RIVERS

Student's worksheets

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NILE Norwich
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<th>5. SUMMARISING</th>
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<tbody>
<tr>
<td>5. 1. Final presentation</td>
</tr>
</tbody>
</table>
1.0. **WHY ROCKS, LANDSCAPES AND RIVERS?**

Look at them: Lluís, Gemma, Marc and Alba and their teacher are going to discover a river!

1. Look at this comic. Read the text in the bubbles.
2. Talk with a partner and find out one word in each bubble related to rocks and rivers.
3. Write the 5 words down.
4. Guess the meaning of the words from the pictures.
5. Are you interested in rocks and rivers? Why or why not?

<table>
<thead>
<tr>
<th>I’m interested in</th>
<th>I’m not interested in</th>
<th>Rocks</th>
<th>Landscapes</th>
<th>Rivers</th>
<th>because</th>
<th>I want</th>
<th>I don’t want</th>
<th>to be</th>
<th>to study</th>
<th>Geology</th>
<th>Geography</th>
<th>Mineralogy</th>
<th>Hydrology</th>
</tr>
</thead>
<tbody>
<tr>
<td>I like</td>
<td>I don’t like</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A fisherman,</td>
<td>A sailor,</td>
<td>a geologist</td>
<td></td>
</tr>
<tr>
<td></td>
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</tbody>
</table>

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**Oh! I wanted to swim in the lake.**

**Girls and boys! Can you help me! I’m falling into the stream!**

**This boulder is fantastic to rest on!**

**Don’t worry! I’ll jump in! Be careful of the pebbles!**

**I’m on the other bank! I can’t cross.**
### Instructions

1. Read the following sentences. Some of them are right and some are wrong. If you think the sentence is right, put a tick in the right column, if you think it is wrong, put a tick the wrong column.
2. Compare your answers with your partner; agree which can be the right one. Bet for your decision (10 / 20 / 30 ....100) and write the number in the bet column.
3. If you are right, you get the number of points you have bet. If you are wrong, you lose the number of points you have bet.
4. Add the total losses and gains to reach a total. (gains minus losses). Who has the most points?

<table>
<thead>
<tr>
<th>RIGHT</th>
<th>WRONG</th>
<th>BET</th>
<th>LOSS</th>
<th>GAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weathering is the effect of weather on rocks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erosion is the action of the water only</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterfalls are in the upper part of the river</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All the rivers end in the sea</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estuaries and deltas are the same</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold and heat can break down the rocks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Granite is harder than limestone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The vegetation protects the soil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artificial lakes don’t damage ecosystems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rivers are not useful for people</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL**

**HELP!!!**

Look around, can you see some pictures with names on the walls? Can you understand every word now?

Use the words on the whiteboard to report and discuss your results with the rest of the class.
1. Fill in the gaps with the words provided below:

Weathering is the effect of ...................... on rocks

...................... is the action of the water and wind on the surfaces

Waterfalls are in the ............................. of the river

Not all the rivers end in the...........

Estuaries and.......... are not the same

............................. can break down the rocks

------------------------ is harder than limestone

The vegetation protects the........

................................. can damage ecosystems

................................. are useful for people

WORD BANK:

Rivers, Granite, Sea, artificial lakes, Weather, deltas, soil, upper part, erosion, cold and heat,

2. Draw lines to match each word with its opposite:

- cold           useful
- hard           natural
- to start       hot
- useless        soft
- artificial     to finish
1.2. MISSING WORDS

1. Read the text.
2. Complete the missing words by looking at the keys.

1.1. R........... LANDSCAPES

Different rocks are weathered in d............. ways, so each rock produces its own landscape:

- Granite landscape: tors, spheroid granite boulders, o...........-skin weathering.
- Sandstone landscape: angular forms, cliffs, d........... skin weathering.
- Basalt landscape: flows of lava, h........... pillars.
- Chalk and limestone landscapes (karsts): dolines, c........... caverns, holes, stalactites, swallow-holes...

3. Correct the mistakes.
4. Read the text again
5. Memorize the four types of landscapes and one or two particular forms in each.
### 1.3. Changing Earth

**Instructions:**

- Watch the video carefully.
- Make sure you know the meaning of weathering, erosion, transportation and deposition.
- In pairs, discuss the meaning of any difficult or new words.
- In pairs, fill in the table with the words in the bank.
- Ask your teacher the words you cannot understand.

<table>
<thead>
<tr>
<th>GEOLOGICAL TIME</th>
<th>ADJECTIVES</th>
<th>GEOLOGICAL AGENTS</th>
<th>ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To break apart, powerful, wind, large period, tremendous, gravity, shaping, millions of years, water, slow process, majestic, freezing.

**HELP!!!**

- I think this means................
- I don’t know what this means
- Do you know what this means
- How do you spell...........?
- What does it mean.............?
- What’s the meaning of.......?
- I cannot understand the word........
1.2. WHAT IS WEATHERING?

R........s are solid. However, wind, gases from the atmosphere, water, ice or living beings can break them down. W............... is the breaking down of rocks into small particles such as sand and p............. It may be:

M............... weathering is the breaking down of rocks in s........r pieces by physical processes. Freeze-thaw is the fracture of rock by repeated frosts: water during the d.... and ice during the n....... so the crack is enlarged. Exfoliation is due the expansion in hot t................ during the day, and contraction in cold nights. Abrasion rocks are broken down by particles such as sand carried by w....... or water.

C............... weathering is the breaking down of rocks by chemical r............. Some rocks can react with water (hydrolysis), o............ (oxidation) and with carbonic acid from the acidic r........ (carbonation).

B............... weathering is the breaking down of rocks by living o................, for example damage from t........ roots, from a................ walking or from machinery.

WORD BANK

Rocks day smaller Weathering night temperatures rain wind Mechanical tree Biological organisms pebbles animals oxygen Chemical reactions

CONCLUSION. To break down a rock it’s necessary to have one of these 2 factors, contrast of temperatures and water, or both.

a) Put the following types of weathering inside the cells according to the temperature and disposal of water.
b) Work with your partner and compare your results.
1.5. A. LOOP GAME: EROSION AND TRANSPORTATION

1. Instructions:

- Look at your card
- Be prepared to read the words if they are the answer to “Who knows…”
- Then read to the class the unfinished sentence on your card.
- The game finishes when all the cards have been read.
1.5. B. HOMEWORK: EROSION AND TRANSPORTATION

Fill in the gaps according to the Loop game cards.

1.3. WHAT IS EROSION?

E............. is the process of carrying away the small rock particles such as s....... and pebbles. The main a........... of erosion are: Water (in rivers, o........... waves and glaciers), wind , g...................... and animals and machinery.

