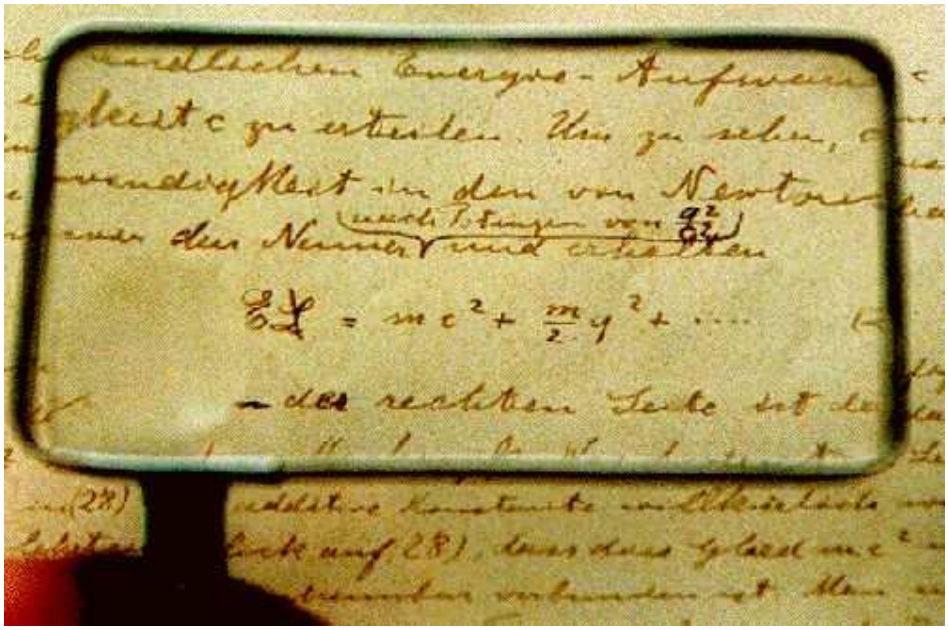
$E=mc^2$

Aim: To show a copy of a detail of Einsteins' original manuscript.

Subjects: 7F10 (Relativity)

Diagram:



Equipment:

- Picture of original manuscript (see Diagram).
- Beamer to project image.

$E=mc^2$

Presentation: The theory has already been treated, and somewhere on the blackboard there is $E = \gamma(v)mc^2$, and

$$\gamma(v) = \frac{1}{\sqrt{1-\frac{v^2}{c^2}}} \approx 1 + \tfrac{1}{2}\frac{v^2}{c^2} + \tfrac{3}{8}\frac{v^4}{c^4} + \ldots\ldots$$

Coffeebreak follows and during that break we project the image of the manuscript. When students enter again they see the manuscript.
At restart of the lecture the correspondence between the manuscript and the writing on the blackboard is shown to the students.

Explanation: Textbooks present the explanation.
Importance of the demonstration is that it can be stressed that $E=mc^2$ as you see it on T-shirts etc. is an interpretation of Einstein's way of presenting kinetic energy: When you write $E=mc^2$, $E=\gamma mc^2$ is interpreted as an expansion for the inertial mass:

$$m\gamma(v) \approx m_0 + \tfrac{1}{2}m_0\frac{v^2}{c^2} + \tfrac{3}{8}m_0\frac{v^4}{c^4} + \ldots\ldots$$

Sources:

- McComb,W.D., Dynamics and Relativity, pag. 247-248 and 301