

Teaching Guide 12

Land transport

Preface

The Healthy and Sustainable Schools Programme is a result of Sazani Associates UK and Sazani Trust Zanzibar's ongoing partnership with the Ministry of Education to improve the quality of education and learning in Zanzibar.

The project is aligned with the Sustainable Development Goals and actively supports teachers and schools in achieving Global Education Target 4.7.

By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development (UNSD, 2021).

Focusing on the combined importance of key skills and healthy and sustainable life skills, we have revised and updated our series of fifteen Teaching Guides to support competency based curriculum linked learning.

The teaching materials are suitable for use in the last two years of primary across the transition to the first two years of secondary school.

There are fifteen Teaching Guides in this series, themed around topics that contribute to healthy and sustainable life styles within the context of Zanzibar, as follows:

- 1. Why we need to eat well**
- 2. Getting enough food**
- 3. Keeping food safe and clean**
- 4. Population and health**
- 5. Water**
- 6. Sanitation and waste**
- 7. Tourism**
- 8. Biodiversity**
- 9. Agriculture**
- 10. Fisheries and marine resources**
- 11. Energy**
- 12. Land transport**
- 13. Land use**
- 14. Climate change**
- 15. Participatory action learning**

Each Teaching Guide is themed and contextualized to bring Zanzibar and contrasting localities into a classroom setting and to make learning engaging and relevant to local livelihoods. Activities are gender responsive, participatory and proven to support numeracy, literacy, English language and critical thinking.

For more information please visit our website **www.sazani.org**

Acknowledgements

This series of fifteen Teaching Guides has been adapted from Sazani Associates HSSP topic books by Rajab S. Ali, Safia M. Abdalla, Mwanawije M. Makame, Patrick Rutledge, Nicola Shone, Joshua Shawe and Rashid O. Shehe, with editorial review by Marilyn James and Dr Cathryn MacCallum. Graphic design and layout by Seven Six Design.

Contents

Preface and acknowledgements

1. Introduction

2. Topic overview

3. Road transport

- 3.1 Zanzibar's road network
- 3.2 Advantages and disadvantages of road transport
- 3.3 How to improve road transportation in Zanzibar
- 3.4 Other means of transport in Zanzibar: sea and air

4. The pollution problem

- 4.1 Global warming

5. What we have learned

6. Learning activities

Learning activities – Land transport

Activity 1: **Transport survey**

Activity 2: **Pie charts**

Activity 3: **Mapping**

Activity 4: **The impacts of climate variability on journeys**

Activity 5: **Journey diary**

Activity 6: **Journey planner**

Activity 7: **Daladala**

Activity 8: **Town planning**

1

Introduction

The learning content and activities in this Teaching Guide have been designed to be easily integrated across the curriculum. Throughout the resource, knowledge, skills, attitudes, and values are interlinked and are built into all the topic areas addressed.

We have revised and updated our series of fifteen Teaching Guides to support competency-based, curriculum linked learning and development by focusing on the combined importance of key skills including numeracy, literacy, critical thinking and English language for healthy and sustainable lifestyles. The teaching materials are suitable for use in the last two years of primary across the transition to the first two years of secondary school.

There are different methods of displaying this information, through text, tables, diagrams, images and activities. Each activity includes icons to illustrate which curriculum area and which key skills are used as summarised in the tables below.

Key skills

Numeracy	Literacy	Critical thinking	English language	Creativity
				

Activity / STD V-VI	Maths	English	ICT	Civics	Geography	History	Science	Religion	Arabic
Transport survey			X		X	X	X		
Pie charts		X		X	X	X	X	X	
Mapping				X	X	X	X		
The impacts of climate variability on journeys		X		X	X	X	X		
Journey diary	X	X	X	X	X	X	X	X	X
Journey planner		X	X	X	X	X	X	X	X
Daladala		X	X	X	X	X	X	X	X
Town planning					X	X			

Activity / Form 1-2	Maths	English	ICT	Civics	Geography	History	Biology	Chemistry	Physics	Religion	Arabic
Transport survey			X		X	X	X	X	X		
Pie charts		X		X	X	X	X	X	X	X	
Mapping				X	X	X	X				
The impacts of climate variability on journeys		X		X	X	X	X			X	
Journey diary	X	X	X	X	X	X	X	X	X	X	X
Journey planner		X	X	X	X	X	X	X	X	X	X
Daladala		X	X	X	X	X	X	X	X	X	X
Town planning					X	X					

Key words

Transport: take or carry (people or goods) from one place to another by means of a vehicle, aircraft, or ship.

