The Kid's Guide to Staying Clear and Staying Safe

What **you** need to know about **safety** around **dams, hydroelectric stations** and **surrounding waterways**

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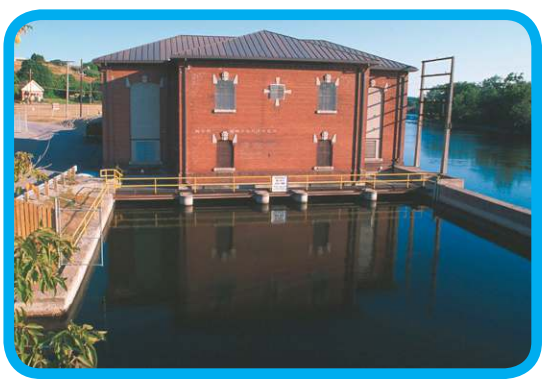
Stay Clear. Stay Safe.

Hydroelectric generating stations make electricity from flowing water. They are a source of environmentally-friendly, economical electricity. They are NOT places for recreation.

Some hydroelectric generating stations are located in towns and cities. Others are located many kilometres away from where people live. No matter where they are, the area around them can be dangerous.

Most dams and stations are operated by remote control. That's right! Operators, who work hundreds of kilometres away, can start and stop the generators with the click of a mouse.

Giant, remote-controlled gates can also allow extra water to flow past the generating station.



There's also a lot of dangerous water in the holding pond above a dam. When the generators inside start to spin, currents suck the water and anything in it, down below the surface. **It's what you can't see that WILL hurt you**.

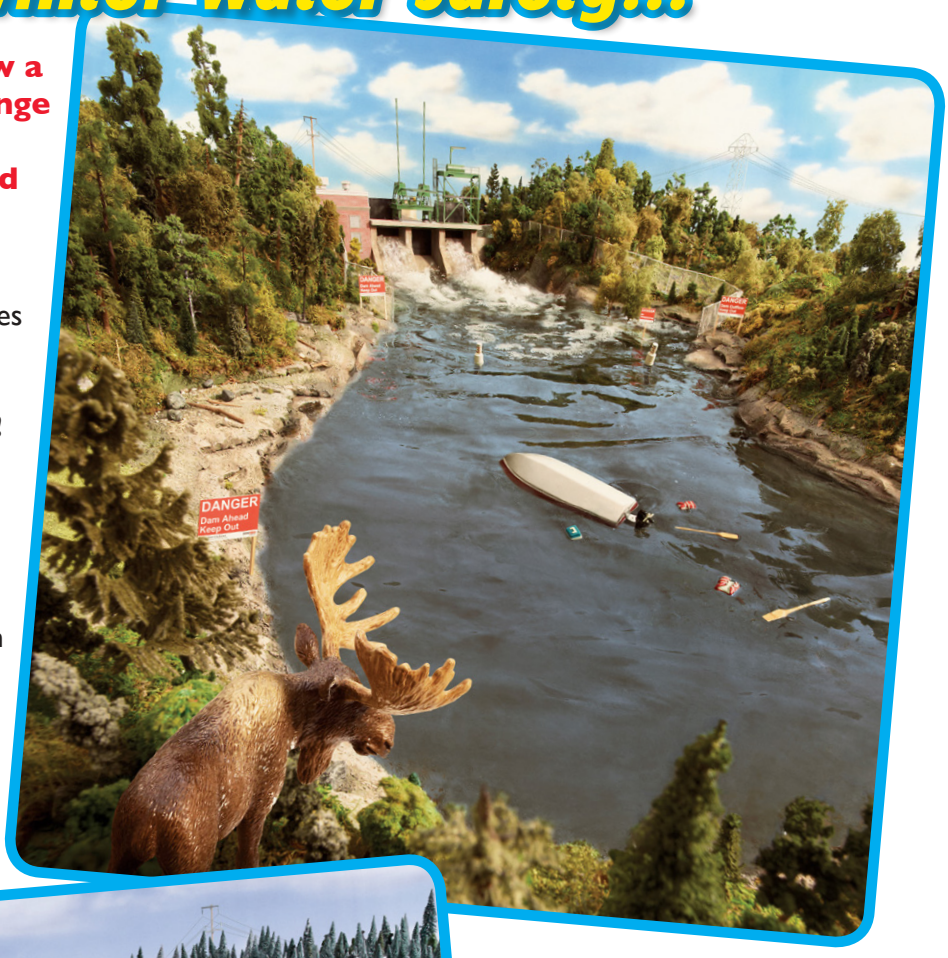
It's like what happens when you pull the plug in your bathtub. But a hydroelectric station is not a bathtub. If you got sucked down below the water at one of these stations, you would likely drown.