Rivers erode in four ways: H............. action, the force of the flowing water on the bed and banks. Abrasion, s.......... carries by the river wear away the c............... (sandpaper effect). Attrition, stones collide becoming smaller and r............... Corrosion, acidic waters dissolve rocks made of c............... carbonate.

1.4. WHAT IS TRANSPORTATION?

The m............... carried by a river is called its load, depending on the size of the flood, the river can carry more or fewer materials, the maximum weight of load a river can carry is the C.............

The load is transported in four ways: Traction, s.....................s are rolled along the river bed, saltation, stones bounce along the river bed, suspension, particles of silt and clay f........... in the water, solution, m............... dissolve in the river water.
1.5. C. REVISION WEATHERING, EROSION AND TRANSPORTATION

A. Find 10 words related with weathering and erosion

LANDSCAPE, EROSION, EXFOLIATION, LANDSCAPE,
PEBBLES, SALTATION, SAND, STONES, WEATHERING

B. Complete the diagram by adding the words:

CAPACITY, CORROSION, EROSION, EXFOLIATION, LANDSCAPE,
PEBBLES, SALTATION, SAND, STONES, WEATHERING

River Processes: Transportation
### C. MATCH THE WORDS WITH THE DEFINITIONS

| 1. WEATHERING | a) the process of carrying away the small rock particles such as sand and pebbles |
| 2. FREEZE-THAW | b) the expansion in hot temperatures during the day, and contraction in cold nights |
| 3. EXFOLIATION | c) stones collide becoming smaller and rounder |
| 4. ABRASION | d) acidic waters dissolve rocks made of carbonate. |
| 5. EROSION | e) the breaking down of rocks into small particles |
| 6. ATTRITION | f) Some rocks can react with water |
| 7. CORROSION | g) particles of silt and clay float in the water |
| 8. HYDROLYSIS | h) sandpaper effect |
| 9. BIOLOGICAL WEATHERING | i) Minerals dissolve in the river water. |
| 10. SOLUTION | j) the fracture of rock by repeated frosts |
1. Read the piece of paper with part of one text
2. Some students have the same part as you.
3. Walk around and find 5 students with different parts of the text
4. Are you in a group of 5? Everyone has a different part of the text? Now order the text!
5. Read the text aloud and compare with other groups. Do you have the same result?

HELP!

<table>
<thead>
<tr>
<th>I have got</th>
<th>one paragraph</th>
<th>that ends with</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you got</td>
<td>one part</td>
<td>that finishes with</td>
</tr>
<tr>
<td>I think that</td>
<td>this comes</td>
<td>before</td>
</tr>
<tr>
<td>In my opinion</td>
<td></td>
<td>after</td>
</tr>
<tr>
<td>I believe that</td>
<td>you are right</td>
<td></td>
</tr>
<tr>
<td></td>
<td>you are wrong</td>
<td></td>
</tr>
</tbody>
</table>
1.6.B. HOMEWORK: DEPOSITION

• Read the text and answer the questions:

1.2. WHAT IS DEPOSITION?

In places where the river slows down, it loses energy and deposits some of the material it is transporting inside bends of meanders, and middle and lower course or the river. Heaviest materials are deposited first and sand and clay are deposited last. Minerals in solution become salt in the sea. Depending on their size, the particles can be classified as: Boulders, Cobbles, pebbles, sand, silt and clay.

1. What happens when the river slows down?

2. Where are the materials deposited?

3. Which material is deposited first and which material last?

4. How are the particles classified?

5. What are the six types of particles?
1.7. BE A GODFATHER OR A GODMOTHER!

Now, you are going to be the GODFATHER or GODMOTHER of one word. You have to protect the word against the wrong uses, spellings, etc, you have to make sure that your peers understand YOUR word and that they use and spell it properly.

Choose a word from the list below. Write your word on a card (with a drawing if you like) and on the other side write the definition, according to the text. Be a good godfather or godmother!

Listen to a partner read his/her definition to you, then write the word which describes their performance. Tick the table below:

Excellent: You don’t hesitate
Good: you need some help
Well: you answer, but you need be helped, with clues
Need more work: you can’t find the word

<table>
<thead>
<tr>
<th>NAME…………………………………………              DATE………………………………… ………</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORD</td>
</tr>
<tr>
<td>1. Agents erosion</td>
</tr>
<tr>
<td>2. Basalt landsc.</td>
</tr>
<tr>
<td>3. Biological W.</td>
</tr>
<tr>
<td>4. Boulders</td>
</tr>
<tr>
<td>5. Capacity</td>
</tr>
<tr>
<td>6. Chemical w.</td>
</tr>
<tr>
<td>7. Conglomerate l.</td>
</tr>
<tr>
<td>8. Deposition</td>
</tr>
<tr>
<td>9. Erosion</td>
</tr>
<tr>
<td>10. Granite landsc.</td>
</tr>
<tr>
<td>11. Hydrolysis</td>
</tr>
<tr>
<td>12. Load</td>
</tr>
<tr>
<td>13. Mechanical W.</td>
</tr>
<tr>
<td>14. Oxidation</td>
</tr>
<tr>
<td>15. Pebbles</td>
</tr>
<tr>
<td>16. Saltation</td>
</tr>
<tr>
<td>17. Transportation</td>
</tr>
<tr>
<td>18. Weathering</td>
</tr>
</tbody>
</table>
1. Instructions

- Work in your group of 5 students
- Each one in the group has an assigned role: reporter, organizer, harmonizer, and planner and material manager.
- Look at your picture of a rock landscape.
- Discuss and fill in the table below
- Describe your landscape to the rest of the class. They guess which landscape is described.

| PICTURE NUMBER | MAIN ROCK
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CLIMATE (if relevant)</td>
<td>SHOULD BE PROTECTED?</td>
</tr>
<tr>
<td>WEATHERING</td>
<td>CHEMICAL</td>
</tr>
<tr>
<td>EROSI VE AGENT</td>
<td></td>
</tr>
<tr>
<td>USE</td>
<td>ECONOMIC</td>
</tr>
</tbody>
</table>
1.9. SELF ASSESSMENT

You should be able to distinguish between weathering and erosion and provide examples of each. Can you?

http://qldscienceteachers.tripod.com/junior/quizzes/geology_erosion.html
2.1 LISTEN TO A SONG

1. Listen to the song, tick the words you can hear:

http://www.youtube.com/watch?v=2VS3s3NnNl8&feature=related

mountains night river deep faith jungle
doubt cross night desert streams wide
shore opposite side night valley fair ocean night
truth night land dreams night soul

Listen to the song again and try to fill in the gaps with the words from the box above:

“River of Dreams” Billy Joel

In the middle of the ............... I go walking in my sleep
from the ............... of......
To the ............... so deep
I must be lookin’ for something
Something sacred I lost
But the river is ............
And it’s too hard to.............
even though I know the river
is.............
I walk down every evening and stand
on the ............
I try to cross to the .............
So I can finally find what I’ve been
looking for
In the middle of the ............
I go walking in my sleep
Through the ............... of............
To the river so deep
I know I’m searching for something
Something so undefined
That it can only be seen
By the eyes of the blind
In the middle of the ............(break)

I’m not sure about a life after this
God knows I’ve never been a spiritual
man

Baptized by the fire, I wade into the river
That is runnin’ through the promised ............