Tourism: the commercial organisation and operation of holidays and visits to places of interest.

Railway line: is a set of two parallel rows of long pieces of steel. They are used by trains to transport people and things from one place to another.

Company: a commercial business.

Government of Zanzibar: is the semi-autonomous Government of Zanzibar.

Omnibus: an old animal drawn bus.

Dhows: traditional hand-crafted sailing boats.

We all need to get from one place to another. Through the role of moving people and goods (whether it is furniture, cabbages or a new refrigerator), transport enables tourism, economic development and travel by making it possible for people to go to the places they want and need to go.

Box 1. Early land transport in Zanzibar

In the past people mainly travelled by foot. Some used to travel and transport goods on a donkey and bullock cart (see below). In 1905, a 7 mile railway line connecting Zanzibar town to Bububu was built and operated by an American company before being sold to the Government of Zanzibar. This railway line carried an average of 1,300 people daily before it was closed in 1928. Another form of land transport was the omnibus, which allowed farmers to take their produce to the markets. People also used to travel between the islands by dhows which are traditional hand-crafted sailing boats.



Key words

Freight: goods transported in bulk by truck, train, ship, or aircraft.

Commuter: a person who travels some distance to work on a regular basis.

Fleet: a group of vehicles.

Urban: of or relating to cities and the people who live in them.

Commodities: basic goods used in commerce, e.g., rice, flour, radios.

Emissions: the production and discharge of something, especially gas or radiation.

Greenhouse gas: a gas that contributes to the greenhouse effect by absorbing infrared radiation.

LPG: Liquid Petroleum Gas; the same fuel as used for gas cookers.

Road network: a set of roads.

Pollution: the presence in or introduction into the environment of a substance which has harmful or poisonous effects.

Respiratory complications: breathing problems.

Seaports: a town or city with a harbour for seagoing ships.

Imports and exports: Exports refers to selling goods and services produced in the home country to other markets. Imports refers to bringing in the goods and services to a country.

Commodities: a raw material or primary agricultural product that can be bought and sold, such as copper or coffee.

Transport infrastructure: is composed of the fixed installations of canals, waterways, airways, railways, roads, and terminals, as well as pipelines such as seaports, refueling depots, trucking terminals, warehouses, bus stations, railway station, and airports.

Road transport in Zanzibar is the dominant form of transportation with 70% of freight and 90% of passenger movement.

Road transportation involves the use of vehicles like bicycles, motorcycles, donkeys and carts. Daladala (public transport) carry more than 65% of daily commuters from their place of origin to another, e.g., from Fuoni to Zanzibar town.

According to 2011 estimates, there are more than 22,000 vehicles in Zanzibar, of which more than 10,000 are motorcycles.

Zanzibar's commercial vehicle fleet is estimated at around 7,000, of which 6,000 are freight vehicles used to transport goods. For example, cargo trucks that operate from Zanzibar port to Mwanakwerekwe market.

Urban and rural transportation infrastructure

Road networks in urban areas – such as Michenzani, Malindi and Mwanakwerekwe – tend to be superior to those in rural areas characterized by uneven surfaces, mud, huge gullies or huge rocks to avoid.

3.1 Zanzibar's road network

Zanzibar's road network originates from Zanzibar town to rural areas, categorized as north region road network using Malawi road from town to Bumbwini Donge, Nungwi and Kiwengwa. The Southern region road network which covers Jambiani, Kizimilazi, Makunduchi and Muyuni.

