



PEMBELAJARAN IPA YANG BERMAKNA



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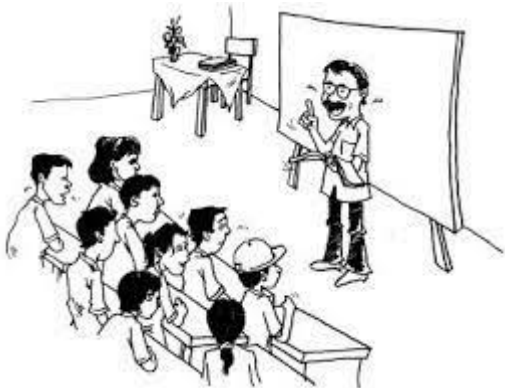
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Pembelajaran Bermakna??

1. **Active learning menemukan pengetahuan**
2. **Memfasilitasi perkembangan belajar siswa**
3. **Menyenangkan**
4. **Mencapai tujuan**





Mengapa Pembelajaran IPA yang bermakna?

Meningkatkan Minat belajar

Mengembangkan keterampilan abad 21

Thinking skills, Literacy, life skills

Meningkatkan kualitas pembelajaran





Dasar Mengembangkan Pembelajaran IPA yang bermakna

1. Tahap perkembangan Psikososial (Erickson T)

siswa belajar untuk menjadi diri sendiri dan membagikan konsep dirinya pada orang lain

