target audience

MATERIAL AND RESOURCES:

Computer with Publisher/Word, Colour printer, Paper, Ink, Access to information on the Internet, library, etc

Markers, water colours, crayons, Spray paint, Bristol board, Stencil set, Pencils, pens, erasers, rulers
Scissors, CDs, DVDs, Audio recorder, Digital camera, Guillotine
Any other materials or resources approved by the teacher

CHALLENGE 2: Growing Media

CONTEXT:

Many farmers and home gardeners in Trinidad and Tobago use the grow box method for cultivating vegetables. In this method of farming, bagasse is mixed with sharp-sand to produce a soilless growing media. With the closure of Caroni (1975) Ltd. however, bagasse is no longer available and grow box farmers are looking for a suitable material to replace bagasse.

CHALLENGE:

Your group is required to design and produce a soilless growing media that does not contain bagasse. The material you use to replace bagasse should:

- be biodegradable
- support healthy plant growth for at least 7 days
- cost less than \$30.00 per bag (50 kg)

MATERIALS AND RESOURCES:

- Sharp sand
- Fertiliser e.g. 12:12:17:2 (N.P.K)
- 15 cm plastic plant container
- Vegetable seedlings
- Bucket
- Garden trowel
- Plant label/masking tape
- Digital camera
- Computer with colour printer
- Access to information on the internet, library etc.
- Any other materials and resources approved by the teacher

CHALLENGE 3: Food Item

CONTEXT:

During intense physical activity the human body uses a considerable amount of minerals. If these minerals are not replaced, the body cannot function properly. For example, it is not uncommon for athletes and persons doing manual work to complain of cramps. Food items, drinks and beverages can replace minerals that are used up during intense physical activity.

CHALLENGE:

Your group is required to design and prepare a food item that can replace minerals that are lost during intense physical activity. The item should:

- be tasty
- be made from at least two local agricultural produce or products
- have a shelf life of at least 7 days
- cost no more than \$15.00 to produce, per serving.

MATERIALS AND RESOURCES:

Local agricultural produce or products

Sugar and salt

Rehydration salt, e.g. Gesol, Prolyte, Genhydrate

Spices and condiments

Common kitchen equipment and utensils

Digital camera

Computer with colour printer

Access to information on the Internet, library, etc

Any other materials or resources approved by the teacher

CHALLENGE 4: Chair Item

CONTEXT:

Many secondary school students find that the chairs provided for them to sit on are hard and uncomfortable. This situation can lead to reduced student attentiveness in the classroom.

CHALLENGE:

Your group is required to design and produce an item to increase the seating comfort of chairs in your classroom. The item should:

- Fit the standard size secondary school chair
- Be comfortable
- Be durable
- Costs no more than \$30.00 to produce

MATERIALS AND RESOURCES:

Fabric

Leatherette

Fabric glue

Padding material

Fasteners

Scissors

Needles

Thread

Sewing machine

Digital camera

Computer with colour printer

Access to information on the Internet, library, etc

Any other materials or resources approved by the teacher

CHALLENGE 5: Transport Device

CONTEXT:

In many mechanic shops, engine parts are cleaned in a wash area and then transported by hand to an assembly area, where the engine is mounted up. Sometimes the parts slip out of the mechanic's hand during transport, resulting in damage to the parts. Additionally, several trips must be made to transport all the parts from the wash to the assembly area.

CHALLENGE:

Your group is required to design and produce a working model of a transportation device that will move engine parts from the wash area to the assembly area. The device should:

- be mobile
- be able to make a 90 degree turn
- transport the parts securely and safely

MATERIALS AND RESOURCES:

Sheet metal

Wood

Castors

Common wood working tools and equipment

Common metal working tools and equipment

Access to information on the Internet, library, etc

Any other materials or resources approved by the teacher

CHALLENGE 1:

COMPONENT:

Materials Technologies

Tired and Aching Feet

CONTEXT:

During the Independent parade many people have to stand for long periods. They often complain of aching feet and might be willing to purchase an item to assist them.