Zanzibar has a transport network that includes 1,150 km of roads, of which 820km (71.3%) are under the authority of the Ministry of Communication and Transport (MOCT).

The MOCT roads comprise 250 km trunk roads, 440 km of rural roads and 130km of feeder roads. Despite road transport being the dominant form of transport, only an average of 44% of roads are in good condition. Many of these roads are poorly or inadequately managed.

Zanzibar classified road network (length in km) in 2003

	Paved	Unpaved	Total
Trunk roads	107.1	142.9	250
Feeder roads	66.7	63.3	130
Rural roads	220	220	440
Total	393.8	426.2	820

Source: Zanzibar roads upgrading project appraisal report, 2003.

3.2 Advantages and disadvantages of road transport

Advantages of road transport

Less cost: road transport is low cost compared to other types of transportation. It requires low first-time payments or 'initial capital investment', and the cost of functioning and operation and upkeep / maintenance is much less than other types.

Equitable: road transport gives access even to the common individuals.

Flexible service: In road transport, routes and timings can be adjusted and changed to suit individual requirements with ease. This naturally gives road transport a significant edge over all other modes of transportation that follow rigid and inflexible time and route schedules (e.g. trains).

Service in rural areas: road transport is most flexible and adaptable with an outreach into the most remote areas that are inaccessible by rail, air or water. Therefore, road transport is most suited for carrying goods and people to and from rural areas which are not served by rail, water or air transport. Hence, transport of cargo between large towns and small villages is possible only through road transport.

Disadvantages of road transport

Accidents and breakdowns: road transport carries high risks with its increasing number of road accidents and breakdowns. This makes road transport unpredictable and less safe than other modes of transportation, such as rail transport.

Air pollution: Road transport results in a high air pollution rate due to the production of carbon dioxide, nitrogen oxide and various other chemicals. High degrees of air pollution leads to global warming and illnesses such as respiratory complications.

Poor Maintenance of Roads: the efficiency of road transportation is highly dependent on the condition of roads. Bad roads can cause breakdowns and may result in delay in goods reaching the marketplace.

Cost of Petrol and Diesel: road transport is greatly influenced by fluctuating petrol and diesel prices caused by changes in the price of crude oil. When prices of petroleum products and diesel are high, road transport's operational costs increase making the mode of transport costlier. This is exacerbated in times of fuel shortages as the rates are not standardised.

Slow speed: road transport is not as fast as air or rail transport and there is less capacity: road vehicles can carry fewer goods than other modes of transport, e.g. trains.

3.3 How to improve road transportation in Zanzibar

To reduce the issues related to road transport in Zanzibar, the government must implement a basic monitoring system to firstly regulate the transportation system and secondly decrease the level of air pollution and lastly encourage the traffic police to ensure that all road users have an equal chance to use the road effectively.

The more cars on the road, the more the traffic (the flow of vehicles) needs to be regulated. Lack of traffic regulation may result in congestion where too many cars slow down the traffic. Poor traffic management can result in bottlenecks where traffic comes to a complete stop, and people become stuck in their vehicles. Traffic in Zanzibar is concentrated along the Zanzibar to Dunga Road – one of the roads planned for rehabilitation.

Roads also need to be regulated to ensure the safety of drivers and pedestrians. This could be achieved by enforcing or reducing speed limits that cars can drive at, installing traffic lights or employing traffic wardens that help manage traffic flow and stop traffic periodically so pedestrians can cross the roads. This is especially important in cities where lots of cars and people, increase the risk of accidents.

3.4 Other means of transport in Zanzibar: sea and air

The sea has always been important for transport in Zanzibar. There are three functioning seaports, one in Unguja, the main port for import and export, and two smaller ports in Pemba. In Zanzibar, most commodities arrive by sea in large ships whilst ferryboats provide regular services between the main islands. Since Zanzibar consists of many small islands and two large ones, sea transport is vital to import and export goods. In contrast, land transport is critically important for the efficient transportation of goods within the islands. Transport infrastructure helps facilitate economic activity by bringing people, places, markets, and products together for trade.

