

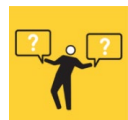
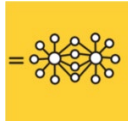
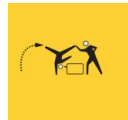
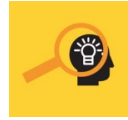




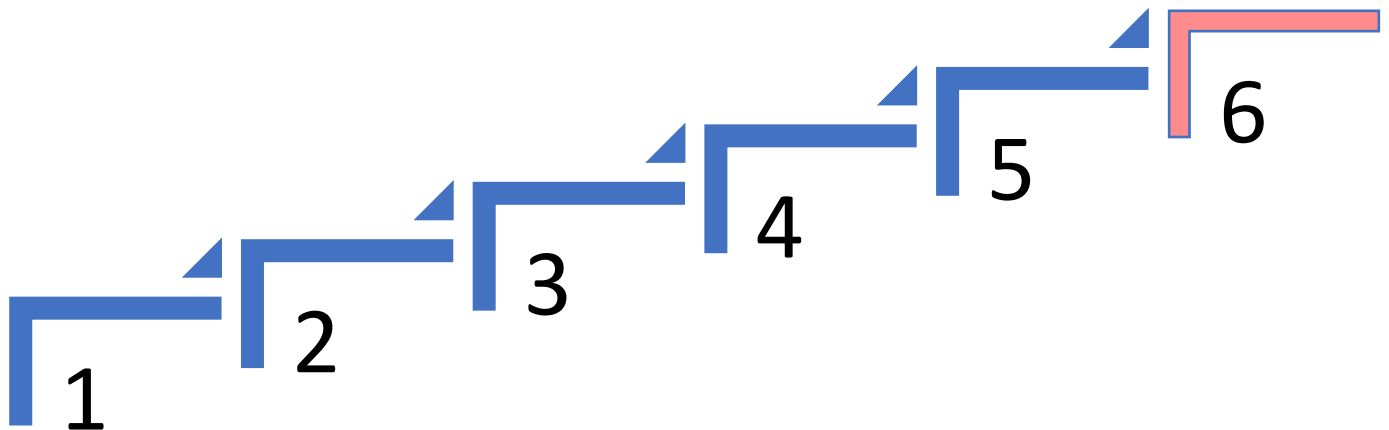


## Rosenshine's Principles (dual coding icons) for teachers' use

Principle	Description	Icon
1	<b>Rosenshine 1 – (Daily) review</b> Start each lesson with a repetition of previous material. Regular repetition reinforces what was learned and leads to more spontaneous recall.	
2	<b>Rosenshine 2 - New materials in small steps</b> Present learning materials in small amounts. Accompany students with practice after each step.	
3	<b>Rosenshine 3 - Ask questions (onderwijsleergesprek)</b> They connect the new learning material with previous knowledge and practise it.	
4	<b>Rosenshine 4 - Provide models</b> Pupils can focus on the steps to solve a problem.	
5	<b>Rosenshine 5 - Guide student practice</b> The best teachers spend a lot of time supervising the practice/learning of new material.	
6	<b>Rosenshine 6 - Check student understanding (onderwijsleergesprek)</b> By checking in between, pupils can learn the material with fewer mistakes.	
7	<b>Rosenshine 7 - Obtain high success rate</b> Aim for the students to experience approximately 80% success in the exercises, questioning ...	
8	<b>Rosenshine 8 - Scaffolds for difficult tasks</b> The teacher provides temporary support that decreases as students become more competent.	
9	<b>Rosenshine 9 - Independent practice</b> Provide practice time in and out of the classroom so that the learned material can be automated.	
10	<b>Rosenshine 10 – (Weekly and monthly) review</b> Pupils need to practise intensively in order to automate the material. Not necessary for this key study.	

Icons based on [Rosenshine poster by Oliver Caviglioli](#)



Step 1: Direct instruction / teacher facilitated stage - this is where schema building begins. Present new material.


Step 2: Modelling / Scaffolding, with review and questioning – what data are needed?

