

The Cookie Quiz



Throw away

Put in pocket

Hold in clenched fist

Eat one ...

*Alpha
cookie*

*Gamma
cookie*

*Beta
cookie*

*Neutron
cookie*



**GOAL: Minimize your
radiation exposure**

Alpha-particle

Energetic helium nucleus

Beta-particle

Energetic electron

Gamma-ray

**Energetic (high frequency) form
of light**

**Neutron
nucleus**

Neutral particle, part of the

**Some or all of the above are typically emitted when a
radioactive nucleus decays**

Alpha particle	very short range	Piece of paper
Beta	Medium range	Thin piece of e.g. Al
Gamma-ray	Long range	1-2 inches of lead
Neutron	Long range	~ Feet of paraffin (or water or people)

To do damage ...

**The radiation needs to be absorbed by the cells
in your body**

If it passes right through you then ... so what!

Alpha ... particularly 'bad' if ingested

To do damage ...

You need to get a big enough `dose`

Radiation Worker 5000 mrem (5 rem) per year

**This is WELL below any
known danger level**

General Public 500 mrem/year

To be sure to be sure

**... in addition to the exposure we all get every day from
just being alive!**

Typical Doses ...

Coast-coast airplane trip	5 mrem
Chest x-ray	8 mrem
Dental x-ray	10 mrem
Head/Neck x-ray	20 mrem
CT (head and body)	1100 mrem
Therapeutic thyroid treatment (whole body)	7000 mrem
Average dose to U.S. public (all sources)	360 mrem

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**GOAL: Minimize your
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The Cookie Quiz: Answer 1

Throw away

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*Alpha
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Eat one ...

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The Cookie Quiz: Correct Answer



Throw away

*Alpha
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cookie*

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Eat one ...

**GOAL: Minimize your
radiation exposure**

Mutiny at once

Retire from the navy and

Toss ALL cookies away