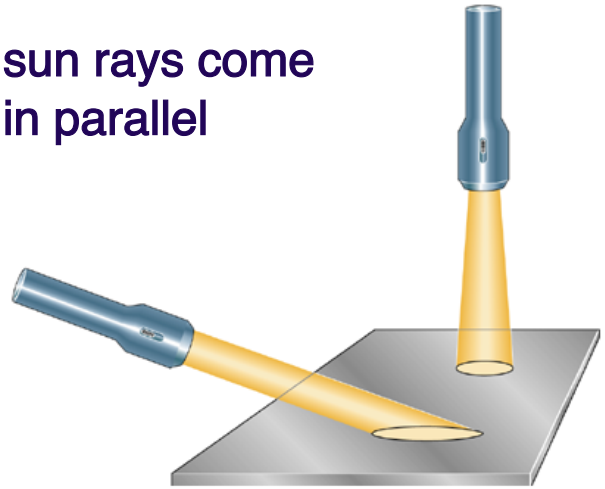
Why does Earth have Seasons?

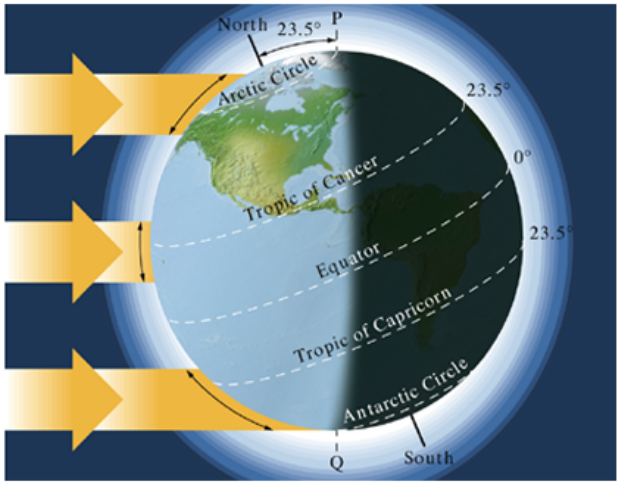
1) insolation per area:
lower at poles
higher at equator

insolation per area:
2.4 times lower at poles
than at equator

zenith

sun rays come
in parallel





Marshak: Earth, Portrait of a Planet

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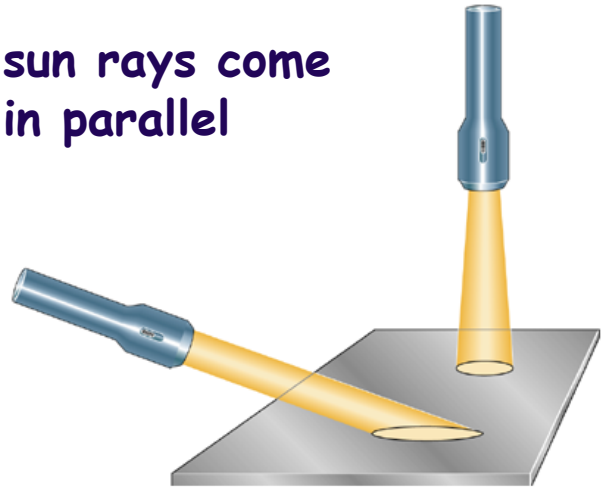

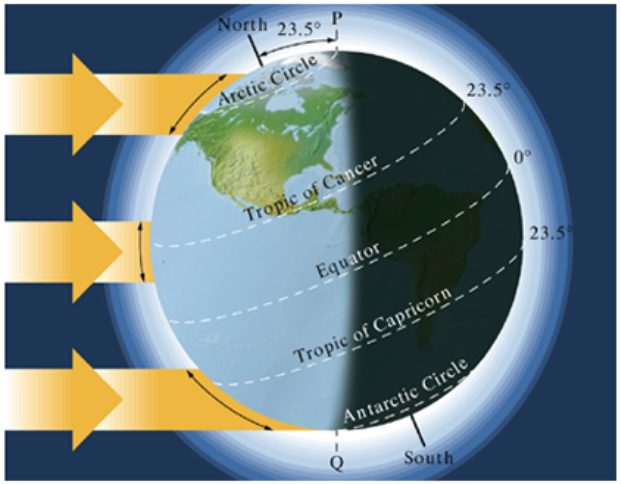

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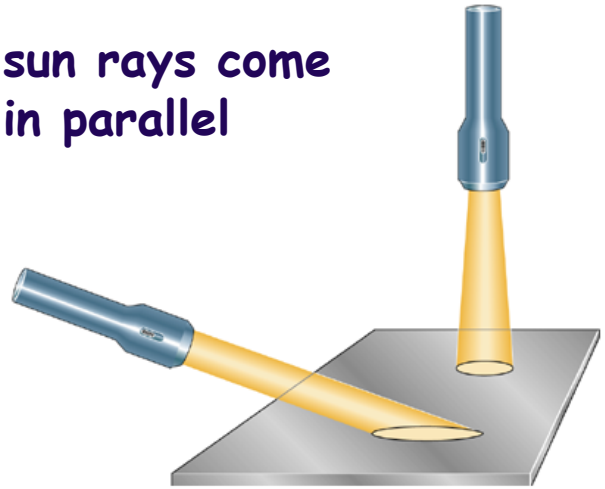

