



# Broader Impacts: K-12 STEM Education Outreach

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# Types of Education Outreach

1. Informal science education
2. Teacher professional development
3. Student programs



# 1. Informal Science Education

- Outstanding local informal science institutions:

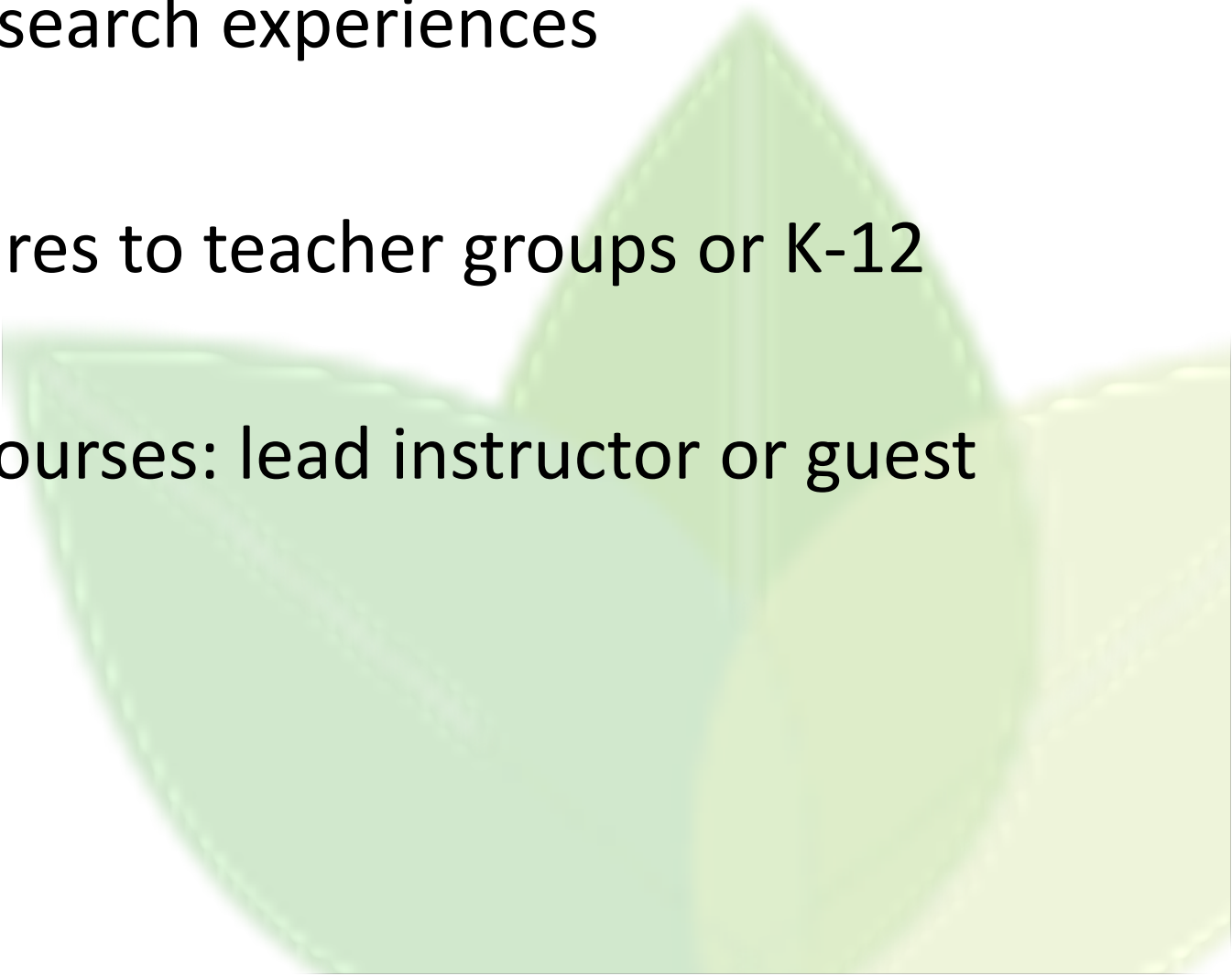


Missouri  
Botanical  
Garden

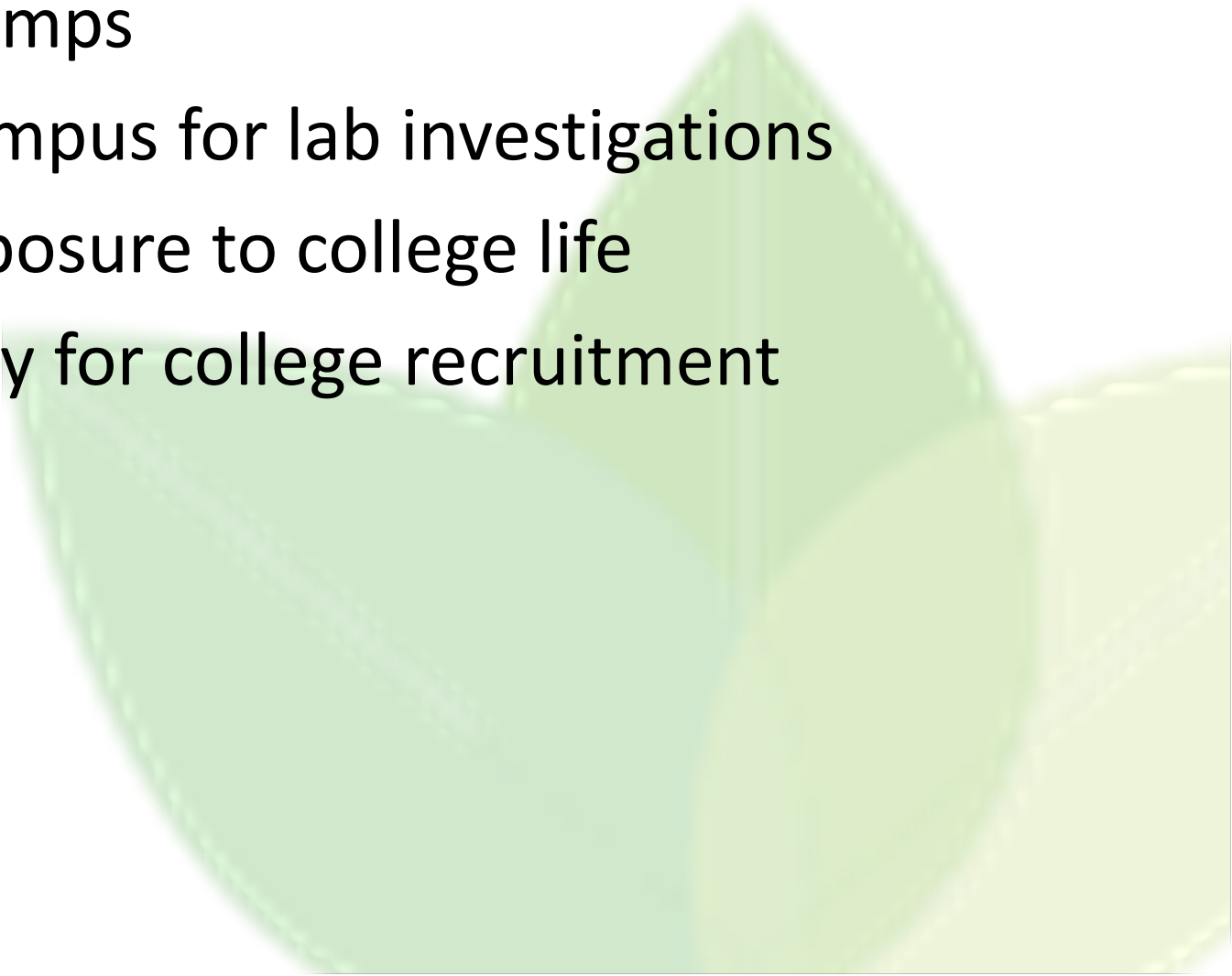


- Missouri Department of Natural Resources sites, Tyson Research Center
- Reach broad audiences; not specific
- Connections to special days or events
- Large impact numbers


