EO C440.11 – WATCH EINSTEIN'S BIG IDEA

1. **Performance**: Watch *Einstein's Big Idea*

2. **Conditions**:

   a. Given:

      (1) Supervision, and

      (2) Assistance as required.

   b. Denied: Nil.

   c. Environmental: Classroom or training area large enough to accommodate the entire group.

3. **Standard**: The cadet shall watch *Einstein's Big Idea* and discuss the history of the formula $E=mc^2$, to include:

   a. development of physics,

   b. applications of nuclear physics, and

   c. history of the principle investigators.

4. **Teaching Points**:

TP	Description	Method	Time	Refs
TP1	Conduct an activity where the cadets: a. define the word "energy"; b. describe what kinds of energy they have used today; and c. describe the difference between sources of energy (eg, sun, wood, oil, wind, or food) and energy itself (eg, light, heat, electrical or mechanical action).	In-Class Activity	5 min	C3-319 (p. 3)
TP2	Have the cadets determine that atoms of matter have mass by: a. examining a list of common materials; b. determining what elements are in those materials; c. locating the elements in a periodic table; and d. determining the mass of those elements' atoms.	In-Class Activity	10 min	C3-319 (p. 3)
TP3	Have the cadets watch *Einstein's Big Idea* and make notes on topics assigned, to include: a. energy, b. mass, c. light, d. velocity,	In-Class Activity	110 min	C3-320

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TP	Description	Method	Time	Refs
	e. development of the equation $E=mc^2$, and f. confirmation of the equation $E=mc^2$.			
TP4	Conduct an activity to create a timeline of the development of the formula $E=mc^2$.	In-Class Activity	15 min	C3-319 (pp. 4–5)

5. **Time**:

a.	Introduction / Conclusion:	10 min
b.	In-Class Activity:	140 min
c.	Total:	150 min

6. **Substantiation**: An in-class activity was chosen for this lesson as it is an interactive way to provoke thought and stimulate interest among cadets about the development of the formula $E=mc^2$.

7. **References**:

   a. C3-319 NOVA. (2005). *Teacher's guide: Einstein's big idea*. Retrieved January 30, 2009 from http://www.pbs.org/wgbh/nova/einstein/

   b. C3-320 Johnstone, G. (Producer & Director). (2005). *Einstein's big idea* [Motion picture]. United States: WBGH Educational Foundation.

8. **Training Aids**:

   a. Presentation aids (eg, whiteboard / flip chart / OHP / multimedia projector) appropriate for the classroom / training area, and

   b. *Einstein's Big Idea* DVD.

9. **Learning Aids**:

   a. Periodic table, and

   b. Note template handout.

10. **Test Details**: Nil.

11. **Remarks**:

   a. If EO C440.09 (Describe the Relationship Between Gravity and Space-Time) or EO C440.10 (Discuss Kinetic and Potential Energy) are also selected, they should be presented prior to this lesson to introduce concepts of energy.

   b. It is recommended that Chapters 1–6 of *Einstein's Big Idea* be presented in three consecutive periods and Chapters 7–9 be presented in two consecutive periods, all on two consecutive training days.

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