

# Fish & Frogs Forever



Clean water  
starts with you

# Fish and Frogs Forever Youth Education Program

## Presentation Manual

Activity A: Introduction to Frogs and Their Calls  
Activity B: Life Cycle of a Frog  
Activity C: Life Cycle and Stresses on Frogs





Fish & Frogs  
Forever

# How to Use This Manual

This manual is meant to homogenize Fish & Frogs Forever presentations by giving a general outline of topics to cover when presenting to a class; there are recommended points and main points. The main points must be covered in each presentation. You may wish to add some points to suit the age group you are presenting to – this guide lists the minimum points to be covered.

Each activity is expected to last 45 minutes.



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# Symbols Guide



## Main Point

*A point of info that hits on the key messages of the 3F program.*



## Suggested Question

*A question to pose to the class that either reinforces or expands a main point.*



## Did you know?

*A point that will expand knowledge, or is suitable for older grades.*

# Activity A: Introduction to Frogs & Their Calls

Goal: To raise awareness about the impact of storm water on ecosystems, and their impact to local species of frogs





- What is a frog?
  - Amphibian – lives in and out of water
  - ! – Breathes through their skin, and are sensitive to chemicals in their enviro
- ? • How do frogs talk to each other?
  - They use calls generated in their vocal sacs
    - ★ • Vocal sacs take in air using two slits on either side of the tongue. To call, the frog inflates its lungs, then shuts its nose and mouth. Air is expelled through the larynx, which vibrates and generates a sound. Air is cycled between the lungs and vocal sac using body muscles to sing at a certain rate. The vocal sac's main role is to amplify sound: some calls can be heard 1km away.
    - ★ • Some frogs use the vocal sac to scoop up and protect recently hatched tadpoles to protect them until metamorphosis.
  - Only males sing! They use it to attract females



? When do frogs call? Do you hear frogs in the winter?

During mating season, which is typically in the spring and summer

Depends on the species

Different frogs have different calls

**Interactive Activity:** Requires access to speakers or a CD player. Have audio versions of the calls ready to go. Can be done in one large group or small groups.

1. Hold up poster board with labelled frog pictures. Give a scale, to show which frogs are the smallest and which are largest – it may generate discussion in the third step.
2. Play the call (available calls are on the next slides with brief descriptions of the frog).
3. Discuss which frog the call is associated with. Why?
4. Note identifying features of the frog and IUCN status, if listed.



# American Toad

[http://post.queensu.ca/~scb/American\\_toad.mp3](http://post.queensu.ca/~scb/American_toad.mp3)

- IUCN Least Concern
- Use vegetation for cover and hunting
- Live anywhere; from forests to backyards
- Hibernate in winter
- Can live up to 36 years
- Back is covered with different sized warts
- Three to four dark spots down the back
- Prominent eyes
- Females larger than males







# (Northern) Green Frog

[http://post.queensu.ca/~scb/Green\\_Frog.mp3](http://post.queensu.ca/~scb/Green_Frog.mp3)

- IUCN Least Concern
- Range in size from 5-10 cm
- Live near shallow freshwater (ditches, lakes, swamps)
- Not nocturnal – usually active during the day
- Native to Canada and the US





# Gray Tree Frog

[http://post.queensu.ca/~scb/Grey\\_Treefrog.mp3](http://post.queensu.ca/~scb/Grey_Treefrog.mp3)

- IUCN Least Concern
- Camouflage themselves and vary in colour from green to grey
- Change colour based on substrate
- Body size of 4-5 cm
- Lumpy skin texture
- Females have a white throat and are larger than males





# Northern Leopard Frog

[http://post.queensu.ca/~scb/Leopard\\_Frog.mp3](http://post.queensu.ca/~scb/Leopard_Frog.mp3)

- IUCN Least Concern
- Green to Brown with oval dark spots on back, white to off-white belly
- White stripe on upper jaw
- Call sounds similar to a “motorboat snore”
- Can forage far from water
- Prominent eyes





# Spring Peeper

[http://post.queensu.ca/~scb/peeper\\_short.mp3](http://post.queensu.ca/~scb/peeper_short.mp3)

- IUCN Least Concern
- Characteristic “X” pattern on the back
- Colour ranges from brown to grey to green
- No distinct stripes, mottling, or spotting
- Plain stomach (no design)
- Native to Eastern North America
- Choral groups form near standing trees and shrubs





# Western Chorus Frog

[http://post.queensu.ca/~scb/Chorus\\_Frogs.mp3](http://post.queensu.ca/~scb/Chorus_Frogs.mp3)

- IUCN Least Concern
- Females are larger than males
- Back markings include three dark, narrow stripes that may or may not be broken-up by spots
- White stripe along upper lip
- Very small body size
- Unwebbed toes
- Live in wooded areas near swamps and marshes
- Present from Canada to the Gulf of Mexico





# Wood Frog

[http://post.queensu.ca/~scb/Wood\\_Frog.mp3](http://post.queensu.ca/~scb/Wood_Frog.mp3)

- IUCN Least Concern
- Live up to 5 years
- Adults are very small
- Mid-dorsal line
- Dark brown/black “mask” extends behind eyes
- Gray to brown colouring
- Dark markings on chest







? Why are the frog calls different?

