

Student Worksheets

# Climate Change Adaption and Mitigation

Name: \_\_\_\_\_

## Overview:

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### **Session 2: Precipitation & the West-African Monsoon**

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**Session 1: Temperature & Global Warming**  
**Experiment: Greenhouse effect in a bottle**

**Data record**

Names: .....

Date and time: .....

Location of the thermometers in the schoolyard: .....

Weather conditions (cloud, rain, wind): .....

Unit of measurement: .....

	<b>Time</b>	<b>“Greenhouse bottle” temperature</b>	<b>“Control” temperature</b>
At start of experiment			
30-45 min after start of experiment			

## Session 2: Precipitation & the West-African Monsoon

### Experiment: Low budget rain and evaporation gauge

#### Data record

Names: .....

Start date: .....

Location of the gauges in the schoolyard: .....

Day	Time	Rain gauge water volume [mL]	Evaporation gauge water loss [mm]	Weather conditions	Comments
1					
2					
3					
4					
5					
6					
7					

## Session 2: Precipitation & the West-African Monsoon

### Data Exploration: Monsoon seasons

$\frac{mm}{month}$	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>2015</b>									67.5	254.6	27.1	0.1
<b>2016</b>	0.4	7.2	143.9	76.6	202.6	80.2	32.2	18.8	208.9	152.2	21.5	6.8
<b>2017</b>	0.7	5.9	83.5	83.1	90.8	156.6	87.4	55.0	168.4	105.0	101.6	0.6
<b>2018</b>	0.1	33.2	138.3	171.3	121.8	196.8	151.8	163.7				

### Calculations

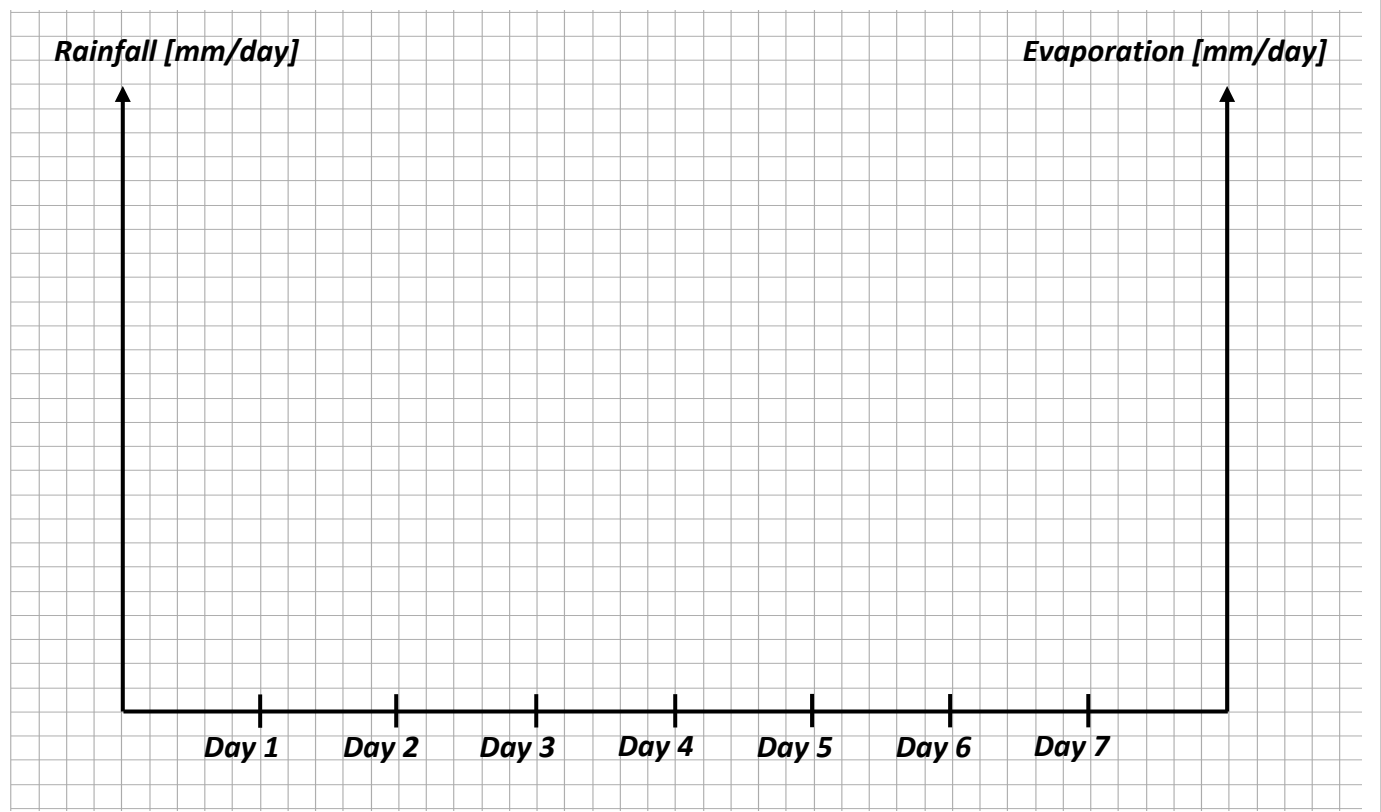
## Session 3: Evaporation & the Water Cycle

