ACTIVITY ONE

Contour Information:

The contour interval will be 50 Kelvins. There will be lines for the values 50, 100, 150, 200, 250, 300, 350, 400, and 450.

The values can be differentiated by using different colors or by labeling each line.

50 = **Gray** 300 = **Green**

100 = **Black** 350 = **Yellow**

150 = **Purple** 400 = **Orange**

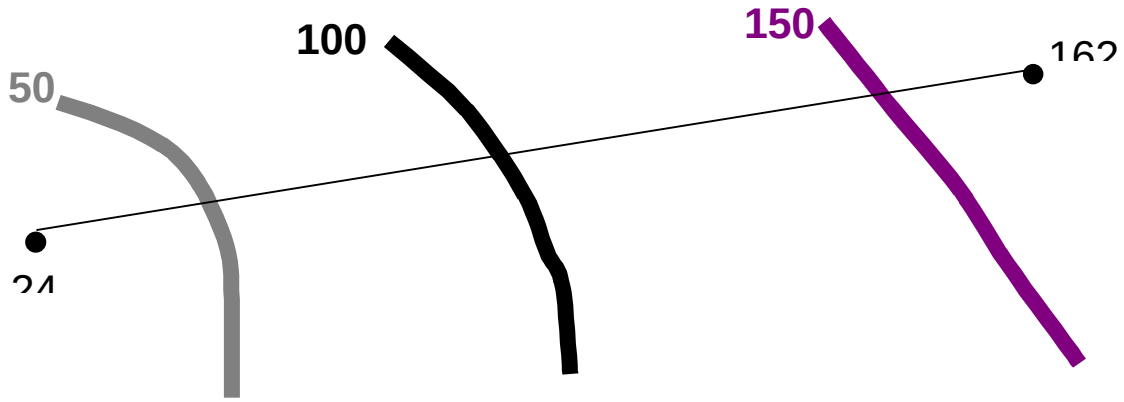
200 = **Dark Blue** 450 = **Red**

250 = **Light Blue**

Contour lines do not cross themselves or other lines.

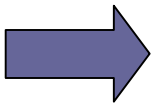
Contour Information (continued):

All line values that fall between two point will be represented. The locations of the lines can be mathematically interpolated or "guess-timated" by visual inspection. For the purposes of this exercise we will be "guestimating." A mathematically interpolated version will be generated by the computer modeling portion of this lesson.



Lesson: Mapping a Radio Source

JupiterQuest



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0	5	0	5	5	5	5	0	5	5	10	10	5	5	0	5	0
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65	90	115	135	185	160	70	95	105	110	125	415	255	190	155	105	60
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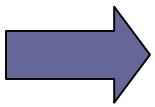
A Goldstone Apple-Valley Radio Telescope Project

Lesson: Mapping a Radio Source

JupiterQuest



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A Goldstone Apple-Valley Radio Telescope Project

Lesson: Mapping a Radio Source

JupiterQuest

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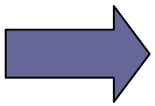
Lesson: Mapping a Radio Source

JupiterQuest



50

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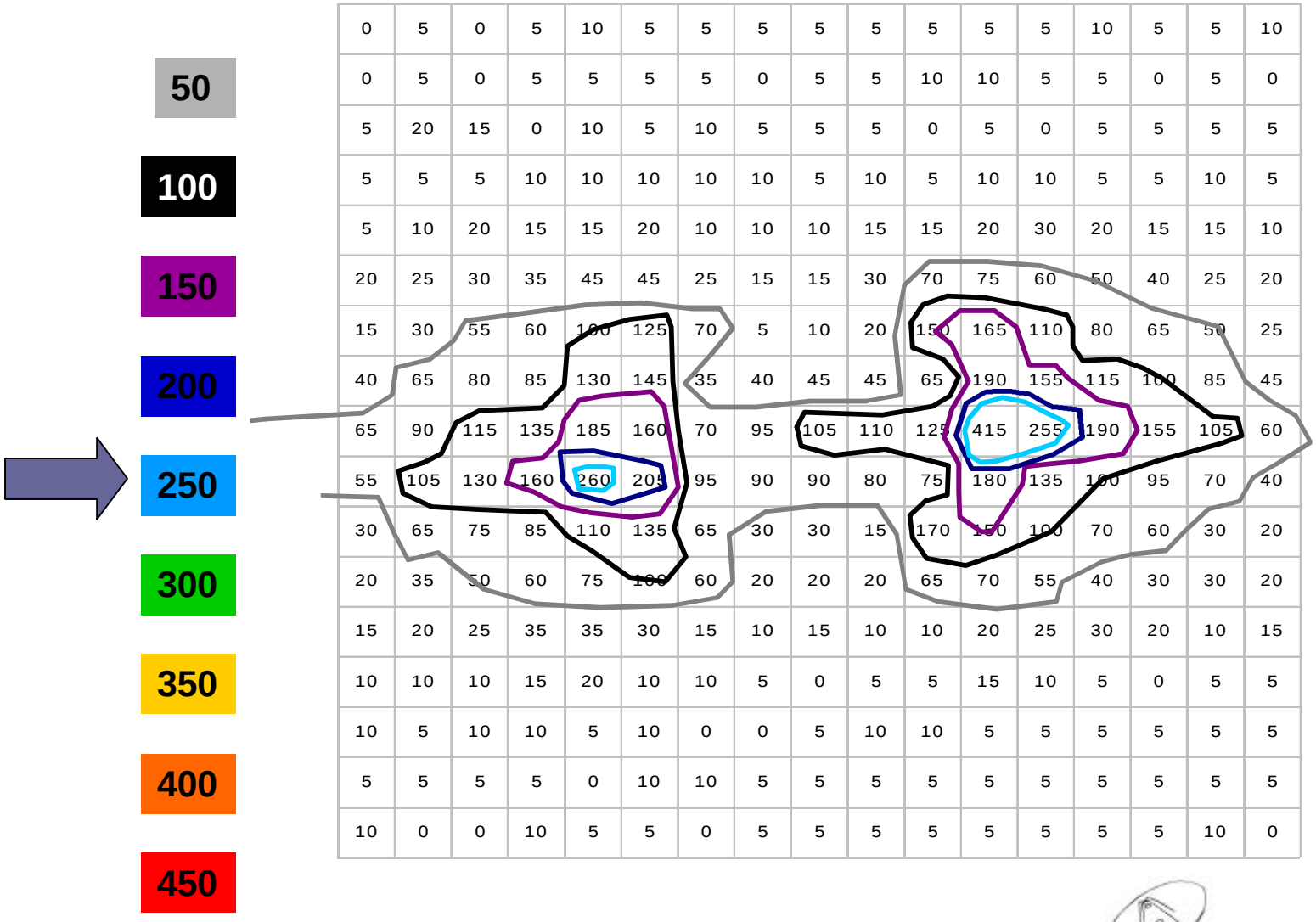
A Goldstone Apple-Valley Radio Telescope Project

