

Do Metals in Biosolids Pose a Risk to Human Health? Current Research

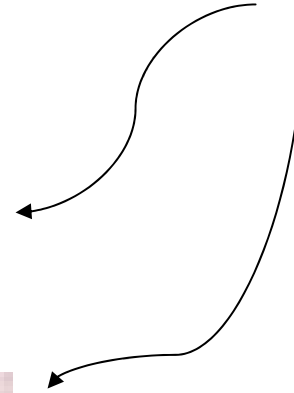
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Hargreaves, P. Smith

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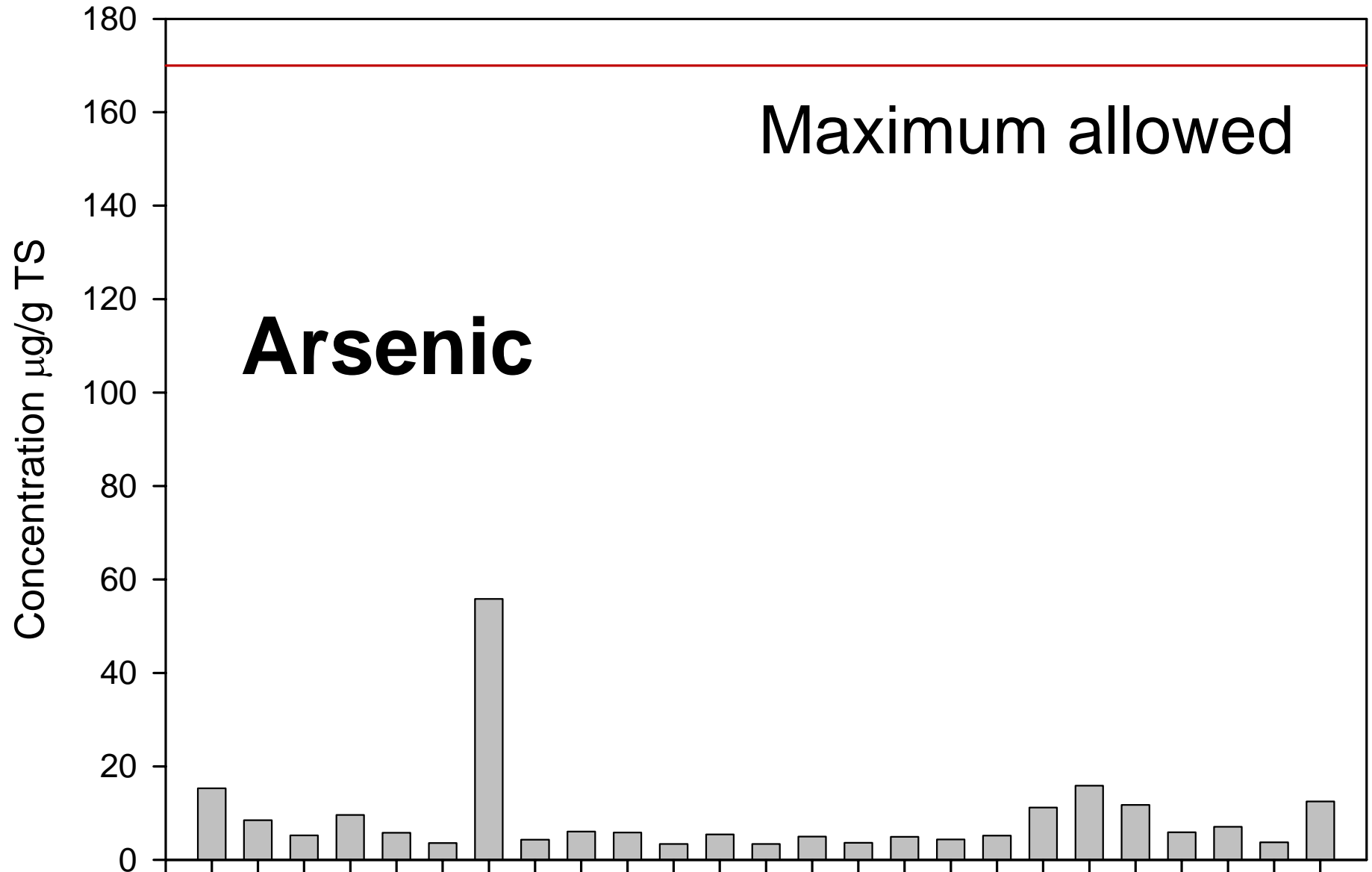


