



© Irish Peatland Conservation Council, Bog of Allen Nature Centre, Lullymore, Rathangan, Co. Kildare R51 V293. Charity No.: CHY6829. Website: www.ipcc.ie,



## Welcome

Dear Teacher

Thank you for introducing and exploring the wild bogs of Ireland with your students. These printable worksheets have been specially prepared by the Irish Peatland Conservation Council to raise awareness about boglands. We are the national charity in Ireland that aims to conserve a representative portion of Irish peatlands for future generations to enjoy. There are two types of bogland in Ireland: raised bogs found in the midlands and blanket bogs located in the mountains and along the western seaboard of Ireland. Boglands are 90% water and 10% dead plant material. Boglands once covered 1.3 million hectares of the landscape of Ireland. Due to the harvesting of turf as a domestic fuel, the burning of milled peat to make electricity and the use of moss peat in gardening and horticulture, less than 18% of the original area of boglands in Ireland remain.

Today our bogland habitats are not only valued for their economic benefits but also:

- For recreation
- As one of Ireland's last wildernesses
- For their diversity of plants and animals including insect eating sundews and frogs
- For providing food including cranberries and blueberries collected on bogs in Autumn
- For helping to regulate flooding in river catchments Sphagnum moss can absorb and store 20 times its own weight in water
- By acting as a carbon store bogs are made of dead plants that have not decomposed in the waterlogged conditions of the peatlands forming peat

The worksheets provided in this pack support the primary school curriculum studies with links to the SESE Science, Geography, Maths and English Curricula.

If you have any comments or thoughts you would like to share with the Irish Peatland Conservation Council please contact us at the Bog of Allen Nature Centre on 045-860133 or e-mail bogs@ipcc.ie. Why not consider visiting the Bog of Allen Nature Centre as part of your bogland studies.

Kind Regards

Nuala Madigan, M. Ed.

Much Madigan

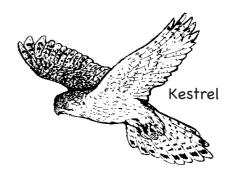
Environmental Education Officer

The Irish Peatland Conservation Council



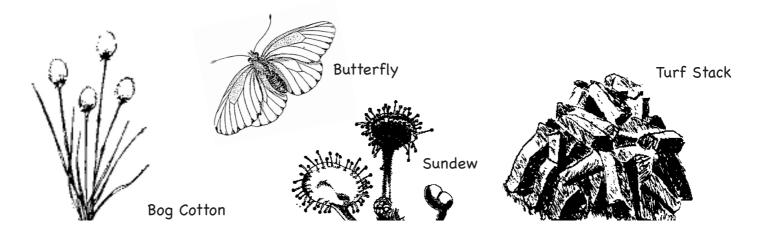


## Contents



Contents		Page Number
The Wild	Bogs of Ireland Introduction	1
Why are	Bogs so Special?	2
Teachers	Guide to Raised Bog Formation	3
Teachers	Guide to Blanket Bog Formation	4
Using IC	T to Help Identify Bogland Plants	5
BogWatc	h Flower Dial template	6-8
Bogland	plants identification	9
Bogland	Carnivores, Herbivores and Omnivores	10
Bogland	Animals Tracks and Signs	11
Bogland	Plant and Animal Word Search	12
Bogland	Crossword	13
Investig	ating Bogs and Climate	14-15
Make yo	ur Own Wind Turbine	16
Make a	Classroom Wormery	17
Bogland	Maths – Percentages	18
Lifecycle	of the Smooth Newt	19
Raised B	og Summary Worksheet	20-21
Blanket 1	Bog Summary Worksheet	21-22

You can learn more about the wild bogs of Ireland by visiting 'Discovering the Wild Bogland 3rd & 4th Class Worksheets' where you can investigate why bogs are so wet and why bogs are nutrient poor with your students





### The Wild Bogs of Ireland



There are two types of bogland in Ireland, raised bog and blanket bog. The raised bogs can be found in the midlands of

Ireland while blanket bogs are found in the uplands with many of them located along the West Coast of Ireland. Raised bogs are 10,000 years old. Boglands are wetlands. A special plant called Sphagnum moss builds the bog by growing upwards and storing 20 times its own weight in water. Sphagnum moss is also know as the 'bog builder'. A bog is home to many wonderful plants and animals and it is known as a habitat. There are insect eating plants called sundews and bog cotton with white fluffy seed heads living on the bog. The red grouse is a bogland bird and it feeds on the heather plant while another bogland bird the curlew has a long curled beak for feeding on insects living in the bog pools. It is recommended while visiting a bog that you should wear waterproof footwear such as wellies. The bog surface may look flat but it has dry areas called hummocks and wet areas called hollows. Sometimes you can sink into a hollow and commonly we call them 'bog holes', so watch out for these when visiting a bog!