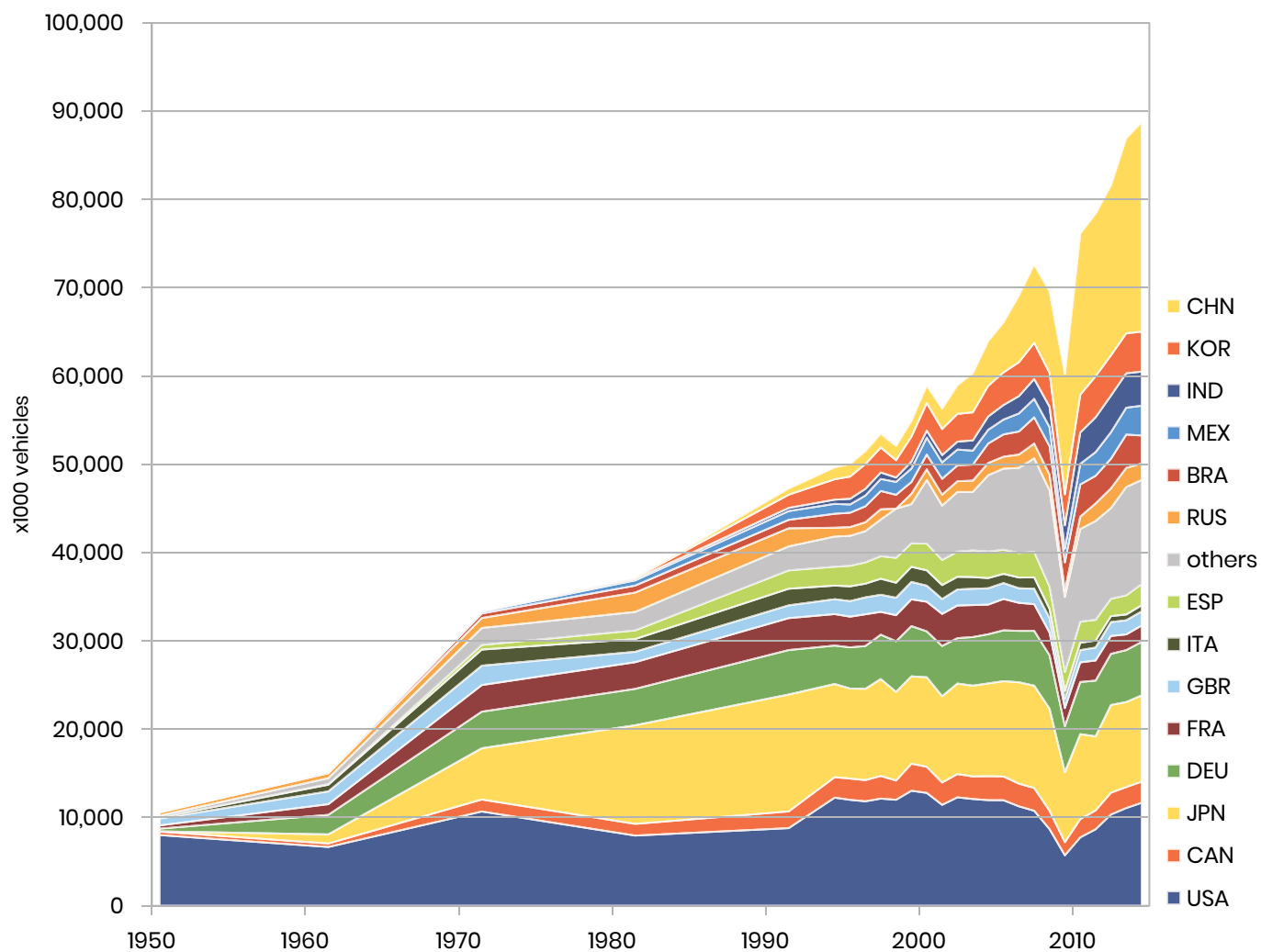
Air transport has become increasingly important as tourism has developed. There are currently two airports in Zanzibar, located on the two large islands: *Unguja* and *Pemba Island*.

