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Wiebe Dijkstra

Blended Learning Developer

Teaching and Learning Services

TUDelft

Goals

Explain the concept of **Blended Learning**

Develop a **sequence of online and face-2-face** learning activities

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What

Why

Examples

Start

What

is blended learning?

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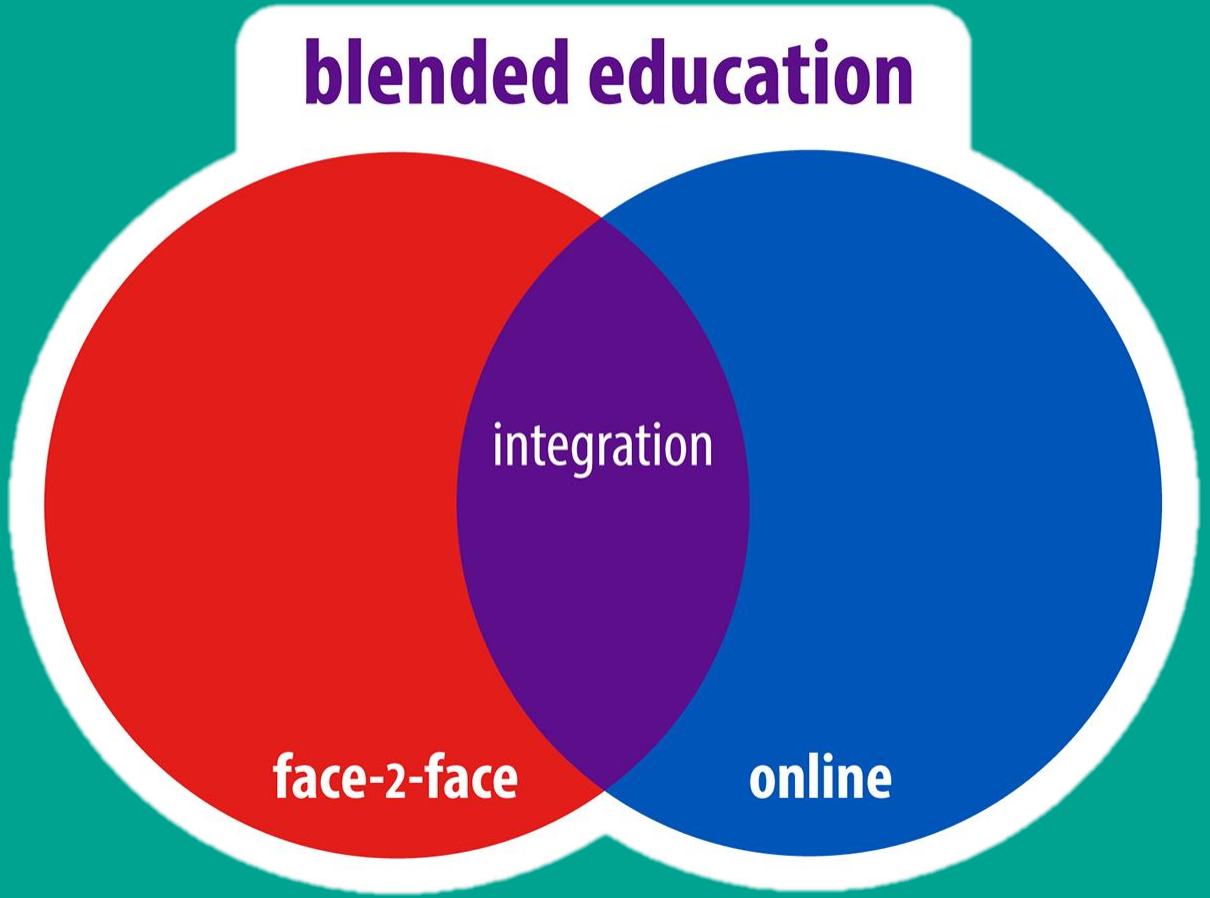