Summer or Winter water safety...

The water above and below a generating station can change quickly. This means that a calm river can soon be filled with rapids.

When the big gates are opened at the top of the dam, the water rushes through. It flows fast and furiously above and below the dam. **This water is very DANGEROUS!**

When water rushes out of the generating station and back into the river, it's going super fast and makes dangerous undercurrents. Most people don't know that when bubbles form in fast flowing water, it's nearly impossible to swim or float in it, even if you're in a boat and wearing a life jacket!



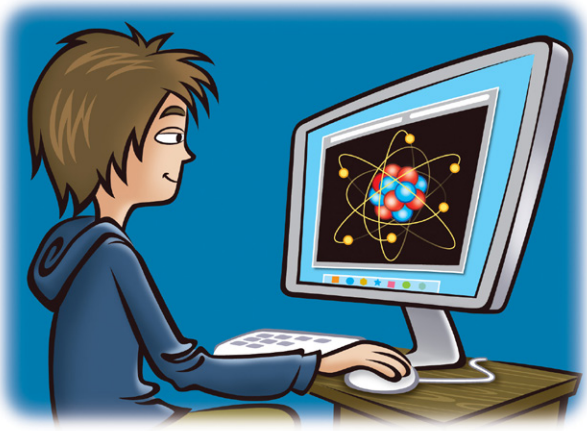
Dams are NOT safer in the winter.

Fast flowing water doesn't freeze as quickly as still water. The constant undercurrents allow only a very thin coating of ice or none at all. It's the thin ice that's most dangerous to you. Why? Because thick or thin, ice still looks the same when you see it from the top, especially when it's covered in snow. The ice near a dam is NOT safe for a snowmobile, or for skiing, or for snowshoeing or skating. Stay off the ice near dams.

Stay Clear, Stay Safe of hydroelectric facilities year round.

the DANGER is REAL!

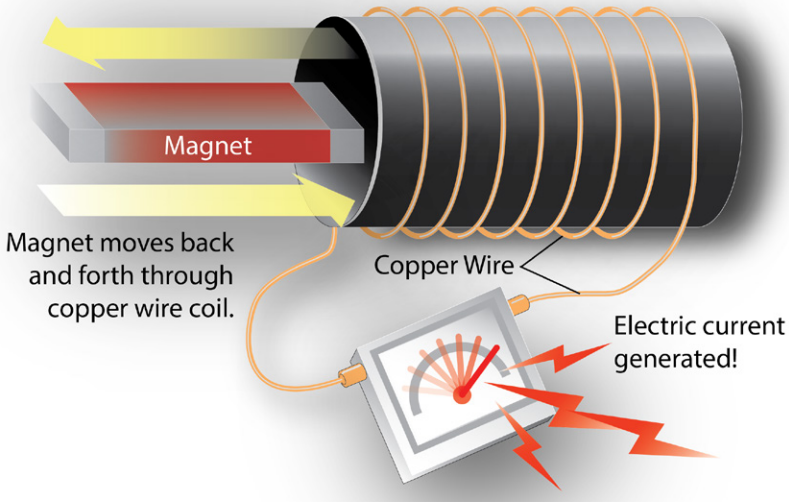
So, what is electricity?



