

Biology fun at Christmas

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Ho! Ho! Ho! How to keep the spirits high, as the end of the autumn term is nigh. Festive fun and a pub-style quiz with a biological flavour! Choose your team name and read on.



For some time now I have run a session, near to the end of the autumn term, which involves a problem-solving approach with a Christmas festive spirit (Lock, 1992). In September 2006 the structure of our PGCE course changed and students were no longer back in a college-based phase prior to the end of the autumn term. The new structure left a single afternoon in which to carry out the routine administration and other similarly boring chores as well as space for a fun, but educationally and biologically relevant, activity with which to end the term.

My central philosophy in education has long been '*learn while you're laughing*'. This is sometimes alternatively expressed, as will be familiar to those who know well my thinly veiled contempt for anything that smacks of telling you *what* to do, as '*it's not what you do it's the way that you do it that counts*'. In this vein, I end the term with a 'pub quiz' style of activity in which groups, of about four, compete for a suitably festive prize. You will have to use your imagination a bit for the latter, as do I, for often the group consists of students from a wide range of beliefs and cultures. At this point I hasten to add that we have suitable celebrations, with similar appropriate activities, linked to extending our knowledge about, say Eid, Divali or Guru Nanak's birthday, the festive days of other religions. The 'pub quiz' style is a deliberate choice as it celebrates my 'culture', having been born, and spent most of my formative years, in a Norfolk village pub (crib or threeha'penny nap anyone?).

ABSTRACT

Give your class an end-of-term challenge with a biological, nay mainly botanical, bent. Try this seasonal and possibly novel teaching and learning activity as a way of keeping the interest from flagging while at the same time developing observational and drawing skills, dissection talents and Web search strategies with a soupçon of general knowledge and cross-curricular links stirred into the pudding mix.

About the quiz

So to the quiz that forms the main part of this article – see Box 1 (pages 26–28). In the format presented here the quiz consists of eleven rounds, each focused on an item of potential interest to biologists and with strong links to the festivities associated with Christmas. Table 1 shows the subject of each round, whether a specimen is essential or optional, whether Internet access is needed and any associated risks. The sequence of the rounds is thoughtfully chosen, leaving those where activities are most likely to get out of hand until the end, when the teacher can make a timely and, if necessary, hasty exit!

There are a wide variety of different activities within and between each round. However, the reader might like to reduce the number of rounds that feature nuts, even though they are all different in origin and structure. There is a deliberate focus on botanical aspects of Christmas as it is vital that trainee teachers are inducted into the joys of plants and come to associate them with fun activities that they could replicate with their pupils in schools. There are rounds that have a more zoological flavour, for example on reindeer and robins (see Reiss, 1995, for ideas) as well as those on Santa, elves and fairies, but the session is only two hours long and this journal has limited space so they are not included here. The reader is invited to develop others, for example on frankincense and myrrh, to suit their own purposes.

Inspection of the questions will show that the quiz involves close observation of botanical specimens combined with scientific drawings of whole and dissected/cracked open specimens. These, of course, in the rather traditional (or should that be old fashioned?) style, ask for suitably annotated labels, which in places require an understanding of embryology and/or structure and function. That is not all, as there is a need for what used to be called 'general knowledge' but which nowadays means a high level of Internet search skills. Add to this an insight into the religious significance of some plants,

Table 1 The quiz rounds and related information.

<i>Subject of the round</i>	<i>Specimen essential (E) or optional (O)</i>	<i>Internet access needed</i>	<i>Risk analysis</i>
Holly	O	yes	poisonous berries, spiked leaves
Hazelnut	O	yes	nut allergy
Ivy	E	no	poisonous berries
Monkey nut/ground nut	O	no	peanut allergy
Fig	E	no	none
Christmas tree	O	yes	spiked leaves
Date	O	yes	none
Walnut	E	no	nut allergy
Chestnut	E	no	nut allergy
Mistletoe	O	yes	poisonous berries
Songs and carols	E	no	not applicable

how some elements of a pagan festival became Christianised, and aspects of folklore, history and geography, and you have a truly cross-curricular activity. The choice of fruits and nuts from a range of different geographical origins is also deliberate and extends the cultural element. Spend a day on it! (see QCA, 2007).

