

# Modeling real-life situations with functions and GeoGebra in mathematical education

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- Due to its features, the **modeling** based lessons are an excellent tool for learning and teaching mathematics.
- In this presentation, we propose the use of **GeoGebra** in modeling-based **teaching** of mathematics.

# Modeling-based teaching

- Supported by new technologies, model-based teaching and learning move beyond the traditional views of mathematics and mathematics teaching.
- through mathematical and didactical modeling, theoretical perspectives and examples of practice for enhancing students' mathematical understanding are provided.

# GeoGebra

- Designed specifically for teaching mathematics, GeoGebra integrates dynamic multiple representations in a conceptually rich learning environment that supports the exploration, construction, and evaluation of mathematical models and simulations.

# The GeoGebra`s facilities allow the teacher to:

- give high quality, attractive presentations linking to real world situations that interest students,
- provide support for students to engage in problem solving related to real world situations,
- set tasks that allow students to explore mathematical regularities and variation within one mathematical representation
- set tasks that allow students to explore mathematical ideas by linking different mathematical representations of mathematical objects.

# Teachers

- The question of what teachers need to know in order to incorporate technology into their teaching has received a great deal of attention in the last decade.
- Knowledge of technology cannot be isolated from the content, and good mathematics teaching requires an understanding on how technology is related to the pedagogy and mathematics (Hughes, 2005).

# With the *GeoGebra*,

Teachers are able to make graphical representations of math concepts.

As the concepts are introduced with visual representations, teachers and their students are able to make the connections between the pictures, the mathematical concepts, and the symbolic representation.

Technology makes all of this possible in a short amount of time.

That is the reason why

- methodological innovations in teaching mathematics,
  - professional development of teachers of mathematics in primary and secondary schools,
  - application of computer as a teaching aid, connections between mathematics and other subjects,
  - and mathematical modeling
- should be initiated.



# Examples: The real-life problems & GeoGebra models

- As will be shown, the facility to prepare high quality, attractive presentations quickly is an advantage for the teacher.
- Modeling-based teaching, not only capture students' attention but also may lessen the immediate cognitive load for the teacher as they deal with the class, the mathematics and the technology.

# Earthquake in Japan



Претражи Прегледај Стре

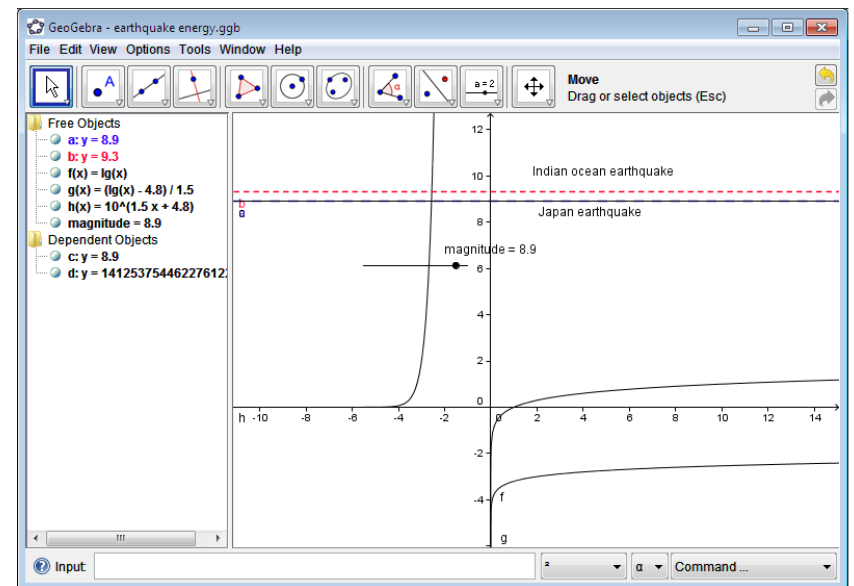
20/20 from ABC News: Japan Earthquake Pictures, Video. Disaster in the



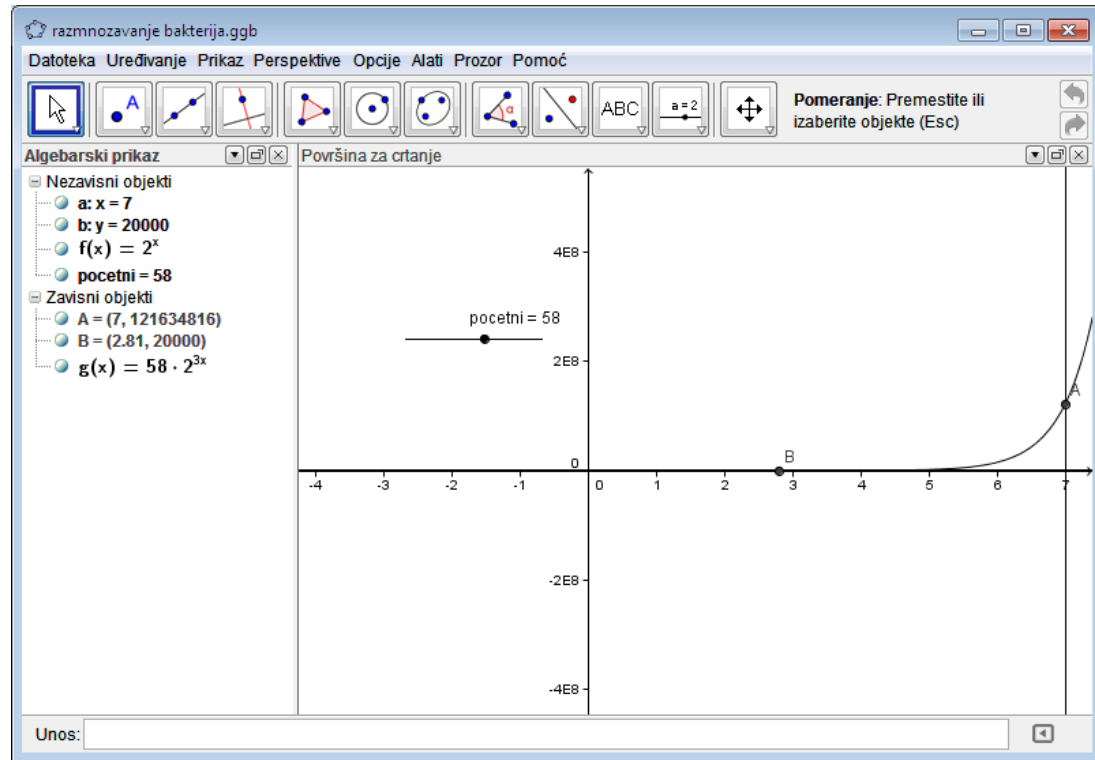
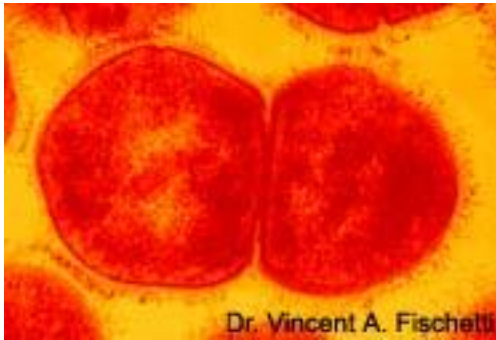
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# Bacteria growth