In the middle of the ............
I go walking in my sleep
Through the ............... of............
To the river so deep
We all end in the .............
We all start in the .............
We’re all carried along

By the river of .............
In the middle of the ............

2. Classify the words according to how they are related with the words below:

<table>
<thead>
<tr>
<th>RIVERS</th>
<th>LANDSCAPES</th>
<th>ABSTRACT WORDS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Compare the answers to exercises 1, 2 and 3 with a partner. Try to agree.
4. Read the complete lyrics and correct your mistakes.

"River of Dreams" Billy Joel

In the middle of the night
I go walking in my sleep
From the mountains of faith
To the river so deep
I must be lookin’ for something
Something sacred I lost
But the river is wide
And it’s too hard to cross
even though I know the river is wide
I walk down every evening and stand on the shore
I try to cross to the opposite side
So I can finally find what I’ve been looking for
In the middle of the night
I go walking in my sleep
Through the valley of fear
To a river so deep
I’ve been searching for something
Taken out of my soul
Something I’d never lose
Something somebody stole
I don’t know why I go walking at night
But now I’m tired and I don’t want to walk anymore
I hope it doesn’t take the rest of my life
Until I find what it is I’ve been looking for
(in the middle of the night
I go walking in my sleep
Through the jungle of doubt
To the river so deep
I know I’m searching for something
Something so undefined
That it can only be seen
By the eyes of the blind
In the middle of the night

(break)
I’m not sure about a life after this

God knows I’ve never been a spiritual man Baptized by the fire,
I wade into the river that is runnin’ through the promised land

In the middle of the night
I go walking in my sleep
Through the desert of truth
To the river so deep
We all end in the ocean
We all start in the streams
We’re all carried along
By the river of dreams
In the middle of the night

5. Did you like this song? If yes, why? If not, why?

HELP!

<table>
<thead>
<tr>
<th>I like</th>
<th>the whole song</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>the lyrics</td>
</tr>
<tr>
<td></td>
<td>the rhythm</td>
</tr>
<tr>
<td></td>
<td>this kind of music</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I don’t like</th>
<th>a good way to start</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>too long</td>
</tr>
<tr>
<td></td>
<td>too spiritual</td>
</tr>
<tr>
<td></td>
<td>difficult to follow</td>
</tr>
<tr>
<td></td>
<td>nice</td>
</tr>
</tbody>
</table>
2.2. RUNNING DICTATION

1) First watch a short video:
http://www.youtube.com/watch?v=hJftAYYxpVw

2) Report orally to the class some things you have seen in the video.

3) Now, make groups of 3 students.

4) Decide who is student A, student B and student C.
   a. Student A is going to read sentences 1, 4, 7
   b. Student B, sentences 2, 5, 8
   c. Student C, sentences 3, 6, 9.

5) If you are student A you start: walk around the class looking for sentence n. 1, read the sentence, memorize it and dictate it to the other two students in your group.

6) Student B, do the same with the sentence n. 2, then student C with sentence n. 3.

7) Go on until you have dictated the 9 sentences.

1. Discharge .................................................................
2. ................................................................. (m³/s).
3. ................................................................. tributaries channel
4. ................................................................. width depth
   .................................................................
5. ................................................................. factors relief
6. .................................................................
   .................................................................
7. Velocity .................................................................
8. ................................................................. m/s:
   .................................................................
9. ................................................................. hydrograph

So, you have completed the text. Congratulations!

8) Watch the video again.
9) If the teacher asks you, answer orally the questions about the text, using the key words.
   Pay attention because these are the same questions you'll have as homework!!!!
2.2.A. HOMEWORK-(difficult)  DISCHARGE AND VELOCITY

1. What is the discharge of a river? How is it measured?

2. Which river features increase from the source to the mouth?

3. What factors affect the discharge?

4. What is velocity and how is it measured?

5. What does a Hydrograph show?

2.2. B. HOMEWORK (easy)  DISCHARGE AND VELOCITY

TRUE OR FALSE?

1. The discharge of a river is its speed.

2. Discharge decreases from the source to the mouth

3. The land use is a factor that can affect the discharge of a river

4. Velocity is the speed of the river; it’s measured in m²/s.

5. A hygrometer shows the changes in river discharge over time.
2.3. LET’S DRAW A HYDROGRAPH!

1. Read the following text and listen carefully to the teacher’s explanations:

After a rainstorm, the water level in a river rises, dropping back to normal once the storm is over. A Hydrograph is a graph showing the flow in a river after a storm. It shows two variables: rainfall and river discharge.

Because rainwater takes time to flow overland and through the ground to the river, there is a delay or lag time for the flow to rise to its peak.

2. Read the data at the side of the graph.
3. Draw the hydrograph using bars for the rainfall and a line for discharge.

4. Complete these sentences:
   
   If it .......... heavily, the .......... will increase
   
   When the .......... melts, the .......... can increase suddenly
5. Answer the following questions:

a) What information does the horizontal axis of the graph show?

b) In which units is the rainfall expressed?

c) And the Discharge?

d) Which day had the most rainfall?

e) When does the discharge peak?

f) How long is the lag time?

g) Why is the data expressed differently for rainfall and for discharge?

h) If the water level was dangerous, what could people do to prevent problems? Give three bits of advice.

i) Why are Hydrographs very useful for local people?

Use the helping table to answer questions h) and i)

<table>
<thead>
<tr>
<th>I think it</th>
<th>HELP</th>
<th>will</th>
<th>rise</th>
</tr>
</thead>
<tbody>
<tr>
<td>I don’t think it</td>
<td></td>
<td>could</td>
<td>fall</td>
</tr>
<tr>
<td>I think they</td>
<td></td>
<td>should</td>
<td>peak</td>
</tr>
<tr>
<td>I don’t think they</td>
<td></td>
<td>can help</td>
<td>..........</td>
</tr>
<tr>
<td>They are useful because they</td>
<td></td>
<td>might indicate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>suddenly</td>
<td>steeply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>gently</td>
<td></td>
</tr>
</tbody>
</table>
2.4. DISCOVERING A RIVER

Gemma is a second year student at a secondary school in Sheffield. She is travelling with her class through Catalunya on an exchange, to find out about the river Ter. She likes to take notes about everything, but she is not very tidy and she has mixed up the notes of the different days.