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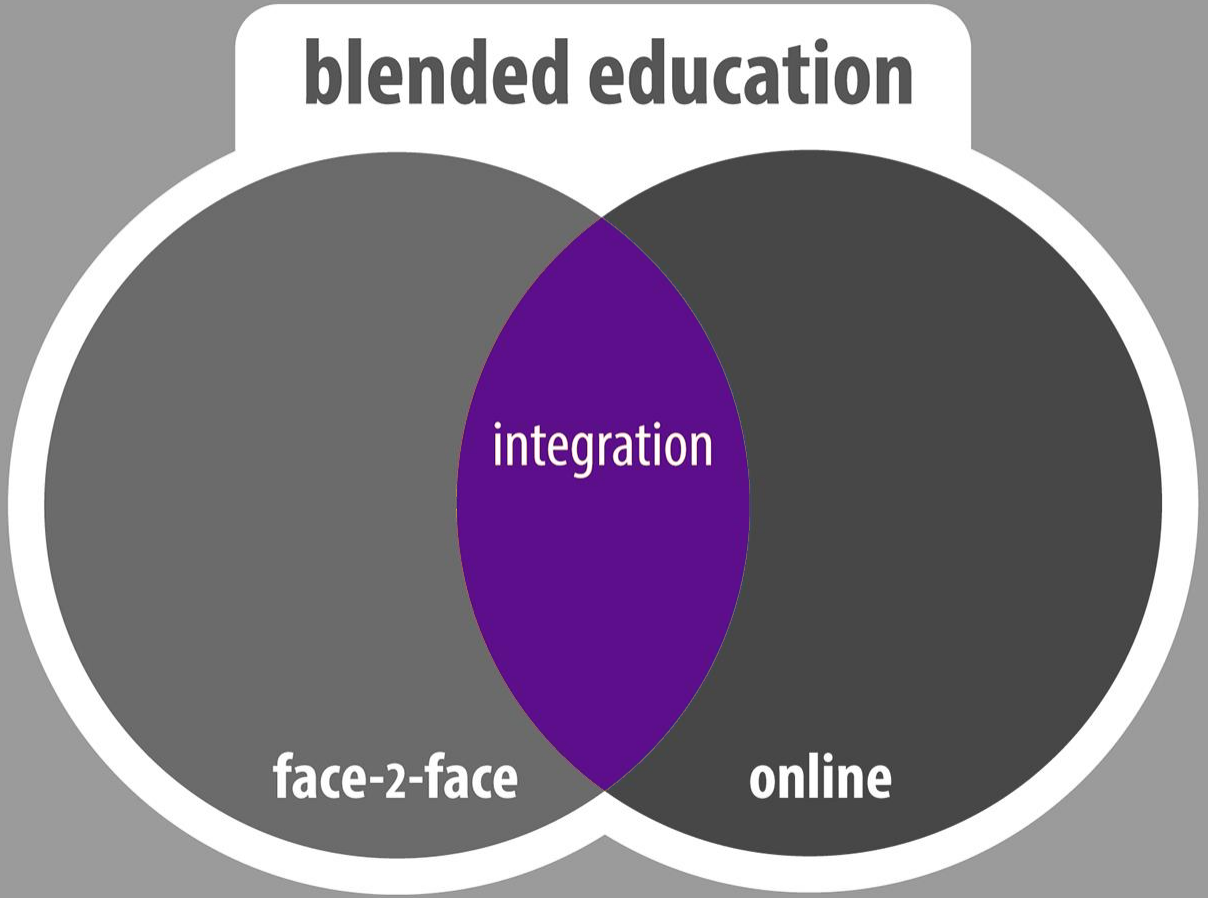
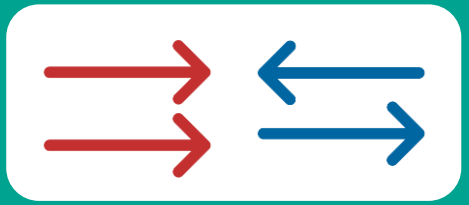
Learning as a result of a **deliberate, integrated combination** of online and face-to-face learning activities.