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From the STP

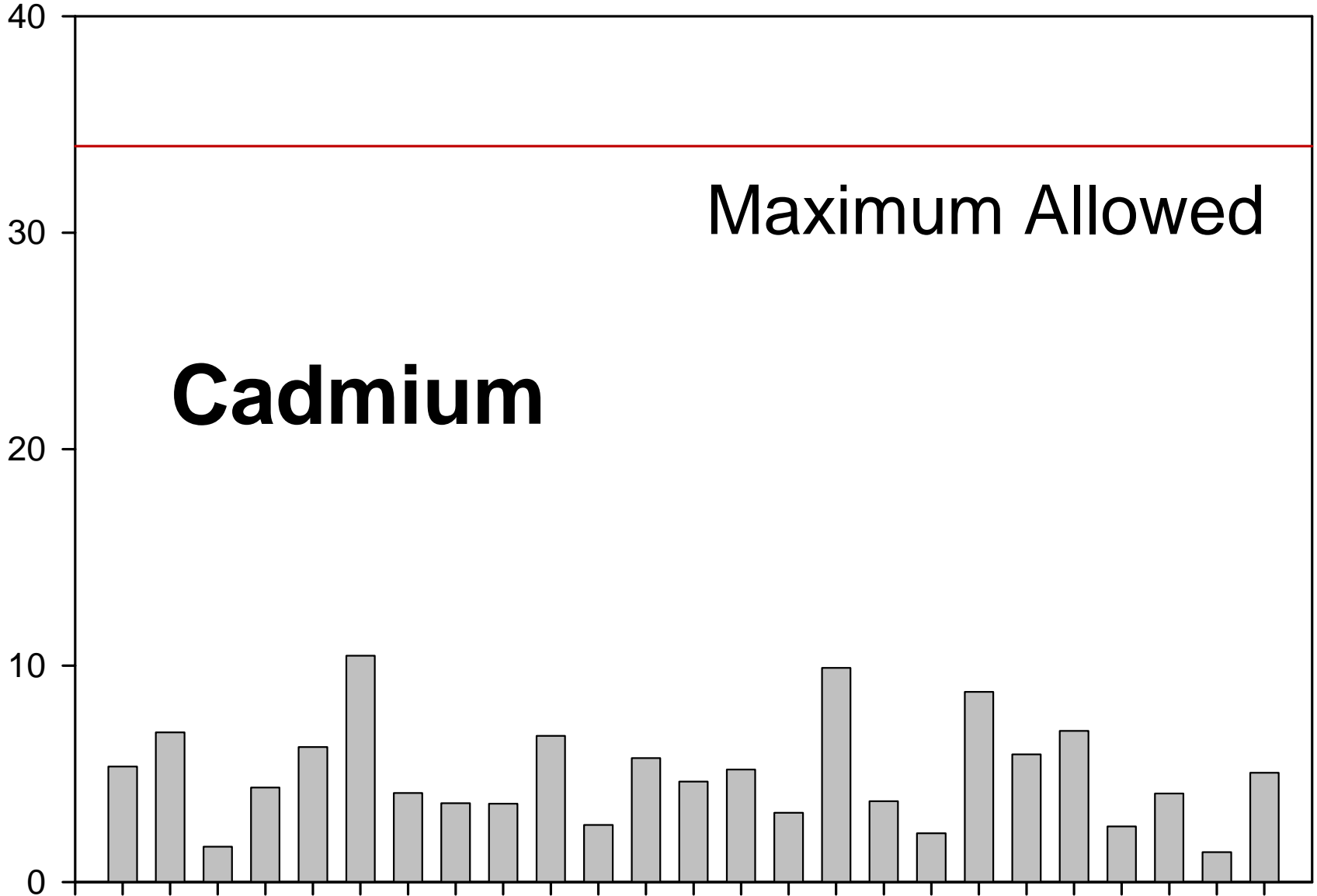


From the STP

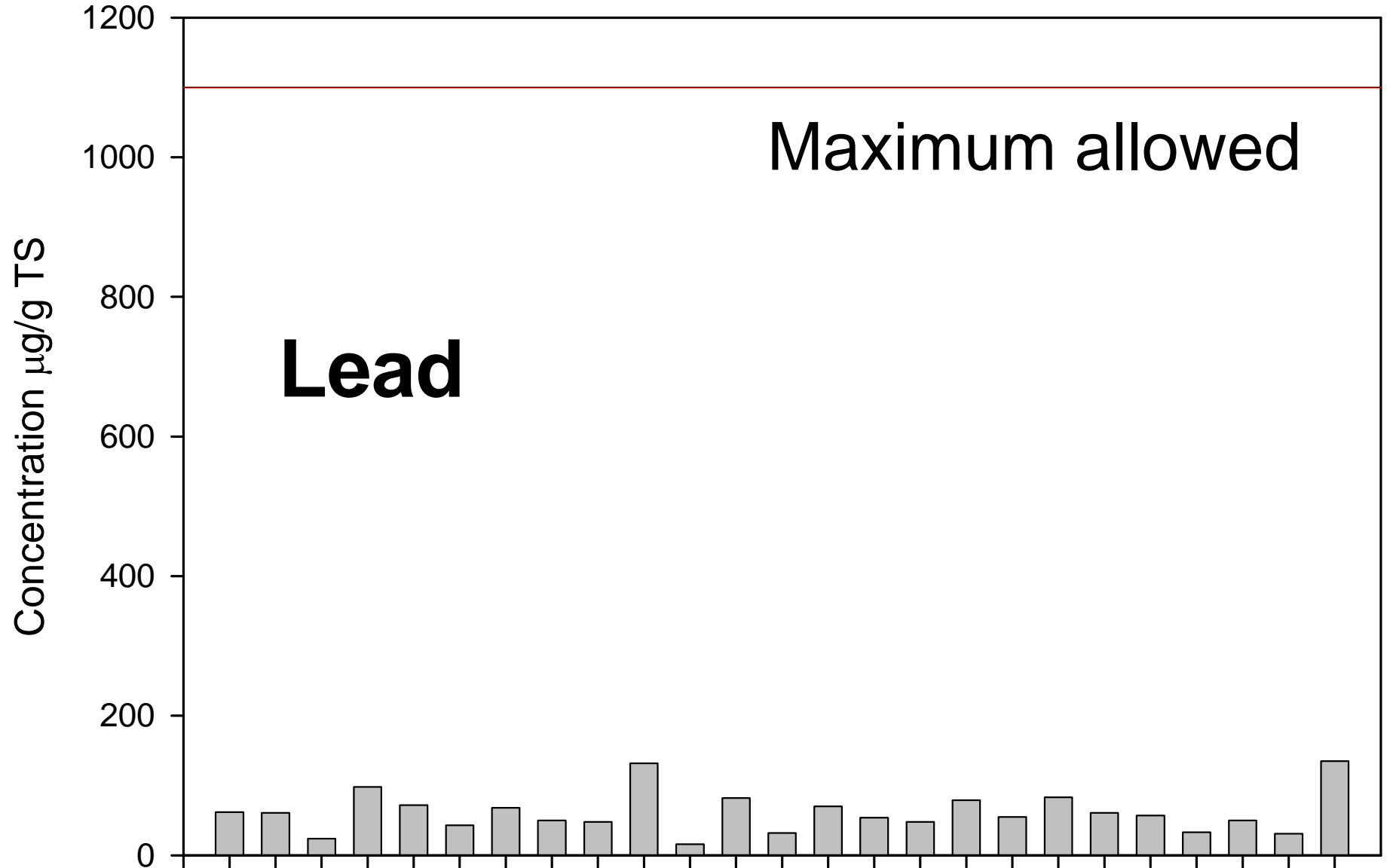
Concentration $\mu\text{g/g TS}$

Cadmium

Maximum Allowed



From the STP



From Biosolids to Soils

| | Average Soil Concentration | Increase in Soil Concentration per 5 years |
|----------------|-----------------------------------|---|
| Arsenic | 7 mg/kg | 0.03 mg/kg (<1%) |
| Cadmium | 0.8 mg/kg | 0.009 mg/kg (~1%) |
| Lead | 15 mg/kg | 0.18 mg/kg (<2%) |

From Soil to Food

| | Soil Concentration | Food Concentration | Transfer |