Can you help her to order her notes?

Work in groups of 6 students.
1. Each of you has 6 different explanations corresponding to 6 different parts of the trip.
2. Order the text.
3. Fill in the gaps and label the diagram below:

LONG ……..OF A RIVER

The long .......... of a river is a cross-section from its ...... to its ......

The course of a river can be divided into 3 main sections: ...... course, ...... course and ........ course.

Rivers begin flowing in .......... areas and flow downwards to ........ areas

Upper, source, middle, profile, highland, mouth, lowland, profile

Diagram 2.6i A Model of a River Valley
2.5. VALLEY CROSS-PROFILES

The shape of a river valley changes between the source and the mouth. Look at the pictures below:

1. Describe to your partner the pictures of the valleys 1, 2 and 3 using the key words.
2. Write at least 3 sentences for each picture.
3. Fill in the table below:

<table>
<thead>
<tr>
<th></th>
<th>A. UPPER VALLEY</th>
<th>B. MIDDLE VALLEY</th>
<th>C. LOWER VALLEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>PICTURE N.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHAPE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIDES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EROSION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEDLOAD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Work in pairs

KEY WORDS

Make sure you understand these words:

- Erosion/deposition
- Narrow/wide
- Angular/round
- V-shaped/U-shaped
- Steep/gentle/flat
- Downwards/sideways
- Boulders/cobbles/pebbles
- Sand/silt/clay
4. Now, imagine that you are a drop of rainfall water, falling in the very source of the river. Explain your journey to your partner; explain him/her how you move, places you pass, rocks or sediments you find.

Use words from the following lists:

<table>
<thead>
<tr>
<th>TO LIST</th>
<th>VERBS</th>
<th>ADVERBS</th>
<th>THINGS</th>
<th>ADJECTIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>I come out</td>
<td>Quickly</td>
<td>Rocks</td>
<td>V-shaped</td>
</tr>
<tr>
<td>Next</td>
<td>I flow</td>
<td>Slowly</td>
<td>Pebbles</td>
<td>Beautiful</td>
</tr>
<tr>
<td>After</td>
<td>I run</td>
<td>peacefully</td>
<td>Mountains</td>
<td>Quiet</td>
</tr>
<tr>
<td>Secondly</td>
<td>I swirl</td>
<td>smoothly</td>
<td>Valley</td>
<td>Deep</td>
</tr>
<tr>
<td>Then</td>
<td>I fall</td>
<td>roughly</td>
<td>Rapid</td>
<td>Steep</td>
</tr>
<tr>
<td>Again</td>
<td>I foam</td>
<td></td>
<td>Waterfall</td>
<td></td>
</tr>
<tr>
<td>finally</td>
<td>I end</td>
<td></td>
<td>canyon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I reach</td>
<td></td>
<td>Meander</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sand</td>
<td></td>
</tr>
</tbody>
</table>

1. .................................................................
2. .................................................................
3. .................................................................
4. .................................................................
5. .................................................................
6. .................................................................
7. .................................................................
8. .................................................................
9. .................................................................
10. .................................................................
2.6. LET´S PLAY: AIRLINE AISLES

1. Get into teams of 10 or 12 (the same number of words chosen)
2. Sit in the chairs in lines.

3. One of you stands at the front of the teams.
4. Say one definition for a key word.
5. You, the student in the front seat of the line for your team, try to call out the correct answer in the time given, to get one point for your team.
6. You can ask only the student sat just behind you
7. You have a limited time to answer (30-40 s.)
8. The person in the front seat for that round then moves to the back seat. Everyone else moves forward one seat. So the front row now has a new seat of competitors. Return to step 3 above.
2.7. BE A GODFATHER OR A GODMOTHER!

Now, you are going to be the GODFATHER or GODMOTHER again. Do you remember how to do it? (See activity 1.7.) Choose a word from the list below. Write your word on a card (with a drawing if you like) and on the other side write the definition, according to the text. Be a good godfather or godmother!

Listen to a partner read his/her definition to you, then write the word which describes their performance. Tick the table below:

- **Excellent**: You don’t hesitate
- **Good**: you need some help
- **Well**: you answer, but you need be helped, with clues
- **Need more work**: you can’t find the word

<table>
<thead>
<tr>
<th>WORD</th>
<th>EXCELLENT</th>
<th>Good, but keep trying!</th>
<th>Good, but you can improve!</th>
<th>Need more work</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bedload</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Condensation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Discharge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Groundwater</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Highland</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Hydrograph</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Infiltration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Lower course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Lowland</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Middle course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Mouth</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Precipitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Rainwater</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. River long profile</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Source</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Upper course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Velocity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. V-shaped valley</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 2.8. River Processes: Self-Assessment

At this point in your learning about river concepts you should be able to answer some questions, but are you?

Revise the content for Running water by looking at “explore Key terms in the following website:  


Now, yes! You might know everything! Do you? Test yourself.

I can identify and define (circle)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Parts of the hydrologic cycle</td>
<td>Yes</td>
</tr>
<tr>
<td>2.</td>
<td>long profile of a river</td>
<td>Yes</td>
</tr>
<tr>
<td>3.</td>
<td>Upper course</td>
<td>Yes</td>
</tr>
<tr>
<td>4.</td>
<td>Middle course</td>
<td>Yes</td>
</tr>
<tr>
<td>5.</td>
<td>Lower course</td>
<td>Yes</td>
</tr>
<tr>
<td>6.</td>
<td>V-shaped valley</td>
<td>Yes</td>
</tr>
<tr>
<td>7.</td>
<td>Steep valley</td>
<td>Yes</td>
</tr>
<tr>
<td>8.</td>
<td>Highland</td>
<td>Yes</td>
</tr>
<tr>
<td>9.</td>
<td>Lowland</td>
<td>Yes</td>
</tr>
<tr>
<td>10.</td>
<td>Discharge</td>
<td>Yes</td>
</tr>
</tbody>
</table>

I have improved:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>my writing skills</td>
<td>a lot</td>
</tr>
<tr>
<td>2.</td>
<td>my listening skills</td>
<td>a lot</td>
</tr>
<tr>
<td>3.</td>
<td>my reading skills</td>
<td>a lot</td>
</tr>
<tr>
<td>4.</td>
<td>my spoken English</td>
<td>a lot</td>
</tr>
</tbody>
</table>
3.1. RIVER-BASIN

1. Read the text below carefully:

A river basin is an area drained by a river and its tributaries. Other river features include:

- **Watershed** is an area of higher land separating two drainage basins.
- **Source** is the place where a river begins.
- **Tributary**, a smaller river joining a large river
- **Confluence** is the place where two rivers join together.
- **Mouth**, the place where a river enters a lake or the sea
- **Streams, creeks or brooks** are the names given to small rivers
- **Drainage pattern** is the way Rivers are arranged on the landscape, the most common are dendritic, parallel or radial.