CHALLENGE:

Your group is required to design and produce an item that would alleviate the problem of either having to stand for long periods or the resulting aching feet. Your group is also required to produce a brief newspaper article to introduce your product.

The product must:

- Be effective
- Be safe to use
- Cost less than \$30.00 each to produce

The article must be:

- No more than one hundred (100) words in length

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 2:

COMPONENT:

Materials Technologies

Fusion Cuisine

CONTEXT:

Trinidad and Tobago's cultural heritage is the result of people coming from many different lands. The meeting of these cultures brought a variety of foods to Trinidad and Tobago have developed foods referred to as fusion cuisine.

CHALLENGE:

Your group is required to create a recipe and make a product that will incorporate ingredients associated strongly with at least (2) different cultures found in Trinidad and Tobago.

The product should:

- be nutritious
- be tasty
- cost no more than \$30.00
- contain at least two ingredients associated with at least (2) different cultures

Resources : Appropriate resources approved by the teacher

CHALLENGE 3:**COMPONENT:**

Information and Communication Technology

International Children's Day Presentation

CONTEXT:

International Children's Day is celebrated annually on November 20th. Your school plans to have a celebration in 2011 and wants to involve the surrounding community.

CHALLENGE:

Your group is required to produce a media presentation using appropriate technologies advertising your school's activity for the forthcoming International children's Day.

The presentation must:

- be visually pleasing
- contain relevant photographs animation, graphics or video clips
- address a theme affecting children internationally
- cost less than \$30.00

RESOURCES:

Appropriate resources approved by the teacher.

CHALLENGE 4

COMPONENT:

Landscape design

CONTEXT:

The new principal of your school wants help in beautifying your school's entrance. Your class proposes to develop a flower garden on a small piece of land.

CHALLENGE:

Your group is required to create a presentation to illustrate your proposal to the principal and staff. Your presentation should:

- be neat
- consist of a proportional sketch making use of at least four different geometric shapes.
- Contain a display of layout of the finished product
- A handout illustrating the advantages of your solution

RESOURCES:

Appropriate resources approved by the teacher C

CHALLENGE 5:

COMPONENT:

Energy and the Built Environment

Relief Plan

CONTEXT:

Trinidad and Tobago can be affected by natural disasters such as hurricanes, floods and earthquakes. Your community has been warned that one or more of these events is likely to affect it in the near future.

CHALLENGE:

Your group is selected by the community council to develop a presentation which identifies, explains and illustrates the features of an effective relief plan. Your presentation should include

- At least four requirements of a relief center
- At least four relief personal needs
- At least four essential supplies
- A cost figure for these supplies for one (1) family of four (4) for one week.

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 1

COMPONENT:

Biological Technologies

Beauty product

CONTEXT:

Acne is a condition that is prevalent among adolescents. David is a fifteen-year-old boy who has oily, sensitive skin and is experiencing this condition.

CHALLENGE:

Your group is required to develop an organic product that will help control the acne in the affected area(s).

The product should:

- be made from natural ingredients
- be attractively packaged
- be safe for use
- cost no more than \$30.00.

RESOURCES:

Appropriate resources approved by your teacher

CHALLENGE 2

COMPONENT:

Information and Communication Technologies

Safety for life

CONTEXT:

Good safety practices mean freedom from danger which suggests that the general condition of the body is free from injuries. As such, it is important that good health and safety practices are observed at the workshop/laboratory to ensure that everyone is protected from accidents.

CHALLENGE:

Your group is required to design and present a communication media for educating your classmates about the importance of having a safe and healthy working environment.

The medium should:

- be informative
- be a combination of words and artwork
- be attractive
- cost no more than \$30.00

RESOURCES:

Appropriate resources approved by your teacher.

CHALLENGE 3

COMPONENT:

Energy and the Built Environment

Fire Prevention

CONTEXT:

Candles are used for many purposes such as religious ceremonies, during power outages, and even to enhance the ambience at the dining table. Unfortunately, many home fires are caused by candles resulting in loss of lives and properties.