Answer the tollowing Questions:
Can you name the two types of bog in Ireland?
Where would you find raised bogs in Ireland?
How old are raised bogs in Ireland?
Can you name the bog building plant?
Which plant eats insects on the bog?
What do you call the dry areas of the bog?
What is the name of the boas found in the mountains in Ireland?



## Why are bogs so Special

Use the wordbank to complete the story

Bogs are specia	al to many	people. For over	hundred	d years we
have harvested	l a domestic fuel knov	vn as fror	n both raised and	d blanket
bogs around Ir	eland. The	_ was the traditio	nal tool 🛚 🌋	
used to cut tur	rf and for many famili	es it was the only	source	
of fuel they ha	ad for	and		
	their homes. Today v	we even harvest pe	eat /	
from Ireland's	wet and wild bogs to	burn to		
make	and us	se it in our		
gardens as a _	to grow	flowers and vege	tables. By remov	ing the peat
from the wet _	of Ireland we	have sadly lost m	ost of the wild b	ogs of
Ireland.				_
Irel		n we did in the pauch more than a full a ful	st. Today the will lel. The boglands rs coming from a As Sphagnum month to the water they and bluebed. Artists have	ld bogs of of Ireland round the oss can hold are valued erries grow been
	culptor Michael Casey	'		9
wood. Bogs ar	e also a living history	book with	, the Great	Irish Elk
and even	$\_ \_ \_$ $\_$ found in the I	bog. Bogs have mo	any values.	
Let's	$\_ \_ \_$ a sample of the	m for future gene	rations to enjoy,	
Word Bank				
Irish tw	enty research	bodies	butter	cooking
four be	ogs inspired	electricity	recreation	heating
protect	cranharries	tunf compact	Classes	

← Present day living layer

← Sphagnum moss growth

→ Woodland 4,000 years ago

← Fen peat 7,000 years ago

**←** Lake



## Teachers Guide Bog in a Bottle - Exploring Raised **Bog Formation**

www.ipcc.ie

Opening Discussion - Has anyone seen the movie Ice Age?

Did you know that 10,000 years ago Ireland was in the grips of an Ice Age? Can you describe what the land in Ireland would have looked like during the Ice Age? Does it still look the same today? What happened the ice?

Take an ice cube out of the freezer and ask students to predict what will happen to the ice. Did they predict that the ice would change to water? What would cause the ice to melt?

This is where our raised bog story begins......

Equipment: As this is a model we will just use items that we can find around our school. You will need:

- \* 1 x empty 2 litre clear plastic bottle
- \* White tissue paper
- \* Compost
- \* bark chips
- \* Plants such as moss and heathers

Stage 1: Shallow Lakes 10,000 years ago



At the end of the last Ice Age 10,000 years ago a weather change caused the ice to melt forming shallow lakes in the midlands of Ireland. Put the white tissue in the bottom of the bottle to represent this stage.

Stage 2: Fen 7,000 years ago



Slowly plants began to grow in these lakes. Over 3,000 years they grew bigger and bigger to fill up the lakes to create a fen. A fen is a lake filled with dead plants. Put two cups of compost into the bottle.

Stage 3: Woodland 4,000 years ago



4,000 years ago almost all of Ireland was covered in trees a weather change bringing wind and rain was to cause these trees to fall over. Fill a cup of bark chips into the bottle to represent the fallen woodland.

Stage 4: Sphagnum Moss growth



Once the trees fell it opened up the surface of the fen and allowed Sphagnum moss to grow. Sphagnum moss is the bog builder growing 1mm a year upwards and storing 20 times its own weight in water. Fill the remainder of the bottle with compost and add your plants to the cunface. Vou have now made vous own electroem 'Dan in a Dattle'



## Teachers Guide Bog in a Bottle - Exploring Blanket **Bog Formation**

**Irish Peatland Conservation Council** www.ipcc.ie

Opening Discussion - A woodland is a collection of trees. Did you know that 4,000 years ago most of Ireland was covered in trees?

Is most of Ireland covered in trees today?

What does the land in Ireland look like today?

Can you guess what happened all these trees?

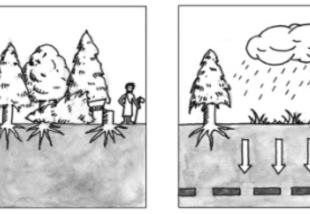
Did your students guess that early farmers removed trees in the mountains to create fields?

But Irelands weather was to change to the rain and wind we get a lot of today.

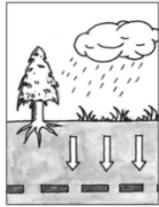
This is the beginning of our blanket bog story ........