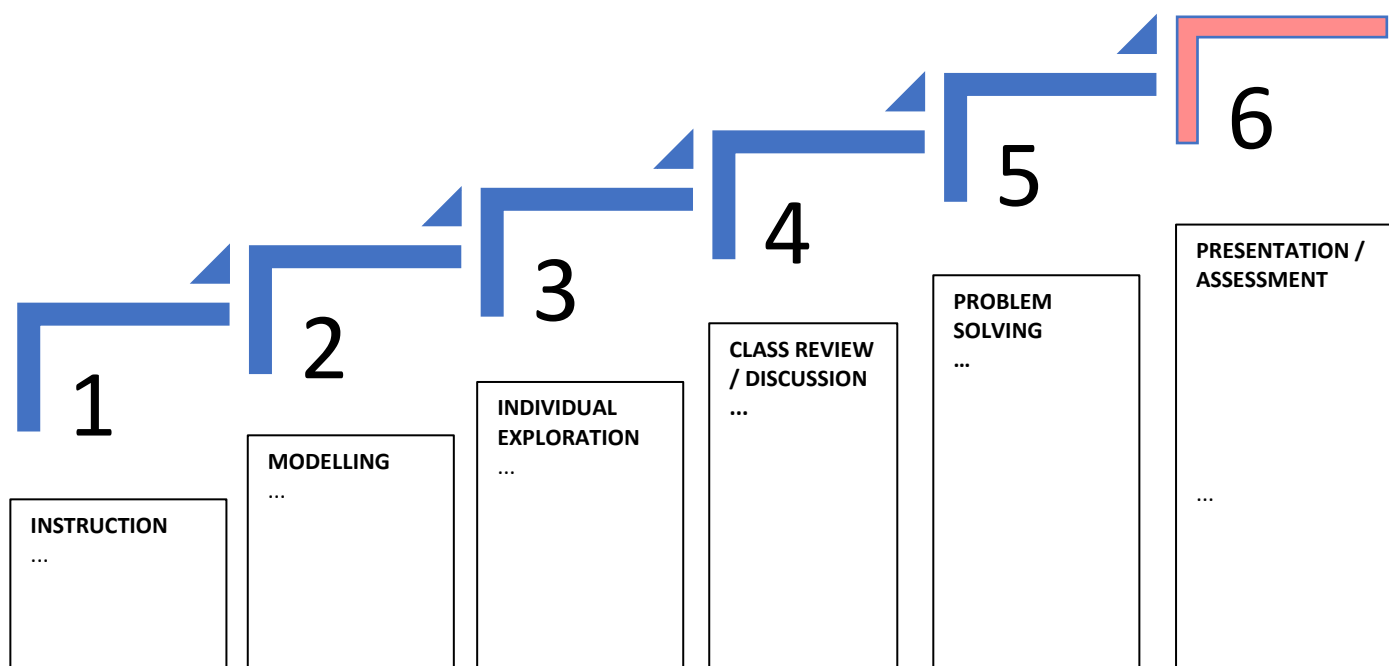
Step 3: Individual exploration

Step 4: Review - discussion

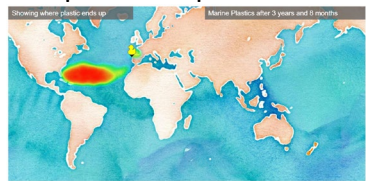
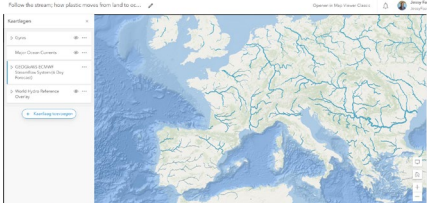
Step 5: Problem-solving








Step 6: Presentation/Assessment (Peer assessment possible too) and sharing of outcomes. This will also be the stage where students may feel secure enough to start their own exploration.






 = checking understanding




# CASE STUDY < FOLLOW THE STREAM; HOW PLASTIC MOVES FROM LAND TO THE OCEANS > by Jessie Faas

Step	Identify a topic / story that is going to be told / explored using GIS	Other
	Follow the stream	
	How plastic moves from land to the oceans.	
	Curriculum context: Water, oceans and pollution	
	Target age group: 13-14 year old	
Los	Learning objectives	
	<ul style="list-style-type: none"> <li>Retrieve prior learning about working with GIS maps.</li> <li>Get to know the local rivers.</li> <li>Describe where a plastic bottle thrown on the street can end up.</li> <li>Explain why plastic pollution is a problem.</li> </ul> <p>Can link to SDGs especially:</p> <div data-bbox="202 826 1104 1059" data-label="Image"> </div>	
Res	Key resources and embedded hyperlinks if appropriate	
	<p>e.g. GIS resource; .pptx .csv .doc; video or audio clips</p> <div data-bbox="917 1140 1353 1881" data-label="Complex-Block"> <p>Map to track plastic trash</p>  <p><a href="http://plasticadrift.org/index.html">http://plasticadrift.org/index.html</a></p> <p>Map with different map layers</p>  <p><a href="https://www.arcgis.com/apps/mapviewer/index.html?webmap=9661eda02c4f470c8338131dfa9ab0cc">https://www.arcgis.com/apps/mapviewer/index.html?webmap=9661eda02c4f470c8338131dfa9ab0cc</a></p> </div>	
	<p><b>Individual exploration:</b> [RESOURCES for students e.g. .pptx .csv .doc; video or audio clips]</p>	

