

Ri Off the Shelf Masterclass: Modelling Forest Fires

Worksheet 3 – Your Adaptations

How could we make our models more realistic? What else could be included?

1. Note down as many different things you can think of which might affect how the forest fire spreads in real life.
2. Choose one of these ideas (or one of the sample ideas below) to include in your models.
3. How will you adapt the model you have been using to include this idea? Think about:
 - What effect will your idea have on the spread of the fire?
 - What starting weather conditions will you use and what effect will your idea have on these?
 - What probabilities will you be using? What type(s) of dice (and what numbers will you be looking for)?
 - Try writing or drawing an algorithm (set of instructions) which someone else could follow in order to use your model.
4. Incorporate your changes and see what happens to the spread of the fire – it is always a good idea to try things several times as the spread of your fire will be affected by chance. Use the grids on the next page or draw your own.
 - How does your improved model compare to the original?
 - Do you need to make any adjustments to better fit what you would expect to happen in the real world?
5. Once you have tried to incorporate one extra condition, think about what else you could add in to improve how realistic your model is. If you have time, you could try several ideas. **IMPORTANT:** Add these extra things in one at a time and test them before adding in another idea.

Extra ideas:

Here are some ideas for additional factors to include – you will need to work out how to put these into your model. You can also use one of your own ideas. Be creative, but make sure you are starting from a real-world situation.

- Trees could burn out after three time-steps; they can no longer set other trees on fire and cannot re-ignite. How would you monitor this?
- There are different probabilities of catching fire for adjacent (directly left/right/up/down) neighbouring trees, and diagonal neighbouring trees.
- There could be a prevailing wind which makes it more likely for a tree to catch fire from trees in a particular direction (this would be relative to the burning tree, not just a higher probability in one area of the forest).
- There might be barriers such as rivers or lakes.
- There could be a few different types of tree with different likelihoods of catching fire, randomly distributed throughout the forest.
- The initial burning tree could be in a different place, or there could be more than one initial burning tree at time-step 0.
- The 16 trees just outside your neighbouring trees also have a small influence on whether a tree catches fire, for example through travelling sparks.

Improved model:

Try out your improved models using these grids, or draw your own.