Equipment: As this is a model we will just use items that we can find around our school. You will need:

- \* 1 x empty 2 litre clear plastic bottle
- \* Sand or gravel
- \* Compost and Garden soil
- \* Bark chips
- \* Plants such as moss and heathers



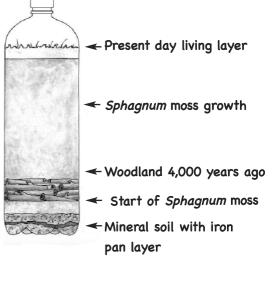
5,000 years ago Ireland was covered in woodlands. As farmers came to Ireland they cleared these woodlands to create farmland. Add two cups of garden soil to the bottle.



A weather change was to bring rainfall greater than 1200mm per year and caused leaching of iron through the soil. Add a layer of sand or gravel to represent the forming of an



This iron pan, impermeable to water was to cause water logging of the land allowing Sphagnum moss to grow. Add two cups of soil and one cup of bark chips to show the end of tha waadland





As the Sphagnum moss continued to grow it covered the mountains. Fill the bottle with compost and add some plants such as moss and heather to the top of the bottle to show



# Using ICT to Help Identify Bogland Plants

There are many hundreds of bogland plants - Your challenge is to identify some bogland plants. You can do this in two ways:

- Use the Internet to search and identify your bogland plants
- Use the internet to find, print and make your own Bog Watch Flower Identification Dial from www.ipcc.ie

Follow the steps below to learn how to make, retrieve and print your own Bog Watch Flower Identification Dial:

Step 1: Using the internet on your classroom computer visit www.ipcc.ie

**Step 2:** You will now be visiting the homepage of the Irish Peatland Conservation Council website – click on the 'Discover and Learn' tab on the website header

**Step 3:** On the 'Discover and Learn' webpage click on the link called 'Resources for Educators'

**Step 4:** You will now be visiting the Bogs in the Classroom webpage - click on the link called Bog Watch Flower Identification Dial

Step 5: Read the instructions on how to make your Bog Watch Flower Identification

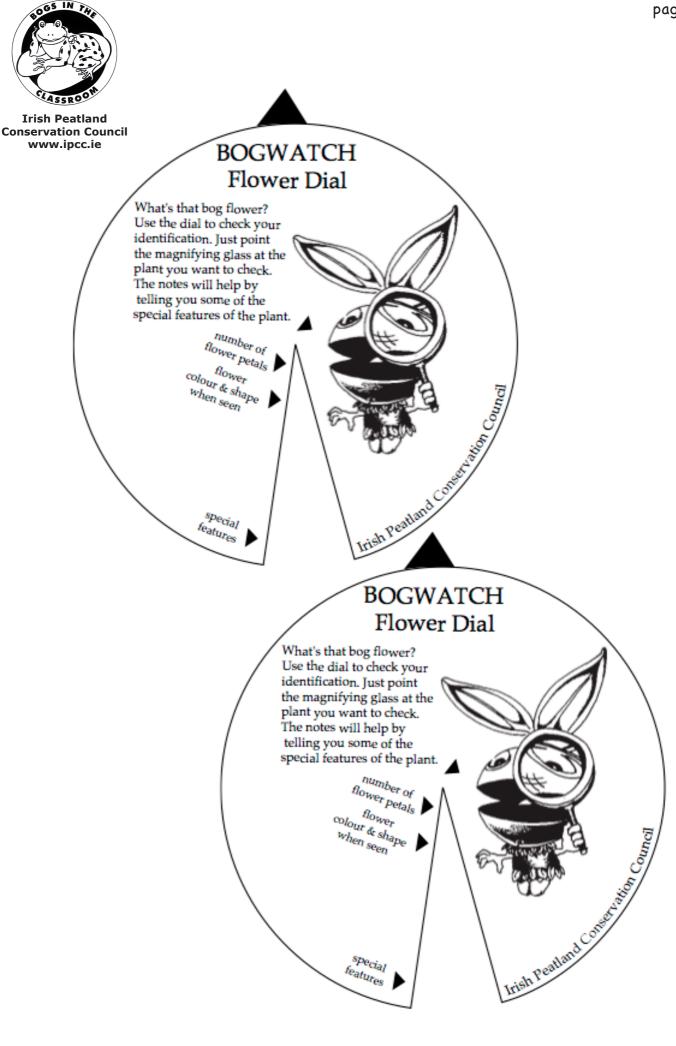
Dial on this new webpage called 'Bog Watch Flower

Identification Dial'