2. Tahap perkembangan intelektual/kognitif (Piaget)

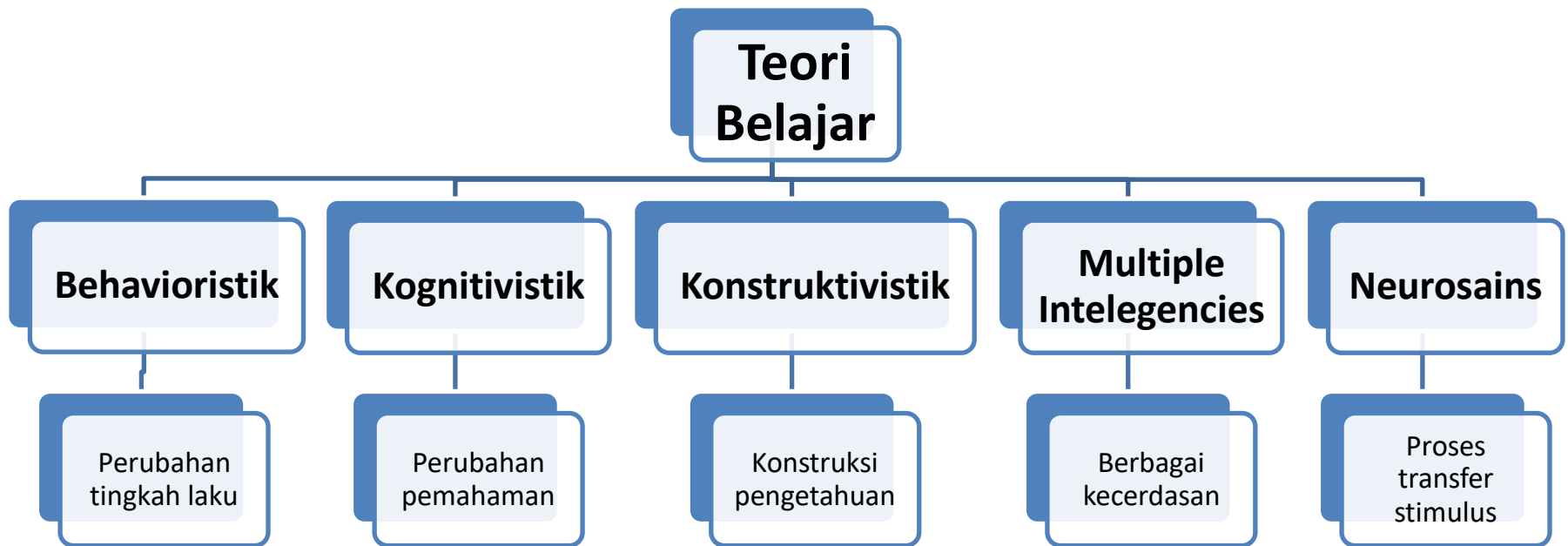
perkembangan operasional formal

3. Tahap perkembangan moral (Kohlberg)

Internalisasi individu untuk menjaga nilai tatanan sosial

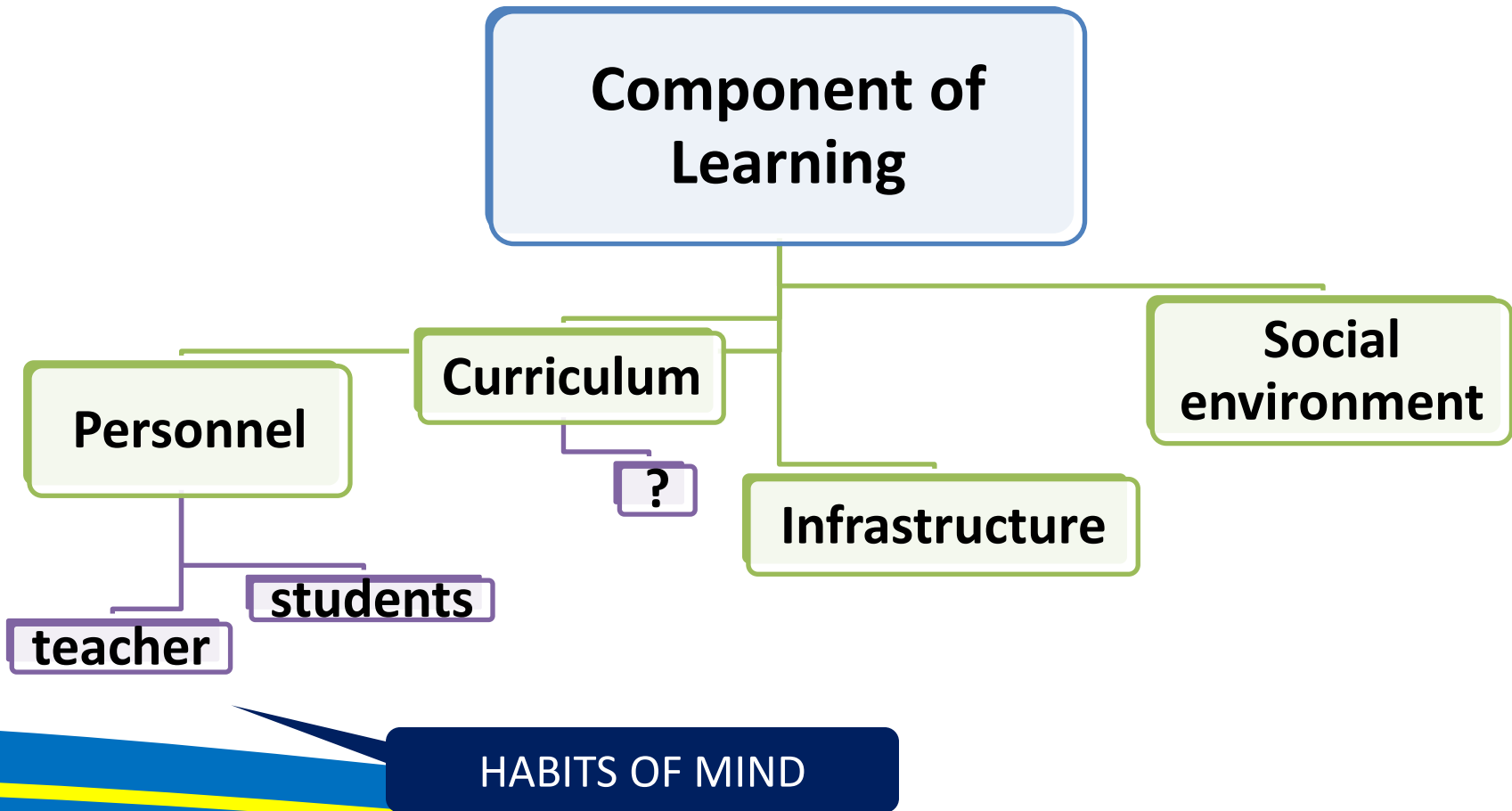


Dasar...





Where..





Curriculum

objektive

Attitude

Knowledge

Skills

Content

Characteristic, level of knowlegde, knowledge domain

Learning Activities

Models, Strategies, methods

Media & learning source

Evaluation and Assesement

assessment target

Assessment domain

Assessment Methods



MULTIMEDIA SISTEM DARING/ONLINE PERSAINGAN GLOBAL MULTITASKING





Student centered

Life-long learning

ICT (virtual) integration

Flipped classroom

collaboration

Soft-skill oriented

Hybrid learning



Fitur pembelajaran pada pendidikan era 4.0



Concept essential selection

Real life chemistry

Chemistry case of industry

4 C skills

ICT integration

Penguatan Pembelajaran IPA di era 4.0



Prinsip Pengembangan Skenario Pembelajaran

Kesiapan dan Motivasi (Readiness and motivation)

Penggunaan alat pemusat perhatian (Atten directing devices)

Materi yang relevan (Focus on relevan content)

Perulangan (Repetition)

Umpan balik (Feedback)