Depends on the species – helps tell different species apart

Some species have larger vocal sacs, so the noise is typically louder and deeper

Where have you seen a frog?

Where do they live?

Wetlands are common areas; also see them in water bodies

Where does our water comes from?

- When water falls to the Earth as rain, we call that **stormwater**. Rain water coming over the land is called **runoff**. During a storm, the water can pick up pollutants and/or chemicals and carry them to lakes and streams where you find frogs and fish. If we can reduce the amount of chemicals and pollutants runoff encounters as it moves to a body of water, we can help better the water quality.
- Water is always moving – it's easy for pollutants to spread



! How do we impact where they live?

- Storm water in the City of Kingston goes directly into Lake Ontario
- Anything that goes into our storm water system can get into the frog's habitat
  - Remember, frogs breathe through their skin – they can absorb whatever goes into the water, but can't selectively remove chemicals from the water
- **Good news:** we can treat the water to remove oil, grease, solids, etc. from water before it reaches our water ways, but they're very expensive. We already have natural filtering systems in our environment – tree roots, grass, soil, wetlands – that help slow water down and reduce the amount of water running off into the water

! What can you do?

- Plant trees and flowers to prevent runoff of excess soil (and whatever is in it!) from going into our lake
- Sweep soil and vegetation away from pavement and storm drains to reduce the amount of silt (bad for frogs) entering rivers and streams
- Dispose of hazardous waste, ex. motor oil and paint thinners, at the Kingston Area Recycling Centre – these substances can kill frogs and fish
- Pick up after your pet. If you don't want to touch it, frogs probably shouldn't be absorbing it through their skin. It prevents bacteria from polluting storm water.



# Activity B: Life Cycle of a Frog

Goal: To raise awareness about the impact of storm water on ecosystems, and their impact to local species of frogs during different stages of development.





What is a frog?

- Amphibian – lives in and out of water
- Breathes through their skin, and are sensitive to chemicals in their environment

What is metamorphosis?

- “Change of shape during an animal’s life”
- Frog develops back legs, then front legs



# Fish & Frogs Forever

## Eggs

- Laid in wet areas
- Called **egg masses** when clumped and floating in a body of water
- Frogs can lay up to 4000 eggs at a time
- Will hatch to form...



## Adult

- Tail is gone!
- Reaches full size
- Alternates between land and water
- Eats mainly insects



## Tadpoles

- Small, fish-like – gills included!
- No limbs - just a tail!
- Eat mainly plant matter
- Undergo **metamorphosis**...



## Metamorph/Froglet

- Has both pairs of limbs and a tail
- Exchanged gills for lungs
- Crawls onto land
- Still eats primarily plant matter





**Interactive Activity:** The class will imitate frogs in their stages of development. This activity requires a large space or the ability to go outdoors (in good weather).

In order to go to the next stage, a volunteer or teacher must tap them on the shoulder after displaying all of the distinguishing features in each stage (ex. Making themselves small for the egg stage, tail and swimming motion (no limbs!) or gills in the tadpole stage, legs and a tail in the metamorph/froglet stage, ribbiting and jumping in the adult stage).



! How do we impact where they live?

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- Dispose of hazardous waste, ex. motor oil and paint thinners, at the Kingston Area Recycling Centre – these substances can kill frogs and fish
- Pick up after your pet. If you don't want to touch it, frogs probably shouldn't be absorbing it through their skin. It prevents bacteria from polluting storm water.

# Activity C: Life Cycle & Stresses on Frogs

Goal: To explain why frogs need to lay so many eggs and how we impact their populations.





**Fish & Frogs  
Forever**

What is a frog?

- Amphibian – lives in and out of water
- Breathes through their skin, and are sensitive to chemicals in their environment

What is metamorphosis?