CHALLENGE:

Your group is required to design and produce a device that will be able to focus the light produced from the candle in an 1800 plane.

The device should:

- be made from non-flammable material
- be marketable
- be safe to use
- cost no more than \$30.00

RESOURCES:

Appropriate resources approved by your teacher

CHALLENGE 4

COMPONENT:

Materials Technologies

Textile Techniques

CONTEXT:

Garments can be damaged in many different ways such as stains, poor laundering techniques and maintenance methods. Most damaged garments can be recycled into various functional articles.

CHALLENGE:

Your group is required to recycle damaged garments into functional accessories, to be modeled at your school's upcoming Easter fashion show.

The accessories should:

- be attractive
- be embellished
- be marketable
- cost no more than \$30.00

RESOURCES:

Appropriate resources approved by your teacher

CHALLENGE 5**COMPONENT:**

Materials Technologies

Guarding the nation's health

CONTEXT:

Students must be provided with healthy foods. School cafeterias have been known to provide foods high in fat, sugar and salt such as hamburgers which may contribute to diseases such as diabetes, obesity and hypertension.

CHALLENGE:

Your group is required to produce a burger for a bun.

The burger should:

- contain at least two (2) local agricultural produce
- be tasty
- be healthy
- cost no more than \$30.00 for a pack of four (4)

MATERIALS:

Appropriate resources approved by your teacher

CHALLENGE 1

COMPONENT:

Information and Communication Technologies

New brooms sweep clean

CONTEXT:

The availability of new and emerging Information and Communication

Technologies in Trinidad and Tobago have allowed entities to reach a larger audience at reduced costs. Schools can also use this medium to advertise upcoming events.

CHALLENGE:

Your group is required to design and create an item to publicize an upcoming school event using suitable media for the online environment.

The item should:

- take into consideration our culturally diverse society
- entail the use of audio/visual recordings
- not infringe on any copyright laws
- cost no more than \$30.00

RESOURCES:

Appropriate resources approved by your teacher

CHALLENGE 2

COMPONENT:

Information and Communication Technologies

Old brooms know the corners

CONTEXT:

In 2008, the Ministry of Education changed the names of several governments Secondary schools. This necessitated, in most instances, changes in the uniforms worn by students.

Your group is required to design and draw a logo/monogram, using a scale of 2:1, which would reflect the new name of the school.

The item should:

- fit within a rectangle 9.5 cm x 8 cm
- contain no more than three (3) geometrical shapes
- consists of three (3) colours, inclusive of the school's colour
- cost no more than \$30.00

Appropriate resources approved by your teacher.

CHALLENGE 3

COMPONENT:

Material Technologies

Healthy Eating

CONTEXT:

Taste and aesthetics are of great importance in food preparation. Unfortunately, not all foods that taste and look good are healthy. There is a growing trend towards living a healthy lifestyle with the focus on reducing the fat and sugar in the diet. It is hoped, that this direction to health will reduce the evidence of over nutrition due to the excessive intake of calories.

CHALLENGE:

Your group is required to create and display a dish for a programme called Healthy Eating.

The dish should:

- be tasty
- be nutritive
- be aesthetically pleasing
- cost no more than \$30.00

RESOURCES:

- chicken breast/protein based substitute
- 1/4 cup mayonnaise
- 1/2 tbs. curry
- 1tbs. thyme
- 1 tomato
- 2 tbs. mango chutney
- any other appropriate resources approved by the teacher

CHALLENGE 4

COMPONENT:

Energy and the Built Environment

Upstairs, downstairs

CONTEXT:

The ability to turn on a lighting device from more than one location can prove to be very convenient. It can reduce the risk of injury and the energy bill when the device is used to illuminate an external stairway in the night.

CHALLENGE:

Your group is required to design, build and test a model of a system that may be used to activate the same lighting device from two locations.

