



AUSTRALIAN STEM

# VIDEO GAME 2019 THEME INFORMATION CHALLENGE

## EMERGENCE!

“Order arises from chaos.”

“The whole is greater than the sum of the parts.”

You may have heard one or both of these sayings. They are features of the principle of **emergence**. The world is full of examples of emergence – of new and unpredictable and complex things coming from simpler starting points.

## Emergence in games

Many games – board, card and video – include emergence: small numbers of rules combining to yield large numbers of game variations; game mechanics changing according to the player’s actions; goals being set by the player and not the game designer.

Emergence can be incorporated into a game through:

- emergent worlds – the possibility space of the game
- emergent story – the player discovers or creates the story of the game
- emergent characters and agents – and how they respond and react to the game world
- emergent society – where multiple players interact in different ways

As with previous themes, how you and your team incorporate emergence into your game is completely up to you! We’re looking for creative, engaging and fun responses to the theme – they can be very literal and direct, or highly conceptual. Let your imagination run wild!

---

### Emergence can be Coherent

Emergent things may be coherent, or organised and stable. A living organism, like you or me or an ant or a tree, is an example of coherent emergence.

### Emergence can be Experiential

All around us, different forms of electromagnetic (EM) radiation fill the air with their frequencies and waves. X-rays and ultra-violet rays are just two. We humans can only see some of these EM wavelengths – the visible part we call ‘light’. From this ability a whole bunch of experiences emerge, such as what it is like to see colours.

### Emergence can be Scaled

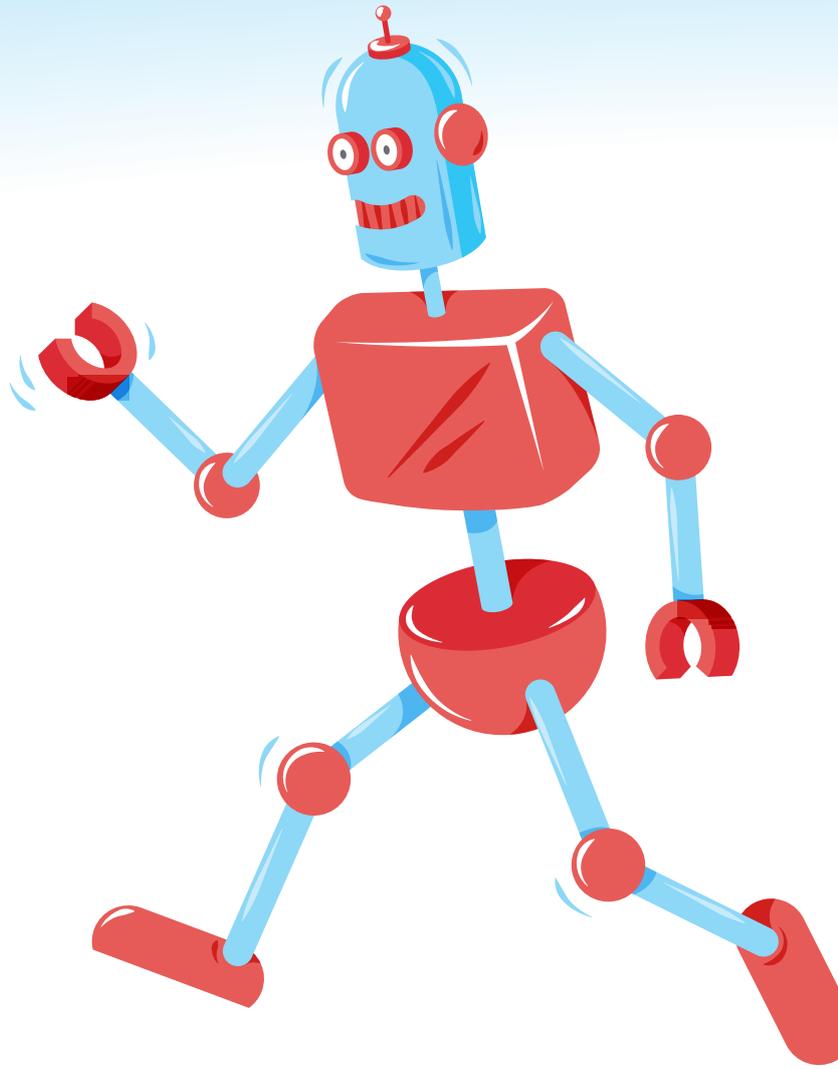
Emergence can be related to the size of things. Small things can combine to form large things, or large things can break up into smaller things, causing new properties and features to emerge. Nanoparticles can have special properties that emerge because of their tiny size.

### Emergence can be Recursive

Something is recursive if it repeats or loops, like feedback. Ant trails are a good example of how emergence can be recursive. An ant leaves behind it a pheromone – a sort of chemical deodorant spray – that allows it to retrace its steps, and allows other ants to follow it. They leave their own pheromones too, which builds up and encourages more and more ants to follow the trail.

### Emergence can be Unpredictable

When something is unpredictable you don’t know what you’re going to get, or what’s going to happen beforehand. This is a common feature of emergence – we can’t predict exactly what we’ll get before we get it. Many of the emergent things from our culture and society are unpredictable in this way, like the behaviour of memes and viral videos, and stock markets.



#### Biological science examples of emergence:

- Bird flocks, fish schools, and ant trails;
- Consciousness and mind;
- Living things.

#### Engineering examples of emergence:

- Artificial intelligence;
- Cities;
- Clocks, watches and other machines;
- Traffic jams.

#### Social and cultural examples of emergence:

- Families;
- Games;
- Language;
- Memes;
- Nation states;
- Patterns developed from optical illusions;
- Stock markets;
- Viral videos.

#### Physical science examples of emergence:

- Chemical compounds like water;
- Climate, weather and storms.



***Remember: These ideas and questions are just the beginning of your game development journey.***

***The Australian STEM Video Game Challenge is all about creativity and imagination – we can't wait to see the EMERGENCE of your ideas this year, and we look forward to playing awesome games made by you!***

***For helpful tips, tutorials and resources on game design and development, be sure to visit the 'Student Resources' section of our website!***

**WWW.STEMGAMES.ORG.AU**