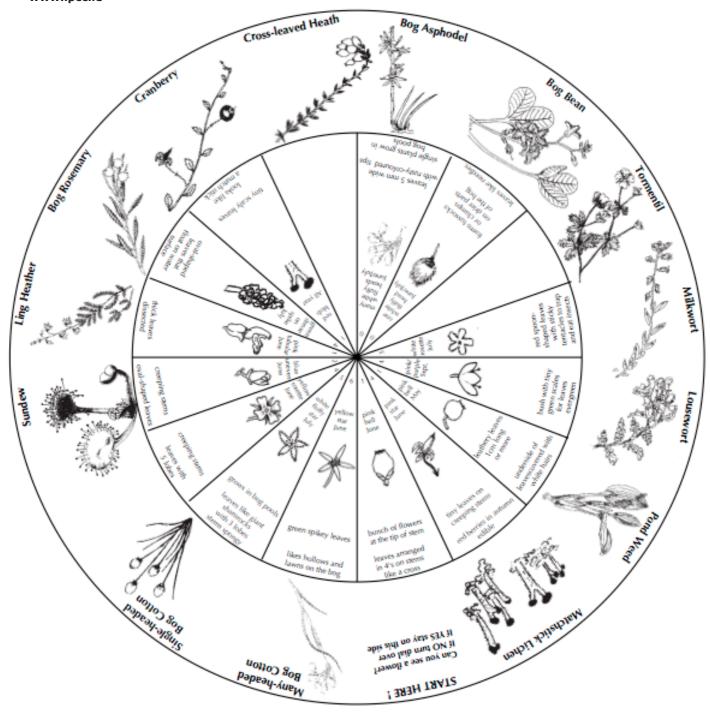
**Step 6:** To retrieve your Bog Watch Flower Identification Dial, click on the link within the text called 'Bog Watch Flower Identification Dial Template'

**Step 7:** Your Bog Watch Flower Identification Dial will now appear on the screen as a .pdf and now you should print it

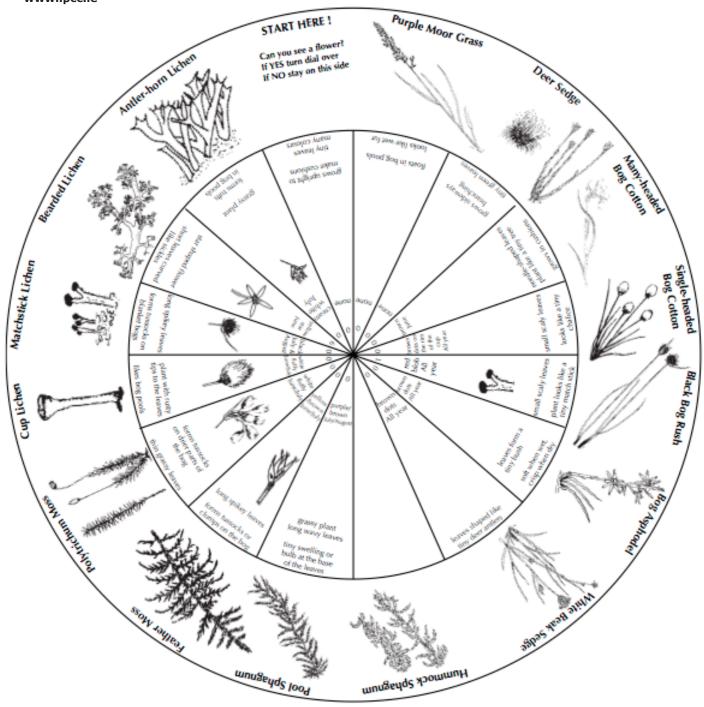
Step 8: Make your Bog Watch Flower Identification Dial











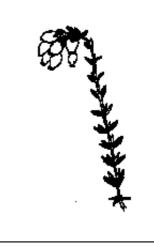


## **Bogland Plants**

# Using your Bog Watch Flower Identification Dial name the bogland plants







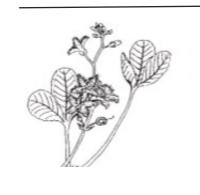


















# Bogland Carnivores, Herbivores and Omnivores

www.ipcc.ie		
Some bog animals eat othe	r animals we call them:	
Some bog animals eat plan	s we call them:	
Some animals eat both plan	its and animals we call them:	
	Bogland Food Web	
Using this bogland food		
web can you identify	Kestrel Fox Heron	
which animals are		
herbivores,	SKYIATK 144 K	rlew
carnivores or omnivores	Red Grouse	
Kestrel	Caterpillar of Large Heath, Emperor Moth, Oak Eggar Moth  Plant Seeds  Dragonfly  Spider  Spider  Pond  Beetle  Ant  Spri  Dead  Animal  Material	estman bider ingtail
Meadow Pipit	Frog	nfly
Hare	Red Grou	ıse