BEBERAPA TRENDS DALAM PEMBELAJARAN

1. **Android-Based Game**
2. **Augmented Reality**
3. **Virtual Reality**
4. **Hybrid Learning**
5. **Context-Based learning**
6. **Problem Based-learning**
7. **Project-Based Learning**
8. **STEM (Science, Technology, Engineering & Mathematics)**
9. **Multiple Representations**
10. **Literacy (Science, mathematics, reading, technology, media)**
11. **Socio-scientific Issues (SSIs)**
12. **Education for sustainable development (eg. Green chemistry)**
13. **HOTS (Higher Order Thinking Skills)**
14. **Two-Three-Tier Test**



Pernahkah terpikir?

1. Ibu-ibu memasukkan sendok saat merebus daging?
2. Ibu –ibu merebus dot bayi?
3. Membeli bakso dibungkus plastik?
4. Memilih warung untuk membeli galon air mineral?
5. Membaca kandungan makanan kemasan?
6. Pertamax lebih mahal dari premium?
7. Air jadi bahan bakar kendaraan?
8. Anak kecil bermain baterai bekas?
9. Anak –anak suka bermain game?
10. Berita hoax lebih mudah tersebar?
11. Anak-anak mengidolakan seseorang?

As learning
context



Socio-scientific Issues (SSIs)

- ❑ An issue about which there is no one fixed or universally held point of view
- ❑ An issue often divides society, because different groups may offer conflicting explanations and solutions
- ❑ SSIs dimensions; economic, political, religious, ethical, environmental, health,
- ❑ scientific, technological, societal,

road salting,
tattoo,
overhead power transmission lines,
mobile phones,
mass vaccination,
dietary supplements,
tourism in historical place(s),
acid rain

alternative medical treatment,
climate change/global warming,
nuclear power plant,
(human) cloning,
organic agriculture,
biodiversity,
Volcanoes
Birth control
Ground water



Pembelajaran berbasis STEM

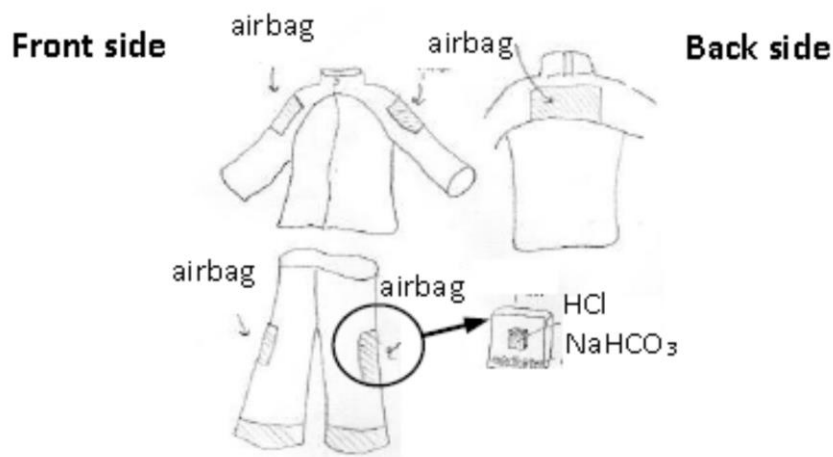
- ❑ merupakan pendekatan interdisiplin pada pembelajaran
- ❑ peserta didik menggunakan sains, teknologi, engineering, dan matematika dalam konteks nyata
- ❑ mengkoneksikan antara sekolah, dunia kerja, dan dunia global, mengembangkan literasi STEM
- ❑ memungkinkan peserta didik bersaing dalam era ekonomi baru yang berbasis pengetahuan

Dalam unit-unit pembelajaran berbasis proyek (PjBL) (project-based learning) untuk mengembangkan 4C

Development of Analytical Thinking Ability and Attitudes Science Learning of Grade-11 Students through Science Technology Engineering and Mathematics (STEM Education) Study of Stoichiometry

Patcharee Chonkaew^a, Boonnak Sukhummek^a, Chatree Faikhamta^b

The purpose of this study was to investigate the analytical thinking abilities and attitudes towards science learning of 11 students through science, technology, engineering, and mathematics (STEM) education integrated with learning in the study of stoichiometry. The research tools consisted of a pre- and post-analytical thinking science learning attitudes test, classroom observations, student reflective journals, and semi-structured findings indicated that STEM learning activities based on the problem-based learning successfully developed thinking abilities and attitudes towards science learning. Consequently, the students realized how important and were able to integrate their knowledge from various fields to solve problems and to create new innovations. The students showed higher analytical thinking ability scores above the prescribed criterion of 70% of the learning, the scores of the students were higher than those before learning at the confidence level of 0.05. The scores of the students were higher than those before learning at the confidence level of 0.05. The scores of the students were higher than those before learning at the confidence level of 0.05.