2. Look at this map; the blue shows the river-basin of the Trent River. According to the text, identify these features in the map:
- **Source**, **mouth**, one **tributary**, one **confluence** and **the watershed**

3. Which drainage pattern does the river Trent show?

4. Let’s calculate the surface of this huge river-basin: You’ll need: a centimeter grid paper, a calculator

   A. Draw an irregular form on one paper. How can you calculate the estimated surface?
   B. Do it!
   C. Explain the way you did it with a partner
   D. Share your ideas to the class
   E. Watch the video:

   F. Now you can calculate the area of the river basin in km².
   G. Convert the results in miles² and in Ha, by using the table provided:

<table>
<thead>
<tr>
<th>METRIC</th>
<th>IMPERIAL</th>
<th>METRIC</th>
<th>IMPERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Km²</td>
<td>100 ha</td>
<td>1 mile²</td>
<td>640 acres</td>
</tr>
<tr>
<td>1 ha</td>
<td>10,000 m²</td>
<td>1 acre</td>
<td>4840 yards²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.59 km²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4046.9 m²</td>
</tr>
</tbody>
</table>
### 3.2. WATERFALLS AND RAPIDS

Alba and Marc are two Catalan teenagers; they are talking about their past holidays.

1. Read their conversation aloud:

   **Alba:** Last August I visited Niagara Falls in Canada!

   **Marc:** Lucky you! But I think they are Cataracts and they are in the USA.

   **Alba:** It’s the same! Cataracts, cascades, waterfalls...

   **Marc:** I visited Ordesa and there was a waterfall as well, called Horsetail.

   **Alba:** I thought that in Ordesa there were rapids...

   **Marc:** So, do you think cascades, rapids, cataracts and horsetails are different things?

   **Alba:** Maybe they are a little bit different...

   **Marc:** Let’s surf in the web!

   **Alba:** (to the teacher) May we look for waterfall information in the internet?

   **Teacher:** Yes, you can find good information from books and in internet.

2. Read the text in the box. The diagram can help you to understand some difficult new words:

   A **waterfall** is a place on a river where water flows vertically. Waterfalls are a common feature in the upper course of many large rivers. A waterfall occurs when a layer of hard resistant rock lies over a layer of softer rock, which will erode more easily.

   **Rapids** are a series of small waterfalls; these can be found where a waterfall has retreated, the hard rock layer is undercut causing the waterfall to move upstream. They are found where there are alternative bands of hard and soft rocks.
3. Looking at the diagram order these 5 sentences:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>It leaves a steep sided gorge as it retreats</td>
</tr>
<tr>
<td>b</td>
<td>The rocks collapsed fall into the plunge pool, this causes more erosion of the soft rocks and a deeper plunge pool.</td>
</tr>
<tr>
<td>c</td>
<td>As water falls, it erodes the softer rock much quicker therefore it undercuts the harder rock.</td>
</tr>
<tr>
<td>d</td>
<td>The hard, overhanging rock eventually collapses.</td>
</tr>
<tr>
<td>e</td>
<td>This goes on continuously and causes the waterfall to move upstream.</td>
</tr>
</tbody>
</table>

4. Go to the following website and write a description of these 4 types of waterfalls.
   
   http://worldwaterfalls.com/waterfall_types.php

5. Work in pairs and look for famous world waterfalls in the following website:
   
   http://www.world-waterfalls.com/

6. Make cards for 4 waterfalls, with the name, the country and the height in English system (feet) and in metric system (meters).
NAME: 
COUNTRY: 
HEIGHT: feet 
HEIGHT: meters 

NAME: 
COUNTRY: 
HEIGHT: feet 
HEIGHT: meters 

NAME: 
COUNTRY: 
HEIGHT: feet 
HEIGHT: meters 

NAME: 
COUNTRY: 
HEIGHT: feet 
HEIGHT: meters
3.3. **MIDDLE COURSE: FLOODPLAINS**

All the rivers in the world are different but, in their middle course there are special features that make this part of the river very useful for agricultural purposes: these are floodplains, meanders, ox-bow lakes and fluvial terraces.

1. Watch the video about the middle course of a river and then listen to the teacher’s explanations.  

2. Make groups of 3 students. One student is the reader, another one, the organiser and the last one, the speaker.

3. Each group has a table with four pictures and the rest of the cells empty (for each picture there is a name, a definition, a process of formation and a possible use of the river).

4. You have got also four envelopes with:
   
   - The 4 Key words
   - 1,2,3,4. The 4 definitions
   - A,B,C,D the 4 process of formation
   - a,b,c,d, the 4 river uses

5. Match the 16 cards with the 4 pictures. You have 20 minutes.
   
   - The **organizer** has the envelopes, the empty table and the bluetag (or Velcro). Decide how to start and watch the time
   - The **reader** reads the cards and discusses and decides the order with the group.
   - The **speaker** reports the results to the rest of the class, and answers possible questions from the other groups or from the teacher.

6. Orally, compare and correct the results of the different groups.

7. Look at the completed tables.

8. Keep them for the homework!
<table>
<thead>
<tr>
<th>STUDENT’S WORKSHEETS</th>
<th>UNIT 3 RIVER LANDFORMS</th>
<th>RIVERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image1.jpg" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td></td>
<td><img src="image2.jpg" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td></td>
<td><img src="image3.jpg" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td></td>
<td><img src="image4.jpg" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td></td>
<td><img src="image5.jpg" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td></td>
<td><img src="image6.jpg" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td>Student's Worksheets</td>
<td>Unit 3 River Landforms</td>
<td>Rivers</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>meander</strong></td>
<td>1. They are large bends in a river, which normally occur in the middle and lower courses where the water is moving more slowly. The river forms S-shaped bends.</td>
<td>A. As the river enters the middle course the gradient of the river becomes less steep. Lateral erosion becomes more important and the river starts to swing from side to side.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>fluvial terrace</strong></td>
<td>2. They are elongated deposits of fluvial sediments that border the sides of floodplains and fluvial valleys all over the world. They lie parallel to and above the river channel and its floodplain.</td>
<td>b. They are due to changes in elevation or changes in the base level or in the volume of the fluvial flow (changes in climate).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ox-bow lake</strong></td>
<td>3. It’s horseshoe-shaped and often temporary. It’s formed when a meander of a river is cut off from the main channel.</td>
<td>c. Over time, the loop of a meander becomes tighter. If it becomes too tight, the river may cut across the neck of the meander to form a straight river channel.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>floodplain</strong></td>
<td>4. It’s a flat area around a river that regularly floods. Each time a river floods, silt (alluvium) is deposited here.</td>
<td>d. They are due to a combination of erosion and deposition on either side of a river</td>
</tr>
</tbody>
</table>
3.3. B. HOMEWORK. MIDDLE COURSE: FLOODPLAINS

