**Blue Waters Petascale Semester Curriculum v1.0**

**Unit 6: Hybrid MPI + OpenMP**

**Lesson 3: Pebble in Pond Wave Equation**

**Sample Assessment**

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*Browse and search the full curriculum at*[*http://shodor.org/petascale/materials/semester-curriculum*](http://shodor.org/petascale/materials/semester-curriculum)

*We welcome your improvements! You can submit your proposed changes to this material and the rest of the curriculum in our GitHub repository at*[*https://github.com/shodor-education/petascale-semester-curriculum*](https://github.com/shodor-education/petascale-semester-curriculum)

*We want to hear from you! Please let us know your experiences using this material by sending email to* [*petascale@shodor.org*](mailto:petascale@shodor.org)

1. What computer architecture features are needed for OpenMP.
2. Why compute intensive loops need speedup and how multi-thread and multi-core can help?
3. What are the main differences between MPI and OpenACC/OpenMP?
4. Describe a scenario or scientific application that could benefit from MPI, and then extend to using OpenMP.
5. What language compilers and operating systems support both MPI and OpenMP.
6. How programs run times scale as problem data sets get larger.
7. What is algorithm complexity?