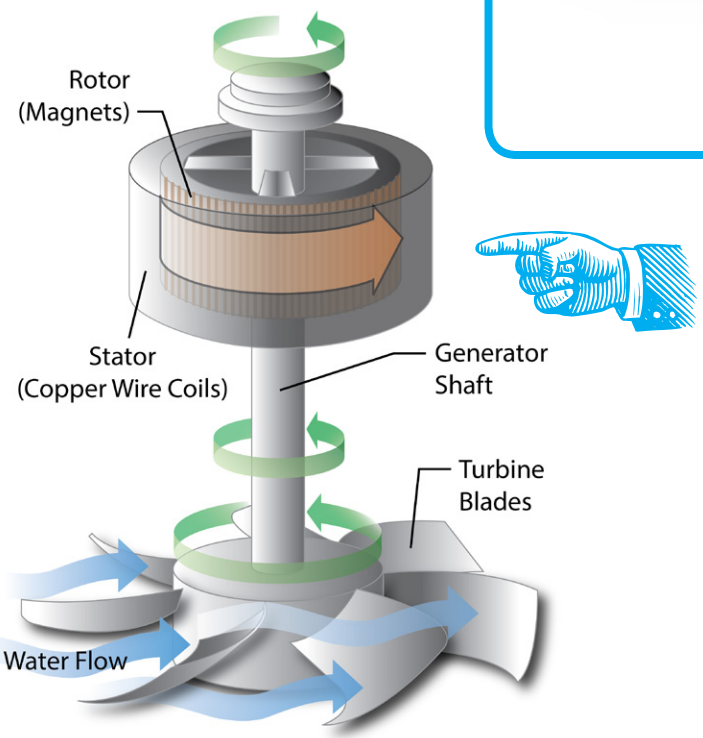
Everything in the universe is made up of **ATOMS**. Atoms are made of even smaller particles called **ELECTRONS.** Electrons are what make up the invisible force around a magnet.

In 1831, an English scientist named Michael Faraday discovered he could produce an electric current by ***moving*** a magnet inside a coil of copper wire. This pulled the electrons away from their atoms and a flow of electrons was created in the copper wire. The flow of electrons is called **ELECTRICITY**.

Faraday's discovery



Other scientists learned from Faraday's discovery and built larger machines called **GENERATORS**. These scientists you may have heard of included Hippolyte Pixii, Thomas Edison and Nikola Tesla. Generators were used to make electricity for industries, street-lights and homes.

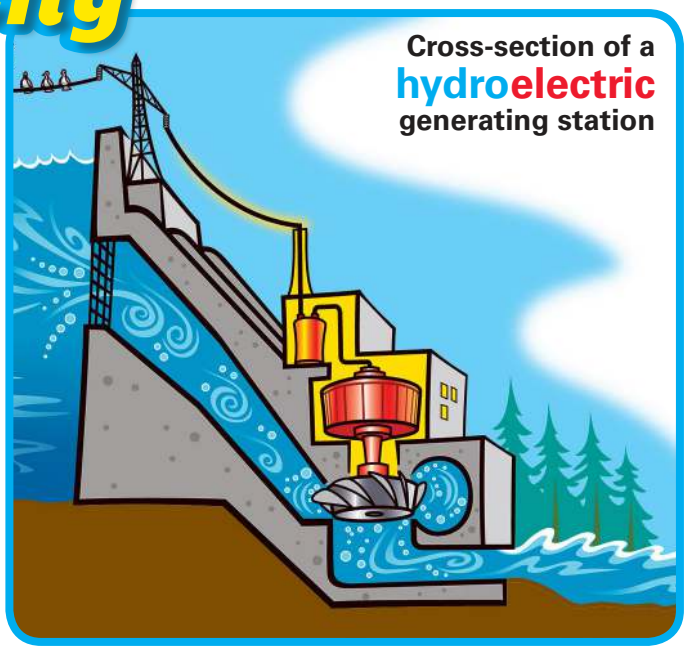


What is a generator?

A generator is a machine containing wire coils and magnets. The magnets are attached to a shaft which is connected to a turbine or propeller. When the turbine is pushed, it spins the magnets around the wire coils. Since the wires pass through the magnetic field as the magnets spin, electricity is produced in the wires.

Hydroelectricity

Hydroelectricity is the use of water to make electricity. "Hydro" is the Greek word for water.



At the **GENERATING STATION**, water is collected at a dam in what is called a **FOREBAY**. The water then flows through a large pipe called a **PENSTOCK** and turns a wheel called a **TURBINE**. At the end of the turbine shaft is the **ROTOR**, which spins inside the **STATOR** and makes electricity.