	<b>Learning phases (may be one lesson or a sequence of lessons)</b>	<b>Timing</b>
<b>0</b>	<b>Step 0: Retrieval (e.g. quiz to check prior learning)</b>	<b>min</b>
	<b>Review</b> Retrieval: Showing a GIS map that the pupils used and saw before. Asking them how to use the map (zoom, panning, selecting objects, turning layers on and off)	10
	<b>Check student understanding / misconceptions about ...</b> Check if they know how it works. If not, show again.	
<b>1</b>	<b>Step 1: Direct instruction / teacher facilitated - schema building begins</b>	<b>min</b>
	<b>New material in small steps</b> <b>Key question(s) and/or concept(s):</b> [BRIEF DETAILS] > Refer to this explicitly as a GIS resource and, if necessary, explain / remind students about what GIS is and how it works etc. Input in small steps using GIS layers to <b>build the narrative</b> . <ul style="list-style-type: none"> <li>• Today we will use GIS maps to investigate what will happen if somebody throws a piece of plastic on the ground.</li> <li>• Look together at the map with the rivers, investigating location 1 (a local city). Repeat the rule that water always streams towards the sea/ocean.</li> </ul> Map: <a href="https://www.arcgis.com/apps/mapviewer/index.html?webmap=9661eda02c4f470c8338131dfa9ab0cc">https://www.arcgis.com/apps/mapviewer/index.html?webmap=9661eda02c4f470c8338131dfa9ab0cc</a>	10
	<b>Ask questions (klasleergesprek):</b> Are schema in place? <ul style="list-style-type: none"> <li>• Where would a piece of plastic enter the sea/ocean?</li> <li>• What rivers will it travel through?</li> <li>• Why is it bad that the plastic ends up in the water?</li> </ul>	
	Input in small steps using GIS layers to <b>continue to build the narrative</b> . <ul style="list-style-type: none"> <li>• Step</li> <li>• Step</li> <li>• Step</li> </ul>	
<b>2</b>	<b>Step 2: Modelling / Scaffolding Review and Questioning – what data are needed?</b>	<b>min</b>
	<b>Modelling</b>	
	Modelling of individual exploration task (see <b>Step 3</b> )  Using the website: <a href="http://plasticadrift.org/index.html">http://plasticadrift.org/index.html</a> Teacher demonstrating how to use the website to check where the plastic can end up if it gets into the ocean near the location of the pupils.	
	<b>Scaffolding</b>	

	<p>Compare the result with the map layer 'major ocean currents' from <a href="https://www.arcgis.com/apps/mapviewer/index.html?webmap=9661eda02c4f470c8338131dfa9ab0cc">https://www.arcgis.com/apps/mapviewer/index.html?webmap=9661eda02c4f470c8338131dfa9ab0cc</a></p> <p>And explain why the plastics moves in that direction. This is a good time to also point out the difference between the red and blue arrows, and explain about hot and cold water streams.</p> <p>Also turn on the map layer with the gyers and decide in which one it will end up in.</p>	
	<p><b>Obtain high success rate</b></p> <p>Instructions in ppt; Teacher and peer support</p> <p>Let the students do it themselves, by copying precisely where you click on the map.</p>	
<b>3</b>	<b>Step 3: Individual exploration</b>	<b>min</b>
	<p><b>Guide student practice</b></p> <p>Now it's the student's turn. Let them check 3 predefined locations in the Plastic Adrift map and let them also explore locations they are interested in.</p> <p>Locations:</p> <ul style="list-style-type: none"> <li>- California (USA)</li> <li>- West coast of Portugal</li> <li>- East coast of South Africa</li> <li>- Own location</li> <li>- Own location</li> <li>- Own location</li> </ul> <p>They will make screenshots of the map result of Plastic Adrift and using the other maps, they will find out and note the name of the gyre where the trash will end up.</p>	
	<p><b>Obtain high success rate</b></p> <p>The teacher will be actively going around and checking if the students are on the right track and helping and asking questions where needed.</p>	
	<p>Instructions in ppt; Teacher and peer support</p> <p>[RESOURCES so to support students e.g. .pptx .csv .doc; video or audio clips]</p>	
<b>4</b>	<b>Step 4: Review - discussion</b>	<b>min</b>
	<p><b>Check student understanding (onderwijsleergesprek):</b> Are schema in place?</p> <ul style="list-style-type: none"> <li>• Checking if the students understand how the ocean currents work</li> <li>• Talking about the plastic pollution in the oceans, can the students explain why there are specific places where plastic trash is accumulating?</li> </ul>	
	<p>Review of <b>Step 3: Individual exploration</b></p> <ul style="list-style-type: none"> <li>• Feedback from students about their findings. Corrections discussed.</li> </ul>	
<b>5</b>	<b>Step 5: Problem-solving</b>	<b>min</b>
	<p><b>Independent practice</b></p> <p>Deliberate practice</p> <ul style="list-style-type: none"> <li>• Working in pairs to come up with ideas to decrease the amount of plastic that ends up in the ocean.</li> <li>• Discussion in the class about those ideas. Making a mindmap. If possible, make a plan to put one idea in practise.</li> </ul>	