Lesson: Mapping a Radio Source

JupiterQuest



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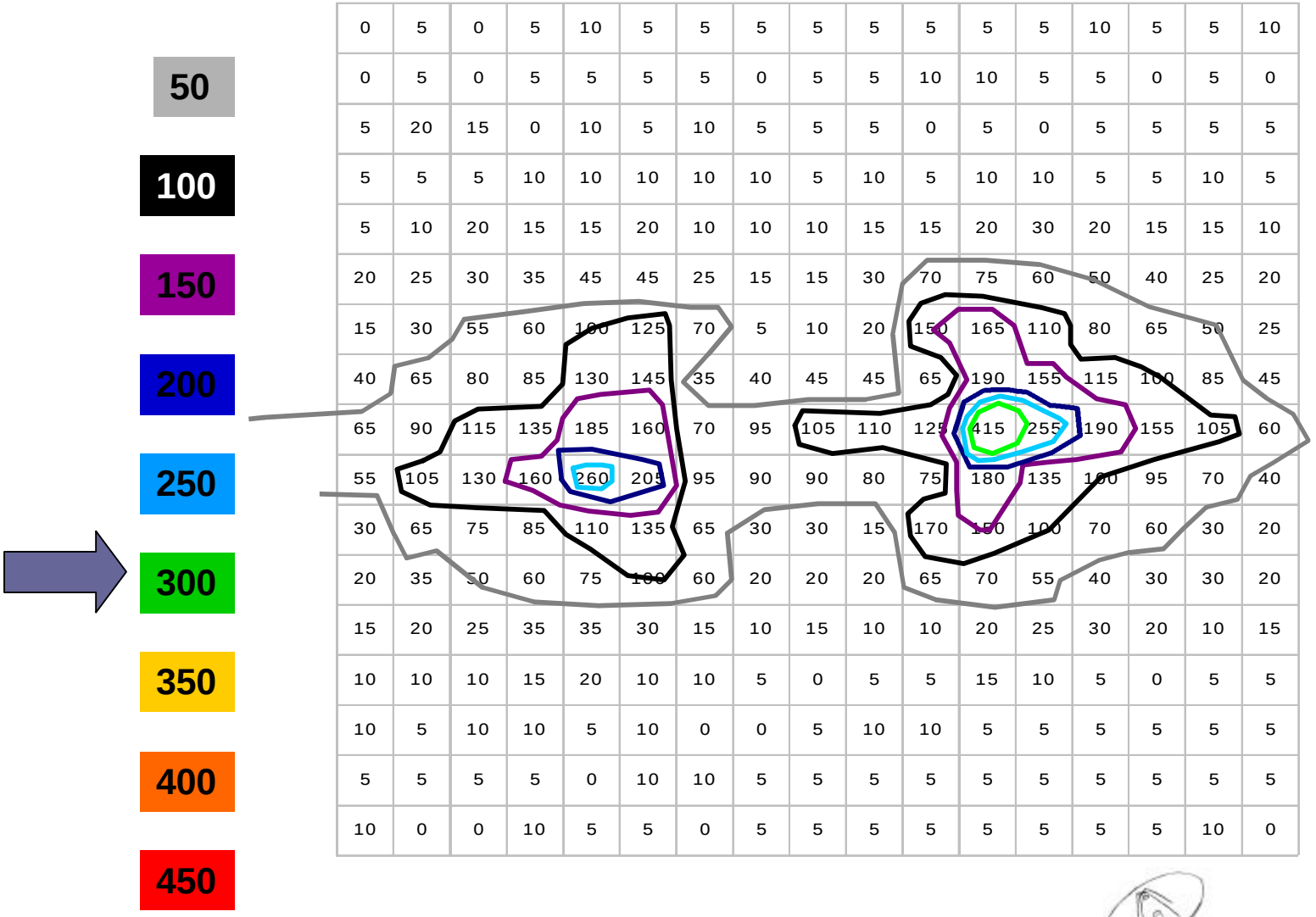
Lesson: Mapping a Radio Source

JupiterQuest



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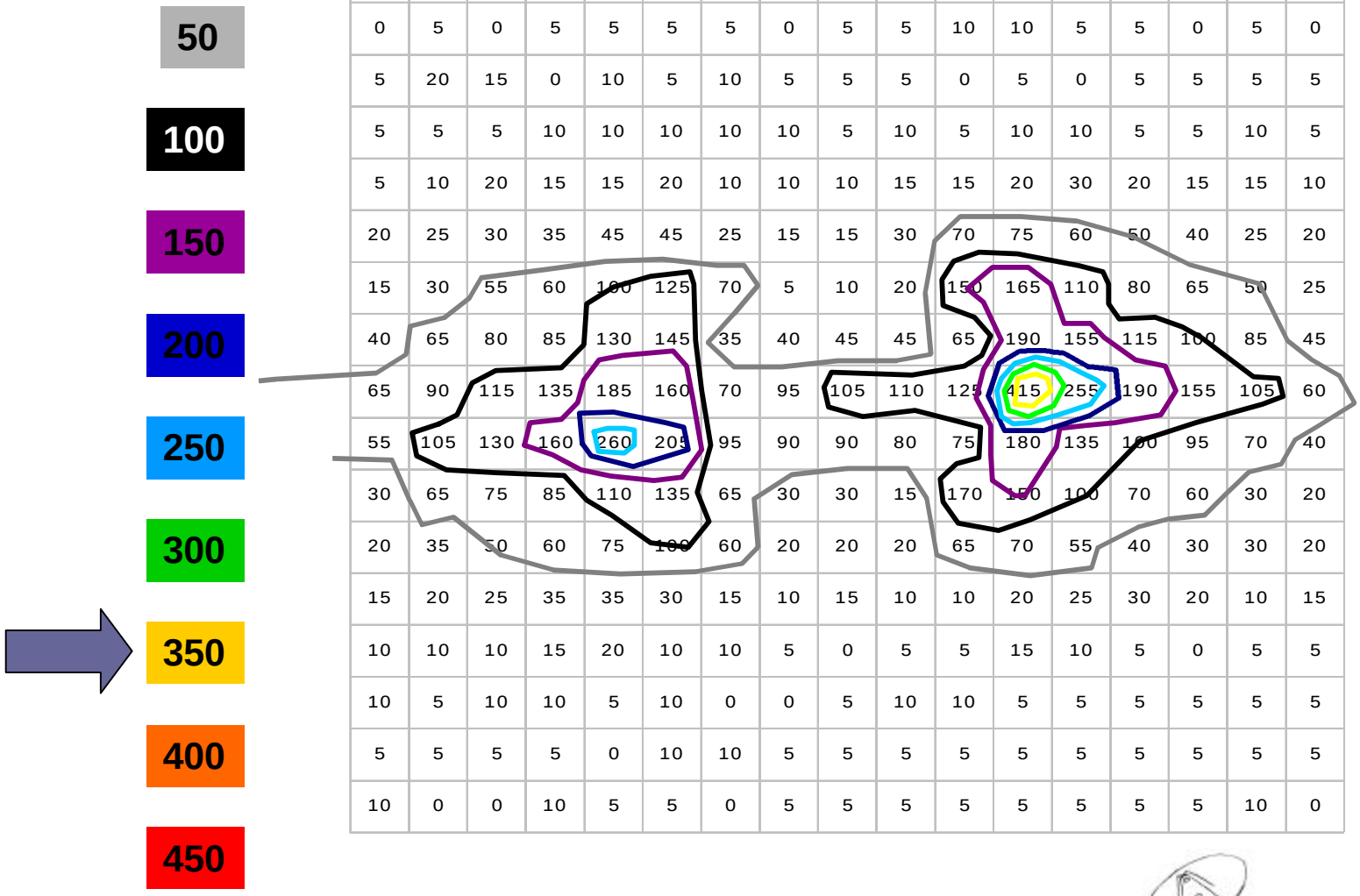
Lesson: Mapping a Radio Source