The water exits the generating station and re-joins a lake or river. You can then turn on your lights, heat or cool your house, power your TV, do homework on your computer, and run anything else that uses electricity. **Ontario Power Generation (OPG) uses water to make clean, renewable electricity at 65 hydroelectric generating stations in Ontario. Water is a *RENEWABLE RESOURCE*.**

Look out for the signs

OPG has done a lot to make our hydroelectric stations safe, but the biggest part of ensuring your safety is up to **YOU**. Obey all of the warning signs and barriers.

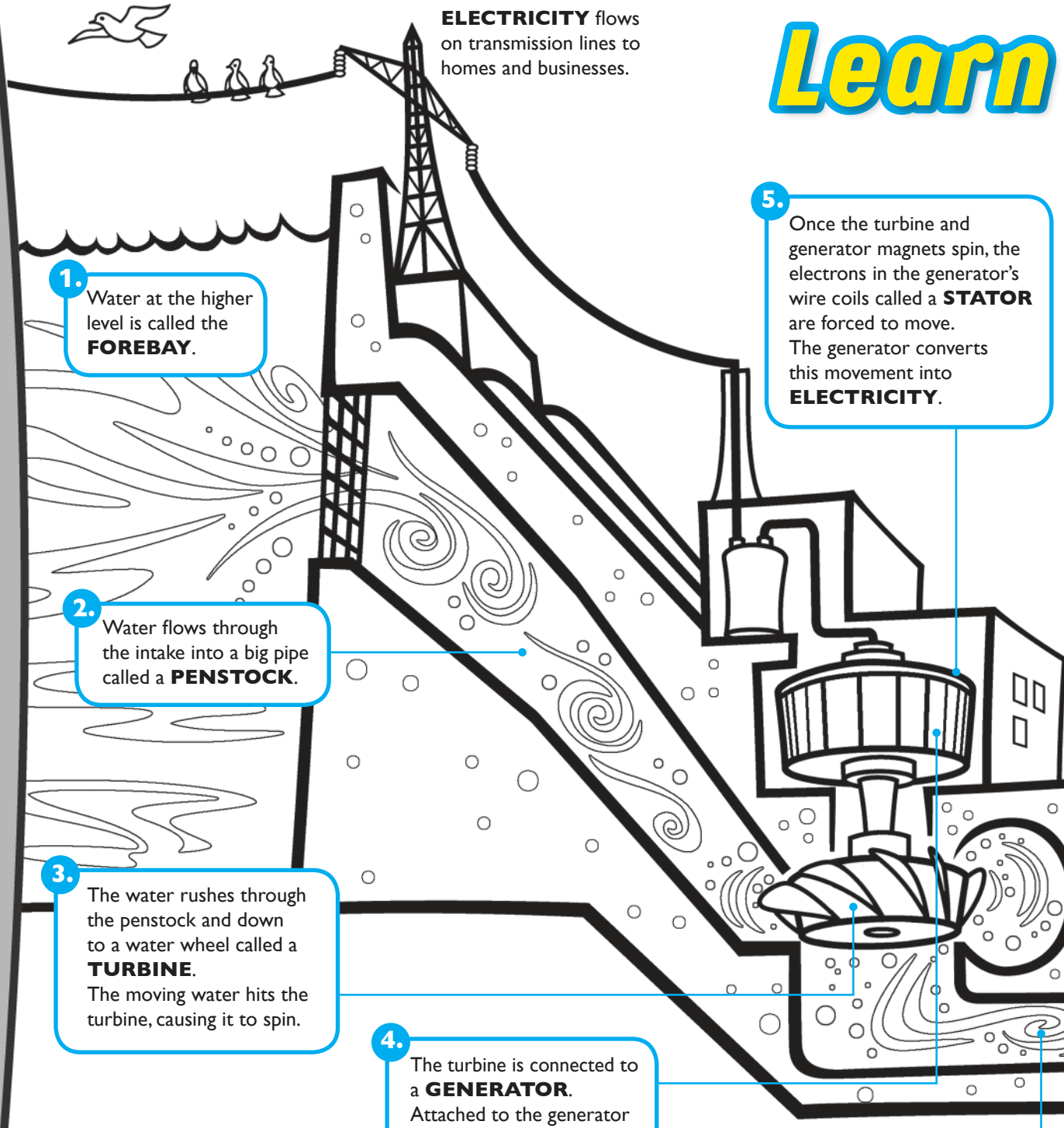
OPG has partnered with the Ontario Provincial Police (OPP) to bring you the **STAY CLEAR STAY SAFE** message.

