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## Toilet Paper Scale - Student Worksheet

It is difficult to imagine the immense distances between the planets of our solar system. Compared to these distances planets are small.

So much of Space is, well ..... space.



When scientists find data difficult to represent or explain, they may use simple models. We will discuss the good points and bad points of this model we are about to use after the experiment.

### A 'Toilet Roll' Model of the Solar System

#### Materials/situation

- A dry, relatively windless day on the school oval
- At least one toilet roll.
- A pencil or rod to place in the core of the toilet paper.
- Students to hold down the paper and mark the location of each planet and of the Sun.
- A calculator.

#### Method

1. Weigh or fix the end of the roll to the ground and mark as the Sun.
2. Place the rod or pencil in the hollow cardboard tube of the roll and start unrolling.
3. Using the table provided, count out the sheets and mark



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- the position of each planet
4. Leave the unrolled strip and answer the first set of questions. Keep any unused sheets for the second activity.

Estimate the number of sheets of toilet paper which are needed to represent these distances.

PLANET	Distance from Sun km	Sheets of toilet paper
Mercury	57,909,175	6
Venus	108,208,930	
Earth	149,597,890	
Mars	227,936,640	
Asteroid Belt		
Jupiter	778,412,020	
Saturn	1,426,752,400	
Uranus	2,870,972,200	
Neptune	4,498,252,905	

1. What scale (roughly) is this model? \_\_\_\_\_
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2. Did this model help you realise the immense distances between planets and our Sun? Explain your answer.
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3. What problems did you have with this model and suggest how they can be fixed?

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### Extending the 'Toilet Roll Model' to Demonstrate Differences in Planet Size

One sheet of toilet paper represents about 100 million km.

I have worked out the diameter of the largest planet for you. It is 1/10 of a sheet of toilet paper.

PLANET	Diameter of planet Km	Part of one sheet of toilet paper which would represent the diameter of each planet
Mercury	4,879	
Venus	12,104	
Earth	12,756	
Mars	6,786	

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Jupiter	142,984	0.1 or 1/10 <sup>th</sup> of one sheet
Saturn	120,536	
Uranus	51,118	
Neptune	49,528	

Which planets could be represented relatively accurately at this scale?

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Can we change the scale for the planets but leave the same scale for the distances and still use the original toilet roll? (Hint - The next question below may help you with your answer)

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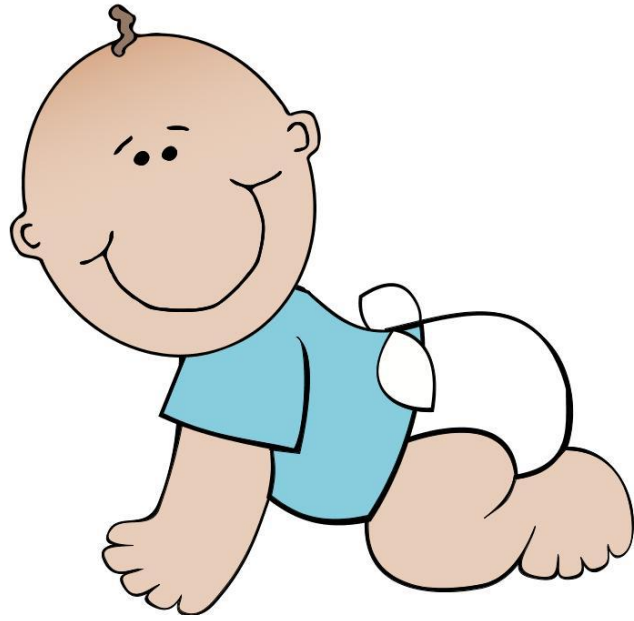


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The baby girl  
Scale 1 cm = 90 cm



The baby boy  
Scale 1cm = 45cm

Are these babies different sizes? \_\_\_\_\_

Please clean away the used toilet paper into a recycling bin.