JupiterQuest



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A Goldstone Apple-Valley Radio Telescope Project

Lesson: Mapping a Radio Source

JupiterQuest

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A Goldstone Apple-Valley Radio Telescope Project

Lesson: Mapping a Radio Source

JupiterQuest

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0	5	0	5	5	5	5	0	5	5	10	10	5	5	0	5	0
5	20	15	0	10	5	10	5	5	5	0	5	0	5	5	5	5
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10	0	0	10	5	5	0	5	5	5	5	5	5	5	5	10	0

A Goldstone Apple-Valley Radio Telescope Project

ACTIVITY TWO

2-Dimensional Iso-Concentration Contour Map Using Microsoft Excel®
On pages 7 and 8 of the handout, there are specific directions (18 steps) for constructing this map.

Lesson: Mapping a Radio Source

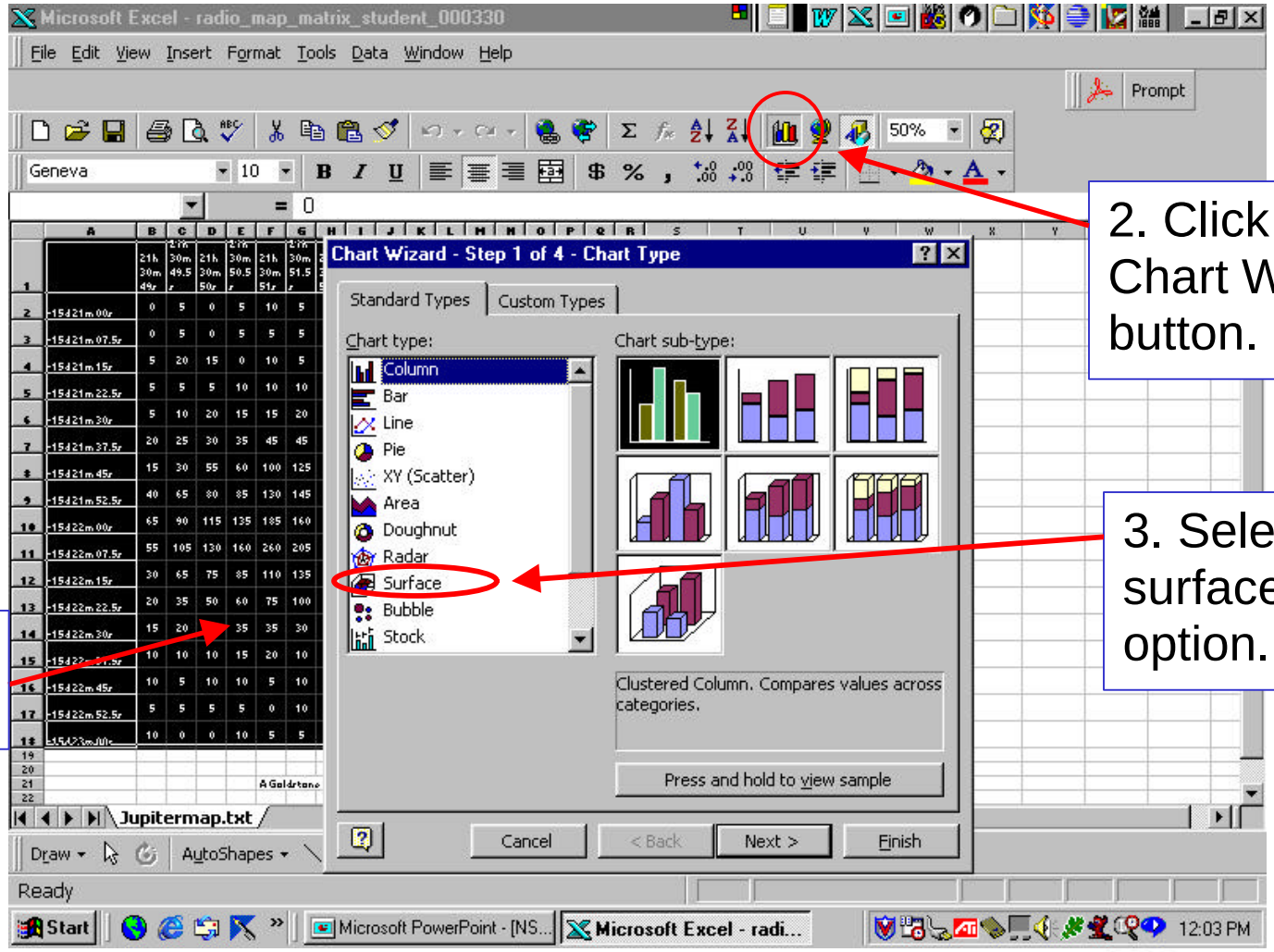
JupiterQuest

	21h 30m 49s	21h 30m 49.5s	21h 30m 50s	21h 30m 50.5s	21h 30m 51s	21h 30m 51.5s	21h 30m 52s	21h 30m 52.5s	21h 30m 53s	21h 30m 53.5s	21h 30m 54s	21h 30m 54.5s	21h 30m 55s	21h 30m 55.5s	21h 30m 56s	21h 30m 56.5s	21h 30m 57s
-15d 21m 00s	0	5	0	5	10	5	5	5	5	5	5	5	5	10	5	5	10
-15d 21m 07.5s	0	5	0	5	5	5	5	0	5	5	10	10	5	5	0	5	0
-15d 21m 15s	5	20	15	0	10	5	10	5	5	5	0	5	0	5	5	5	5
-15d 21m 22.5s	5	5	5	10	10	10	10	10	5	10	5	10	10	5	5	10	5
-15d 21m 30s	5	10	20	15	15	20	10	10	10	15	15	20	30	20	15	15	10
-15d 21m 37.5s	20	25	30	35	45	45	25	15	15	30	70	75	60	50	40	25	20