Box 2. The world of cars: did you know?

- ▶ Around 1 billion cars are currently in use around the world. Compared to the world's population, that's around one car for every seven people on earth.
- ▶ Almost 30% of the world's 1 billion cars are used for commercial purposes.
- ▶ The country with most cars per capita is San Marino – a mountainous microstate surrounded by north-central Italy. There are 1,263 cars per 1,000 people; therefore, there are more cars than people in this tiny enclave.
- ▶ China has the most motor vehicles globally, with 360 million motor vehicles in January 2021 including 281 million cars, and in 2009 became the world's largest new car market.
- ▶ The global electric vehicle fleet expanded significantly over the last decade, underpinned by supportive policies and technology advances. Sales of electric cars topped 2.1 million globally in 2019, surpassing 2018 – already a record year – to boost the stock to 7.2 million electric cars.
- ▶ The carbon footprint of the global car industry equaled 9% of annual global greenhouse gas emissions in 2018.
- ▶ According to the World Health Organization, road traffic injuries caused an estimated 1.35 million deaths worldwide a year.
- ▶ 92.8 million motor vehicles were produced globally in 2019.

Global automobile production 1950 to 2016

It is important to note that this graph does not account for the global accumulation of cars.



4

The pollution problem

Key words

Fossil fuels: are fuels that come from old life forms that decomposed over a long period of time. The three most important fossil fuels are coal, petroleum, and natural gas.

Global warming: the rising of the average temperature on Earth. It has to do with the overall climate of the Earth rather than the weather on any given day.

Combustion: a chemical reaction between substances, usually including oxygen and usually accompanied by the generation of heat and light in the form of flame.

Air pollution is the presence in or introduction into the air of a substance which has harmful or poisonous effects. This is the gas released from a vehicle's exhaust pipe. Cars emit a potent mix of exhaust gases, many of which have detrimental effects. They include: carbon dioxide (CO₂) – CO₂ is a greenhouse gas, thought to be a significant contributing factor to climate change.

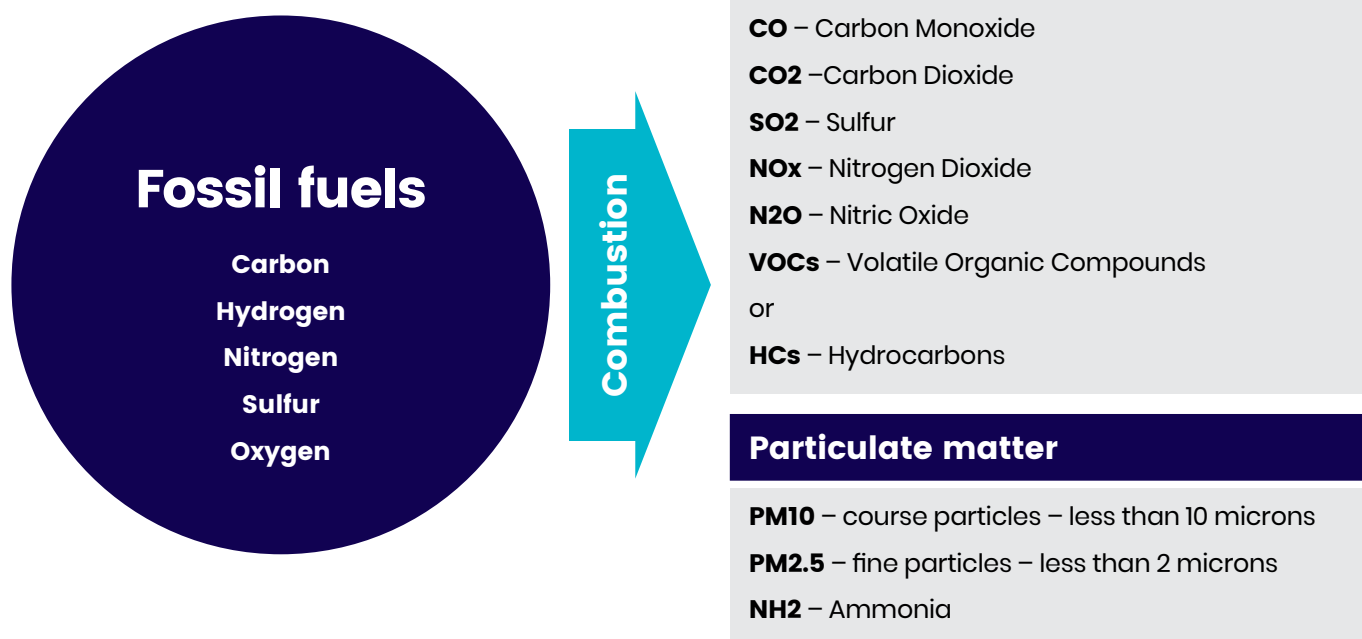
In large cities, the air can become so polluted that people suffer from lung problems. The primary pollutants released from the burning of fossil fuels are:

- Carbon monoxide (CO).
- Carbon dioxide (CO₂).
- Sulfur dioxide (SO₂).
- Nitrogen oxides of the chemical form NO_x (primarily nitrogen dioxide, or NO₂).
- Nitric oxide (N₂O).
- Various hydrocarbons (e.g., methane, CH₄, being one such example).
- Substances collectively termed volatile organic compounds or VOC.

Some of these are hazardous in their native forms; others are especially damaging only after combining with otherwise benign reagents in the atmosphere. For example, when released into the atmosphere, nitrogen oxides contribute to the formation of smog and acid rain.

4.1 Global warming

When we burn oil, coal, and gas, we do not just meet our energy needs – we drive the current global warming crisis as well. The most concerning of the compounds produced is CO₂ because carbon accounts from between 60 to 90 per cent of the mass of the fossil fuels burned, CO₂ is the principal product of the combustion of fossil fuels worldwide. Carbon emissions trap heat in the atmosphere and lead to climate change. In the United States, the burning of fossil fuels, particularly for the power and transportation sectors, accounts for about three-quarters of the countries carbon emissions.



Products formed during combustion of fossil fuels.

Box 3. Nature needs transport too...

Plants are usually fixed in one place, so they need ‘transport’ for their pollen, seeds or spores. Flowers with colourful petals and sweet scents attract insects or bats that carry the pollen from one flower to another. Fruits and seeds may use wind power, water currents or animals to transport them to a new site where the seeds can grow. Most animals move around by themselves, using their muscle power, for example by running, flying, swimming, crawling, or creeping. They also use air currents, sand, and sea currents to help them on their way.

Some animals need to “hitch a lift” on other animals. Here is a rather specialised example: cow dung forms an excellent habitat for several species of beetles and some tiny worms. Now and then these animals need to “move to a new house” and find some new dung to live in. The beetles can fly by themselves, but the worms are too tiny. The worms, therefore, use the beetles as buses! They climb under the beetle’s hard outer wings and get a free trip to the next dung patch. Even disease organisms need transport to get from one host to another, whether they use a sneeze to get propelled through the air or use a mosquito or a snail to get from one human to another.

5

What we have learned:

Knowledge and skills	Attitudes and values
Advantages and disadvantages of road transportation and Zanzibar's road network; solve problems using creative thinking; participate in debate.	Be aware of the causes of environmental problems associated with land transport; value the importance of finding and discussing solutions to problems.

6

Learning activities

How How How activity

Refer to the **How How How activity** detailed in the “Participatory Action Learning” book to help the student explore different ideas and concepts and challenge each other's points of view.

Activity 1: Transport survey



Resources required:

- ▶ One piece of paper per group
- ▶ A pen / pencil for each learner or group

Set up:

Ask the class to get into small groups or pairs.