1. Relate the following concepts with the features of the river:

<table>
<thead>
<tr>
<th>Canoeing</th>
<th>S-shaped bends</th>
<th>Lateral erosion</th>
<th>vegetable plots</th>
</tr>
</thead>
<tbody>
<tr>
<td>fluvial sediments</td>
<td>flat area</td>
<td>changes in climate</td>
<td></td>
</tr>
<tr>
<td>neck of the meander</td>
<td>extraction of gravel</td>
<td>horseshoe-shaped</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>meander</th>
<th>fluvial terrace</th>
<th>ox-bow lake</th>
<th>Floodplain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Write five sentences for five key words.

3. Draw the formation of an ox-bow lake in three steps:

1. The river starts swinging
2. The loop of the meander becomes tighter
3. The river takes a straighter and faster course
3.4. WHERE THE RIVER ENDS, THE BEACH STARTS

Do you remember Lluís, Gemma, Alba, Marc and their teacher?

When they started their journey along the river they were not very enthusiastic, but finally they reached the mouth of the river. They have been discovering interesting places and now they are wiser than before. They are a little bit lost.

Can you place them exactly in the right place in the Ebre’s Delta?

1. Work in pairs. Cut down the images and place them to the right place on the Delta picture.
2. From the sentences in the speech bubbles, write an explanation for the word Delta.
3. Compare with another couple of peers.
4. Report orally to the class.
5. Find a definition in a book and compare with yours.
6. Look for the definition of estuary, as well.

YOUR DELTA DEFINITION

OTHER DELTA DEFINITION

DICTIONARY: DELTA

DICTIONARY: ESTUARY

Write down 2 similarities and 2 differences between deltas and estuaries.
Alba, Gemma, Marc and Lluís have finally arrived to the mouth of the river, they are tired but happy, as well, because now they recognise almost every feature of the river: landscapes: valleys, rocks, sediments, meanders... And what about you? Can you recognise the river landscapes?

1. Read all the river features carefully. Some of them are in the upper course, others in the middle course and others in the lower course; some of them can be found in 2 of these parts and others all along the river.
2. Sort the words into the diagram
3. Compare with a partner.

1) Waterfalls
2) Meanders
3) Tributaries
4) Ox-bow lakes
5) Pebbles
6) Sand
7) Boulders
8) Delta
9) Flood plain
10) V-shaped valley
3.5. Floodings

Sometimes rivers cause problems. If there is a rapid increase in discharge over a short period of time a flood may happen, then the river overflows its bank.

a) Work in pairs; think about facts (caused by people or by natural causes) that can increase river discharge. Make a list of causes:

1. …………………………………………………………………………………………………………..
2. …………………………………………………………………………………………………………..
3. …………………………………………………………………………………………………………..
4. …………………………………………………………………………………………………………..
5. …………………………………………………………………………………………………………..
6. …………………………………………………………………………………………………………..
7. …………………………………………………………………………………………………………..

b) Report your ideas to the class.

c) Working in plenary, classify all these causes into actions and results (e.g. ACTION: deforestation, RESULT: less plants absorbing water).

d) Fill in the Diagram:

![Diagram]

FLOOD

**Actions**

**Results**

Write one consequence in each bubble

Write one example in each star (you can finish this part as a homework by surfing internet)
f) Write three sentences explaining your ideas about the causes and consequences of Floods. Use the table below. EXAMPLE: If a flood occurs people may be unable to go to work.

1. ...........................................................................................................................................................................
2. ...........................................................................................................................................................................
3. ...........................................................................................................................................................................

<table>
<thead>
<tr>
<th>If it’s a flood</th>
<th>crops</th>
<th>will</th>
<th>die</th>
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</thead>
<tbody>
<tr>
<td>If a flood happens</td>
<td>people</td>
<td>could</td>
<td>be broken</td>
</tr>
<tr>
<td>After a flood</td>
<td>cars</td>
<td>may</td>
<td>be lost</td>
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<tr>
<td>If the water level increases</td>
<td>animals</td>
<td></td>
<td>be sunk</td>
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<tr>
<td>In case of floods</td>
<td>ships</td>
<td></td>
<td>drown</td>
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<td></td>
<td>homes</td>
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</table>

HOT QUESTION TO DISCUSS IN PAIRS:

Could FLOODS produce benefits for people?
3.6. RIVER USES

Can you imagine life in Catalonia without the river Ebre? Do you think your life depends on the river?

1. Watch a short video from Youtube, showing how our ancestors used the river Ebre or tributaries to transport logs of wood tied with branches to form a “rai”(raft). The men who did this job were called “raiers” (raftsman)

http://www.youtube.com/watch?v=mckFrdl_x74&feature=player_embedded

2. Work in pairs and write 5 uses of the river. Think of the river next to your house (even if it’s a creek), then of the main river in your province, and then of the main river in your nation.

1) ______________________________________________________
2) ______________________________________________________
3) ______________________________________________________
4) ______________________________________________________
5) ______________________________________________________

Individually, read a text about the uses of the river.

NogueraPallaresa

This area of the Catalan Pyrenees is a hot spot of Catalonia water sports, and a mecca for European rafters.

The Rafting and Kayaking centre for the Pyrenees, and Europe, is located in the NogueraPallaresa.

This river, which is the most powerful in the Spanish Pyrenees, offers over 40 km of navigable water throughout the year.

