

Change and evolution

Purpose of activity

In this activity, students adopt a number of roles to consider the complex interactions of emerging viruses in flying-foxes, the needs of flying-foxes and their importance to forest regeneration and human activities and demands. Students take on the roles of members of a government committee investigating these issues, expert witnesses and a public audience. At the conclusion of the 'hearings', committee members, under the auspices of the Chair (the teacher), produce their recommendations. The activity concludes when the public audience (students who are neither committee members nor expert witnesses) votes on the recommendations.

The activity highlights how competition, in this case from humans, can affect species and forest biodiversity and cause change (evolution). When competition occurs, species can become endangered (e.g. flying-foxes), ecosystems can be destroyed (e.g. eucalypt and rain forests) while some species can be favoured, albeit indirectly (e.g. viruses in bats).

The activity illustrates that variations (differences) exist within a population (e.g. Hendra virus) and that they continue to arise in a population, demonstrating that evolution is an ongoing process. The variations referred to in this activity indicate new strains, but are not yet significant enough for the emergence of new species. The activity also provides an opportunity to compare our reactions to 'new' risks, such as these emerging viruses, with more 'familiar' risks, such as road fatalities.

Student activity

- 1 Students simulate a government inquiry by setting up a committee to investigate:
 - a the threats posed by emerging viruses in fruit bats
 - b the needs of fruit bats and their importance to forest regeneration, and
 - c human activity and its demands and impact on fruit bats.

NOTES

- Inform students that in recent years some viruses that can be traced back to fruit bats have been fatal to humans and/or their animals. Tell them that some of these fatalities have occurred in Australia, while others have occurred in Asia. Ask students for some examples and what they know about each example. (The Hendra virus is one example with which students might be familiar.)
- Inform students that the class is going to hold a 'mock' government inquiry into points a, b, and c above. Explain that some class members will be the committee members, some will be expert witnesses and others will be the public audience. Tell them the committee will be required to come up with recommendations and the public audience will vote on those recommendations.

- 2 In preparation for their role in the inquiry, students research one of four topics — the Hendra virus, fruit bats, emerging viruses in bats and safe animal handling. Initially, all students become informed about aspects of the inquiry by undertaking research as either a potential 'expert witness' or potential 'committee member'.

NOTES

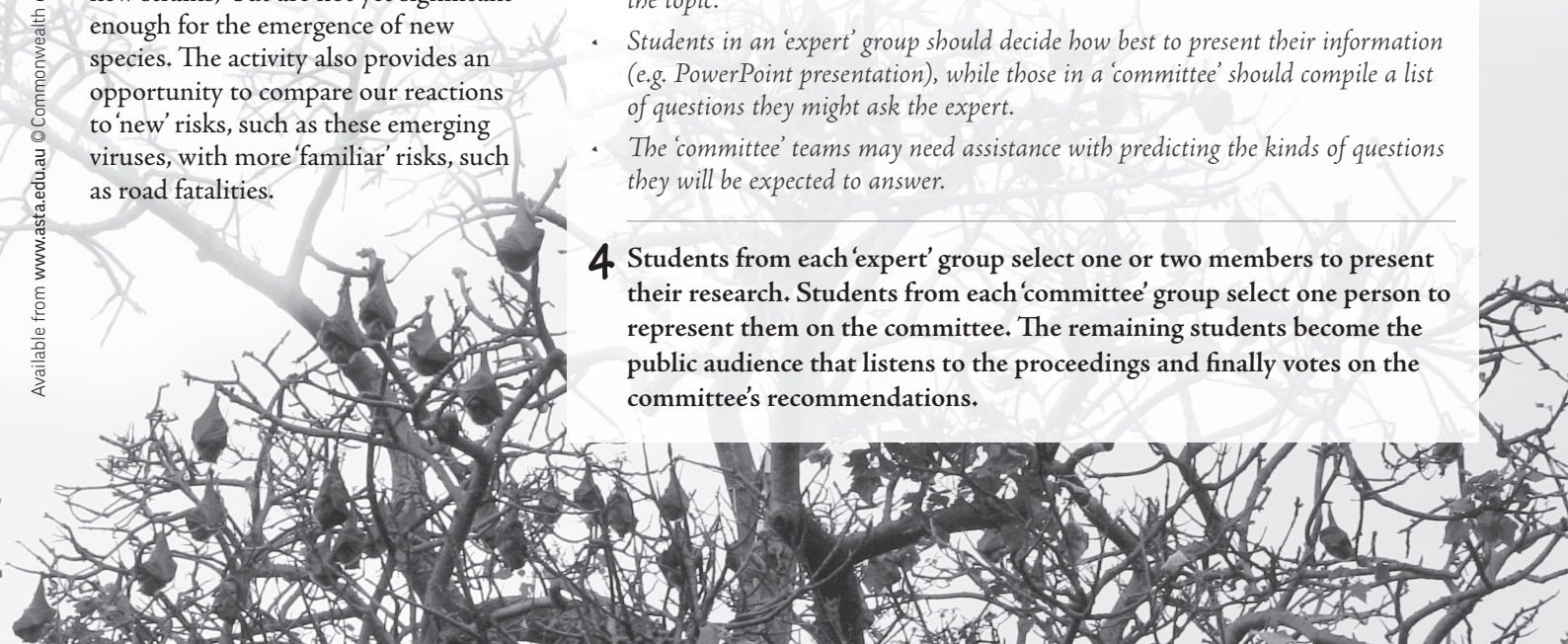
- There will be eight research groups in all. Allow students to negotiate their topic and whether they want to be a 'witness' or a 'committee member'. For the inquiry, up to eight students will be involved as expert witnesses and four as committee members.