|----------------|---------------------------|---------------------------|-----------------|
| Arsenic | 7 mg/kg | 0.4 mg/kg | 6% |
| Cadmium | 0.8 mg/kg | 0.5 mg/kg | 60% |
| Lead | 15 mg/kg | 1.2 mg/kg | 8% |

From Food to Consumer

| Food | Assay | Transfer |
|------------------------|-----------------|-----------------|
| Lettuce 4 mg Cd/kg | to Rabbits | < 1% |
| | to Caco-2 cells | < 1% |
| Grain 2.75 mg Cd/kg | to Mice | < 2% |
| | to Caco-2 cells | << 1% |

From Soil/Dust to Consumer

| | Total Metal | Digestable Metal | Transfer |
|----------------|--------------------|-------------------------|-----------------|
| Arsenic | 12.7 mg/kg | 0 mg/kg | 0 % |
| Cadmium | ? | ? | |
| Lead | 2900 mg/kg | 123 mg/kg | < 1% |

Hale et al., in progress

..and how about your house?

| | House Dust | Garden Soil | HD > GS |
|----------------|-------------------|--------------------|-------------------|
| Arsenic | 7.3 mg/kg | 3.0 mg/kg | 2.4 x |
| Cadmium | 6.5 mg/kg | 0.30 mg/kg | 22 x |
| Lead | 405 mg/kg | 65 mg/kg | 6.2 x |



102%



2



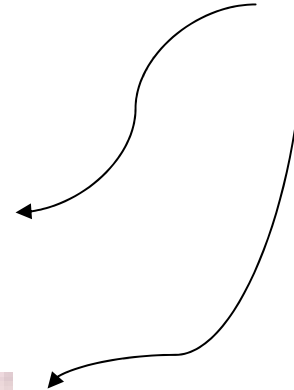
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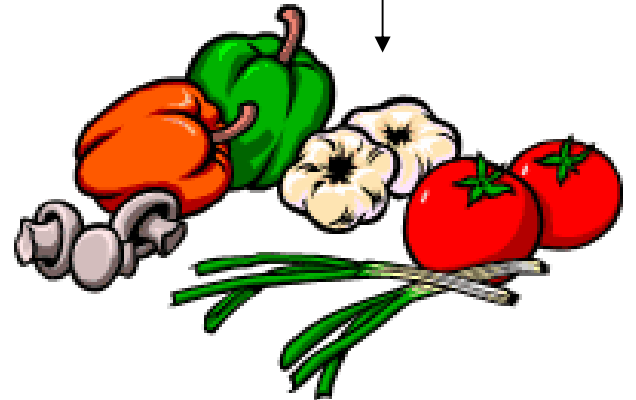
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102%