# Biorytham of a football player

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13. 06. 2010. 09:15h | Z. Kecman | foto: FoNet  
BIORITAM „ORLOVA“ ZA MEČ SA GANOM

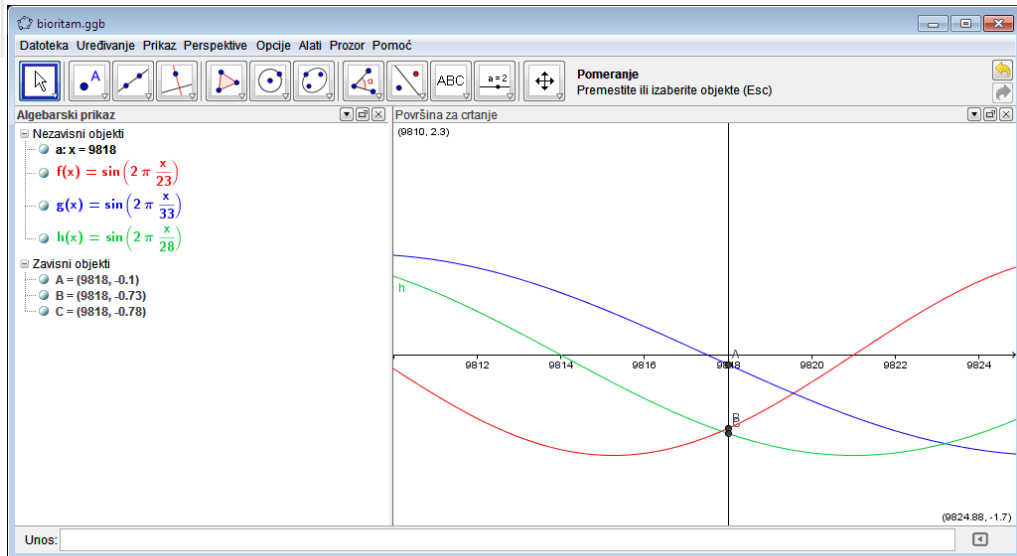
## Kumovi vode do pobede

Uspeh reprezentaciji Srbije u meču sa Ganom mogli bi da donesu kumovi, Dejan Stanković i Marko Pantelić! Oni su igrači sa najjačim bioritmickim potencijalom za danas.



Teorija bioritma, koji je naučno priznat za razliku od horoskopa, kojeg i dalje osporavaju, polazi od činjenice da čovek od svog rođenja prolazi kroz određene cikluse koji se ponavljaju do kraja života. Tri najpoznatija bioritma su fizički (traje 23 dana), emotivni (28) i intelektualni (33). Tako svako od nas prolazi kroz povoljne, nepovoljne i kritične trenutke, pa se to odnosi i na fudbalere koji će danas krenuti u prvu mundijalsku bitku pod imenom Srbije.

U analizi valja poći od glavnog stratega, u ovom slučaju Radomira Antića. Za jednog selektora nije bitno da ima snažan fizički bioritam jer on ne igra, ali je zato jako bitno kako stoji u smislu intelekta i intuicije. Zato, srpski fudbalski korpus može da bude miran, selektor je danas na intelektualnom maksimumu, što označava dobar dan za donošenje velikih odluka. Možda je „tanji“ po pitanju intuicije i čitanju namera protivnika, ali će na terenu, kad meč počne, uspeti da se prilagodi situaciji.



# Conclusion

- Modern students are computer literate and use computers as part of their everyday life. That is a very good reason why computer should become a part of their education, especially mathematics education.
- The availability of free educational software such as *GeoGebra* leaves no room for excuses of not integrating computer-aided mathematical lessons based on the modeling of real-life problems in high school curricula.

As Abramovich and Leonov (2009) put it,

- “The importance of the motivation of mathematical concepts by concrete examples in the teaching of mathematics stems from the commonly accepted notion that, nowadays, students are interested in the study of the subject matter if they are confident in the applicability of the material they are about to learn”