If you're caught by the OPP trespassing on OPG property, you might find yourself in big trouble and get a big fine for not obeying the warning signs. We're sure you'll know better and let your friends and family know just how dangerous it is around hydroelectric facilities and dams.

STAY CLEAR and STAY SAFE of hydroelectric facilities and dams!

Learn

ELECTRICITY flows on transmission lines to homes and businesses.



1. Water at the higher level is called the **FOREBAY**.

2. Water flows through the intake into a big pipe called a **PENSTOCK**.

3. The water rushes through the penstock and down to a water wheel called a **TURBINE**.
The moving water hits the turbine, causing it to spin.

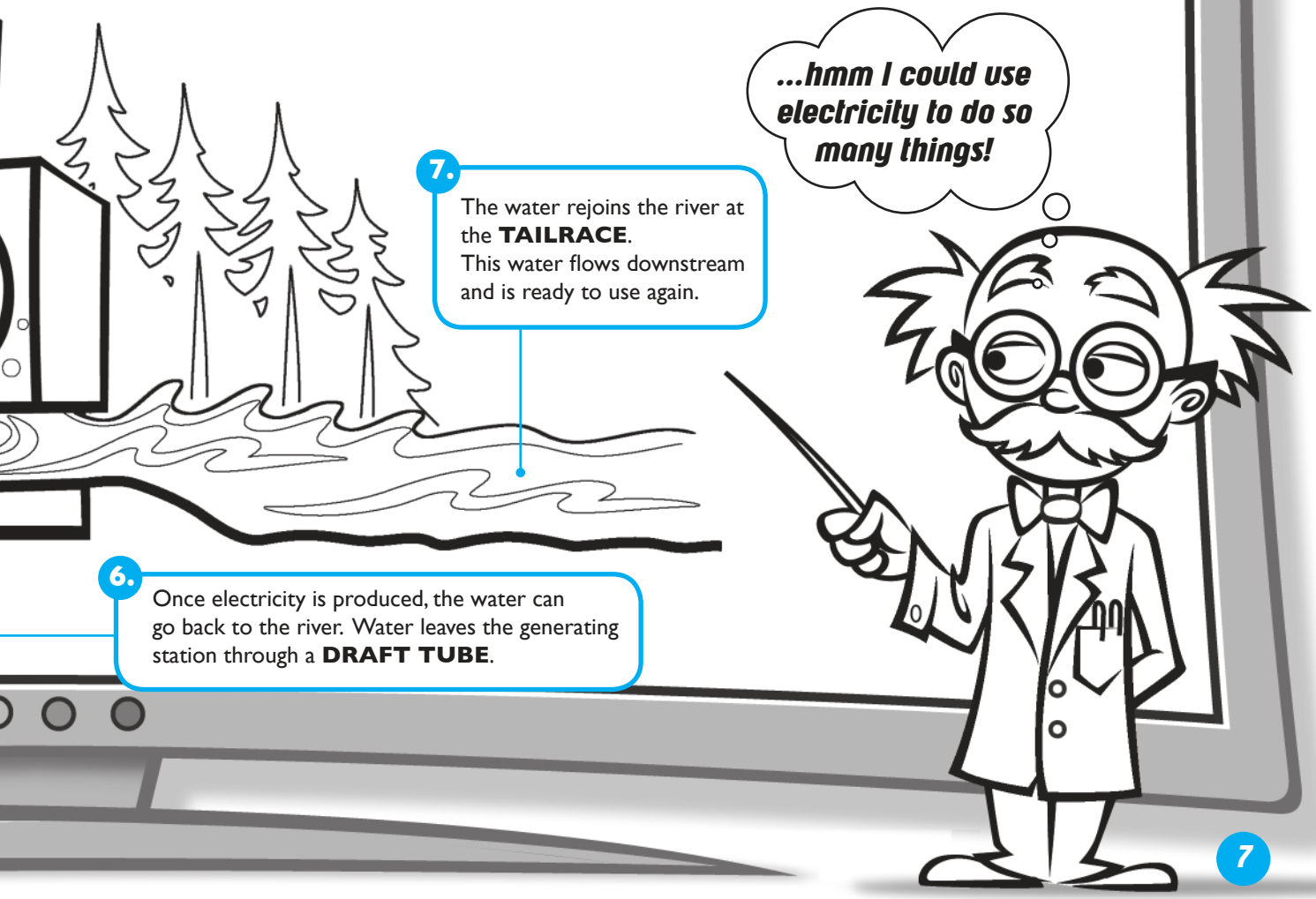
4. The turbine is connected to a **GENERATOR**.
Attached to the generator are some big **MAGNETS**.
When the turbine starts to spin, the magnets spin too.