-15d 21m 45s	15	30	55	60	100	125	70	5	10	20	150	165	110	80	65	50	25
-15d 21m 52.5s	40	65	80	85	130	145	35	40	45	45	65	190	155	115	100	85	45
-15d 22m 00s	65	90	115	135	185	160	70	95	105	110	125	415	255	190	155	105	60
-15d 22m 07.5s	55	105	130	160	260	205	95	90	90	80	75	180	135	100	95	70	40
-15d 22m 15s	30	65	75	85	110	135	65	30	30	15	170	150	100	70	60	30	20
-15d 22m 22.5s	20	35	50	60	75	100	60	20	20	20	65	70	55	40	30	30	20
-15d 22m 30s	15	20	25	35	35	30	15	10	15	10	10	20	25	30	20	10	15
-15d 22m 37.5s	10	10	10	15	20	10	10	5	0	5	5	15	10	5	0	5	5
-15d 22m 45s	10	5	10	10	5	10	0	0	5	10	10	5	5	5	5	5	5
-15d 22m 52.5s	5	5	5	5	0	10	10	5	5	5	5	5	5	5	5	5	5
-15d 23m 00s	10	0	0	10	5	5	0	5	5	5	5	5	5	5	5	10	0

A Goldstone Apple-Valley Radio Telescope Project

Lesson: Mapping a Radio Source

JupiterQuest



1. Hi-light the data

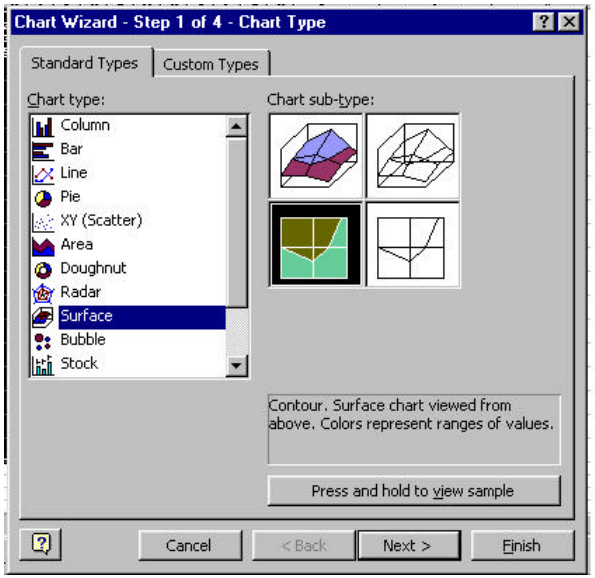
2. Click on the Chart Wizard button.

3. Select the surface map option.

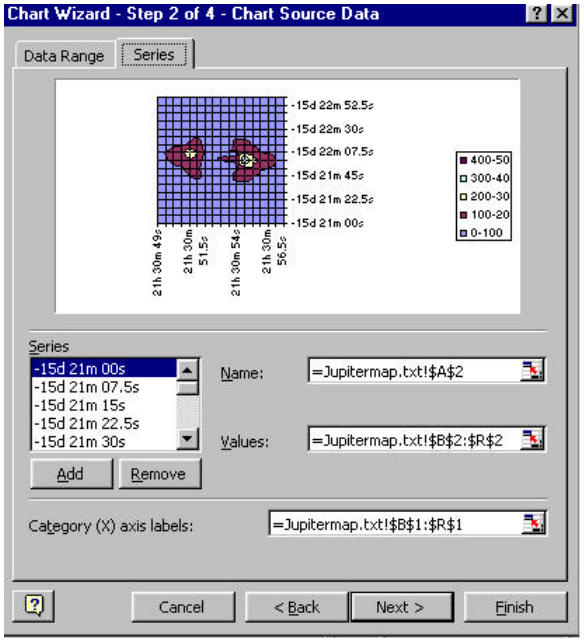
A Goldstone Apple-Valley Radio Telescope Project

Lesson: Mapping a Radio Source

JupiterQuest



There are four surface map options. Select the two-dimensional, color option on the lower left and select **Next**.

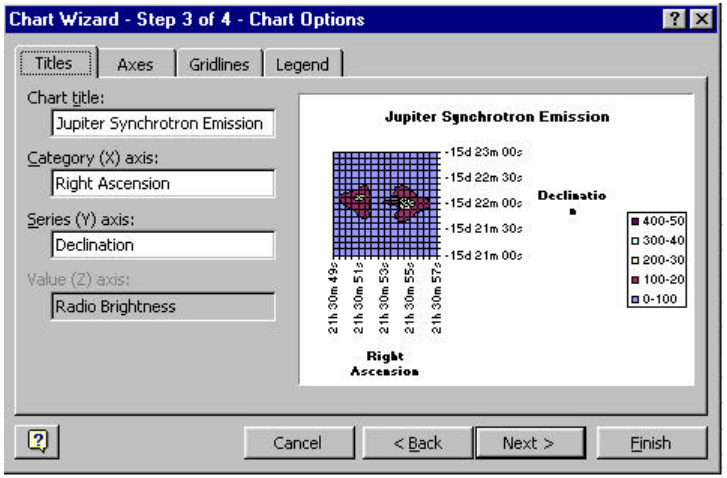


The next screen has two tabs. When you select the **Series** tab, this is what you will see. Select **Next**.