## 2. Teacher Professional Development

- Summer research experiences
  - Workshops
  - Guest lectures to teacher groups or K-12 classes
  - Graduate courses: lead instructor or guest lecture
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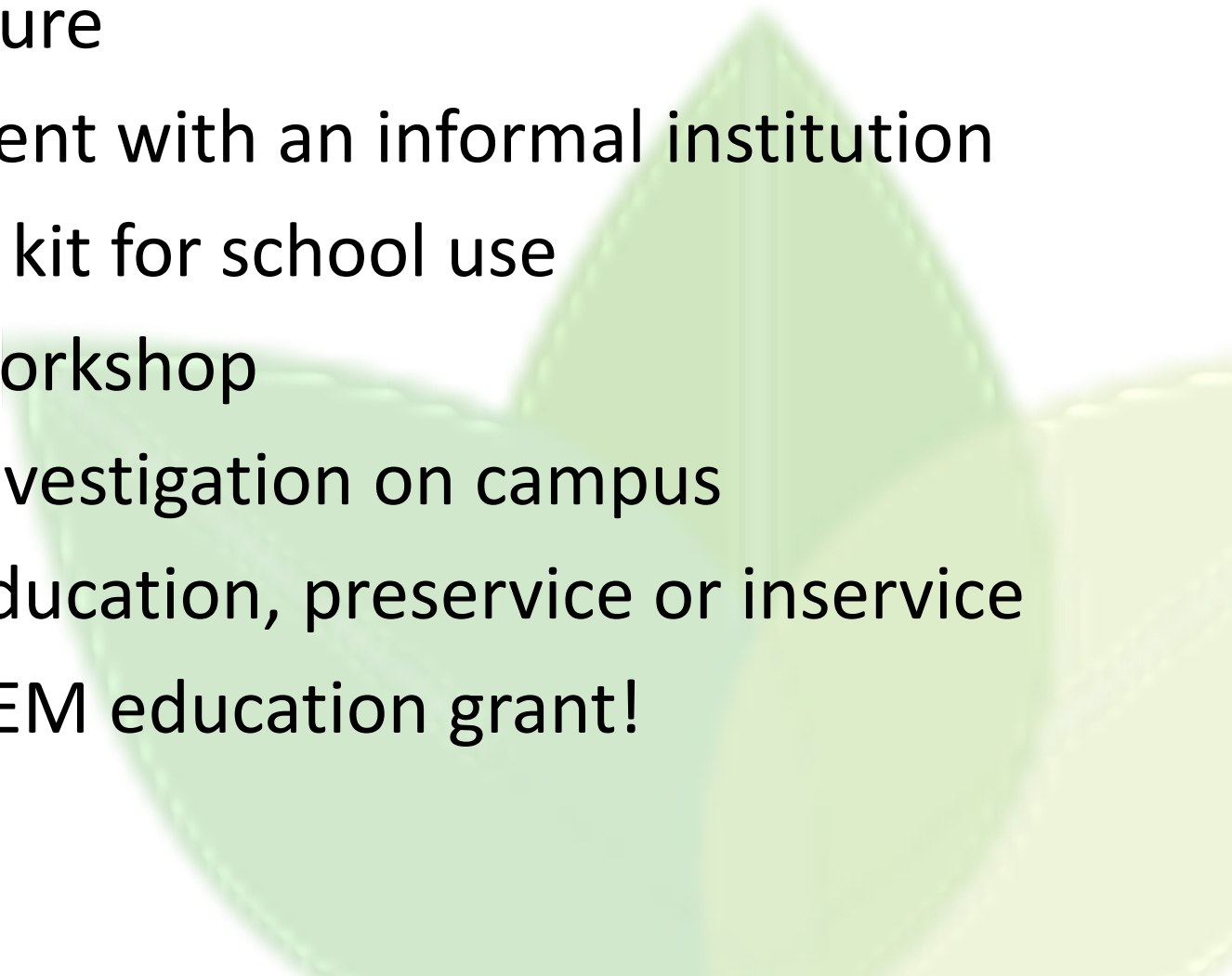
## 3. Student Programs

