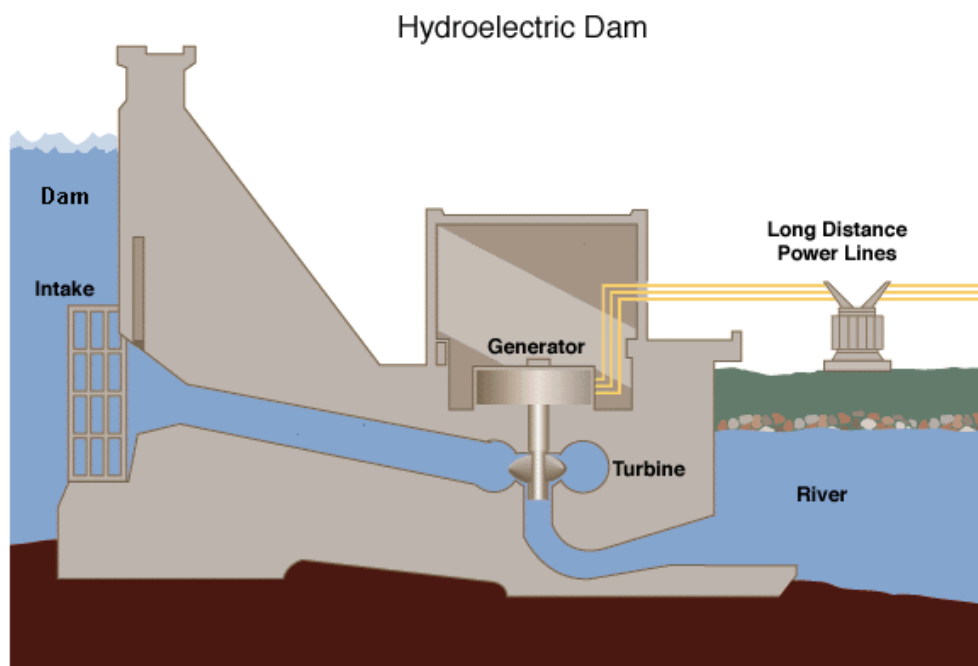


Grade 8 Natural Science Worksheet

Hydro-electricity

Part One: Explain how electricity is generated

1. Use the diagram given below to explain how electricity is generated by a hydro-electric dam.



[20 marks]

2. Write down all the conversions of energy that the water goes through from the dam to the power lines. [6 marks]
3. What important things need to be considered when building a hydro-electric scheme? [10 marks]
4. How does South Africa make use of hydro-electricity? [10 marks]

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Part Two: Different ways of producing electricity

Country	Percentage electricity from coal	Percentage electricity from hydro-electric schemes
Angola	0	64
Namibia	1	97
South Africa	94	1
Zambia	62	19
Mozambique	0	71

1. Which countries produce more than half of their electricity from hydro-electric schemes?
2. Why do you think this is possible?

[12 marks]

Part Three: Research on hydro-electricity from waves

Do some research in order to answer this question.

Why can't we make hydro-electricity from waves?

[15 marks]

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Suggested Solutions

Question number	Possible marks	Solution
1.1	20	A hydro-electric power station (or scheme) is made up of a dam, ✓✓ turbines ✓✓ and generators. ✓✓ The dam stores the water ✓✓ which then flows into intake tunnels. ✓✓ The tunnels take the water to the turbines. ✓✓ The rushing water turns the turbines ✓✓ which are connected to the generators ✓✓ which make the electricity. ✓✓ A network of cables and power lines ✓✓ carries this electricity to the National Grid. ✓✓
1.2	6	Potential energy ✓ (water in the dam) ✓ to kinetic energy ✓ (water moving down tunnels over turbines) ✓ to electric energy ✓ (inside generator). ✓
1.3	10	The most important thing that is needed to build a hydro-electric power scheme is a large river ✓✓ with a steady flow all year round. ✓✓ The water must flow at a regular, constant rate. ✓✓ The water must be able to be dammed up, ✓✓ so a valley or natural catchment area must be available. ✓✓ This valley will be flooded if a dam is made, so people living in the area need to be consulted. This is often a very sensitive issue. ✓✓
1.4	10	In South Africa the only river which is suitable for the generation of hydro-electricity is the Orange River. ✓✓ Our two hydro-electric power schemes are both situated at very big dams along this river. One is the Gariep ✓✓ scheme near Colesberg and the other is the Vanderkloof ✓✓ scheme near Petrusville. ESKOM also gets some electricity from the Cahora Bassa hydro-electric scheme in Mozambique. ✓✓ Another very important hydro-electricity scheme that provides South Africa with electricity is the Tugela Highlands Scheme which comes from Lesotho. ✓✓
2	12	1. Angola ✓✓, Namibia, ✓✓ Zambia ✓✓ and Mozambique. ✓✓ 2. They have large rivers ✓✓ which supply a constant flow of water to their dams. ✓✓
3	15	Learner answers will differ, but this is a guideline to be used in marking the question: Waves are a form of moving water which has a lot of energy. They are caused by winds. If you have ever been to the coast you would have noticed that sometimes there are very strong winds and other times there is hardly any wind. Very strong gale force winds cause massive waves

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		<p>which are very destructive. Waves are not constant in size and strength. They change all the time because of the wind and we do not know beforehand how strong they will be. Waves are very powerful and can cause a lot of damage and destruction to coastlines.</p> <p>The problem of finding a way to control the wave energy is one of the reasons why wave energy has not been used to make electricity yet. Engineers and designers have tried to do this in the past, but the test-generators have been damaged by the force of the waves. Another problem is that the salty water rusts the metal parts of the generators.</p>
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