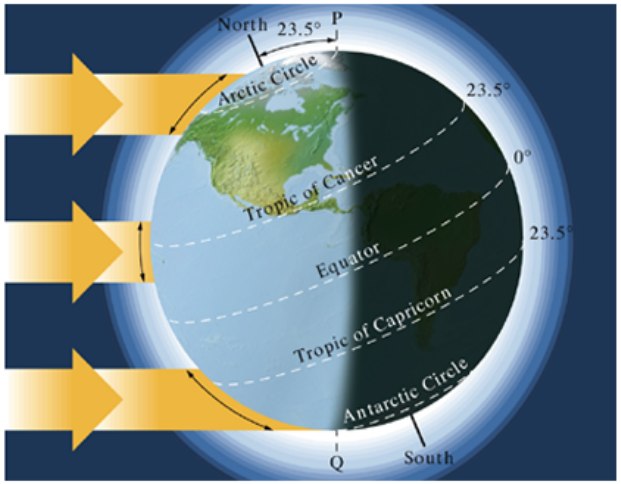

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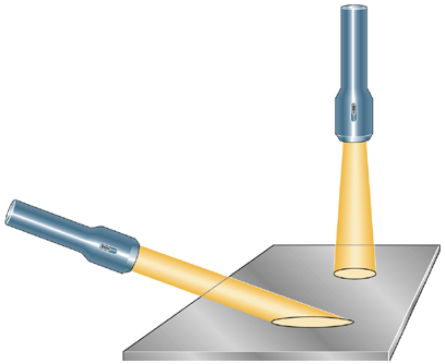

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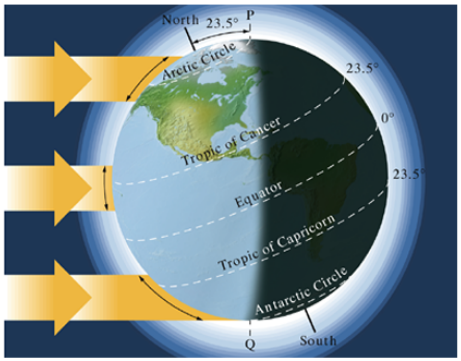
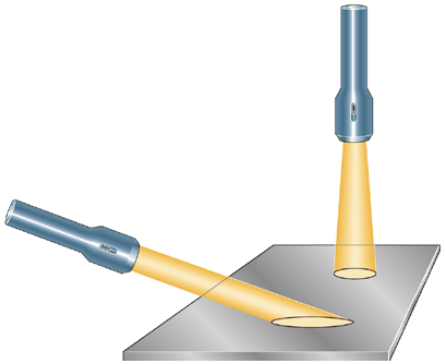


2) Earth's rotation axis is tilted 23.5°

Marshak: Earth, Portrait of a Planet

Why does Earth have Seasons?

zenith



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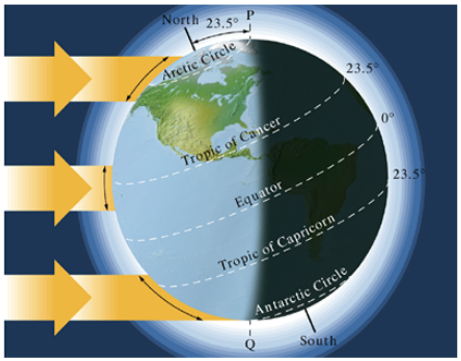

3) summer: axis tilted so that N pole facing sun

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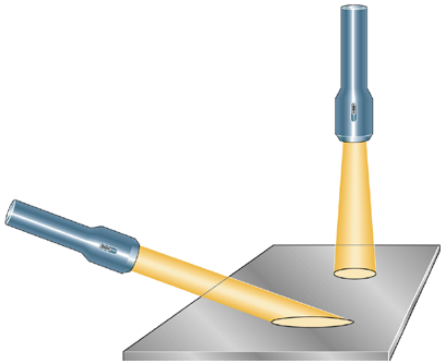
Why does Earth have Seasons?

zenith



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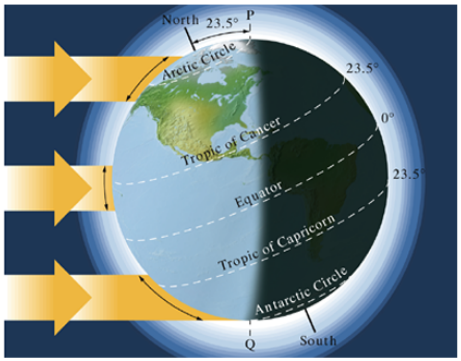

4) winter: axis tilted so that N pole away from sun

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Why does Earth have Seasons?