A good place to get information about rafting and other Catalonia water sports on the NogueraPallaresa is in Sort, the capital of the county of Pallars Sobirà, or in Val d’Aran.
ON YOUR HANDS

1) In plenary think of other river uses.
2) Classify them into generic uses and examples.
3) Make groups of 5 (until 6 groups)
4) Trace one handprint on a piece of cardboard
5) Carefully cut it out.
6) In the palm write the generic name of uses (sports, heritage, agriculture, power, wildlife).
7) Talk about possible examples for your group (canoeing, herons, educational, water reservoir...)
8) Write one word in each finger (if you can’t find 5 examples ask the teacher for help).
9) Then on the back, draw a picture of one example of river uses
10) Each group explains to the class its hand and the examples.
3.6. B. RIVER USES. HOMEWORK A (difficult)

Fill in the blanks with the words provided below:

The River Ebre is................ for:
❖ Drinking water - Water from the River Ebre and its t................ feeds r................ that provide many of us with our drinking water.
❖ Ebre provides................ to adjacent farms and supports agriculture.
❖ The River Ebre has played an important part in the .................of many goods in the past. The Ebre has been used for trade as early as the Roman................. With the growth of road and rail the rivers are used ............... for transport.
❖ There are many .................. stations by the side of the River Ebre, and its tributaries. The power stations use coal to heat water until it turns into steam. The steam turns .................... that make electricity. Huge amounts of water are needed by the stations which is why they are built (by) near big rivers.
❖ Leisure - You can have a lot of .............. on a river. You can go rowing, canoeing, boating, water-skiing and..................
❖ Construction - Gravel and ................ from the Ebre are used in buildings.

3.6. B. RIVER USES. HOMEWORK B (easy)

Which word is better:
The River Ebre is. (Used/good) for:
❖ Drinking water - Water from the River Ebre and its (tributaries/sources) feeds (reservoirs/lakes) that provide many of us with our drinking water.
❖ Ebre provides (agriculture/irrigation) to adjacent farms and supports agriculture.
❖ The River Ebre has played an important part in the transport of many (things/goods) in the past. The Ebre has been used for trade as early as the Roman (time/period) With the growth of road and rail the rivers are used (less/more) for transport.
❖ There are many (electricity/power) stations by the side of the River Ebre, and its tributaries. The power stations use coal to (heat/refresh) water until it turns into steam. The steam turns turbines that make electricity. Huge amounts of water are needed by the stations which is why they are built (by) near big rivers.
❖ Leisure - You can have a lot of (diversion/fun) on a river. You can go rowing, canoeing, boating, water-skiing and (drinking/fishing)
❖ Construction - Gravel and (rocks/sand) from the Ebre are used in buildings.
1. Work in groups of 3 (student A, B and C)

2. Read this dialog. Who is right? Who is wrong? You can find these and other amazing facts by surfing the following webs:
   http://www.worldatlas.com/geoquiz/thelist.htm  
   http://www.world-waterfalls.com/home.php

3. Take notes about 16 famous rivers, waterfalls, deserts, or lakes around the world.

<table>
<thead>
<tr>
<th>RIVERS</th>
<th>WATERFALLS</th>
<th>LAKES</th>
<th>DESERTS</th>
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</tbody>
</table>
4. According to your notes, complete your sentences:

STUDENT A:

The ................ Waterfall is .................., its ................ is .................. feet/ ........ m.
The ................ lake is ..................; its depth is .................. feet
The ........ desert is ..................; its ................ Is .................. inches per year
The ................ river is ..................; its length is .................. Km.

STUDENT B:

................ river is .................. than ..................
................ Lake is .................. than ..................
................ waterfall is .................. than ..................
................ Desert is .................. than ..................

STUDENT C:

For me ................ is .................. than ..................
I think ................ must be .................. than ..................
Probably ................ is .................. than ..................
In my opinion ................ Is .................. than ..................

WORD BANK:

<table>
<thead>
<tr>
<th>STUDENT A</th>
<th>STUDENT B</th>
<th>STUDENT C</th>
</tr>
</thead>
<tbody>
<tr>
<td>tallest/height</td>
<td>Longer</td>
<td>More beautiful</td>
</tr>
<tr>
<td>deepest/depth</td>
<td>Deeper</td>
<td>Less dangerous</td>
</tr>
<tr>
<td>driest/rain fall</td>
<td>Taller</td>
<td>More interesting</td>
</tr>
<tr>
<td>longest/length</td>
<td>drier</td>
<td>Less visited</td>
</tr>
</tbody>
</table>

5. Share your water facts with the members of your group
6. Indicate one waterfall, one river, one lake and one desert on one of these two maps:

Use these symbols:  
- (green) waterfalls
- (yellow) desert
- (blue) river
- (black) lake

MAP A: THE WORLD ACCORDING TO MERCALLI

MAP B: THE WORLD ACCORDING TO PETERS

7. Do the maps have the same representation of the world?
8. Which map did you choose and why?
9. Now, you can move to the next point:

RIVERS OF THE WORLD:  [link]
RIVERS EUROPE GAME:  [link]
1. Go to the website and label the rivers:
   http://www.enchantedlearning.com/geography/rivers/labelrivers/

2. RIVER QUIZ

1) What is the longest river in the world?

2) What is the longest river in North America?

3) What is the longest river in South America?

4) What is the longest river in Africa?

5) What is the longest river in Asia?

6) What is the longest river in Europe?

7) What is the longest river in Oceania?

8) What is the longest river in China?

9) What is the longest river in England?

10) What is the longest river in Iberian Peninsula?

11) What is the longest river in Catalunya?

12) What is the widest river in the world?

13) What is the most beautiful river in your country?

14) What is the longest river in South America?

15) What continent has no rivers?

16) What is the name of the beginning of a river?

17) What is the name of a river or stream that flows into a larger river?

18) River deltas usually have what shape?

19) What is the name of the area where a river meets the sea or ocean?

20) What is the name of the natural cycle in which water travels from the earth to the atmosphere and back again?
4.0. CARRYING OUT A SCIENTIFIC EXPERIMENT

Work in groups of 3. Look at the symbols and answer these questions:

a) What could these symbols mean?

b) Are they in a random order?

c) Are they connected with laboratory experiments?

d) Report, discuss and correct, if necessary, your answers with the rest of the class?

e) Imagine you are going to investigate something. Using the same symbols describe the steps you have to follow.
## 4.1. SAND: NOT JUST THE RIVER LOAD

### OBSERVATION:
Look at some grains of sand. Look at different sands.

### PROBLEM:
What is sand? Are all sands the same? Where does sand come from? Do all sands look the same?

### IDEA:
Look at the sand grains under the stereomicroscope. Observe how they react if you add some chemical substances.

### EXPERIMENT

#### EQUIPMENT:
1. Stereomicroscope
2. Sand samples
3. Petri plate
4. Millimetre paper
5. Hydrochloric acid
6. Oxygenated water

#### METHOD:
1. Put a few grains of sand in a Petri plate.
2. Look at them under the stereomicroscope.
3. Describe the average shape of the grains (rounded or angular).
4. Describe the colour of the grains (most of them, some of them...).
5. Calculate, with the help of the millimetre paper, the average size of the grains.
6. Add some drops of a diluted solution of hydrochloric acid and report what happens.
7. Add some drops of Oxygenated water and observe what happens.
8. Classify the fragments of minerals and rocks.