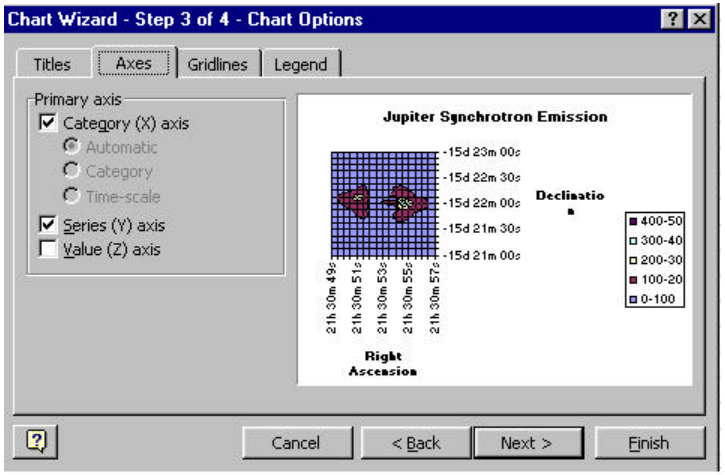
A Goldstone Apple-Valley Radio Telescope Project

Lesson: Mapping a Radio Source

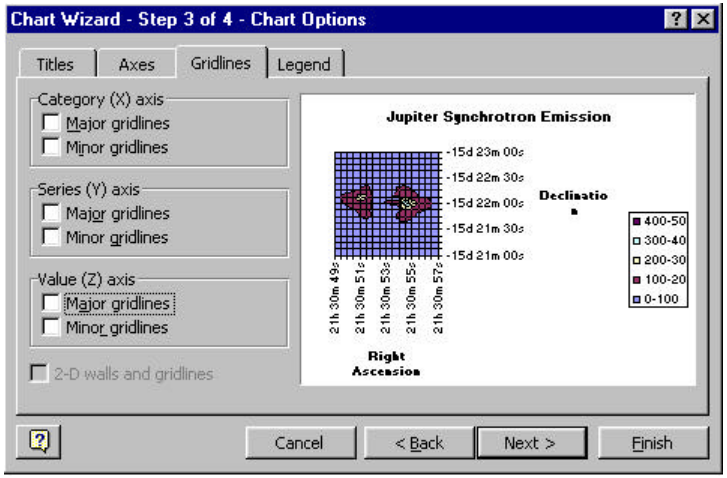
JupiterQuest



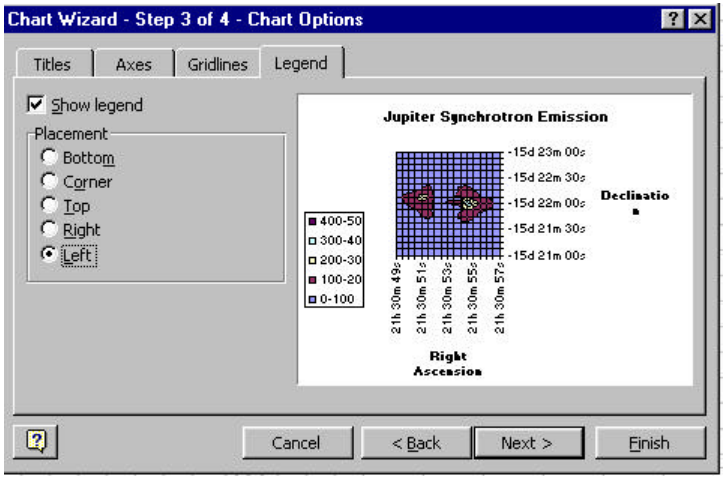
Titles Tab



Axes Tab



Gridlines Tab



Legend Tab

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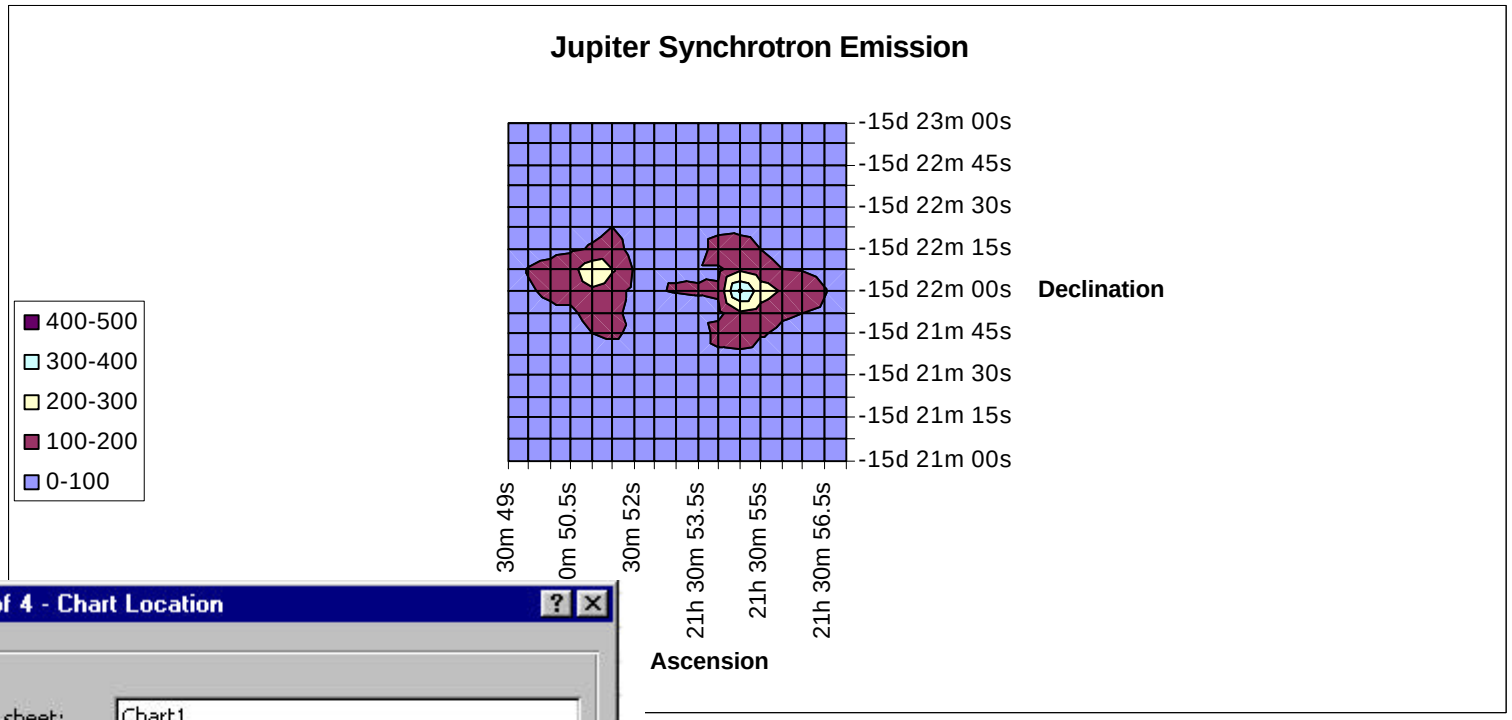
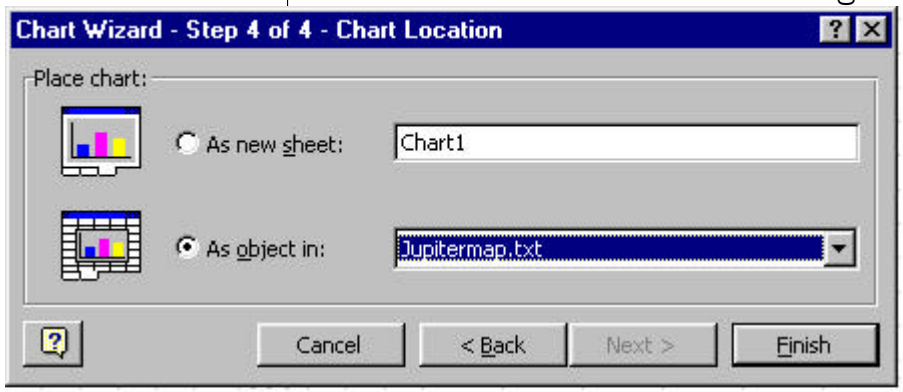
Lesson: Mapping a Radio Source