Science (S)	The mass of substances in the chemical reaction and the relationship of quantities of substances in the chemical equation
Technology (T)	Inventing mechanical parts of the life suit to make it practically and easily portable
Engineering (E)	Selecting substances to make a life suit and designing its shape
Mathematics (M)	Calculating a volume of gas produced, proper quantities of substances used for the reaction, and calculating the volume of the life suit to ensure that it had the right proportion with the gas produced

Integrating STEM to create a life suit



Sparkling tile



Hourglass



Whirling jar



Various shooting tool designs from the reaction of O_2 and H_2 gases and the real model of the automatic fishing tool.

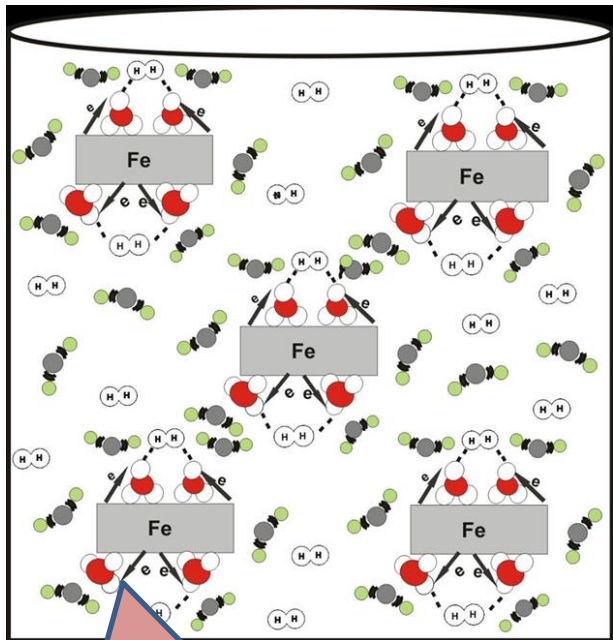
Examples of work pieces and tools designed by students



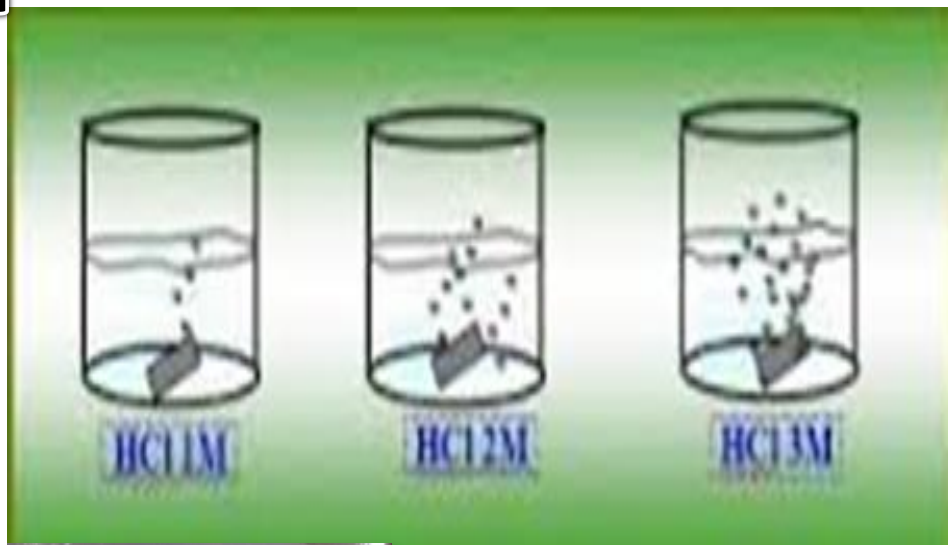
Vacuum cleaner
Hair dryer
Blender/mixer



Multiple Representation



REPRESENTASI
MIKRO



REPRESENTASI
MAKRO



REPRESENTASI
SIMBOLIK



<https://www.youtube.com/watch?v=gMxdBdLpVgc>



https://www.youtube.com/watch?v=M7kaLX4_qL0&t=250s



How...

- a. Menjadi guru pembelajar**
- b. Rajin mencari dan mengumpulkan ide baru**
- c. Berkolaborasi dan sharing pengalaman dengan kolega**
- d. Hilangkan hambatan untuk menjadi guru kreatif**
- e. Mencoba mempraktikkan ide**
- f. Lakukan refleksi**
- g. Internalisasi dalam diri bahwa menjadi kreatif itu wajib**



Skenario Pembelajaran?



Figure 1



Figure 2



Figure 3



Figure 4



THANK YOU

Name of the Presenter

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