60%



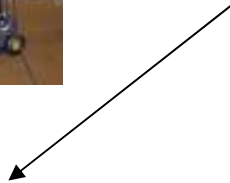
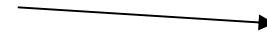
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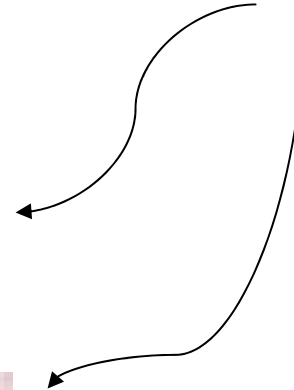
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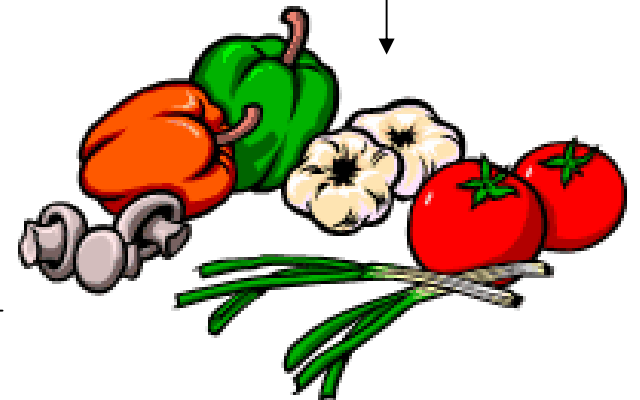
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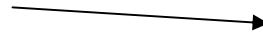
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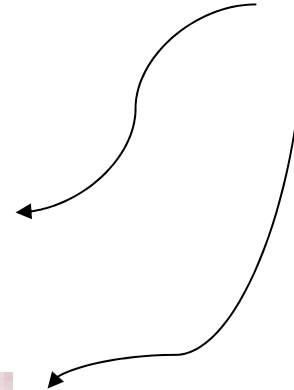
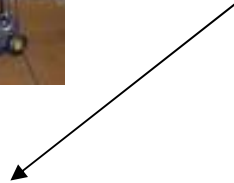
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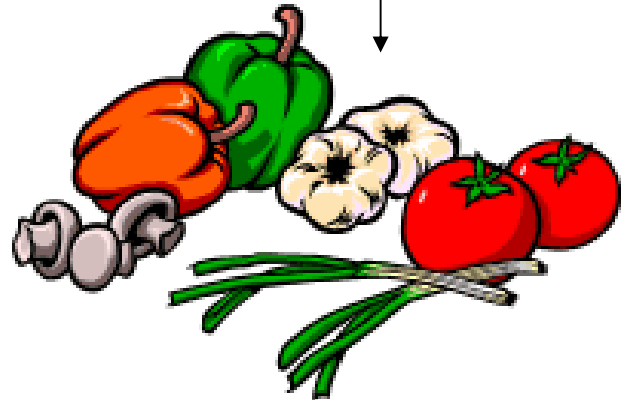
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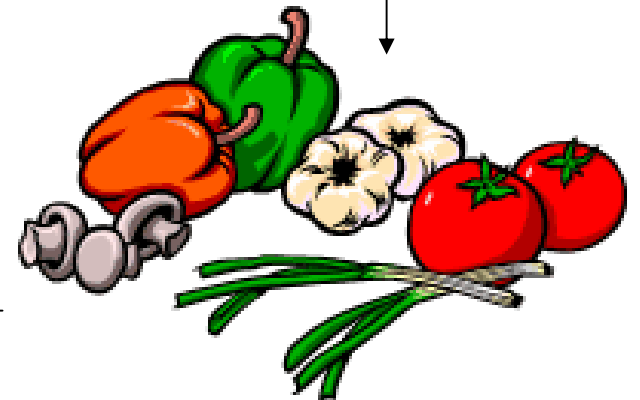
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22 x



60%



2%

Thank you!