The model should:

- be safe to use
- be tested using a direct current (D/C) source
- use suitable conducting materials
- cost no more than \$30.00

RESOURCES:

- switches
- lamp holder
- batteries
- wires
- connectors/contact terminals
- any other appropriate resources approved by the teacher

CHALLENGE 5

COMPONENT:

Biological Technologies

Government juice

CONTEXT:

Water quality has always been a major concern in our lives. In times of natural disasters e.g. hurricanes, earthquake and even in regular household use, small particles and water discolouration can make us suspicious about the quality of water we consume.

CHALLENGE:

Your group is required to design and produce a device that can be attached to any indoor or outdoor tap to create potable water.

The device should:

- be safe to use
- deliver one (1) litre of filtered water in three (3) minutes
- be aesthetically pleasing
- cost no more than \$30.00

RESOURCES:

- 2 litre bottle
- cotton batting
- fine and large grain gravel
- activated charcoal
- fine wire mesh
- any other appropriate resources approved by the teacher

CHALLENGE 1

COMPONENT:

Energy and the Built Environment

Navigation in the new world

CONTEXT:

Modern society has become dependent on technology. The use of technology has improved the navigation of vehicles on land, sea and air. However the navigator's position is always linked to known locations and the application of skills learnt in subjects such as reading, mathematics and science is still required. The location of the prime meridian and the equator are two lines used to assist in this process.

CHALLENGE:

Your group is required to design and build a device that would assist navigators in understanding a geographic coordinate system.

The device should

- be safe to use
- show clearly two main indicators of this system
- be self- supporting (can stand on its own)
- cost no more than \$30.00

RESOURCES:

Appropriate resources approved by your teacher

CHALLENGE 2

COMPONENT:

Materials Technology

Key Device

CONTEXT:

Quick and easy access to keys may prove to be critical in a time of crisis. Consequently, identifying specific keys for locks is important for business as well as home owners.

CHALLENGE:

Your group is required to design and make a product that will aid in the identification of specific keys in a home or a business.

The product should

- be safe to use
- be made from wood, plastic or metal
- be easily identifiable
- cost no more than \$30.00

RESOURCES:

Appropriate resources approved by your teacher

CHALLENGE 3**COMPONENT:**

Materials Technology

Care of hand sewing needles

CONTEXT:

Whenever a hand sewing needle is used, moisture from the finger is deposited on the needle. The used needles should not be returned to the packet of new or unused needles.

CHALLENGE:

Your group is required to design and create a decorated textile-based item to store used hand sewing needles and present the scientific reason/s for the advice given.

The item should:

- be safe to use
- be multi-coloured - at least three (3) colours
- be made from recycled material
- cost no more than \$30.00

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 4

COMPONENT:

Biological Technologies

Sustainable Development

CONTEXT:

One of the problems affecting agriculture in the Caribbean is soil erosion. Some farmers use a method referred to as “slash and burn” to prepare lands for agricultural purposes. However, when rain falls, valuable topsoil washes away, resulting in poor crop growth and reduced yields. In addition, erosion by water leads to silting of rivers, clogging of drains and flooding.

CHALLENGE:

Your group is required to make a presentation to farmers, using a communication medium, recommending at least two (2) methods which may be used to reduce or eliminate soil erosion caused by the preparation of lands for agricultural use. The methods recommended should take into consideration the farmer’s ability to finance their implementations.

The presentation should

- NOT be longer than twenty (20) minutes
- clearly state the two (2) methods recommended
- entail the use of audio/visual recordings
- cost no more than \$30.00

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 5

COMPONENT:

Materials Technologies

Health Management

CONTEXT:

In order to enjoy life to its fullest, it is important to maintain our health. The Minister of Health has advised the public to be mindful of their dietary requirements as a poor diet can contribute to problems of the digestive system. Empirical research supports the view that certain fermented foods help to promote the health of the digestive system.

CHALLENGE:

Your group is required to make a fermented product from agricultural produce available locally.