The European Maturity Model for Blended Education


blended education
integration
face-2-face
online

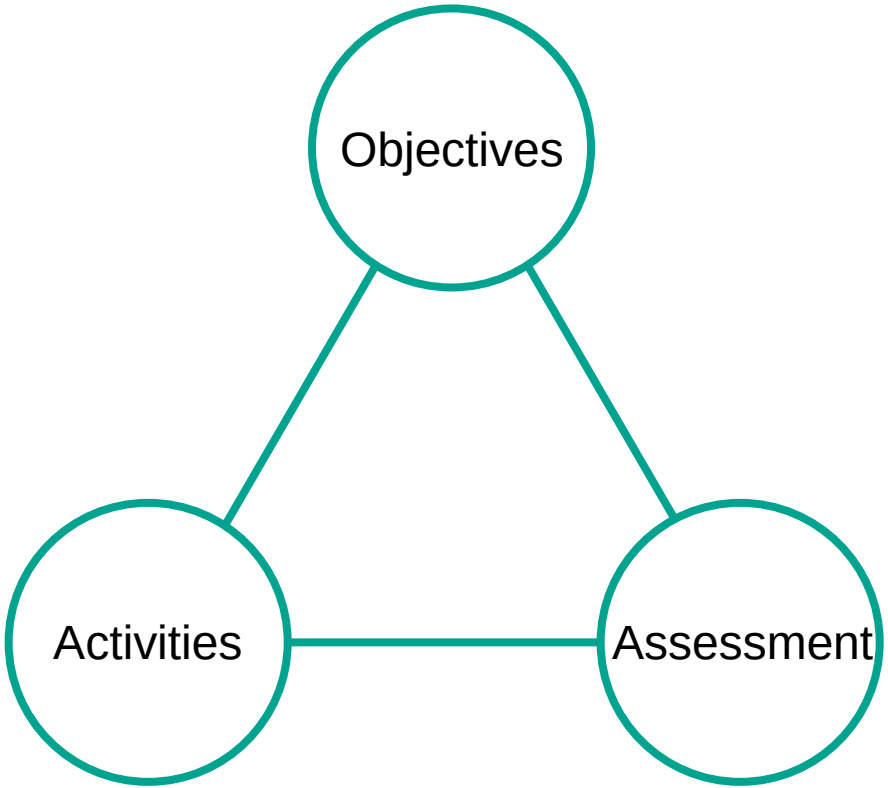
Face-2-face