JupiterQuest



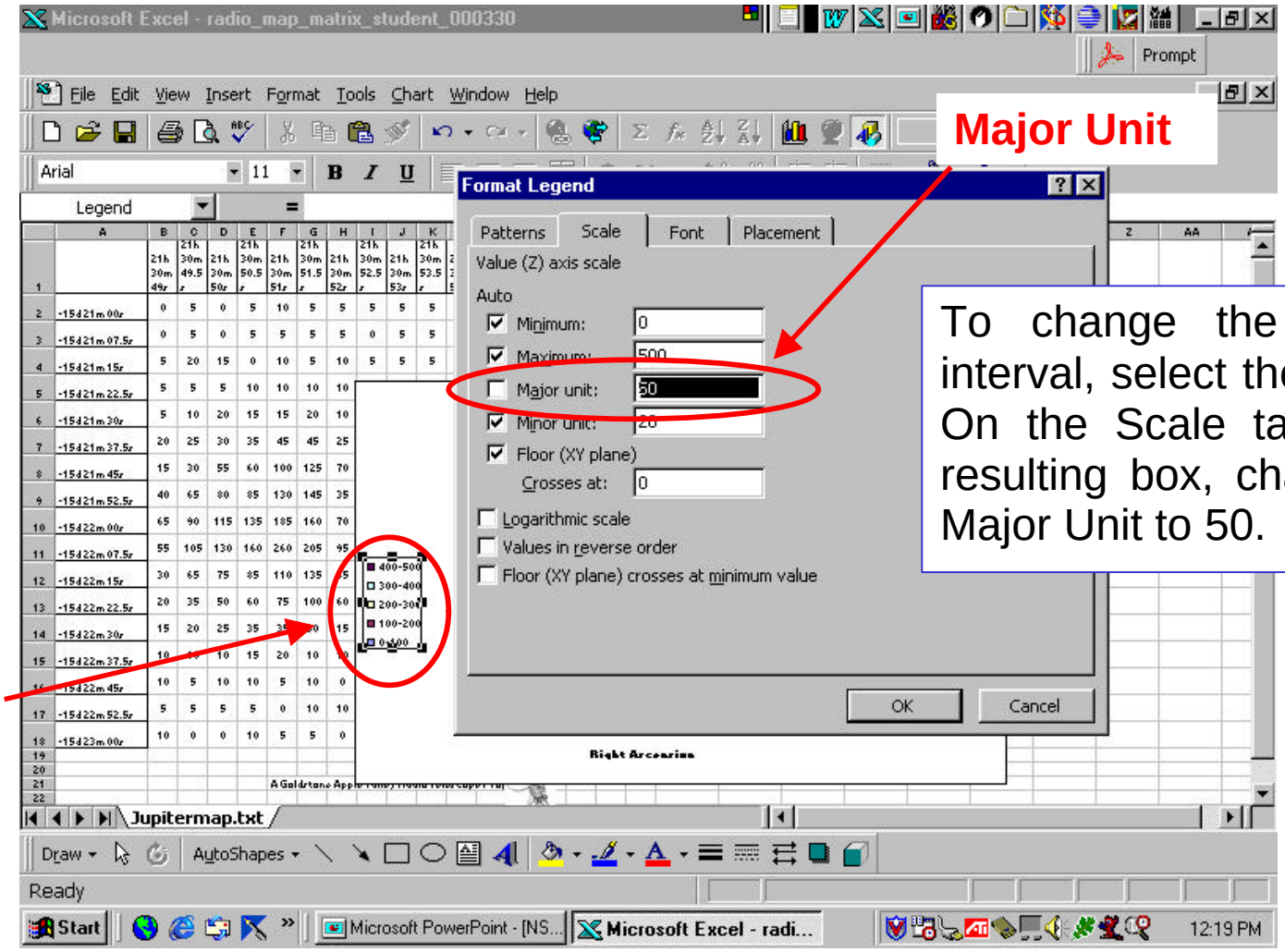


Selecting Finish will generate this graph. Note that the contour interval needs to be changed.

A Goldstone Apple-Valley Radio Telescope Project

Lesson: Mapping a Radio Source

JupiterQuest



To change the contour interval, select the legend. On the Scale tab in the resulting box, change the Major Unit to 50.