The product should

- contain any proportion of at least one fruit
- if flavoured, be flavoured with a natural product
- have a shelf life of at least seven (7) days
- cost no more than \$30.00

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 1

COMPONENT:

Materials Technologies

Skin Protection

CONTEXT:

Your school has recently won the National School's Under 14 Cricket Championship competition. The cricket team will spend six (6) weeks during the August vacation attending training sessions and playing cricket in Australia. During these activities, the team will be exposed to direct sunlight which may be a contributing factor to skin cancer.

CHALLENGE:

Your group is required to make a textile-based item that can be used by the team, to help protect members during exposure to factors/elements which may contribute to skin cancer.

The item should:

- be aesthetically pleasing
- use recyclable materials
- use national colours
- cost no more than forty dollars (\$40.00)

RESOURCES:

Appropriate resources approved by your teacher

CHALLENGE 2

COMPONENT:

Energy and the Built Environment

Precautionary Measures

CONTEXT:

In Trinidad and Tobago, there have been instances where sliding gates designed for walled fences have resulted in accidents.

CHALLENGE:

Your group is required to make a scaled model of your solution which may satisfactorily address this problem.

The model should:

- be aesthetically pleasing
- use recyclable materials
- use engineering concepts
- cost no more than forty dollars (\$40.00)

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 3**COMPONENT:**

Biological Technologies

Wealth Creation

CONTEXT:

The ability to recycle or find innovative uses for the items that would usually be discarded is beneficial for the environment and may provide opportunities for entrepreneurs.

CHALLENGE:

Your group is required to create a useful item using a discarded shoe box.

The item should:

- be aesthetically pleasing
- display items/people/places etc., indigenous to Trinidad and Tobago
- be marketable
- cost no more than forty dollars (\$40.00)

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 4

COMPONENT:

Materials Technologies

Healthy eating

CONTEXT:

Health professionals around the world must stay current with the latest research to meet the consumer's demand for health and wellness information and advice.

The gluten-free diet is one of the fastest growing trends across the world, and many health conscious consumers are choosing a gluten-free lifestyle. This growth is evident in many countries including Trinidad and Tobago.

CHALLENGE:

Your group is required to develop an innovative vegetarian gluten-free product.

This product should:

- contain at least ONE locally cultivated, agricultural product
- utilize baking as a method of cooking
- contain protein
- cost no more than forty dollars (\$40.00)

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 5

COMPONENT:

Information and Communication Technology

Hiking

CONTEXT:

Research suggests that long distance hiking contributes positively to one's wellbeing. There are several places in Trinidad and Tobago that are ideal for this type of activity.

CHALLENGE:

Your group is required to create a communication item advertising the benefits of long distance hiking.

The communication item should:

- indicate the benefits of hiking
- recommend THREE (3) hiking trails
- show three to five (3-5) minutes of edited footage of at least one recommended trail
- cater for the hearing impaired

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 1:

COMPONENT

Materials Technologies

Sort me

CONTEXT:

A major activity in postharvest handling is sorting. Agricultural produce are generally sorted according to size and shape.

CHALLENGE:

Your group is required to design and make a device that can sort a named agricultural produce of three (3) different sizes.

The device must:

- be able to fit on a surface having dimensions of 120cm x 75cm
- NOT cause damage to the produce
- have a capacity of three kilograms (3kg)
- cost no more than forty dollars (\$40.00) to produce

RESOURCES:

Resources approved by the teacher

CHALLENGE 2:

COMPONENT:

Information and Communications Technologies

Eco Adventures

CONTEXT:

Trinidad and Tobago's biodiversity is unique in many ways when compared with other countries of the Caribbean.

CHALLENGE:

Your group is required to create a presentation promoting Trinidad and Tobago as the premier Caribbean destination for ecotourism.

The presentation should:

- be delivered using at least one (1) electronic medium
- NOT exceed five (5) minutes
- highlight two (2) examples of the uniqueness of Trinidad and Tobago's biodiversity
- cater to the needs of the hearing impaired

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 3**COMPONENT:**

Materials Technology

Let's Organize

CONTEXT:

Around the kitchen sink may become crowded with dish washing liquids, scouring solutions and a range of cloths, sponges and scrubs. Proper organization is important as it may reduce wastage and save time.