- “Change of shape during an animal’s life”
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# The Hydrologic Cycle

**Solar energy:** energy provided by the sun for the never-ending water cycle

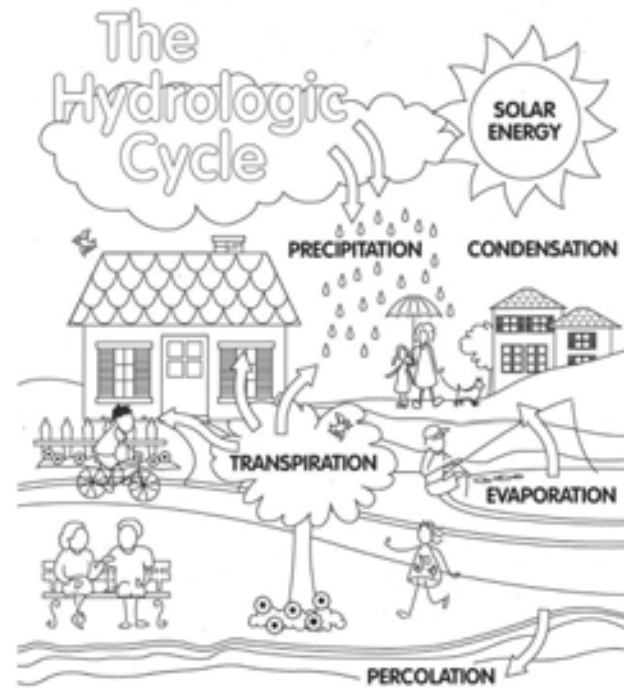
**Evaporation:** vapor created when the sun heats water in lakes, streams, rivers or oceans

**Transpiration:** vapor created when plants and trees give off moisture

**Condensation:** tiny droplets of water formed when water vapor rises into the air and cools

**Precipitation:** moisture released when clouds become heavy and form rain, snow and hail

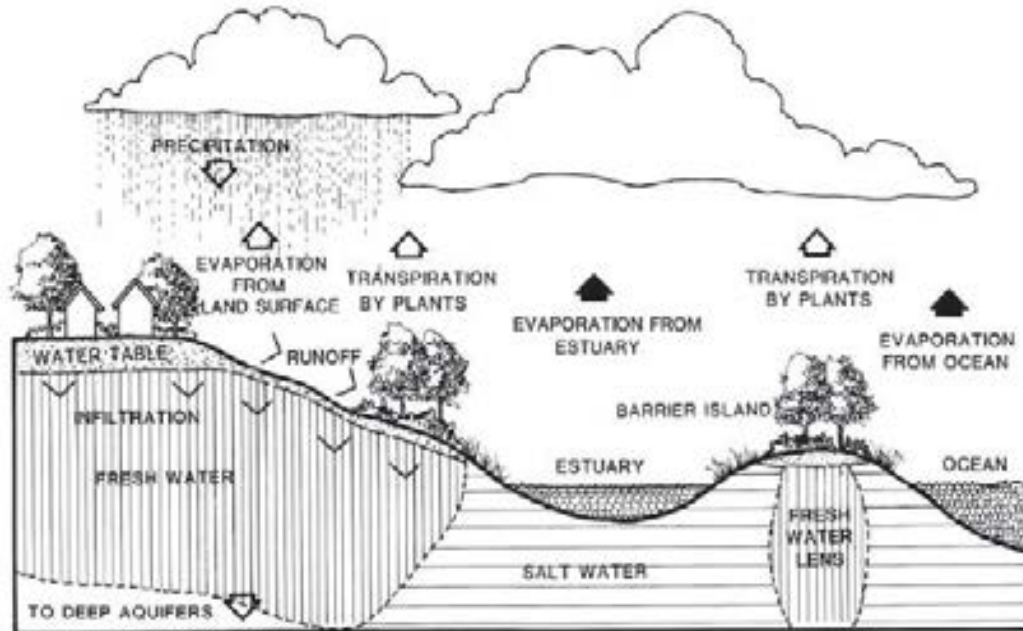
**Percolation:** movement of water through the ground