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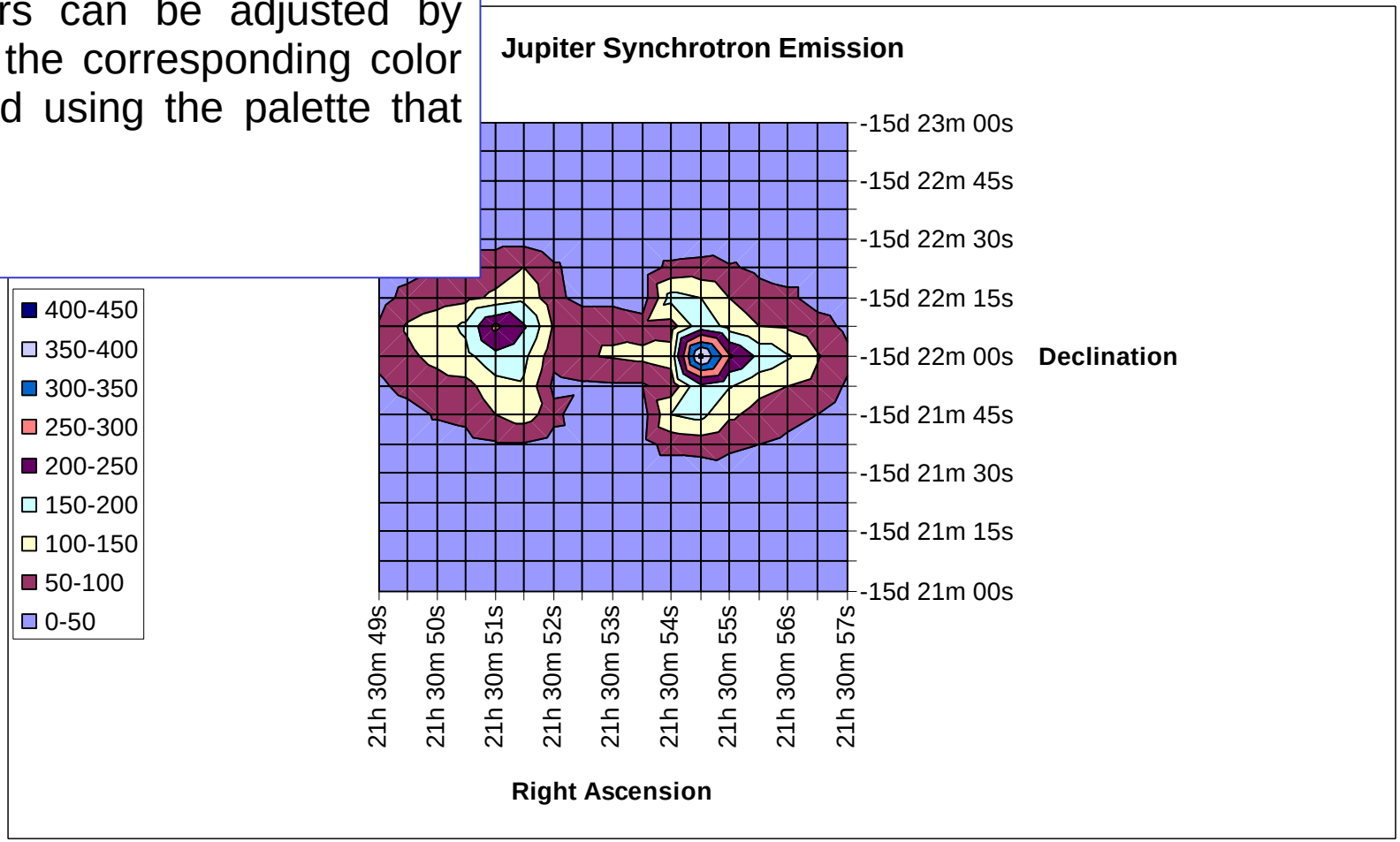
Lesson: Mapping a Radio Source

JupiterQuest

The resulting chart looks like this. The colors can be adjusted by selecting the corresponding color boxes and using the palette that pops up.



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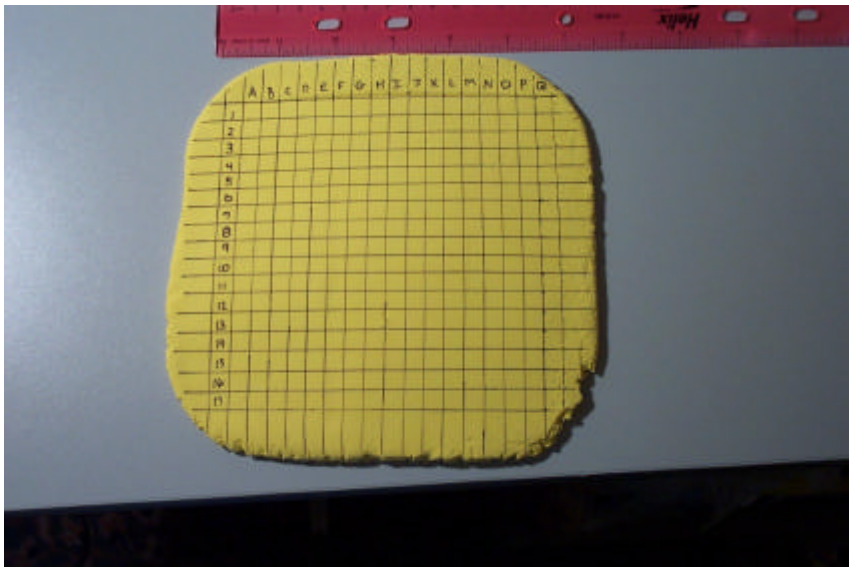
ACTIVITY THREE

3-Dimensional Iso-Concentration Contour Map Using Straws

On page 9 of the handout, there are specific directions for constructing this map.



Prepare the base for the model using Crayola ® Modeling Dough or oil-based clay.

Straws (standard size) are 6mm wide. There should be some clay on either side of each straw to hold it in place. The spacing on this grid is 8mm squares.

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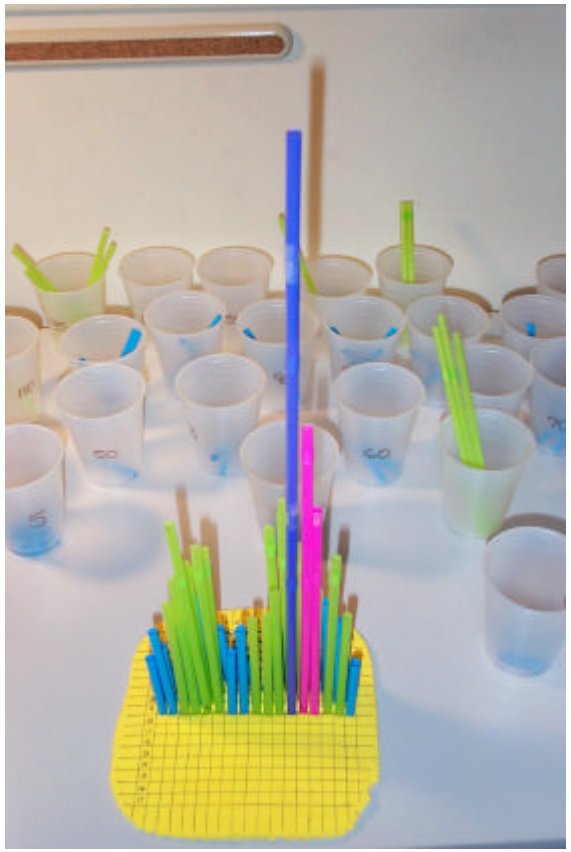