## Bogland Animals Tracks and Signs

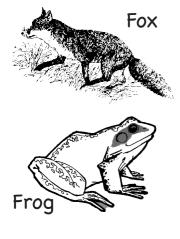
Although the fox and kestrel are two of Ireland's bogland top predators even they will run and hide from another animal living in Ireland. Can you guess who?

	and see can you hear a	you should always stop and listen for ny animals even though you can't see them ?
·	•	at they are living or visiting the bog. Can so we know they have been there?
1.	3	,
2.	-	
3.		
J		
Use the key below to identify w visiting a bog:	hat bogland animals tra	acks and signs you might discover when
	Key to Animal Finds o	n the Bog
1. Is it Pooh?	Yes go to 2	
Is it not Pooh?	Yes go to 3	
2. Is it a round ball?	Yes Hare Pooh	
Is it shaped like a sausage	Yes Fox Pooh	
3. Is it a Footprint?	Yes go to 4	
Is it a cocoon?	Yes go to 5	
4. Is it a mammal?	Yes Deer	\ /
Is it a bird?	Yes go to 6	
5. Is it shaped like a sausage?	Yes Fox Moth Cocoon	Y -
It is shaped like a flask?	Yes Emperor Moth Coc	oon !
6. Is the footprint webbed? Is the footprint not webbed?	No Yes Snine	
-5 The Toolphill Hot Webbea:		No. of the last of

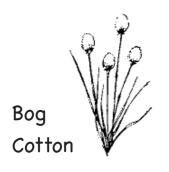


## Bogland Plants & Animals

Boglands are home to many different plants and animals. A home for plants and animals is called a habitat. When visiting a bog the animals often hide. Can you find some of Ireland's bogland animals and plants hidden in the wordsearch?









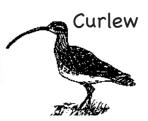
С	u	r	l	e	W	d	g	h	C	f	-	m	n	k	j
٧	z	b	a	S	S	u	n	d	e	W	b	h	a	r	e
i	e	p	٦	f	g	b	h	j	k	У	u	i	0	Р	m
q	S	d	f	С	٧	b	h	У	u	i	0	r	†	f	е
С	٧	r	+	d	f	r	0	g	×	d	f	g	У	b	a
d	q	S	×	Z	С	٧	b	n	h	j	У	f	†	0	d
r	e	d	f	+	q	w	e	r	†	У	h	i	0	g	0
a	S	d	k	e	S	†	r	e	l	f	e	g	h	С	W
g	l	Z	×	С	٧	b	n	m	l	k	a	j	h	0	р
0	f	+	r	У	w	S	d	f	У	u	†	g	h	†	i
n	a	S	С	٧	b	n	m	z	×	d	e	r	†	†	р
f	q	w	e	r	†	f	0	×	†	У	e	i	0	0	i
l	z	×	С	٧	f	d	S	а	f	g	r	u	У	n	†
У	q	е	d	С	٧	†	У	u	i	S	n	i	p	e	р

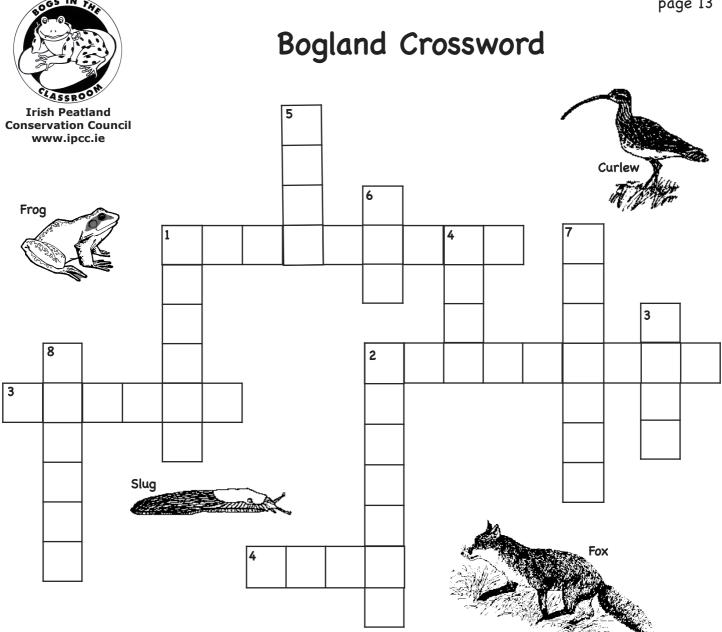












#### **Across**

- 1. This bird is called the heather hen as it eats heather
- 2. A plant with white fluffy seed heads in June and July
- 3. A plant that traps and eats insects
- 4. A mammal that eats plants on the bog, and often is mistaken for a rabbit

#### Down

- 1. This type of bog is found in the midlands of Ireland
- 2. This type of bog is found in the uplands of Ireland
- 3. Sphagnum \_\_\_\_\_ is the bog builder
- 4. This invertebrate is like a snail but does not carry its house around with it
- 5. An amphibian that lays frog spawn in bog pools in the Spring
- 6. One of the top carnivores on the bog is a mammal with a red coat and bushy tail
- 7. The red grouse feeds on this plant
- 8 This hird has a long curled heak





## Investigating Bogs and Climate Page 14

Bogs are made up of water and dead plants. The water table is so high that no natural decomposers like worms live in bogs. As a result bogs are made up of dead plants that have not broken down to release their nutrients and therefore store carbon.