- Summer camps
  - Visits to campus for lab investigations
  - Provide exposure to college life
  - Opportunity for college recruitment
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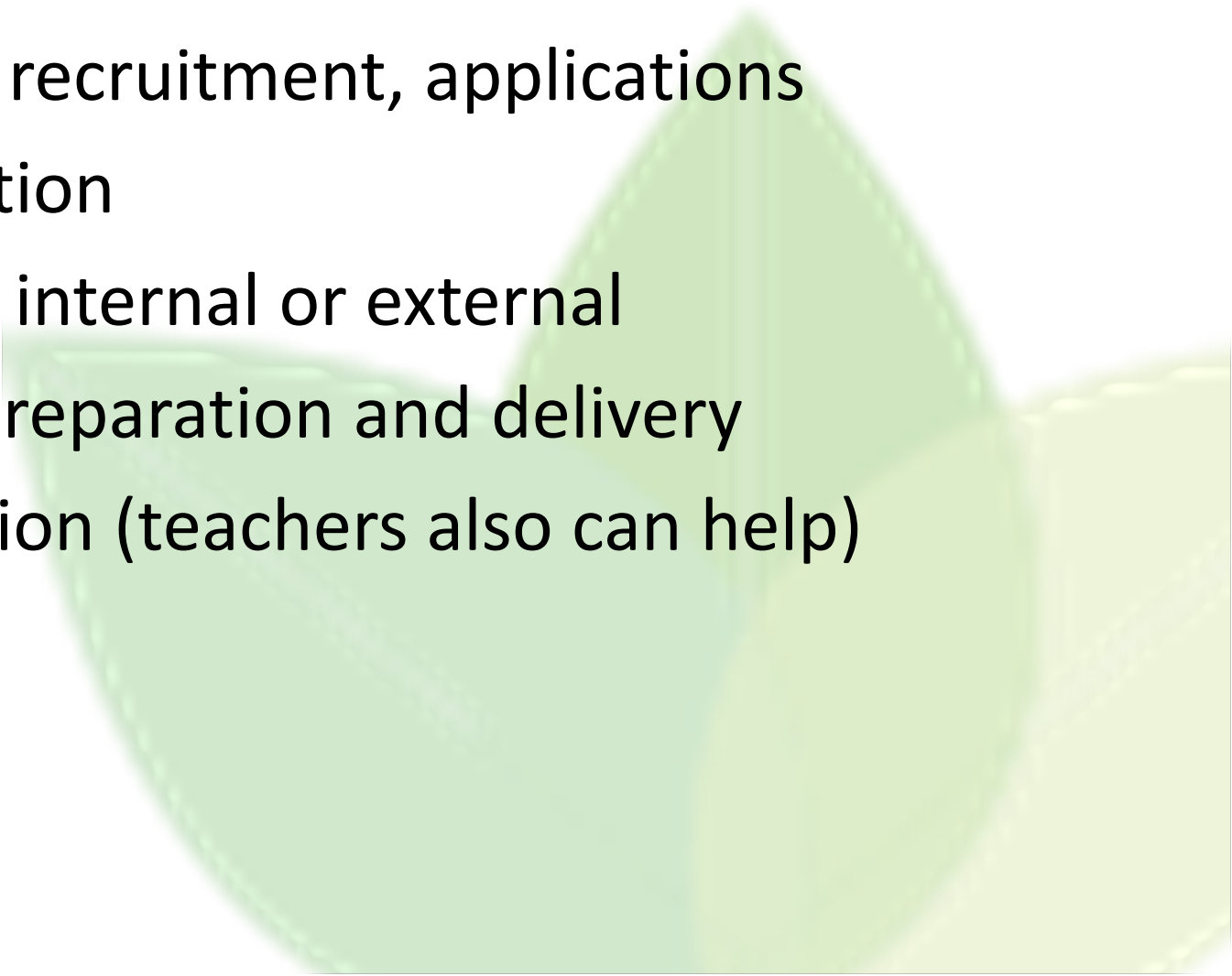
# How to choose?

- Research topic appropriateness
  - Lab personnel abilities and interests
  - Time
  - Scheduling/time of year
  - Special events can offer opportunities for outreach
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# Time factor

