Part III: Exploring the Solar System – Do each of these tasks with your group or a partner. Each student must hand in his or her own paper.

Stand on the orbit of Saturn. Saturn is 10 times farther from the Sun than Earth is. Compared to Earth, how many times farther does Saturn travel to orbit the Sun? _____
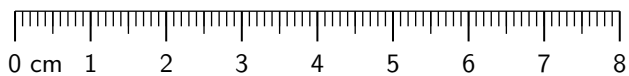
The Saturn markers show its location every 160 days while the markers for the inner Solar System show the planets' locations every 16 days. If we used 16-day markers for Saturn, too, about how centimetres apart would the markers be? _____ How many centimetres are the Earth markers? _____ Which planet is travelling faster, Earth or Saturn? _____ Approximately how many times faster? _____

Saturn is only 10 times farther from the Sun than Earth, but it takes 30 times longer to orbit. For what reasons does Saturn take so long to orbit the Sun?

Get an extra Post-it and stand at one of the Jupiter markers. On the Post-it note, draw a scale model of Jupiter and its Galilean moons, Io, Europa, Ganymede and Callisto. Use the ruler at the bottom of the page, if necessary.

Have a look at your model from Earth's orbit (leave someone behind to hold up the model.) Can you see the dot of Jupiter or the orbits of its moons? If they're so small, how can you see Jupiter with your naked eye at night? And how could Galileo, using a very weak telescope, see the moons?

	Actual		Scaled
	(km)	(AU)	(mm)
Jupiter's diameter	143000	0.001	1
Orbital radius of:			
Io	422000	0.003	3
Europa	671000	0.005	5
Ganymede	1070000	0.007	7
Callisto	1880000	0.013	13

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0 cm  1    2    3    4    5    6    7    8
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The International Year of Astronomy celebrates the 400th anniversary of Galileo's first use of a telescope to look at the sky in 1609.

One partner stand on an Earth marker and another partner stand on the nearest Mars marker. The moment when Earth and Mars are lined up on the same side of the Sun is called opposition (because seen from Earth, the Sun and Mars are on opposite sides of the sky.) In our scaled model, it takes light 8 minutes to travel 1 metre. How how long does it take to send a radio signal to one of the spacecraft on Mars? _____

Move to Earth and Mars markers that are on opposite sides of the Sun. This moment is called conjunction because seen from Earth, the Sun and Mars are together ("conjoined") in the sky. Now how long does it take to send a radio signal to Mars? _____

Approximately how many times farther from Earth is Mars when the two planets are on opposite sides of the Sun, compared to when they line up on the same side of the Sun? _____

The nearest star to our Solar System is called Proxima Centauri. It's 267 800 AU away. If we want to include it in our model, in which of these places should we put it?
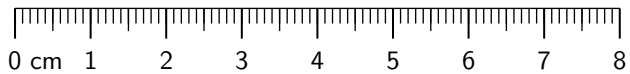☐ UBC bus loop   ☐ Downtown Vancouver   ☐ Kelowna   ☐ Toronto

Part III: Exploring the Solar System

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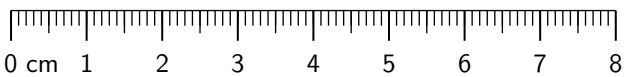
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