Online

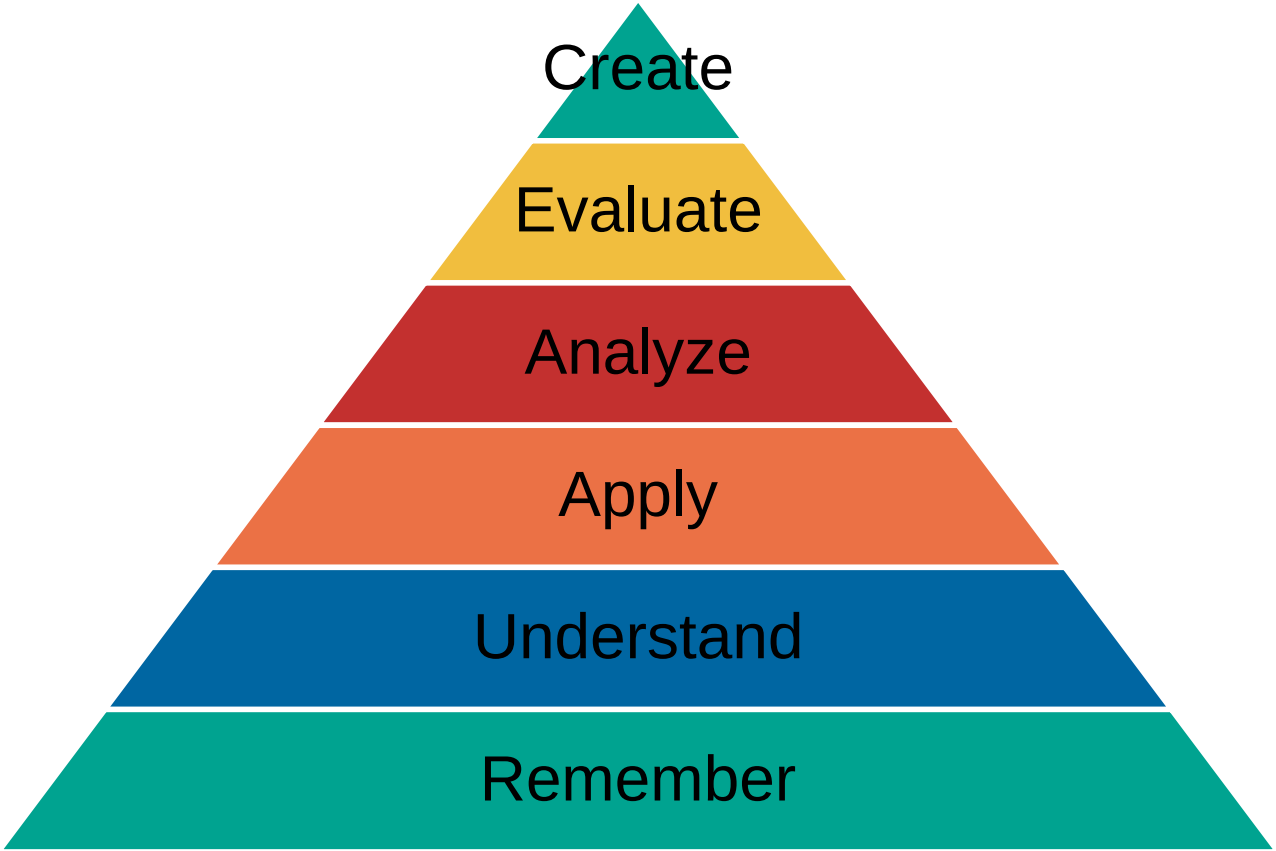
Teacher led
Self study

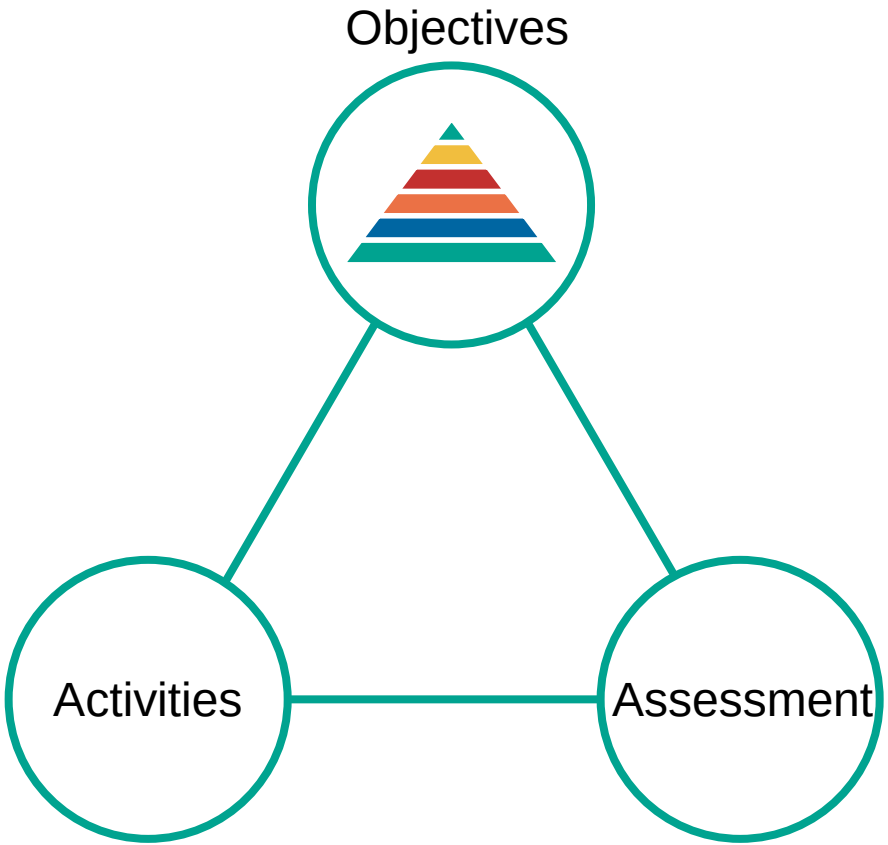


Synchronous
Asynchronous

How does it fit?