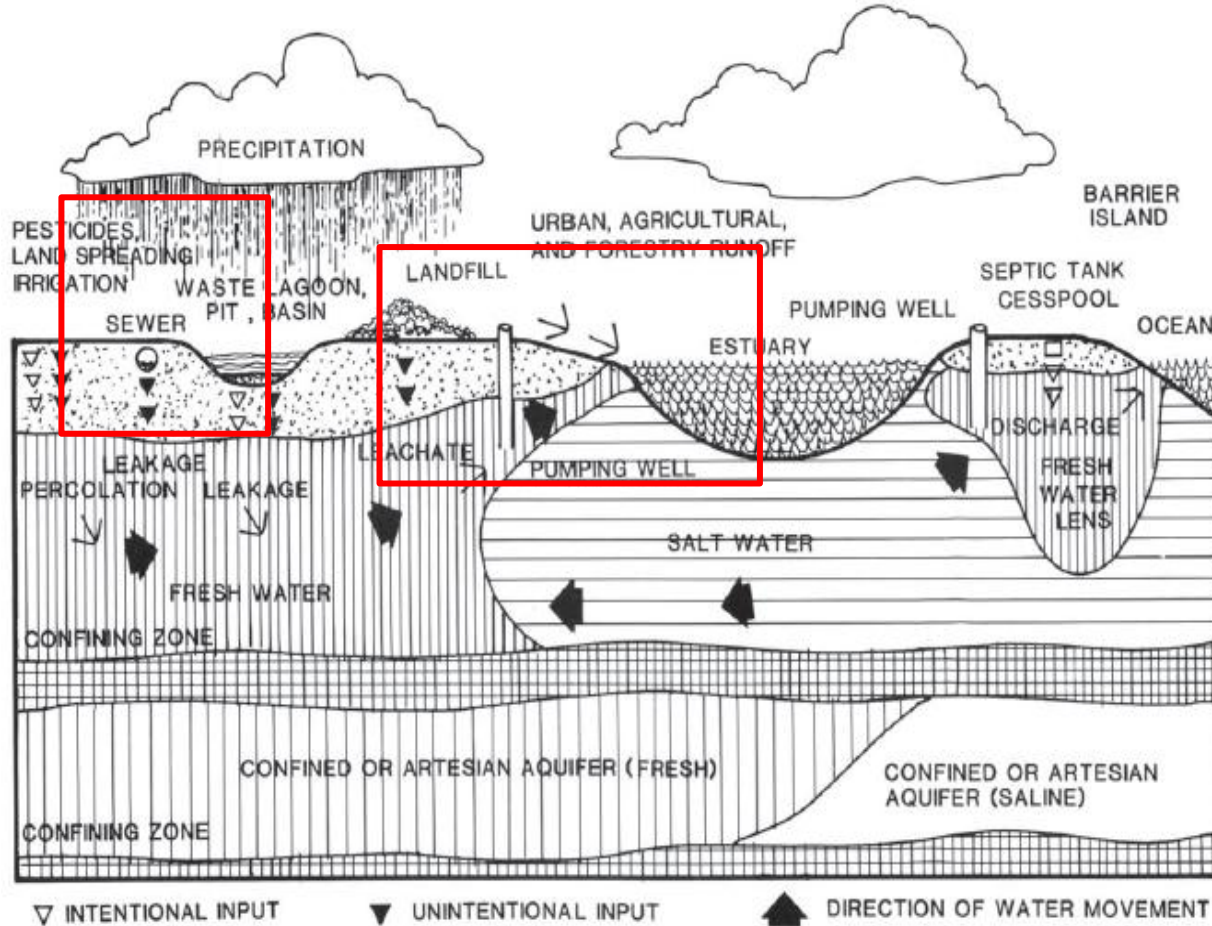






# The Hydrologic Cycle (Advanced)





- Pollution can enter our system in many ways (Advanced)
- Pollution can infiltrate the ground, getting into the water table which may allow it to flow into streams, lakes, or water wells
- It can be intentional or unintentional