CHALLENGE:

Your group is required to design and build an item that can be used to effectively organize simple paraphernalia (sponges, scrubs, etc.) and cleaning solutions used in the washing of utensils in the kitchen sink.

The item should:

- hold at least two (2) different dish washing solutions
- utilize at least two (2) waterproof recycled materials
- be sized to fit next to the sink for easy access
- cost no more than forty dollars (\$40.00) to produce

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 4

COMPONENT:

Biological Technologies

How Refreshing

CONTEXT:

Maintaining healthy dietary habits is often very difficult for some teenagers, as the trend of consuming fast foods is often associated with socializing among peers and entertainment.

CHALLENGE:

Your group is required to develop and produce a drink which can be sold at a Smoothie and Juice Bar. The drink should cater to the dietary needs of a teenager with a **named** lifestyle disease.

The product should:

- contain at least three (3) local fruits and/or vegetables
- have the nutritional content appropriate for the named lifestyle disease
- be tasty
- cost no more than forty dollars (\$40.00) per serving

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 5

COMPONENT:

Energy and the Built Environment

Wind Driven

CONTEXT:

Wind is a form of energy. It is a renewable resource that does not produce any pollution and is a good alternative to fossil fuels.

CHALLENGE:

Your group is required to design and build a wind powered device.

The device should:

- be safe to use
- light a bulb (1.5V)
- be free standing
- cost no more than forty dollars (\$40.00)

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 6**COMPONENT:**

Biological Technologies

Save the Environment

CONTEXT:

Plastic waste remains a global issue on account of it not being biodegradable. Reducing the disposal of plastic waste can prove beneficial to the environment.

CHALLENGE:

Your group is required to create a useful item from a used two litre plastic bottle.

The item:

- should be aesthetically pleasing
- should be marketable
- can be used in the home (purpose must be stated)
- should cost no more than forty dollars (\$40.00)

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 1:

COMPONENT

Engineering Technologies

Virtual Field Trip

CONTEXT:

Outings are fun activities for children. However, many parents rarely get time to take their children on family outings. In these situations, some children may feel denied and this can have a negative effect on their development.

CHALLENGE:

Your group is required to design a virtual zoo showing at least eight (8) animals that can be found locally.

The virtual zoo should:

- be presented using at least one (1) electronic medium
- cater for the hearing impaired
- not exceed five (5) minutes
- contain audio

RESOURCES:

Resources approved by the teacher

CHALLENGE 2:

COMPONENT:

Engineering Technologies

Water Rising

CONTEXT:

The availability of water is essential for home, agricultural and industrial purposes. To make water available to consumers it may entail the movement of water.

CHALLENGE:

Your group is required to design and make a model of a device for transferring water from a lower level to a higher level for different purposes.

The device should:

- be safe to use
- be environmentally friendly
- be able to move at least 2 litres of water to a height of 60cm
- cost no more than fifty dollars (\$50.00)

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 3**COMPONENT:**

Entrepreneurship

We need the money

CONTEXT:

In order to diversify the economy, business men are asked to examine and explore new opportunities for earning foreign exchange in the tourism sector.

CHALLENGE:

Your group is required to develop a small business with the possibility of earning foreign exchange from tourists and other visitors to our country.

The business should:

- highlight at least one (1) aspect of our local culture
- generate a profit
- showcase locally made items
- be attractively displayed for one day at school

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 4

COMPONENT:

Biological Technologies

Vertical planting

CONTEXT:

In these difficult economic times, the price of market produce is increasing. Consumers can lower their food bill by planting crops at home, utilizing small spaces and fence walls.

CHALLENGE:

Your group is required to design and build an item which can be used to grow different types of crops, vertically.

The item should:

- fit in a space of 90cm x 90cm x 90cm
- be aesthetically pleasing
- be made from recyclable material
- contain at least three (3) levels of plants

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 5

COMPONENT:

Human Ecology

Local all the way

CONTEXT:

Trinidad and Tobago can no longer afford to maintain a very high import food bill. Consumers are being encouraged to eat local.