### Data Exploration: Rain and evaporation gauge

Day	Rainfall [mm]	Evaporation [mm]
1		
2		
3		
4		
5		
6		
7		
	<b>Total rainfall [mm/week]</b>	<b>Total evaporation [mm/week]</b>

**Fraction [%] of total evaporation [mm/week] from total rainfall [mm/week]**

### Climatograph



## Session 4: Relative Humidity & Climate Extremes

### Experiment: Foam water model

#### Data table

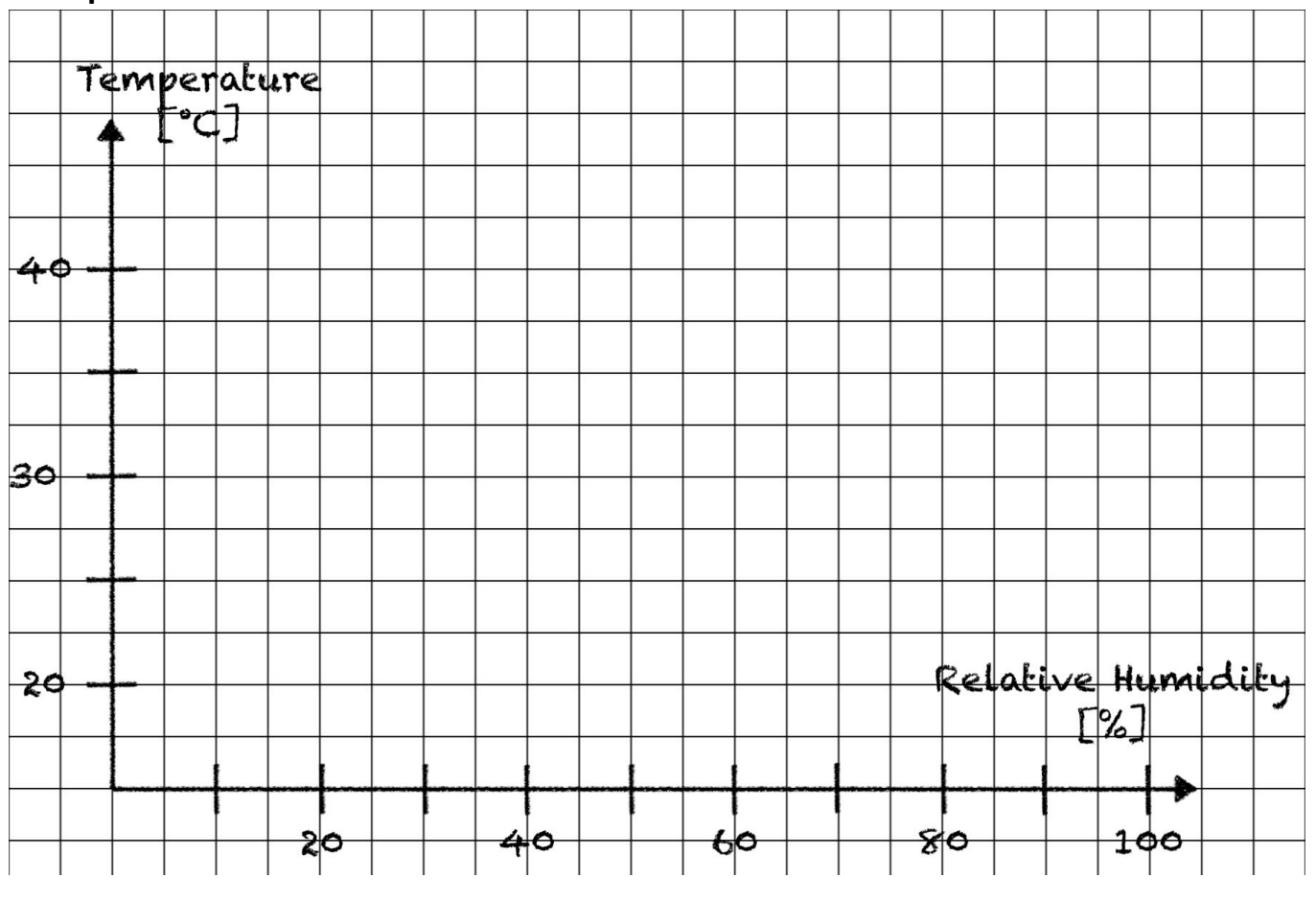
Number of spoonfuls	Saturation
	0%
	50%
	100%

