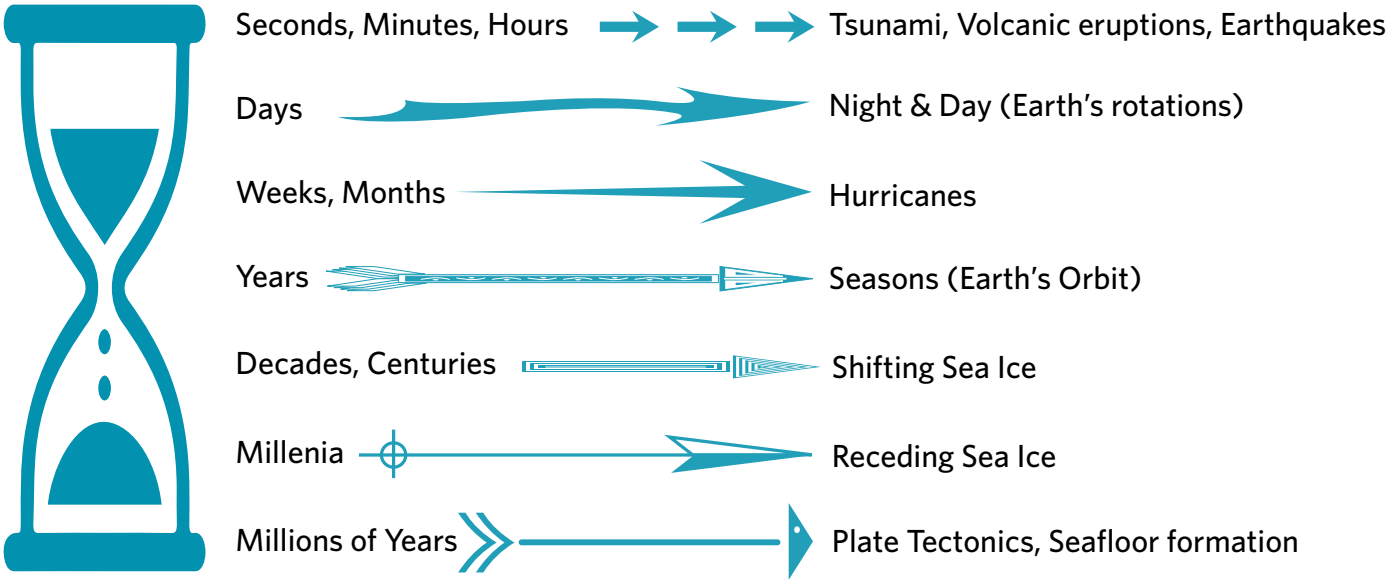
GEOLOGIC TIME

Nothing on Earth is the same from one moment to the next. Even things that seem static during human lifespans are undergoing constant change. Some of these processes—such as earthquakes and tsunami—happen over the course of seconds. Others, like the movement of Earth's tectonic plates, only become apparent over hundreds of millions of years! The OmniGlobe exhibit at the PME can help us visualize some of these changes by showing them on an accelerated timeline.

Below are some examples of planetary events organized by the timescales over which they occur. Which of these will you live to observe? How will you know?



Geologic time, also known as deep time, is a chronological dating system based on the ages of different geologic strata—or the rock layers that make up Earth's crust. It's used by scientists to describe the relationships of events in Earth's history, and covers timescales of millions to billions of years

We can make geologic time easier to grasp by visualizing it relative to scales that we are familiar with. Let's imagine geologic time (Earth's 4.5-billion-year history) as one calendar year, represented by the 12-month calendar. On this calendar, the first 4 billion years would last from January 1st to November 30th, with the majority of our knowledge about Earth's history contained in the last 0.5 billion years (or all of December!)

ACTIVITY: CALENDAR

Find yourself a blank calendar. Starting with January, label each month with the range of geologic time that it represents (hint: divide 4.5 million by 12 to get the length of one month. For even greater accuracy, divide by 365 to get the length of one day). Now, using different coloured markers, plot the following time segments (eons/eras) by colouring in the sections of the calendar where they occur using the colours listed below.

Hadean (Dark Pink)	4,500 Million years ago (mya)	Jan 1 - 12
Archean (Hot Pink)	4000-2500 mya	Jan 12 - Jun 13
Proterozoic (Light Red)	2500-540 mya	Jun 13 - Nov 18
Paleozoic (Green)	540-252 mya	Nov 18 - Dec 11
Mesozoic (Blue)	252-66 mya	Dec 11 - Dec 26
Cenezoic (Yellow)	66-0 mya	Dec 26 - Today

Now, plot the following events in Earth's history on the calendar using the coloured dots as a guide!

Earth's formation	4.54 Billion years ago (bya)	January 1st
Moon forms	4.51 bya	January 2nd
Oldest rocks appear at Earth's surface	4.36 bya	January 14th
Oceans form	3.8 bya	February 28th
First single-celled organisms	3.5 bya	March 24th
Snowball Earth	640 - 710 mya	November 10th
First multicellular organisms	570 mya	November 16th
Cambrian Explosion	541 mya	November 18th
First land plants	500 mya	November 21st

ACTIVITY: CALENDAR

Pangea breaks up	175-200 mya	December 18th
Dinosaurs appear	247-240 mya	December 12th
Dinosaurs go extinct	65 mya	December 21
First human ancestors appear	5-7 mya	December 31
First modern humans	1.8 mya	December 31st (very late in the day)

For example, November should look like the calendar shown below! Have fun and don't be afraid to add drawings to mark different dates!

NOVEMBER

SU	M	TU	W	TH	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					