Rounds where Internet access is essential are shown in the table, as is a clear indication of whether providing a specimen is essential or not. With respect to some of the species there are associated risks. These can be considerably reduced by only providing specimens where they are essential, although this does reduce the educational value and the fun. Prohibiting nut tasting significantly reduces the risk of nut allergies and providing holly, ivy and mistletoe specimens without berries, is possible too. Holly, mistletoe and ivy berries are poisonous (holly especially so) so it is important that a full risk analysis is drawn up, possibly extending that linked to the mistletoe with any extracurricular activities that might be associated with it in the prep or staff rooms when the lesson is over!

In my opinion it is important to have specimens in the lab and not just for the observation and sectional drawing activities; and, yes, I do like to encourage the tasting of what for some are unusual treats, allergy risks permitting. This should not, of course,

be condoned in the lab and, in any case, chestnuts always taste better when roasted and standing in the '*deep and crisp and even*' snowdrift.

It is not essential that these activities take place in school time: they could perhaps form a homework task for the gifted and talented or a PTA fundraiser activity; sell the quiz sheets at a pound a go with a bottle of *Teachers* for the winners!

The discerning reader will note that the previous paragraph contained the first alcohol link with this activity, but if you had rounds associated with Christmas pudding, and its ingredients, or mulled wine, associated herbs and other festive drinks and cocktails, then you can see it could be quite an extended event, even if the quality of the responses does tail off a bit towards the end!

The quiz is provided complete with answers and a suggested mark plan. Readers who would like an electronic copy of the quiz, without the answers, supplied as a *Word* document, should email the author.

This quizmaster cannot resist a few (corny?) jokes such as '*Teachers love little squirts*'. I illustrate this one with a, now rather tatty, whisky advert from my early years of teaching, as modern youth need a visual clue to help them to understand the link between 'squirts' and soda siphons. Yes, you do have to spell it out for some! Sadly my '*Pick*



Winning team
resplendent in prizes.

up a Teacher' advert, from the same era, was badly mauled and vandalised by feminists when I worked in the Oxford University Department of Educational Studies.

Between the rounds the quizmaster has to hold it all together while the scores are totted up and the latest position of teams on the leader board are shared. Look out a few festive stories with a (tenuous) biology link. What happened when Santa's cat swallowed a ball of yarn? She had mittens. Why did Santa think Microsoft had a monopoly? He had to switch from chimneys to windows.

With the student teachers I always end on a serious note associated with alcohol, the current drink-driving campaign, the impact of alcohol

on behaviour, binge drinking and sexual activity as well as the advisory limits on units of alcohol recommended for men and women. I draw the stark contrast too between the excessive spending associated with many of our festivals and the money that some people in this and other countries have to exist on. We close with a festive song involving active listening (see the last question about the Slade classic – the answer is 'none' so the outcome is not changed) and a joke:

Why does Santa have two gardens and an allotment?

So he can hoe hoe hoe!

Merry Christmas.

References

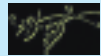
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BOX 1 The quiz**BIOLOGY AT CHRISTMAS****HOLLY** (NB: the berry is very poisonous)

Latin name?	<i>Ilex aquifolium</i> (2)
Old English name?	Holm (1)
Colour of flower?	White (1)
How many petals on each flower?	4 (1)
Why do some holly trees have no berries?	They are male (1)
How many seeds/stones in a holly berry (fruit)?	2 (1)
What parts of it may have medicinal uses?	Young leaves as an infusion for flu, rheumatism and arthritis (1)
Religious significance?	To Pagans (1) and festivals of the winter solstice (1); continuity and renewal of life in winter (1); adopted by Christians (1); berries symbolise blood of Jesus (1) and leaf prickles the crown of thorns (1)