## Session 4: Relative Humidity & Climate Extremes

### Data Exploration: Humidity vs. temperature

Time	Temperature [°C]	Relative Humidity [%]
8 am	26	100
9 am	28	94
10 am	31	84
11 am	32	73
12 am	33	69
1 pm	34	66
2 pm	34	65
3 pm	30	84
4 pm	27	95
5 pm	26	97
6 pm	25	100

#### Data plot

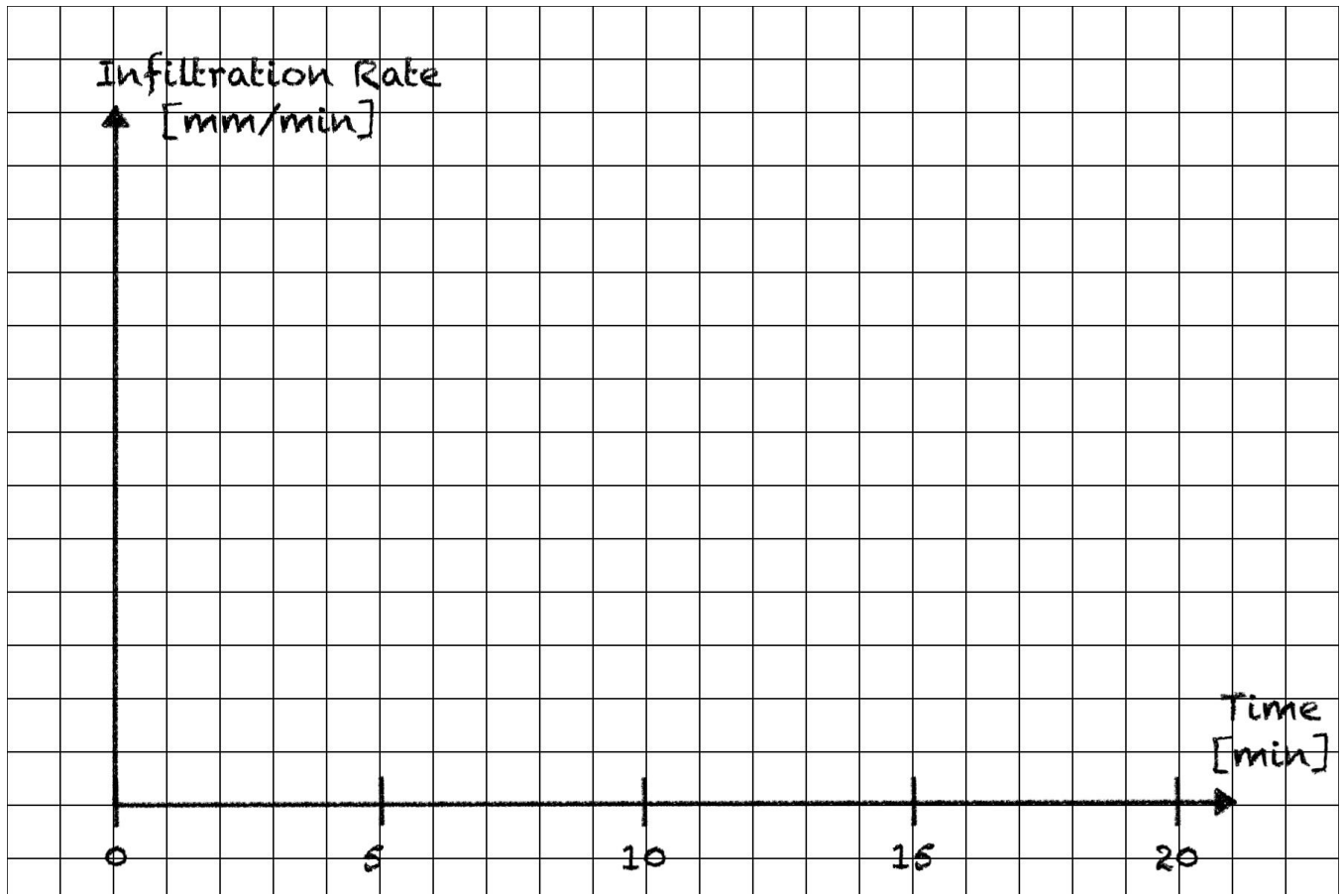








# Scatter plot



## Session 5: Infiltration & Land Use

### Action: Spatial planning role-play

<p><b>JOURNALIST</b></p> <ul style="list-style-type: none"> <li>➤ You can make the topic public by telling other people the real situation.</li> <li>➤ You can put pressure on governments and scientists.</li> <li>➤ You can draw attention on special communities where support and assistance is most urgent.</li> </ul> <p>But: The newspaper might not be interested in printing your story and people might ignore what you write.</p>	<p><b>LANDS COMISSION</b></p> <ul style="list-style-type: none"> <li>➤ You have the function to manage public land and map current and future land use.</li> <li>➤ You can make recommendations to the government for land development strategies.</li> <li>➤ You can promote public awareness and impose fees.</li> </ul> <p>But: It is not sure whether your plans will be realized, and improper settlements might not be manageable.</p>
<p><b>BUSINESS LEADERS</b></p> <ul style="list-style-type: none"> <li>➤ You have power to make changes by trading goods or services that reduce negative impact of soil sealing.</li> <li>➤ You can reach a large amount of people through advertising and sales.</li> <li>➤ You influence your concurrence, too.</li> </ul> <p>But: You have to try to increase your profit for your shareholders or else you will lose your job.</p>	<p><b>YOUNG PEOPLE AND COMMUNITIES</b></p> <ul style="list-style-type: none"> <li>➤ You can change your own way of housing and influence the people around you.</li> <li>➤ You can raise money and start a community action to create green space, construct water harvesting systems or clean drainage gutters.</li> </ul> <p>But: All that requires motivation, time and commitment and not everyone from the neighborhood might be interested.</p>