	Anomalies resource prompt discussion: Q+A to check and deepen student understanding	
6	<b>Step 6: Presentation/Assessment (incl peer assessment) sharing of outcomes.</b>	min
	<b>Check student understanding (onderwijsleergesprek):</b> Are schema in place? Key question(s) to check student understanding... <ul style="list-style-type: none"> <li>• Invite student suggestions (e.g. think-pair-share).</li> </ul>	
	Review of <b>Step B3: Individual exploration</b> [EXAMPLES... <ul style="list-style-type: none"> <li>• Feedback from students about their findings. Corrections discussed.</li> <li>• Students present findings</li> <li>• Teacher and peer evaluation]</li> </ul>	
	<b>Link to next steps in learning</b>	



Write definitions for these terms (add files if needed) **(ANSWERS) Would be added the main concepts used on the vignette**

Key term	Definition
	<b>Suggestions for creating / research on a concept:</b> <b>You can do it!</b> Where would you look for a definition? (you should consult more than one source) How would you define it? Consult several sources and define yourself in a maximum of 5-6 lines, knowing that... the definition serves to clearly delimit the thematic, temporal and territorial scope of a concept. And enrich it, if appropriate, with the why, how, relations with other elements, behavioural patterns... One or two examples and a significant image, graph or map should be added. Always without the defined word being part of the definition.

Concepts Cube to add: (see the ppt also and change these information with the cube after creating it)

#### 1. Blue table - Working memory: Current learning schema

Write up to five key ideas for the lesson. As well as the main concept, add three or four other key ideas that will build towards the main concept. If you are NOT using a 4<sup>th</sup> additional concept then leave the row that starts with '4' blank.

#### 2. Green table - Long-term memory: Prior learning schema

Add up to nine items from prior learning that should already be part of the schema in students' long-term memory.

#### 3. Red table - Long-term memory: Future learning schema

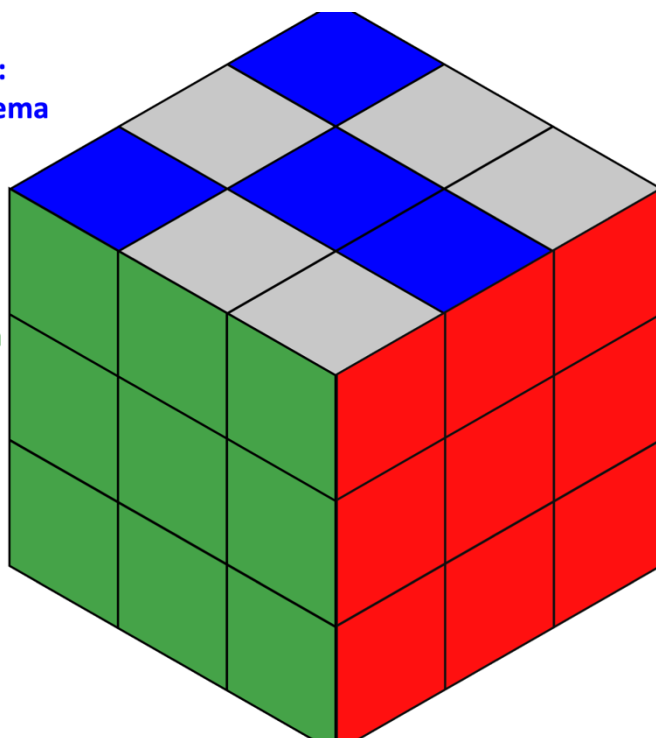
Add up to nine items that will be taught in future learning that will become part of the schema in students' long-term memory.





**Working memory:**  
**Current learning schema**

**Long-term memory:**  
**Prior learning schema**



**Long-term memory:**  
**Future learning schema**