CHALLENGE:

Your group is required to prepare a meal where all **main** ingredients are locally cultivated or reared.

The meal should:

- contain protein, fats, carbohydrates, minerals and vitamins
- cost no more than fifty dollars (\$50.00) per serving
- be attractively plated
- be tasty

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 6**COMPONENT:**

Biological Technologies

Keeping a clean scene

CONTEXT:

Aluminum cans are commonly used by beverage companies because of their durability. Proper disposal of these used cans has been a challenge in many countries.

CHALLENGE:

Your group is required to design and produce an item, for a **named purpose** incorporating used aluminum beverage cans.

The item should:

- be aesthetically pleasing
- be suitable to be used in the home (purpose/s should be stated)
- be safe to use
- cost no more than fifty dollars (\$50.00) to produce

RESOURCES:

Appropriate resources approved by the teacher

CHALLENGE 1: Soak up the sun

COMPONENT

Engineering Technologies

CONTEXT:

The sun is a very important source of renewable energy. Trinidad and Tobago as a tropical country has an abundant supply of sunlight all through the year.

CHALLENGE:

Your group is required to design and make a working model of an innovative solar powered device to solve a named problem in your home, school or community.

This device should be:

- functional
- safe to use
- aesthetically pleasing
- environmentally friendly

RESOURCES:

Appropriate resources approved by teacher

CHALLENGE 2:

COMPONENT:

Biological Technologies

“Stale News”

CONTEXT:

In our country, over a quarter million copies of newspapers are printed and discarded on a daily basis.

CHALLENGE:

Your group is required to reuse and/or recycle old newspapers to make a marketable item.

This item should be:

- environmentally friendly
- aesthetically pleasing
- safe to use
- cost no more than \$50.00

RESOURCES:

Appropriate resources approved by teacher

CHALLENGE 3

COMPONENT:

Biological Technologies

“See shell, see shell”

CONTEXT:

The tremendous health benefits derived from using coconut and its derivatives make it very popular among locals and tourists alike. However, many coconut vendors do not dispose of the coconut husk/shell properly, thus creating a health and/or environmental hazard.

CHALLENGE:

Your group is required to make an agricultural product using coconut husk/shell.

The item should be:

- environmentally friendly
- innovative
- marketable
- cost no more than fifty dollars (\$50.00)

RESOURCES:

Appropriate resources approved by teacher

CHALLENGE 4

COMPONENT:

Human Ecology

“Trinbago desserts”

CONTEXT:

Over the years, desserts with unusual flavor combinations have been widely developed by culinary masters. Unfortunately many of these desserts do not utilize locally grown root crops.

CHALLENGE:

Your group is required to make a dessert which uses root crops in unique flavor combinations.

The item should:

- contain at least two (2) locally grown root crops
- be tasty
- have a shelf life of at least three (3) days
- cost no more than fifty dollars (\$50.00)

RESOURCES:

Appropriate resources approved by teacher

CHALLENGE 5**COMPONENT:**

Entrepreneurship
“Service with a smile”

CONTEXT:

Providing excellent customer service in Trinidad and Tobago remains a challenge for many business owners.

CHALLENGE:

Your group is required to identify and demonstrate how one can provide improved customer service for a named activity at your school.

The service should:

- be completed in one (1) day
- be safe to self, others and the environment
- satisfy the needs of the customer
- cost no more than fifty (\$50.00)

RESOURCES:

Appropriate resources approved by teacher

CHALLENGE 6**COMPONENT:**

Human Ecology
“Weaving, In and Out”

CONTEXT:

As we experience difficult economic times, persons are encouraged to find creative ways of using different materials.

CHALLENGE:

Your group is required to design and make a woven item that can be used in the home to solve a named problem.

The item should:

- be sturdy
- be safe to use
- be marketable
- cost to more than \$50.00

RESOURCES:

Appropriate resources approved by teacher

21ST CENTURY SKILLS

MINISTRY OF EDUCATION
Curriculum Planning and Development Division