



# SCOUTMASTER BUCKY

2024 Class Preparation Page - for IN-PERSON class only

## Nuclear Science Merit Badge



### Expectations

- Read and Review **ALL** requirements prior to the class  
Even though a requirement may be identified as one to be done in class, Scouts are still expected to familiarize, review, and prepare for the requirement – BE PREPARED!
- Active interaction/participation is expected and mandatory.
- Share in your own words – avoid reading your answers.
- Pay attention to the action verbs.
- Bring proof of completion (even partially completed work)



### Things to Remember to Bring

1. Your BSA ID# and /or your Merit Badge Blue Card properly filled out and signed off by your Scout Leader
2. Scout Uniform
3. Notes and Questions from reading the Nuclear Science Merit Badge Pamphlet
4. Supporting documentation or project work pertinent to this merit badge which may also include a Merit Badge Workbook for reference with notes.
5. A positive Scouting focus and attitude

### Contact Scoutmaster Bucky



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## Nuclear Science Merit Badge

### Requirements Insight

Requirements	Expectations
1, 2a, 7, and 8	<p>If you have prepared ahead of time, you will be able to successfully complete these requirements and requirement components during the class.</p> <ul style="list-style-type: none"> <li>Time will be allotted for those Scouts who have prepared to share their work for sign off consideration</li> </ul>
2b	<p>Scouts are encouraged to get started on their models ahead of the class.</p> <ul style="list-style-type: none"> <li>While there will be some time allotted during the class to work on the models, those not starting ahead of the class will find it difficult, if not impossible, to complete this component as a part of the class. <b>Be Prepared.</b></li> </ul>
3	<p>Scouts are strongly recommended to prepare for Requirement 3b which will be discussed in class.</p> <ul style="list-style-type: none"> <li>Time will be allotted for those Scouts who have prepared (for either Requirement 3a or 3b) to share their work for sign off consideration</li> </ul>
4	<p>This requirement will be done as a part of the class.</p> <ul style="list-style-type: none"> <li>While the instructor / counselor will facilitate this requirement during the class, Scouts must still successfully participate in the activities and discussions the instructor / counselor leads in order to receive sign off consideration.</li> </ul>
5	<p>Scouts are requested to prepare for discussion on Requirement 5b for this class.</p> <ul style="list-style-type: none"> <li>Time will be allotted for those Scouts who have prepared (for any option in requirement 5) to share their work for sign off consideration</li> <li>Don't forget to prepare your discussion notes on "the principles of radiation safety" as stated in the Requirement.</li> </ul>
6	<p>This requirement will partially be done as part of the class.</p> <ul style="list-style-type: none"> <li>The instructor / counselor will facilitate the interactive part of this requirement during the class.</li> <li>Don't forget to prepare your discussion notes on "how nuclear energy is used to produce electricity" as this is a part of the requirement that you will need to have prepared for prior to the class.</li> </ul>

$F = \frac{q_1 q_2}{4\pi\epsilon_0 r^2}$   
 $\vec{E} = \sum \vec{E}_i$   
 $R = \sigma T^4$   
 $\sigma = 5.67 \cdot 10^{-8} \frac{W}{m^2 \cdot K^4}$   
 $R = \alpha T^4$   
 $\lambda_m = \frac{b}{T}$   
 $b = 2.9 \cdot 10^{-3} m \cdot K$   
 $\Phi = \int B \cos \alpha ds$   
 $\frac{1}{\lambda} = RZ^2 \left( \frac{1}{m^2} - \frac{1}{n^2} \right)$   
 $C = \frac{\epsilon_0 \epsilon S}{L}$   
 $L = \mu \mu_0 n^2 V$   
 $\Psi_n = \sqrt{\frac{2}{l}} \sin \frac{n\pi x}{l}$   
 $\omega = \sqrt{\omega_0^2 - \beta^2}$   
 $E = mc^2$   
 $h\nu = A + \frac{mv_{ma}^2}{2}$   
 $p = \frac{mv}{\sqrt{1 - \frac{v^2}{c^2}}}$   
 $R = \frac{W}{E \cdot t}$   
 $p = \frac{1}{c} \sqrt{W_x(W_x + 2E_0)}$   
 $E_{cb} = \Delta mc^2$   
 $E_n = \frac{h^2}{8ml^2} n^2$   
 $\sigma = en(u_n + u_p)$   
 $G_2 = \frac{1}{2} \cdot \hbar \omega (n - 2)$   
 $\beta_1 = \frac{1}{2} \cdot \hbar \omega (n - 1)$   
 $G_0 = \frac{1}{2} \cdot \hbar \omega (n - 0)$   
 $\chi = \eta \frac{R}{\lambda}$   
 $R_x = \frac{3\hbar}{8} \frac{r}{ne}$   
 $p = p_0 e$   
 $\psi = N e^{\frac{r}{\lambda}}$   
 $\lambda = \frac{h}{p}$   
 $\lambda_K = \frac{hc}{A}$   
 $W = mg \cdot h$   
 $\langle v \rangle = \sqrt{\frac{3RT}{\pi m_0}} = \sqrt{\frac{3RT}{\pi \cdot 2 \cdot 10^{-3}}}$