

National Science Foundation – TUES Program

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FOLLOW THE GUIDELINES

- Catastrophic consequences
 - TUES Type 2 – Multi-institutional
- Creates doubt about attention to detail

Other General Recommendations

- Need an excellent idea
- Informally test your ideas on colleagues
- Find colleagues who will provide substantive and critical comments on drafts of your proposal
- Listen to those colleagues
- If the proposal is rejected, resubmit and address the criticisms of the reviewers
 - Unless idea does not merit funding
- Talk to the program officers

Review Criteria (NSF)

- Intellectual Merit
- Broader Impact
- Project summary must have a distinct paragraph on each – proposal must clearly address each
- Reviewers must specifically evaluate each (separate sections on reviewer's form)

Components of an NSF Proposal

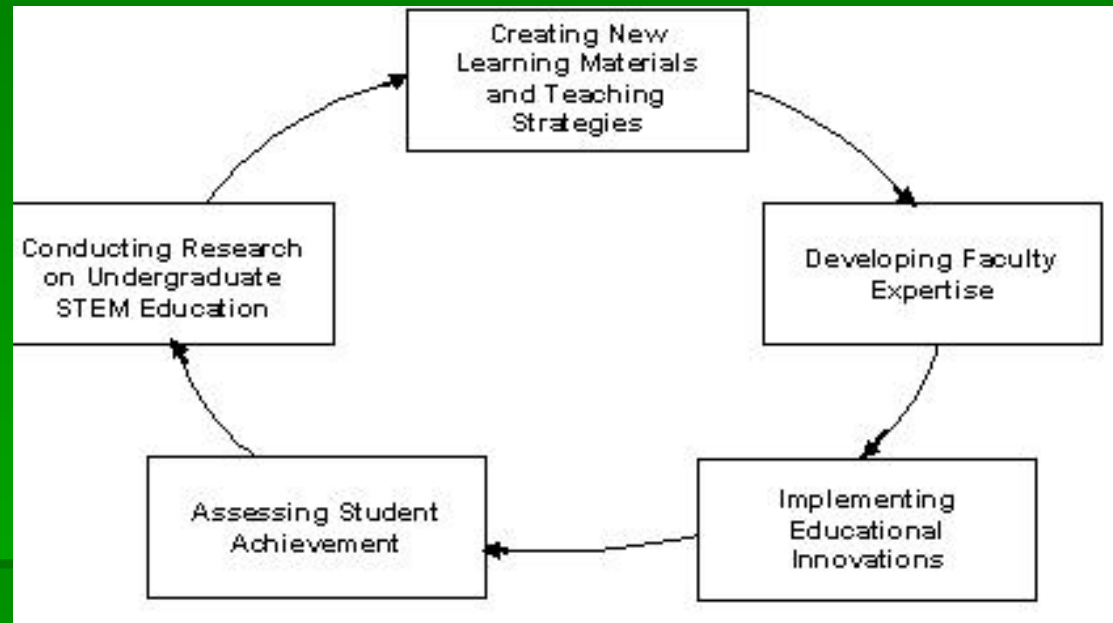
- Project Summary (1 page)
- Project Description (15 pages)
- Literature References
- Biographical Sketch (2 pages)
- Budget and Justification
- Current and Pending Support
- Facilities and Equipment

TUES Program

- Type 1 (\$200K) - \$250K if have significant involvement of a community college
- Type 2 (\$600K) – multi-institutional, far-reaching in scope
- Type 3 (\$\$\$\$\$) – national project

Cycle of Learning

- Five steps:



- Type 1 projects typically will address one program component and involve a limited number of students and faculty members at one academic institution.

Type 1 – What can you ask for?

- Instructional equipment
- Summer salary for laboratory/material development
 - Usually 1 month (2 months – must justify)
- Travel
 - To observe other methods
 - To disseminate results
- Consultant(s)
- Assessment

High Quality Learning Experience

- Must be new – can't just be replacing equipment to continue what is already being done
- Curriculum needs to move in a new and improved direction
- Inquiry/discovery-based experiences

Desired Learning Outcomes

- *Knowledge outcomes* – “..particular areas of disciplinary or professional content that students can recall, relate, and appropriately deploy.”
- *Skills outcomes* – “the learned capacity to do something – for example, think critically, communicate effectively, productively collaborate, or perform particular technical procedures – as either an end in itself or as a prerequisite for further development

- Affective Outcomes – “..usually involve changes in beliefs or in the development of particular values, for example, empathy, ethical behavior, self respect, or respect for others.”
- Learned abilities – “..typically involve the integration of knowledge, skills, and attitudes in complex ways that require multiple elements of learning. Examples embrace leadership, teamwork, effective problem-solving, and reflective practice”

From Ewell, P.T., *Accreditation and Student Learning Outcomes: A Proposed Point of Departure*, Council for Higher Education Accreditation (CHEA) Occasional Paper, Washington, DC, September 2001

Base on Prior Work

- NSF reports
 - Other NSF-funded projects
 - Other educational/scientific reports
 - Other publications that inspire/guide your plans
 - Pilot work you have already done
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- Thorough literature review/references

Provide Specific Examples of Discovery-Based Activities

- Sprinkling the words “discovery-based” throughout is not enough
- Do not provide example experiments that are cookbook
- If sample experiment is too long to include, put up on a web site and put URL in text of proposal
- Best if can provide specific examples for each course involved in proposal

Implementation Plan/Timeline

- When curriculum development will occur
- When changes incorporated into courses
- Formative/summative assessment plans

Describe Research Uses

- Academic and summer to show that equipment will be used year round
- Better if a serious research program
 - one that leads to expected outcomes of research (peer-reviewed publications, conference presentations)

Assessment Plan

- Use established processes that already exist at the institution (student evaluation of courses)
- Better to bring in an expert to do this – institutional research officer, faculty member with demonstrated experience
 - Need to show this person's expertise – mention in text – include biographical sketch

Dissemination

- More than putting on web site
- Conference talks
- Discipline-specific networking opportunities
- Peer-reviewed publications (although helps if already have a track record)

Institutional Support and Matching Funds

- Officially – these are not allowed
 - Can't be put into the budget
- Practically – they are allowed
 - Show budget of \$200K
 - Put matching component into budget justification
- Need letter of commitment
 - Attach as appendix

Other Institutional Support

- Travel support
 - Student assistants to help with project
 - Department funds for materials and supplies
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- Include in the budget justification

“Obtaining Equipment Through Curriculum Development Grants,” Wenzel, T.J., *Journal of Chemical Education*, **2010**, 87, 1128-1130.