Copy the below table onto their pieces of paper.

Home to school					
On foot	Pikipiki	Car	Bus	Bicycle	Other
IIII	IIII	I	II	II	I
School to home					
On foot	Pikipiki	Car	Bus	Bicycle	Other
III	II	II	III	II	I

Activity:

- ▶ Each group or pair to move around the class conducting a transport survey of how your class gets to school, perhaps using a tally table such as above to record their results.
- ▶ Have the class report back with the most common way of travelling and from school.
- ▶ Have the class discuss if there is a difference in travelling to school and back home.

Review:

The following questions or points may be used to review the activity:

- ▶ Was there a mode of transport that was extremely common, why does the class think this is?
- ▶ Was there a difference in travelling to and from school, was there a trend or reason for this?

Activity 2: Pie charts



Resources required:

- ▶ One piece of paper per group
- ▶ A pen / pencil for each learner or group

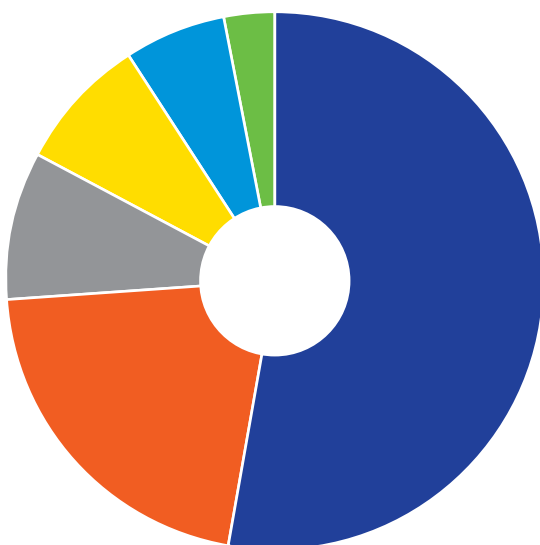
Set up:

The class can remain in the same groups as for activity 1 or create new groups / pairs / work individually.

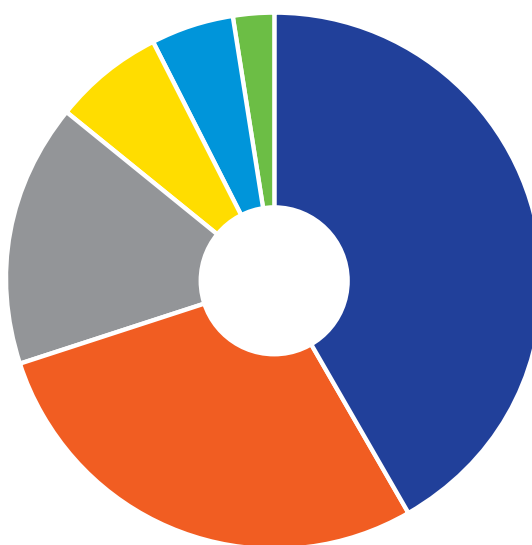
Activity:

- ▶ Analyse the transport data in the tally chart from activity 1.
- ▶ Draw a pie chart with the tally results displaying the different ways students get to school (see below left).
- ▶ Draw another pie chart with the tally results displaying the different ways students get home from school (see below right).

Modes of transport to school



Modes of transport back home



Review:

The following questions or points may be used to review the activity:

- ▶ Are there any ways in which to improve your carbon footprint?
- ▶ Are the two pie charts similar?

Activity 3: Mapping



Resources required:

- ▶ One piece of paper per group
- ▶ A pen / pencil for each learner or group

Set up:





The class can remain in the same groups as for activities 1 and 2 or create new groups.

