

# THEME INFORMATION 2021



The worlds of reality and of our imagination are full of big things and little things; of big things that become little, and little things that become big.

## SCALE

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# SCALE

The theme of this year's STEM video game challenge is **SCALE**. As with previous themes, how you and your team incorporate scale 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!

**“ Every electron in our universe is an entire miniature cosmos containing galaxies and stars and life, and electrons. Every one of those electrons contains a still smaller universe, an infinite regression up and down. ”**

**Carl Sagan**

## SCALE in games

Scale and its use is a common feature in many games, whether it's in your face or somewhere in the background.

Strategy and role playing games use scale with the maps to help navigate their worlds. Other games allow players to zoom in and out – another feature of scale – to access more or less detail as needed.

In some poorly designed games the sizes of objects aren't scaled properly. For example, the tank in a war game is the same size as the soldier who should be much smaller. In other games this mismatch in sizes is used in creative ways. For example, the ant that is the larger than the t-rex and can hold its own in a 'face off'.

Scale is about the size and relationships between things:

- We measure their size using scales.
- We change their size by applying scales.
- We navigate around them with maps oriented by scales.

**“ Some dream in colour. We dream in scale. ”**

**Beth Comstock**

## Some starting points to think about scale and your game

### Zooming in

Changing the view of your game window from the big to the little allows access to different realms such as the atomic, nano or quantum. Films and stories like 'Ant Man', 'Fantastic Voyage', or 'Honey, I shrunk the kids' have featured this sort of change and could be an interesting starting point for a game idea.

What might happen to a game character who relocates to a micro world? What might such a realm look like? How could you move around in such a place? What obstacles would hinder the player? And, how could you get out?

### Zooming out

We could change the view the other way too, zooming from little to big, and thus exploring the solar system, the Milky Way galaxy, other galaxies, the universe, or even the multiverse.

How could we move around in larger scale regions? Could we use wormholes or black holes to move around our galaxy or universe, or even to other universes? What might we discover in our explorations? Other life? Intelligent aliens? Nothing?

## Mismatched scales

Just what would happen in a 'face off' between an ant and a t-rex? Would it make a difference if it was an ant, blown up to match the size of the t-rex, or the t-rex shrunk to match the size of the ant?

What other mismatches could be interesting to explore and maybe constitute an engaging game?

## Measurement scales

We use instruments to measure lots of things – rulers for length, thermometers for temperature, compasses for direction, Geiger counters for radiation, spectrometers for light, and on and on. These instruments are calibrated to certain scales. And many of these measuring scales have wide varieties of different units too – like centimetres, inches, and light years for distance, or Celsius, Fahrenheit, and Kelvin for temperature.

In sports games, we might need to be able to measure lengths and distances. What other ways could measurement or measurement scales be incorporated into a game?

## Scale in living things

Some interesting scales appear when we look at how living things work.

The metabolic rate of animals is inversely proportional to body mass. This means that bigger animals have slower metabolisms. That is, they breathe more slowly, their hearts beat more slowly, and their blood circulates more slowly, than smaller animals.

Interestingly, smaller animals, with faster heartbeats, live much shorter lives than larger animals, with slower heartbeats. This means that animals – no matter what size they are – tend to have similar numbers of total heartbeats in their lives. What other scales occur in living things? Do the same sorts of scale relationships appear in plants, like trees and forests?

Some games like Tyto Ecology, Niche, Spore, and many others have players create their own living things and ecosystems. Could you develop your own games that incorporates scale in living things?

## Scale in non-living things

It turns out, some of the same sort of scale connections found in living things can occur in non-living things like cities. Crime, the spread of disease, pedestrian walking speeds, and the number of inventors amongst other things, scale with the size and population of a city.

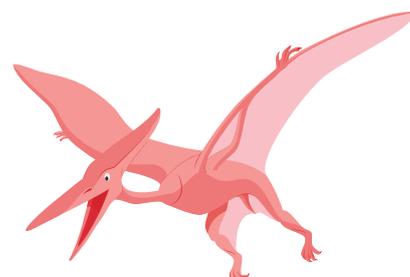
Some games like City Building, SimCity, Cities Skylines, Banished, Surviving Mars, and many others have players create their own cities and gradually scale these up and up. Could you develop your own city and scale simulation game? Maybe a game that scales up classrooms and schools, or local environments?

## Squiggly bits, fractals and scale invariance

What does a coastline look like from space? Irregular with lots of squiggly bits. What does a coastline look like from up close? Irregular with lots of squiggly bits. It doesn't matter what scale you choose to look at it from – this is called scale invariance. Craters on the Moon and planets like Mercury follow a similar pattern. When you look up close you see craters of various sizes, some overlapping and some inside others. When you zoom out for a wider view you see craters of various sizes, some overlapping and some inside others.

Things look the same (or similar anyway) when viewed from many different perspectives.

Another example of scale invariance is fractal patterns that emerge in mathematics or in natural systems. This could be a nice beginning point for a game, perhaps a puzzle game, or might form an interesting background feature to a game. Some games like Fractal, and even number puzzle games like 2048 and 2048 Fibonacci, use aspects of scale invariance in their game play.



**“ A feather will weigh down a scale when there is nothing in the opposite one. ”**

**Thomas Malthus**