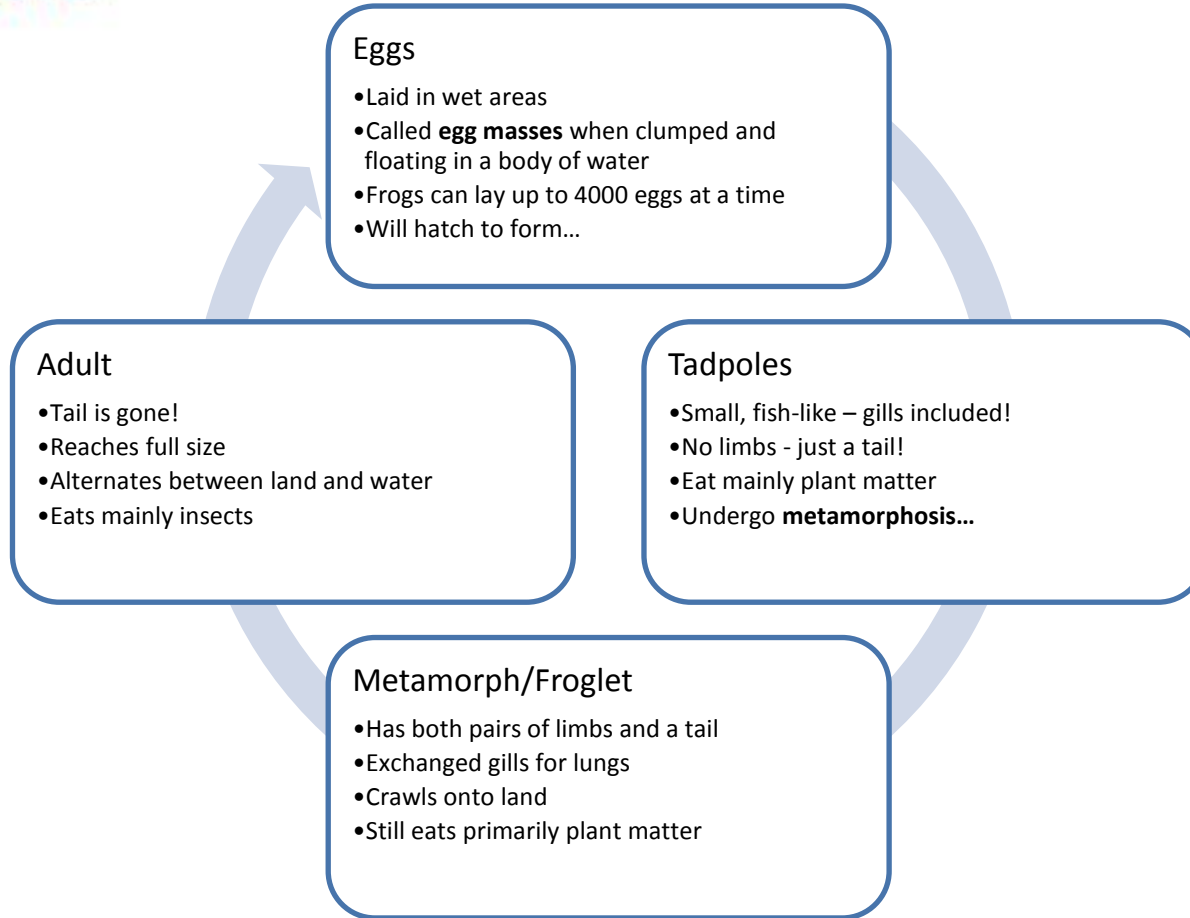
! Water in the form of rain can go many places.

- When it runs over land, it's **runoff**.
  - Runoff can cause **erosion** (water “picking up” particles, such as soil, from the ground and putting them into solution, allowing for transport), which can cause **sedimentation** (particles in water settling out of solution, usually resting against a barrier)
  - When water is absorbed into the ground, it's called **infiltration**.
  - When there is a large amount of water (ex. snow melting during spring thaw or heavy rain), it is a **freshet**
  - When snow melts in the spring, it's called the **spring freshet**

**Good news:** we can treat the water to remove oil, grease, solids, etc. from water before it reaches our water ways, but they're very expensive. We already have natural filtering systems in our environment – tree roots, grass, soil, wetlands – that help slow water down and reduce the amount of water running off into the water



## Fish & Frogs Forever





## Types of stressors

- **Biotic:** Predators, water chemistry (pH, turbidity), competitors, bacterial/fungal/viral diseases
- **Abiotic:** Nitrogenous compounds, phosphorus compounds, pesticides, wastewater pollutants, road deicers, heavy metals, caffeine

## When are frogs most vulnerable?

- Egg or tadpole stage – can't move on their own very well and can easily absorb chemicals in their environment
- Technically, they can absorb chemicals at any point in their life cycle
- ★ • Many ways chemicals can affect frog development:
  - **Teratogens:** causes malformation of an embryo (ex. Lead, PCBs, thalidomide)
  - **Mutagens:** causes a genetic mutation or damage DNA (ex. X-rays, UV light, various chemicals)



**! Interactive Activity:** this activity requires a large space, preferably outdoors. This activity is similar to “octopus” or “tag”.

- Two students will act as “pollution”, chasing other students randomly assigned to a stage in the lifecycle (using numbers and grouping them, ex. 1s are tadpoles, 2s are froglets, etc.) – they must display the distinguishing factors of that life stage (ex, tadpoles can’t jump, eggs don’t move much, adults can move the most).
- If a student is caught, they either sit down or step out of the game’s boundaries for the rest of the game.

**? Which stages were easiest to catch? Why?**

- How many frogs survived? What stage of development are they in?
- Why do frogs need to lay so many eggs?
  - Only a few eggs survive to adulthood – the more eggs there are, the more likely at least one will survive
  - Many eggs and young frogs die due to stressors before they become adults and lay their own eggs



! How do we impact where they live?

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