1. Guest lecture
  2. Special event with an informal institution
  3. Develop a kit for school use
  4. Teacher workshop
  5. Student investigation on campus
  6. Teacher education, preservice or inservice
  7. PI on a STEM education grant!
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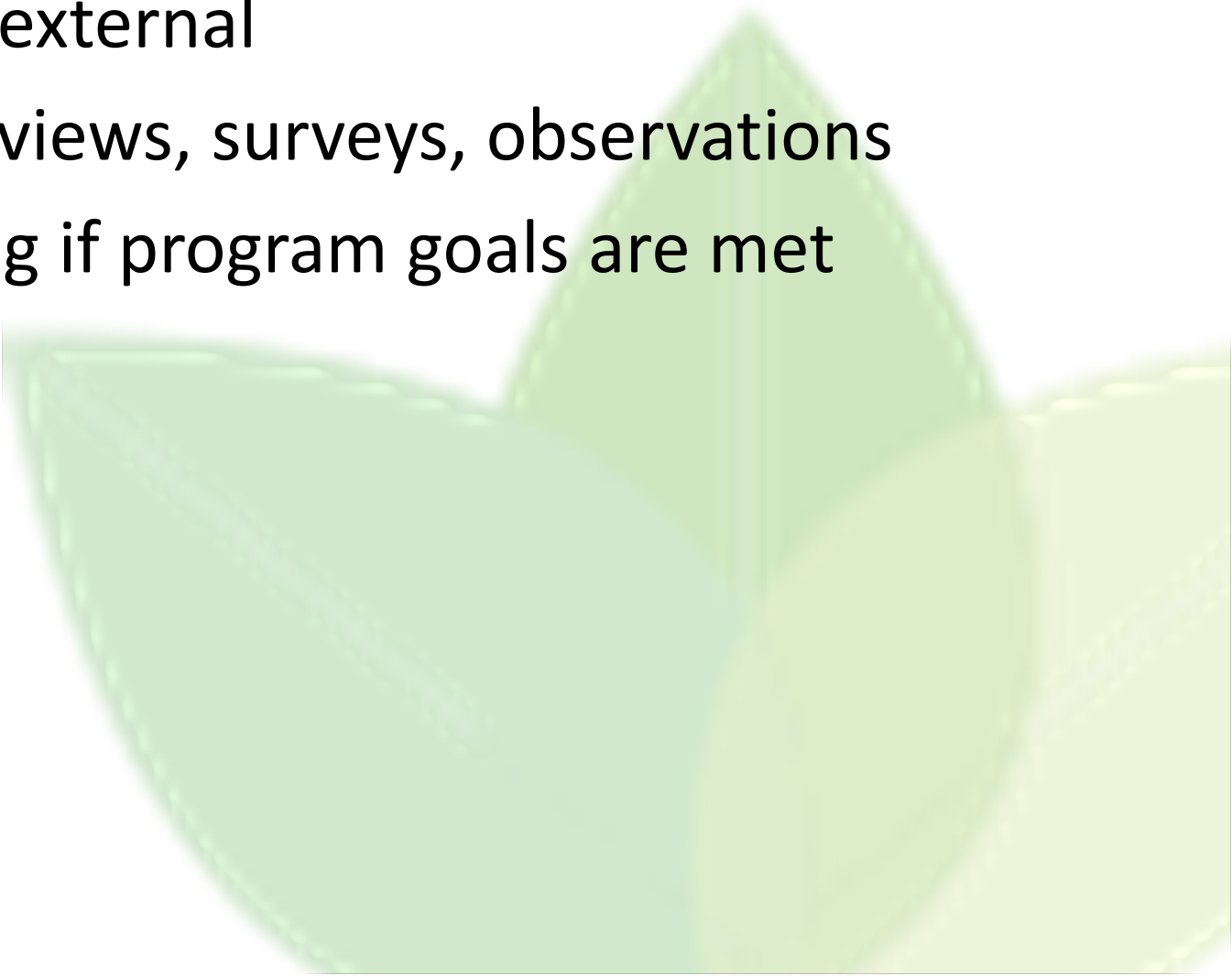
## **Institutional support -- or inter-institutional partnership -- can help with**

- Marketing, recruitment, applications
  - Administration
  - Evaluation: internal or external
  - Materials preparation and delivery
  - Dissemination (teachers also can help)
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# K-12 Challenges

- High stakes testing
- Turnover in staff, teachers, students
- Funding cuts affect transportation, field trips, lab equipment, teacher learning opportunities
- Students who've never visited a college campus
- Kids -- and teachers -- *who've never met a scientist*

# Evaluation

- Internal or external
  - Tools: interviews, surveys, observations
  - Determining if program goals are met
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# Costs

- Substitute teachers: \$100/teacher/day
- Buses: \$250/40 students
- Teacher research stipends: \$800/week
- Evaluation: \$2,000-\$3,000
- Food and materials
- Campus tours: free from Admissions

# Deliverables

- Curriculum published on web
- Pre-post testing data
- Dissemination through teacher conferences
- Education journal publications
- Impact: numbers of visitors, teachers, classrooms, students (One high school teacher can have 100-150 students *each year*)

# Public awareness organizations

- Science and Citizens Organized for Purpose and Exploration (SCOPE)
- Academy of Science of St. Louis
- Junior Academy of Science
- Missouri Math and Science Coalition (formerly METS)

# Education administrator organizations

- St. Louis Area Science Leaders Network (SASLN)
- Math coordinators group
- Cooperating School Districts

# Teacher organizations

- Missouri Environmental Education Association (MEEA)
- Science Teachers of Missouri (STOM, NSTA chapter)
- St. Louis Area Physics Teachers (SLAPT)
- American Chemical Society St. Louis

# College readiness programs

- Gear Up, UM St. Louis
- College Bound
- College Summit
- Scholarship Foundation of St. Louis

# Local issues

- Fragmented political and district boundaries
- Multiple school districts in St. Louis County
- Homogeneous populations within districts

*All lead to greater inequities; but allow for differentiated approaches.*

# STEM business focus

- Engineering (Boeing and Emerson)
- Life sciences and biotech (Monsanto)

# P-20 pipeline

- Coordination is needed
- Support for transitions is critical
- Longitudinal achievement data linked to individuals is needed