- 3 Students use the supplied articles from the ASTA website to research their topic and prepare for the inquiry.

NOTES

- Each article contains sufficient information for a brief factual presentation about the topic.
- Students in an 'expert' group should decide how best to present their information (e.g. PowerPoint presentation), while those in a 'committee' should compile a list of questions they might ask the expert.
- The 'committee' teams may need assistance with predicting the kinds of questions they will be expected to answer.

- 4 Students from each 'expert' group select one or two members to present their research. Students from each 'committee' group select one person to represent them on the committee. The remaining students become the public audience that listens to the proceedings and finally votes on the committee's recommendations.



Student activity continued

NB:

- ✦ This activity requires several lessons.
- ✦ Students will be reading a journal style article from which they will be required to extract and reorganise the information they require. As each article has a high literacy demand, this is not a plain language task. Students could have difficulty in understanding the writing style and the magazine genre and may require assistance to decode the articles. Consider asking students to organise the information they need in point form.
- ✦ There will be a number of terms in each article with which students are unfamiliar. They can use the Internet or a biology dictionary to find the meanings of these terms and create their own glossary.
- ✦ The references provided for each article are starter points, should students wish to undertake further research on that particular topic.
- ✦ Some information provided may need to be updated to include 'events' reported after this book has been published.

Materials required (FOR EACH GROUP OF STUDENTS)

Copies of the journal articles relevant to their group:

- ✦ *The Hendra Virus — an evolving story*
- ✦ *Stressed-out Bats*
- ✦ *The War of the Viruses*
- ✦ *Safe Practices — avoiding the Hendra virus*
- ✦ *Lyssavirus*

These articles can be downloaded from the *Change and evolution* appendix at www.asta.edu.au

5 The inquiry begins and students play their particular roles.

NOTES

- ✦ Prior to the opening of the inquiry, tell students not directly involved they will be expected to listen to all the proceedings and take any notes they consider necessary as it will be their role as citizens to vote on the recommendations the committee makes.
- ✦ The teacher's role, as committee Chair, will be to keep the inquiry flowing, to ensure the relevant questions are asked of the 'experts' and to assist the committee members to sum up proceedings and make recommendations based on the evidence presented. Ensure the committee members can justify their recommendations.
- ✦ The committee members will need some time to put their recommendations into writing so the vote can be taken.

6 The committee presents its recommendations to the class and fields questions from the audience about them. Students then vote whether to accept or reject the recommendations.

NOTES

- ✦ As Chair, the teacher can release the recommendations, or delegate a committee member to do this. The teacher should then chair the question and answer session. Students vote at the end of this session.

7 The results of the vote are released to the students and a short discussion is held on what they have learnt from this activity.

NOTES

- ✦ This is an opportunity for the teacher to highlight the complex and often adverse chain of events that can result from human actions. The teacher should also highlight that the changes students have looked at, particularly in viruses, are examples of variations that occur in populations as a result of changes in their environments. Tell students they have actually studied examples of evolution occurring now and remind them evolution will continue to occur for as long as there is life.
- ✦ The teacher might also wish to point out how we can sometimes be more alarmed about 'rare' causes of fatalities than about more common ones such as motor vehicle accidents to which we are more accustomed.