5. Once the turbine and generator magnets spin, the electrons in the generator's wire coils called a **STATOR** are forced to move.
The generator converts this movement into **ELECTRICITY**.

how ELECTRICITY is MADE from WATER

A hydroelectric generating station needs falling, flowing water to power its generator to make electricity. That's why some hydro stations use the natural flow of a waterfall, and others create a bigger fall by building a dam.

Here's a step-by-step guide to one of OPG's hydroelectric stations.



What happens if you DO end up at a dam or hydroelectric station?

OPG facilities are marked by RED, WHITE and YELLOW danger signs. There are also fences, buoys, booms and barriers telling you to keep out! But if you do end up in the vicinity of a dam, here's what to do:

- **Stay a safe distance** outside of warning signs, buoys, and barriers when fishing, boating, or swimming.
- **Stay well back** from the edge of waters above and below hydroelectric stations.
- **Stay off all dams** and hydroelectric station structures unless walkways or observation points have been clearly indicated.
- **Stay well back** of dry riverbeds below dams. They can quickly change into rapidly flowing waterways. Be alert for changes in water levels.

- **When swimming, fishing, or boating**, be aware of the water level and check upstream frequently for any sign of increasing currents. If the water level is rising or the flow is speeding up, get out of the water.
- **Stay well back** from the edge of a waterway where footing may be slippery.
- **Set an example** for kids who may not be aware of the dangers. If someone suggests going into water that could be unsafe, take charge and warn them to stay away!

Stay Clear. Stay Safe.

Remember, dams and hydroelectric stations, and the areas around them are:

Not fishing areas

Not boating areas

Not swimming areas

Not snowmobile or cross-country ski areas

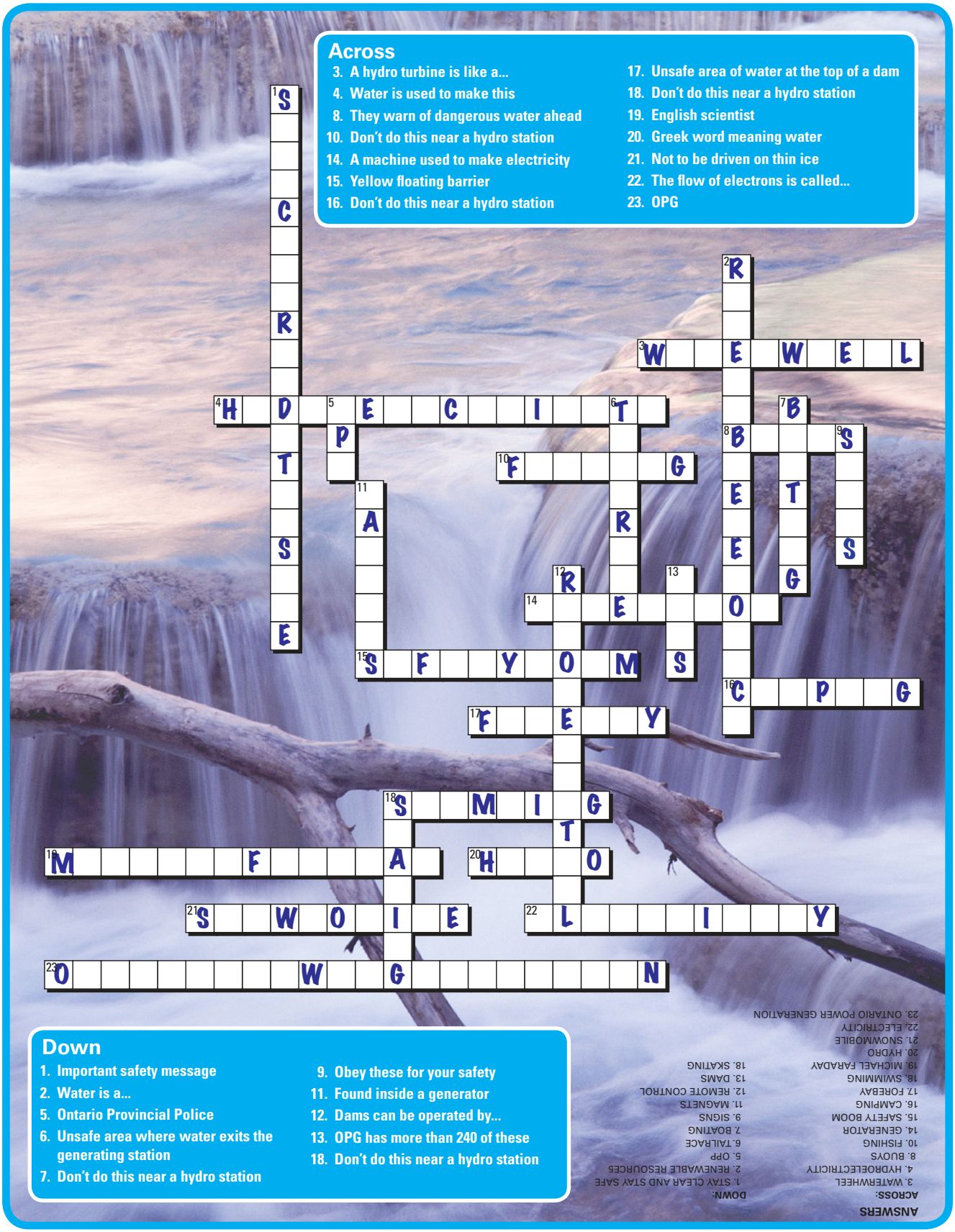
Not camping sites or picnic areas

Not skating areas

Not safe places for recreation

Be a water wiz!

Use your **new knowledge** to complete this **water safety** puzzle.



Across

3. A hydro turbine is like a...
4. Water is used to make this
8. They warn of dangerous water ahead
10. Don't do this near a hydro station
14. A machine used to make electricity
15. Yellow floating barrier
16. Don't do this near a hydro station
17. Unsafe area of water at the top of a dam
18. Don't do this near a hydro station
19. English scientist
20. Greek word meaning water
21. Not to be driven on thin ice
22. The flow of electrons is called...
23. OPG