Visit Discovering the Wild Boglands 3rd and 4th Class worksheets if you would like to investigate how bogs store water

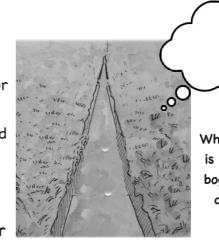


In Ireland we drain bogs to cut the peat for fuel. By draining the bogs we loose the water stored in the bog and natural decomposers begin to break down the dead plant material that was stored there for many years. While burning the peat and draining bogs the plant material in the bog is breaking down and a gas is released called  $CO_2$ . Do you know what this stands for?

CO<sub>2</sub> also known as carbon dioxide is a greenhouse gas that is affecting our weather. Another name for weather is climate and scientists now believe that our climate is changing and this will affect each and everyone of us.

Have a classroom discussion about climate change.

Use your local library and the internet to find out some of the affects climate change will have on our planet.



What is the gas that is emitted from the bogs when they are drained for peat harvesting?

Can you name three changes that are o	occurring around the	e world becaus	e ot	climate	change?
---------------------------------------	----------------------	----------------	------	---------	---------

1.	
2.	

#### Investigating Carbon Dioxide

Carbon dioxide is invisible, we cannot see it. In a chemical reaction we can make carbon dioxide.

You will need:

1 500ml plastic bottle

1 × measuring jug

1 × vinegar

1 × baking soda

1 × balloon

1 × plastic funnel

Step 1: Using the funnel fill the balloon with baking soda

Step 2: Measure 125ml of vinegar into the jug and pour this

into the 500ml bottle

**Step 3:** Without mixing the vinegar and baking soda, place the top of the balloon onto the top of the bottle

Step 4: Predict what will happen the balloon when you mix





www.ipcc.ie

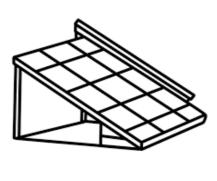
## Investigating Bogs and Climate

We know by burning peat in our power stations and by draining the bogs we are releasing lots of carbon dioxide into our environment.

This is causing our weather to change.

Is there anything we can do?

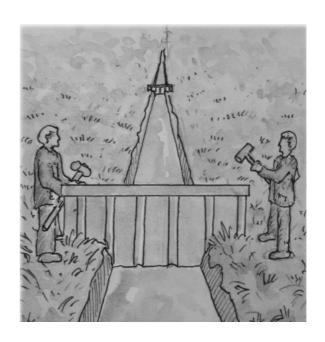




Firstly we can make electricity in a way that does not release carbon dioxide?

- 1. Can you name the two energies shown in the pictures on the left?
- 2. Can you name another way to make electricity without creating carbon dioxide?

Bogs also release carbon when they are drained. In Ireland there is lots of work going on to try and re-wet the bogs by blocking drains. By blocking the drains the water will stay on the bog and encourage the growth of the bog building moss. Can you name the bog building moss?



#### Renewable verses Non Renewable Energy

There are many ways to make electricity today. Some are renewable energies meaning we can use them again and again while some are non-renewable energies meaning we can only use them once before having to harvest more. Below are a number of ways we make electricity in Ireland. Have a classroom discussion on what energies your class think are renewable and non-renewable then circle the renewable energies sources below.

wina	Gas		Oil		Solar	
Geothe	rmal	Hydro		Coal		Peat

## Make your own Wind Turbine page 16

Wind energy is an example of a renewable energy and today there are many proposals to build wind turbines on bogs around Ireland. You can make your own wind turbine. Your wind turbine must meet the following criteria:

1. It must be free standing

2. The blades must revolve three times when held 20cm distance from a hairdryer

Use this planning sheet to help prepare your design and decide what equipment you need. Good Luck!

Draw Your Wind Turbine Design
Equipment you will need to make your turbine
Record any changes you have to make to your design during construction

# 100S IN THE

Irish Peatland Conservation Council www.ipcc.ie

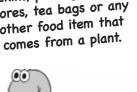
# Choosing Peat Free in the School Garden Making a Classroom Wormery

Worms are the wonders of our soil making it fertile and ready to grow flowers and vegetables. Although you won't find worms in bogs the peat in our bogs has been used for many years in our gardens as a compost. You can help protect Irish bogs by choosing peat free in your school garden and making your own classroom wormery.