<p><b>SCIENTIST or ENGINEER</b></p> <ul style="list-style-type: none"> <li>➤ You can adapt new methods to manage stormwater, waste or heat in urban settlements.</li> <li>➤ You can conduct analysis to identify areas of high risk or also high compensation potential.</li> <li>➤ You can make future predictions on problems due to urbanization.</li> </ul> <p>But: You rely on funding from governments and businesses, so you are restricted to what they ask you to do. Often your developments take years and need to be tested before implementation.</p>	<p><b>POLITICIANS</b></p> <ul style="list-style-type: none"> <li>➤ You are in charge to make decisions and launch policies that limit the extents of urbanization and sealing.</li> <li>➤ You can initiate new ways of how to design residential areas and monitor the construction.</li> <li>➤ You can financially support businesses and scientists for research and product development.</li> </ul> <p>But: You want to stay in power and not become unpopular before the next elections come up. There might be a lack of peoples' support for bold decisions.</p>
<p><b>CHARITY WORKERS</b></p> <ul style="list-style-type: none"> <li>➤ You are in the position to mediate between politicians and local communities and make necessary connections to businesses.</li> <li>➤ Often you might only step in to fight the symptoms of a problem, like malaria breeding or flooding in town districts.</li> <li>➤ You could also support preventive measures before disasters happen.</li> </ul> <p>But: There are many other problems you are already dealing with, your money and staff is very limited, and funding might stop any moment.</p>	<p><b>SCHOOLS and TEACHERS</b></p>