Down

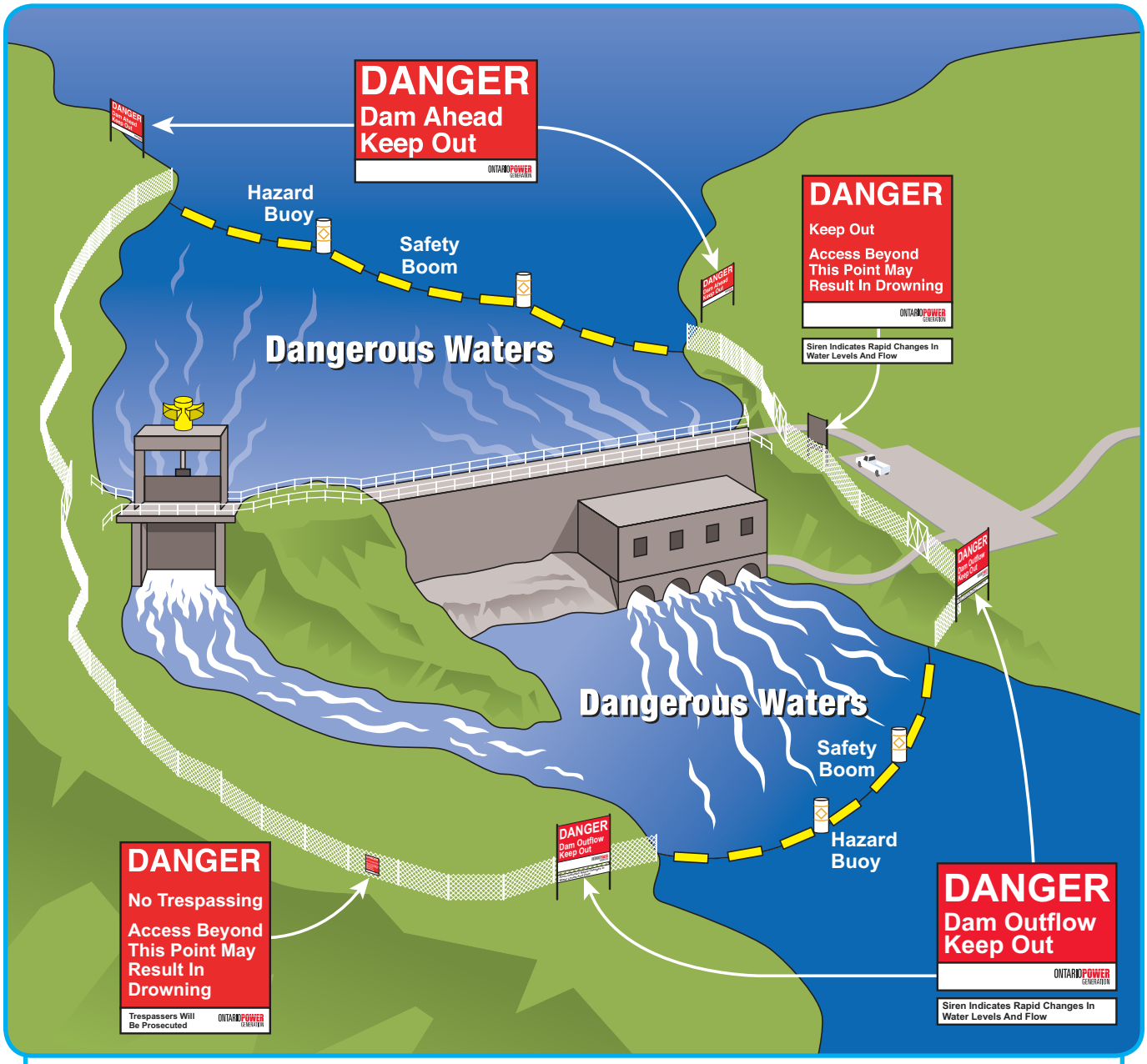
1. Important safety message
2. Water is a...
5. Ontario Provincial Police
6. Unsafe area where water exits the generating station
7. Don't do this near a hydro station
9. Obey these for your safety
11. Found inside a generator
12. Dams can be operated by...
13. OPG has more than 240 of these
18. Don't do this near a hydro station

ANSWERS

ACROSS:
3. WATERWHEEL
4. HYDROELECTRICITY
8. BUOYS
10. FISHING
14. GENERATOR
15. SAFETY BOOM
16. CAMPING
17. FOREBAY
18. SWIMMING
19. MICHAEL FARADAY
20. HYDRO
21. SNOWMOBILE
22. ELECTRICITY
23. ONTARIO POWER GENERATION

DOWN:
1. STAY CLEAR AND STAY SAFE
2. RENEWABLE RESOURCES
5. OPP
6. TAILRACE
7. BOATING
9. SIGNS
11. MAGNETS
12. REMOTE CONTROL
13. DAMS
18. SKATING

Stay Clear. Stay Safe.



Obey the Signs!

Areas surrounding OPG's dams and hydroelectric stations have signs like these to warn you. Obey the signs and other safety barriers and **always be alert for DANGER**.

Although these facilities are an important, renewable energy source, they are **NOT places for recreation**. To help ensure you **"Stay Clear, Stay Safe!"** arm yourself with the facts! It could mean the difference between life and death!

If you're thinking:

"So what's the big deal? There are no dams where I live."

You are wrong!

OPG owns 65 hydroelectric stations and 240 dams throughout Ontario. There are many other dams and hydroelectric stations owned by other companies as well. These facilities are all around. No matter where you live, work or play, there's bound to be one nearby. Use this map to help you find the OPG hydroelectric facilities in your area.

MAP LEGEND

- OPG Hydroelectric Stations
- OPG Control Dams

Visit **www.stayclearstaysafe.ca** for more safety information and materials.

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