Visit Discovering the Wild Boglands 3rd and 4th Class worksheets if you would like to investigate why there are no worms in bogs

A wormery uses the brandling worm also known as the tiger worm to break down your classroom unavoidable food waste into compost.

Suitable items for composting include banana skins, peelings, apple cores, tea bags or any other food item that



#### You will need

- Plastic bin with a lid
- Tray
- Drill
- Tiger worms you can get the worms in horse manure, from a local fishing shop or from Johnstown Recycling and Worm Farm in Westmeath
- Sheet of newspaper
- Some banana peels, apple cores and tea bags
- Gravel
- Plastic bag
- Leaves and shredded paper if you need to make a bedding for the worms

#### **Instructions**

**Step 1:** Use the drill or ask a parent/teacher to drill holes around the bottom of the bin

Step 2: Fill 5cm deep of gravel into the bottom of the bing

**Step 3:** Place a sheet of plastic over the top of the gravel and punch holes in it – this will help stop your worms escaping!

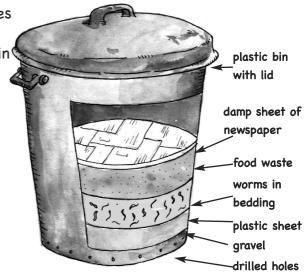
**Step 4:** Add your worms into the bin along with bedding. You can make a bedding using damp leaves and shredded paper or they may be already in a bedding if you have bought them

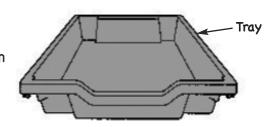
Step 5: Add plant food waste into the bin

**Step 6:** Cover the worms and the food waste with a damp sheet of newspaper. This will help prevent flies

**Step 7:** As food waste is wet you may find a liquid draining from the bin – sit the bin into a tray to avoid any spills. This liquid is called worm tea and is a great fertiliser when diluted 50:50

**Step 8:** Place your wormery outside or in your classroom and feed the worms with a tasty meal at least once a week



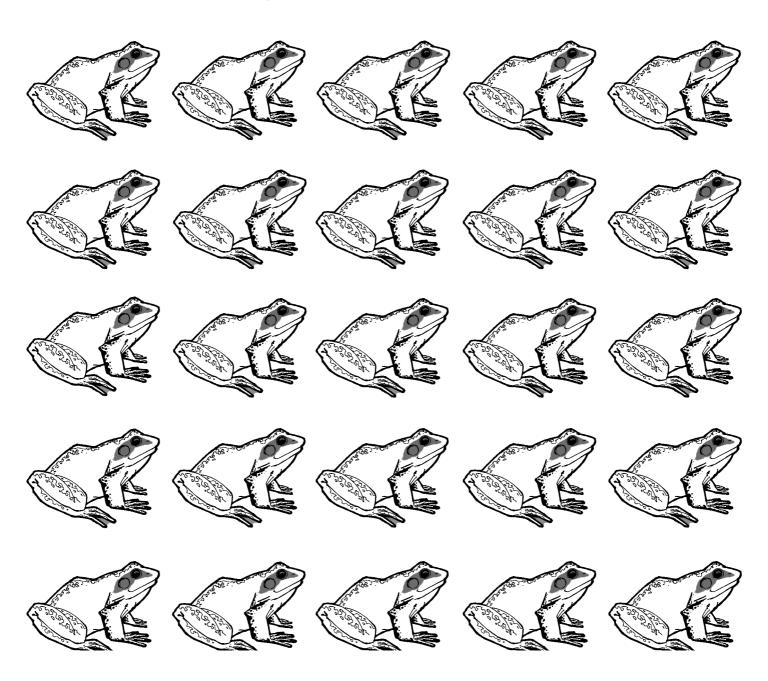




## Bogland Percentages

Frogs are amphibians. Do you know what this means? Ireland has three native amphibians, the Common Frog, Smooth Newt and Natterjack Toad.