Activity:

- ▶ Ask the groups to discuss where they live in relation to the school.
- ▶ Ask each group to draw a map of where everyone in that group lives, with the school in the middle or clear on the map.
- ▶ Ask the groups to report back to the rest of the class with their maps.
- ▶ As a class, see if groups can fit their maps together or discuss where they overlap.
- ▶ The map should have a key as seen in example map opposite:



Key:

	Sea / rivers		Buildings
	Undeveloped land		Parking
	Road		

Activity 4: The impacts of climate variability on journeys



Resources required:

- One piece of paper per group
- A pen / pencil for each learner or group

Set up:

Activity can take place as a walk or by asking the students to think about their journey to and from school.

Activity:

Ask the class to get into groups or pairs and discuss their route to school and consider the following questions:

- What kind of travel routes do you use?
- What are the ground surfaces like?
- What happens to these surfaces when it rains?
- Does it flood?

Discuss as a class and ask students to think of solutions for these potential flood surfaces.

Review:

The following questions or points may be used to review the activity:

- Do learners' answers differ from each other or are they largely similar?

Activity 5: Journey diary



Resources required:

- ▶ One piece of paper per group
- ▶ A pen / pencil for each learner or group

Set up:

Ask students to work independently.

Activity:

Produce a weeklong journey diary (such as below) featuring all the journeys undertaken and the reasons for them.

Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Bus to school, walked home	Walked to and from school				Walked to and from market	

- ▶ Ask students to suggest ways of reducing their carbon footprint.
- ▶ In groups discuss findings and cross check each others' suggestions.

Review:

- ▶ The following questions or points may be used to review the activity:
 - ▶ Are there sometimes reasons we cannot use a more environmentally friendly mode of transport?
 - ▶ Are there times when we can and should use a more environmentally friendly mode of transport?

Activity 6: Journey planner



Resources required:

- ▶ One piece of paper per group
- ▶ A pen / pencil for each learner or group

Set up:

Ask the class to get into groups / pairs.

Discuss the different types of transport available in Zanzibar and write the below questions up on the board for the groups to discuss.

Activity:

Consider the following questions:

- ▶ When are the different types used?
- ▶ Where are the different types used?
- ▶ Which types of transport have the students travelled by?

Plan a journey from Unguja Island to Pemba or Dar es salaam and plot journey on a map or draw own maps of the route.

Review:

The following questions or points may be used to review the activity:

- ▶ What do learners think about the different types of transport for different things?
- ▶ Do the learners enjoy travelling by one mode over another?

Activity 7: Daladala



Resources required:

- ▶ One piece of paper per group
- ▶ A pen / pencil for each learner or group

Set up:

This can be done as a class discussion or in groups with feedback to the rest of the class.

Activity:

Discuss travel by daladala and answer the following questions:

- ▶ What are the advantages / disadvantages of this form of transport?
- ▶ Who would choose to use this type of transport, and when?
- ▶ Which goods can be carried by daladala?

Draw pictures of daladalas.

Review:

The following questions or points may be used to review the activity:

- ▶ Do learners think daladala is a good way to travel?

Activity 8: Town planning



Resources required:

- ▶ One piece of paper per group
- ▶ A pen / pencil for each learner or group

Set up:

The class can get into groups, work in pairs or independently.

Consider the map below, or any other map you have available.

Alternatively ask the students to draw their own map.

Activity:

- ▶ Once students have a map to work from, ask them to imagine the population of the town in the map has increased and there are more vehicles on the road and more accidents have been reported.
- ▶ What can be done? The class need to suggest improvements and adaptations to the town in the map for this increase in traffic and accidents.




Review:

The following questions or points may be used to review the activity:

- ▶ How much traffic is in the school town?
- ▶ Are there many accidents?
- ▶ Are there any improvements that can be made to the town that students live in?



Key:

	Sea / rivers		Buildings
	Undeveloped land		Parking
	Road		

Sazani Associates

UK office

Units 1 & 2 Darkgate Buildings
3 Red Street
Carmarthen
SA31 1QL

Zanzibar office

SH/S/C/091
Mombassa Kwa Mchina
P.O. Box 3720
Zanzibar

Tel: **UK: 0044 (0)1267 243576**

Web: **www.sazani.org**

Email: **info@sazaniassociates.org.uk**



sazaniassociates