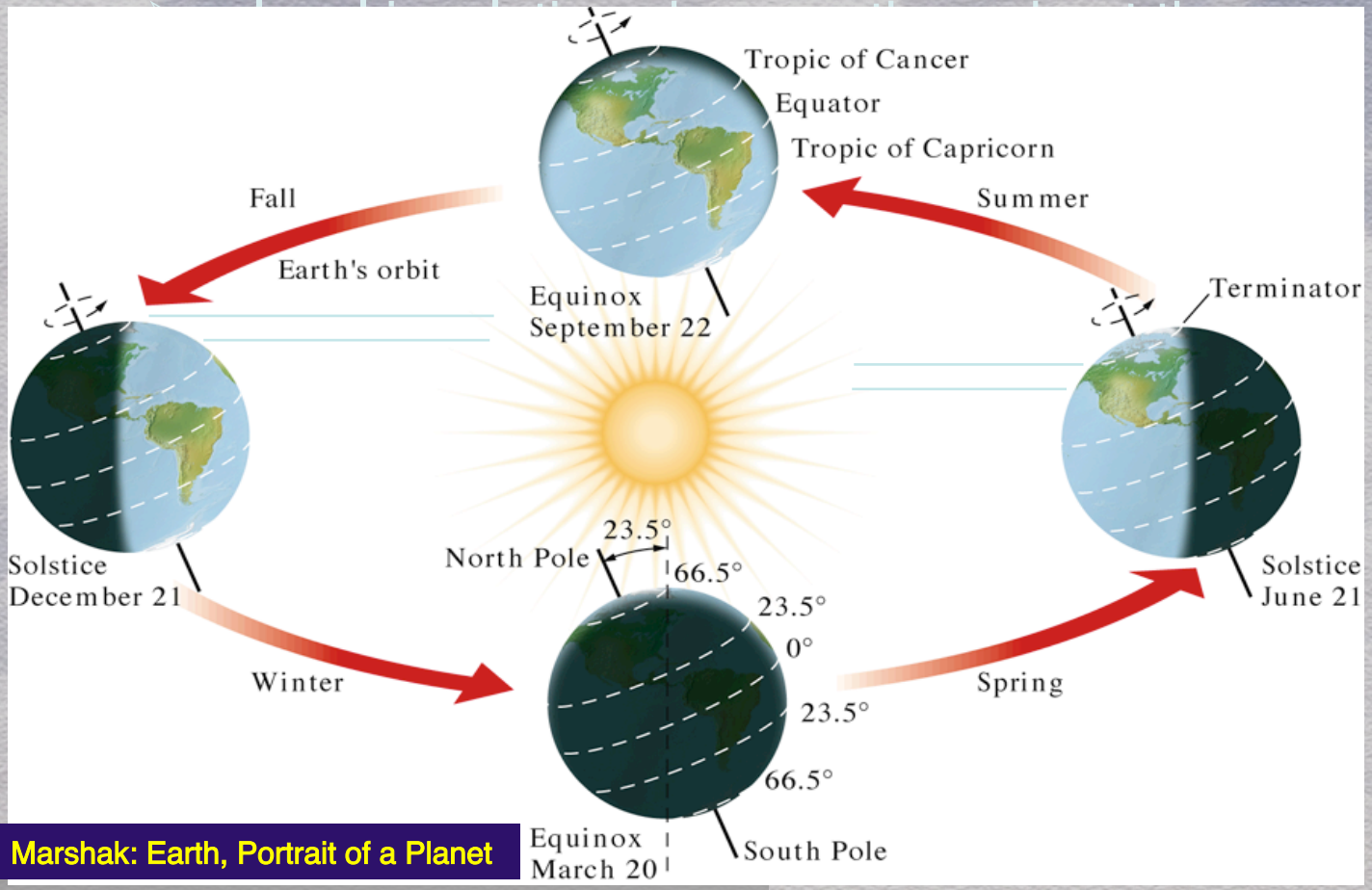
5) if summer in N. hemisphere
-> winter in S. hemisphere
and vice versa

Northern Summer

Northern Winter

Why does Earth have Seasons?

1) Earth's rotation axis is tilted
2) tilted axis orbits Sun
   - sun in zenith at different times (+/- 23.5° N/S)



Marshak: Earth, Portrait of a Planet