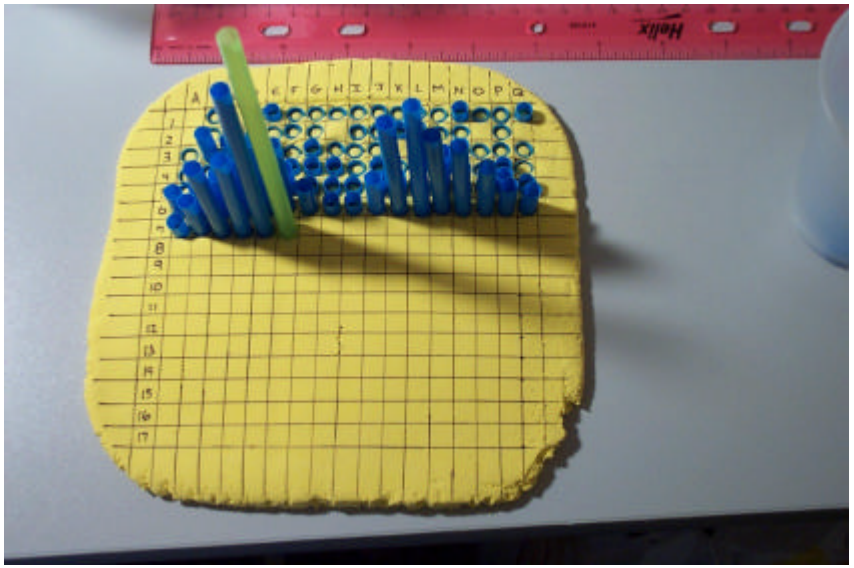

Organizational Tips:
Have the students pre-cut the straws before opening the modeling dough and sort them by size into marked cups, as shown at the left. Marking a grid on the modeling dough with a pencil or permanent marker helps in the placement of the straws.

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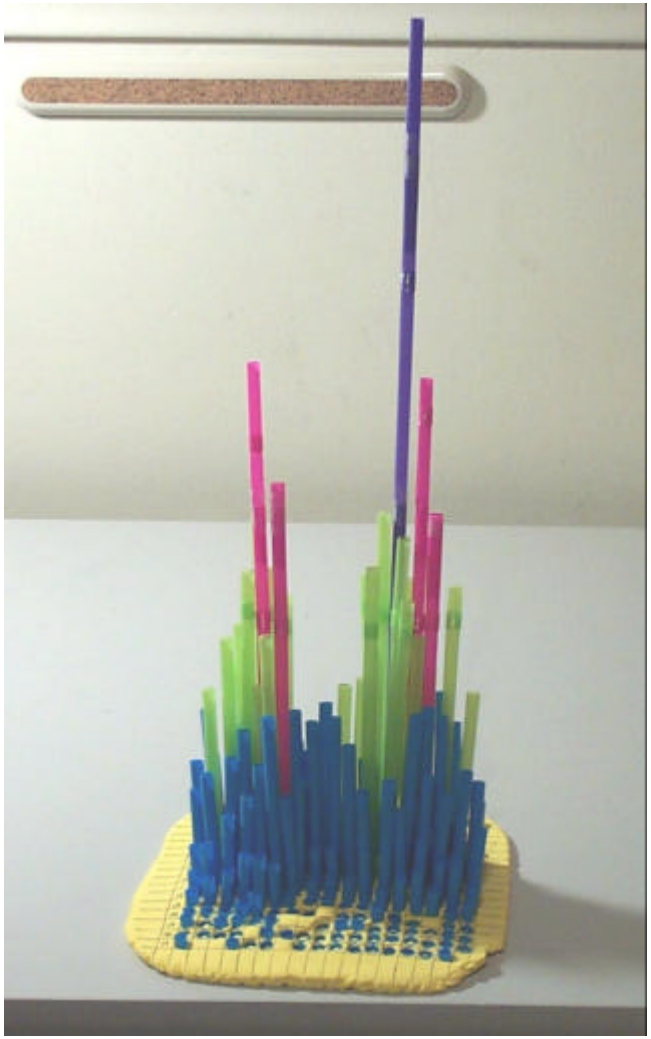

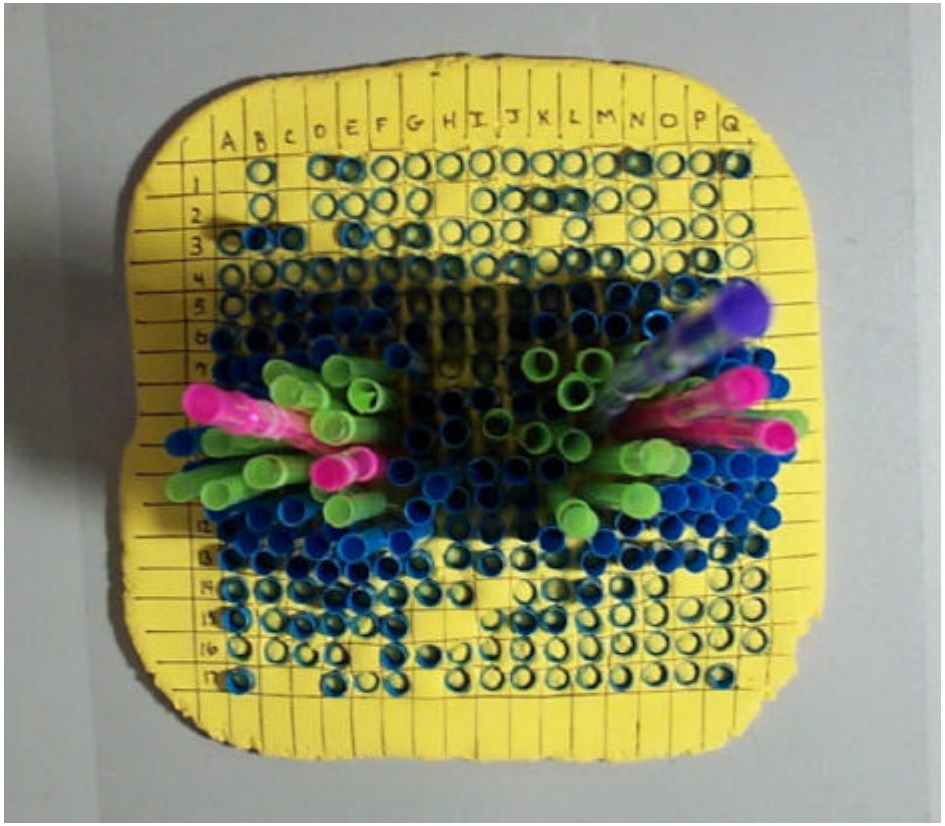

This is the finished product. The straws in this example are color-coded for a contour interval of 100 Kelvins.

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