HAZELNUT

What shape are their leaves?	Roundish/heart shaped (1)
What type of pollination does it have?	Wind (1)
Why is the tree easy to identify early in spring?	Male catkins (1); lamb's tails (1)
What part of the flowers form the shell?	The ovary wall (1)
What is/was the wood of the tree used for?	Walking sticks (1); barrel hoops (1)
Write down a nursery rhyme about a nut tree	<i>I had a little nut tree ...</i> (1); <i>more if sung ...</i> (2+)
Uses of the nut?	Eating (1); cooking oil (1)

IVY (NB: Ivy berries are poisonous)

Latin name?	<i>Hedera helix</i> (1)
Mono or dicotyledon? What's the evidence?	Dicotyledon (1); woody, broad leaf (1) with vein network (1)
What do you notice about the leaves on the flowering shoots compared with others?	They are diamond shaped (1) (well roughly); the others are palmate with 3–5 lobes (2)

MONKEY NUT

What other names are monkey nuts called?



Peanuts, ground nuts (2)

If you planted a roasted peanut what would happen and why?

It would not germinate as roasting denatures the protein (1)

Find out how the nuts develop and why they are called 'ground' nuts.

Plants are self-pollinating (1); after fertilisation (1) a stem grows from the flower to the soil (1); at the end of this stem the seed pods grow (1)

FIG

Use your dried fig to construct a diagram of what a fresh fig would look like in vertical section. Label it as fully as you can.



Figs are complex and develop from a many-flowered inflorescence (1)

Each seed is from one flower (1)

Receptacle (1)

Flower stalk (1)

Ostiole – pore in fruit body (if fresh) (1)

CHRISTMAS TREE

Which species are used?



A wide range of firs (1), pines (1), spruces (1) and cypresses (1) are used, e.g. Norwegian spruce, Norway fir, Scots pine, Douglas fir, Sitka spruce

Who introduced Christmas trees to the UK and where from?

Prince Albert (husband of Queen Victoria) from his native Germany (1)

What characteristics do Christmas trees have in common?

All conifers (1); have cones (1), needle-shaped leaves (1), tracheids (1)

DATE

What sort of environmental conditions is the date palm adapted to?



Dry and semi arid (1)

What else is the date palm used for?

Building material (1) (e.g. roof); syrups, ice cream, baby food (1)

Where are dates grown in the world?

Middle East: Iraq, Oman, Saudi Arabia.
Africa: Morocco, Tunisia
Various others (3 total)

Religious links?

Traditionally part of breaking the fast after sunset during Ramadan (2)

WALNUT

Draw a vertical section of a nut and label as many parts as you can, showing which part of the flower they came from.



Ovary wall – husk of fruit (2)

Cotyledons (dicotyledon i.e. 2) (1)

Hilum/scar (1) or position of

Micropyle (1) or position of

Nut shell – integuments (1)

CHESTNUT

Draw a diagram of the external features of the nut. Show which part of the flower it came from.

Observation score (4+)
Remains of stigma/style (1)
Hilum (scar) (1)
Testa/seed coat (1)
Husk (if present) – ovary wall (1)

How do we use chestnuts at Christmas?

Eating (1) (chestnuts roasting by an open fire); stuffing turkey (1)

MISTLETOE (NB: Berries are poisonous)

Where is the world's largest mistletoe market?

Tenbury Wells, Shropshire (1)

Its Latin name is *Viscum album*. What does the 'album' bit mean?

White (1) (as are its berries)

Medicinal uses?

Possibly lowers blood pressure (1) and may have a role in cancer remedies (1)

Mistletoe is a parasite. What does this mean?

Definition to suit (2)

What Celtic/Druidic customs are linked with mistletoe?

Kissing under the mistletoe (1); remove a berry for each kiss (1); they believed that it could make barren animals fertile (1). Censored responses here!

SONGS AND CAROLS

Write down the titles of songs with Holly, Ivy or Mistletoe in the title.

Lots of possibilities (1 mark each)

How many plants are mentioned in Slade's classic '*Merry Christmas everybody*'.

Listen to the song and work it out (0)

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