### Vocabulary required:
magnifying glass, estimating, sandy grains, shiny, mica moscovite or biotite sheets, feldspath, matt, rock fragments, millimetre paper, hydrogen peroxide, sample, size, drop, organic matter

Effervescence produced by the reaction between carbonates and ClH, according to the reaction:

\[
\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CO}_2 \text{(gas)} + \text{CaCl}_2 + \text{H}_2\text{O}
\]

Effervescence produced by the reaction between oxygenated water and organic matter, according to the reaction:

\[
\text{H}_2\text{O}_2 + \text{organic matter} \rightarrow \text{O}_2
\]

Types of minerals and rocks: quartz (white and shiny), mica moscovite or biotite (shiny white or black sheets), feldspath (matt, white or pink), rock fragments, slate (black and flat),...
## RESULTS

<table>
<thead>
<tr>
<th>SAMPLE SAND NAME</th>
<th>Shape of the grains (angular, subangular, rounded)</th>
<th>Size of the grains (diameter in mm.)</th>
<th>Mineral composition</th>
<th>Organic fraction</th>
<th>Other observations.</th>
<th>DRAWING OF SOME GRAINS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<td>4.</td>
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</tbody>
</table>

**CONCLUDE**

**COMMUNICATE**
4.2. WHAT HAPPENS TO THE RAIN WATER?

Watch the following animation to revise the hydrologic cycle.

http://techalive.mtu.edu/meec/module01/HydrologicCycleQuiz.htm

2. Now, label this diagram:

With one easy experiment you can discover what happens to rainwater.

Material. You will need: absorbent paper, a sponge or sand, modeling clay or plasticine, a fish tank or a dissection tray and water in a watering can.

Procedure: (in groups of 3)
✓ Put into the bowl a plastic sheet or any impermeable material into the bowl and tilt it slightly.
✓ Cover one half of the surface with a layer, 2-3 cm. of fine sand or a sponge (used in gardening) and the other half with plasticine or modeling clay.
✓ Insert some tubes of absorbent paper (to represent trees) vertically in the sand or the sponge.
✓ Use a watering can and gently water just the surface, but avoid watering “trees”.
✓ You are recreating rain so, where is all this water going to?

EXPECTED RESULT: The water falling on the sand (or sponge) will percolate and will reach the impermeable layer, becoming underground water if it’s static, or underground river or stream if it moves. The water falling on the plasticine or modeling clay will run off on the surface. Some water will be absorbed by the absorbent papers (trees)

YOUR RESULT: Explain accurately what happened to the water in the experiment.

<table>
<thead>
<tr>
<th>The water that fell on…</th>
<th>the sand/ the sponge</th>
<th>percolated</th>
<th>into the ground</th>
<th>and it became</th>
<th>underground water</th>
</tr>
</thead>
<tbody>
<tr>
<td>the plasticine</td>
<td>ran off</td>
<td>the surface</td>
<td></td>
<td></td>
<td>a creek</td>
</tr>
</tbody>
</table>
## 4.3. LET'S GO TO THE RIVER!

### OBSERVATION:
We are on the bank of the river. (How)
There's so much water! We can see the stream passing by and how the trunks float on the water.

### PROBLEM:
- How many litres of water are running by?
- And what is its speed? Is this stream strong or weak?
- Is the river deep in this place?

### IDEA:

1. Situate the length of your stream study according to the map (latitude, longitude)
2. Measure the cross-section area of the channel. Measure the stream speed and calculate the discharge.

### EQUIPMENT:
1. Boots
2. Change of clothes
3. Base-map of scale 1:10,000 or 1:5,000
4. Tape measure with cm marking
5. Stick with marks each 10 cm
6. Paper and pencil
7. Length of cord
8. Small empty bottle
9. Chronometer
10. Calculator

### METHOD: (work in groups of 3). There are groups A and groups B

#### GROUPS A. CROSS-SECTION AREA m²
1. Hold the tape measure at one end while one partner in front of you, on the other river bank, holds the other end.
2. Take and note 10 measurements of the river width at different points.
3. Calculate the average width in meters.
4. Put the stick in the water, if possible in the middle, and look at the depth the water reaches.
5. Take 10 measures and calculate the average depth in meters.
6. Imagine our river channel is similar to a half ellipse, then the area is $R \times r \times \pi / 2$
7. The answer to the equation is approximately the cross-section area in m².

#### GROUPS B. VELOCITY m/s
1. Stand at one point of the bank river, one partner walks ten meters away.
2. When your partner say 3,2,1,...0 you put the chronometer on. At the same time he throws one empty plastic bottle in the stream (it's supposed to float).
3. When the bottle arrives in front of you, stop the chronometer.
4. Repeat the procedure 10 times. Calculate the average.
5. Now you get the time in seconds for 10 meters.
6. Divide 10 between the average result (for example if the bottle lasted 30 s. for the 10 m, then is 10/30 = 0.33 m/s).
7. The result is the speed of the stream.

### Vocabulary required:
Stream, discharge, river bank, tape measure, length, width, depth,
### RESULTS

<table>
<thead>
<tr>
<th>AREA $m^2$</th>
<th>SPEED $m/s$</th>
<th>AVERAGE AREA $m^2$</th>
<th>AVERAGE SPEED $m/s$</th>
<th>DISCHARGE in $m^3/s$</th>
<th>DISCHARGE in litres</th>
</tr>
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<tbody>
<tr>
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**CONCLUDE**

**COMMUNICATE**

With your group make a poster drawing the river and writing down the results

**DISCHARGE**

$$\text{DISCHARGE} = \text{AREA} \times \text{SPEED}$$

$$1 \text{ l.} = 1 \text{ dm}^3/s$$

$$1 \text{ m}^3/s = 10^3 \text{ dm}^3/s = 1000 \text{ litres}$$
5. FINAL PRESENTATION

We are at the end of our trip along a river.

Rivers: fascinating, exciting, amazing, beautiful and endlessly varied! Steep and fast at first they finish flat and slow in the sea. They provide us with water, food, energy and fun. Rivers gave us a lovely, exciting journey.

Now it is your turn!

Show your classmates what you learnt about rivers!

Work in pairs
Prepare a poster or a PowerPoint presentation
(a maximum of 10 slides)
1. Find a title for your presentation
2. Think of the ideas you want to share looking for them in your book or notebook
3. Look for pictures to illustrate your ideas
4. Match each idea with one picture
5. Prepare the oral presentation at home
6. Control the time of your oral exhibition.
7. Do it!