How many frogs are on this page?	
Colour 40% of the frogs green	
Colour 20% of the frogs brown	
Colour 16% of the frogs purple	
3 1 1	
Colour 12% of the frogs red	



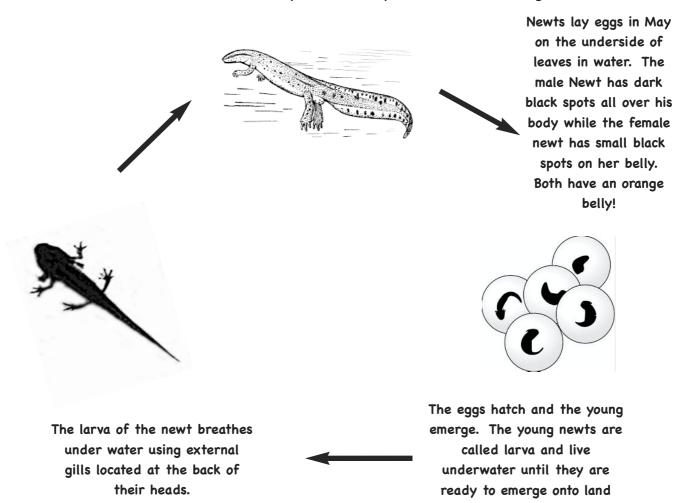
page 19



## Lifecycle of the Smooth Newt

Newts are amphibians like Frogs. This means they need water to complete their lifecycle. The Smooth Newt like the Common Frog is found in every county of Ireland. Ireland's third amphibian is the Natterjack Toad but these can only be found living in Co. Kerry and Co. Wexford.

Visit Discovering the Wild Boglands 3rd and 4th Class worksheets if you would like to explore the lifecycle of the common frog



#### Take Part in The Hop To It Frog Survey - bringing ICT into the Classroom

The Irish Peatland Conservation Council carry out the National Frog Hop To It Survey each year. If you have seen frogs in your local area, record the name of the area, take a description of the site, the date and what stage of the frog lifecycle you saw. Then follow the instructions to submit your frog record online -

Step 1: visit www.ipcc.ie. on your school internet

Step 2: Click the 'Help IPCC' tab in the header banner

Step 3: Click into the link for National Hop To It Frog Survey Card

Step 4: Complete your frog details and press submit

## Raised Bog Summary Worksheet

There are two types of bog in Ireland r \_ \_ \_ \_ bog and b \_ \_ \_ \_ bog.

Raised bog started to form 10,000 years ago at the end of the last Ice Age. Using the diagrams below name the stages of raised bog formation:

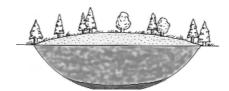
Stage 1: \_ \_ \_ \_



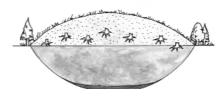
Stage 2: \_ \_ \_



Stage 3: \_ \_ \_ \_ \_ \_



Stage 4: \_ \_ \_ \_ \_ \_ \_



Sphagnum moss is the bog builder it grows \_ \_ \_ \_ and holds \_ \_ times its own weight in water.

There are hundreds of bogland plants can you identify these bogland plants using

your plant dials:







If you were to visit a bogland the animals that live there would hide. Record three signs that you might look for to help you identify what animals live in the bog:

1.



Irish Peatland Conservation Council www.ipcc.ie

In you identify these bogland animals? page 2:
w many times can we use renewable energy?
at is an example of a Renewable Energy Non-renewable Energy
hat is the gas that is emitted when we burn peat in Ireland's power stations?
hat is another name for a weather change?
n you name three examples of how a weather change may affect us?



How can you help to protect the boglands of Ireland?

For further information on the bogs of Ireland contact the Irish Peatland Conservation Council, visit IPCC's website at www.ipcc.ie or why not visit the Bog of Allen Nature Centre in Lullymore, Co. Kildare R51 V293.

Tel: 045-860133 or e-mail: bogs@ipcc.ie

## Blanket Bog Summary Worksheet

There ar	re two	types	of bog	in	Ireland r	bog and b	bog.
		<i>,</i> ,	J				

Blanket bog started to form 4,000 years ago. Using the diagrams below name the stages of blanket bog formation:

Can you name the stages of blanket bog formation?









f\_\_\_\_\_

i \_ \_ \_ \_ pan

m \_ \_ \_

b\_\_\_\_\_ b

Sphagnum moss is the bog builder it grows \_ \_ \_ \_ and holds \_ \_ times its own weight in water.

There are hundreds of bogland plants can you identify these bogland plants using your plant dials:











If you were to visit a bogland the animals that live there would hide. Name three signs that you might look for to help you identify what animals live in the bog:

1. \_\_\_\_\_



Irish Peatland
Conservation Council
www.incc.ie

Can you identify these bogland animals?	page 2:						
	A TONE						
	?						
Peat is an example of a Renewable En	ergy Non-renewable Energy						
What is the gas that is emitted when we burn peat in Ireland's power stations?							
What is another name for a weather change?							
Can you name three examples of how a weath	er change may affect us?						
l							
2							



How can you help to protect the boglands of Ireland?

For further information on the bogs of Ireland contact the Irish Peatland Conservation Council, visit IPCC's website at www.ipcc.ie or why not visit the Bog of Allen Nature Centre in Lullymore, Co. Kildare R51 V293.