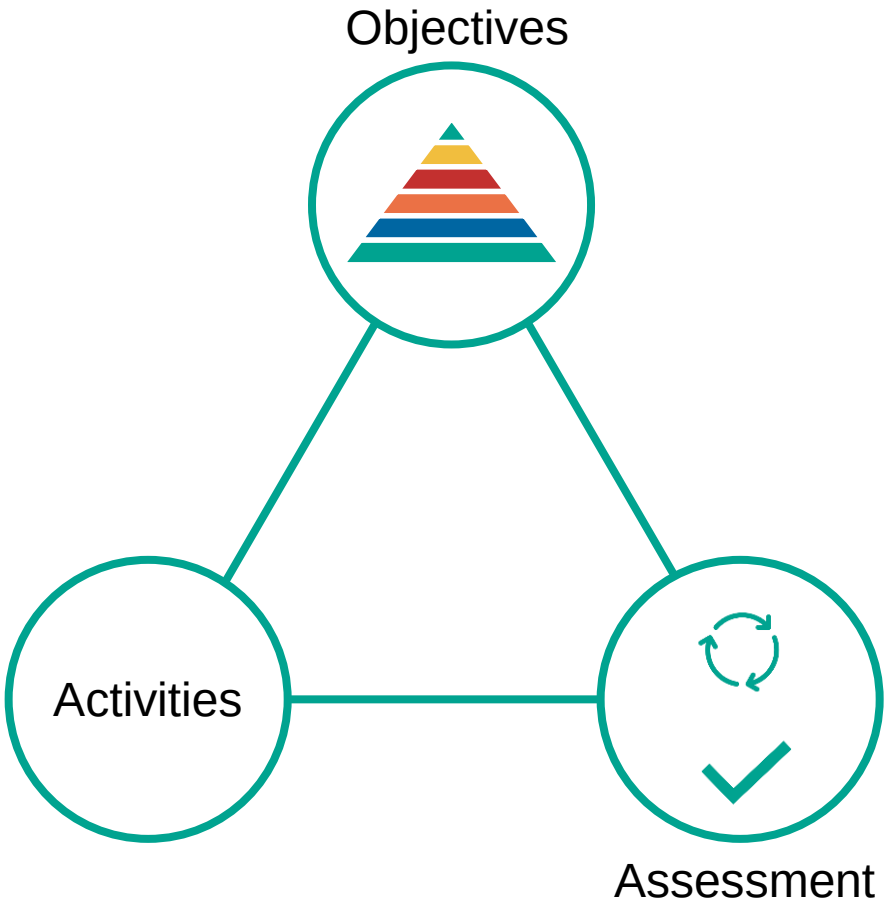

Objectives
Activities
Assessment


Create
Evaluate
Analyze
Apply
Understand
Remember


Objectives
Activities
Assessment

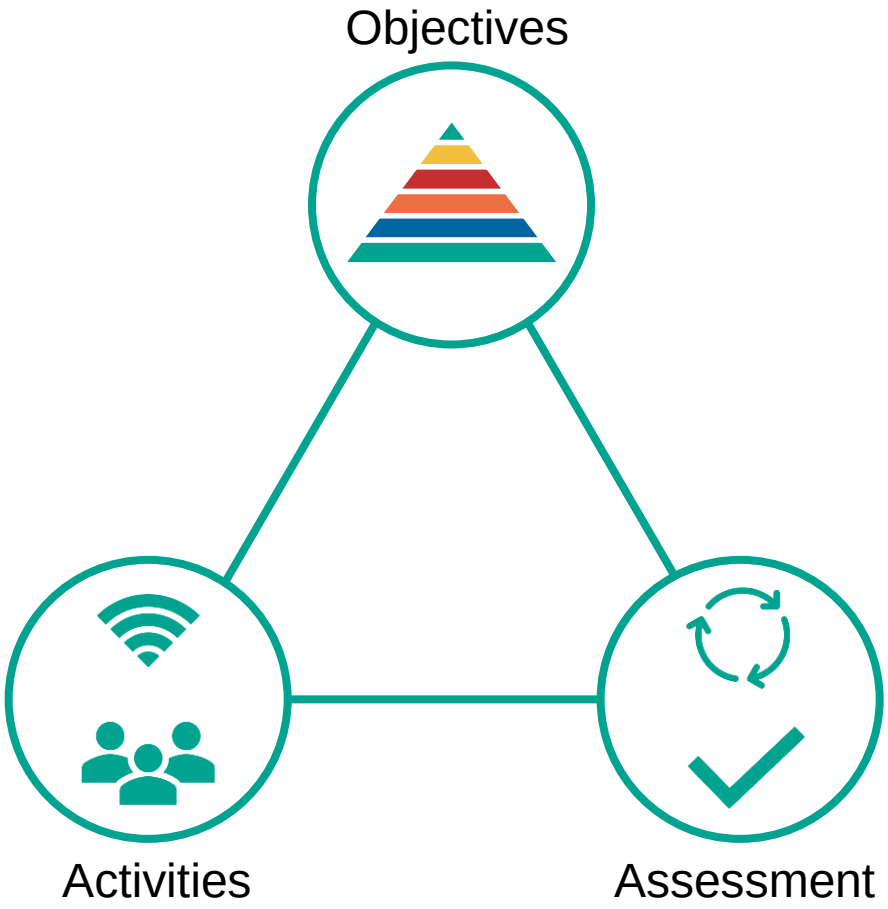
Formative assessment

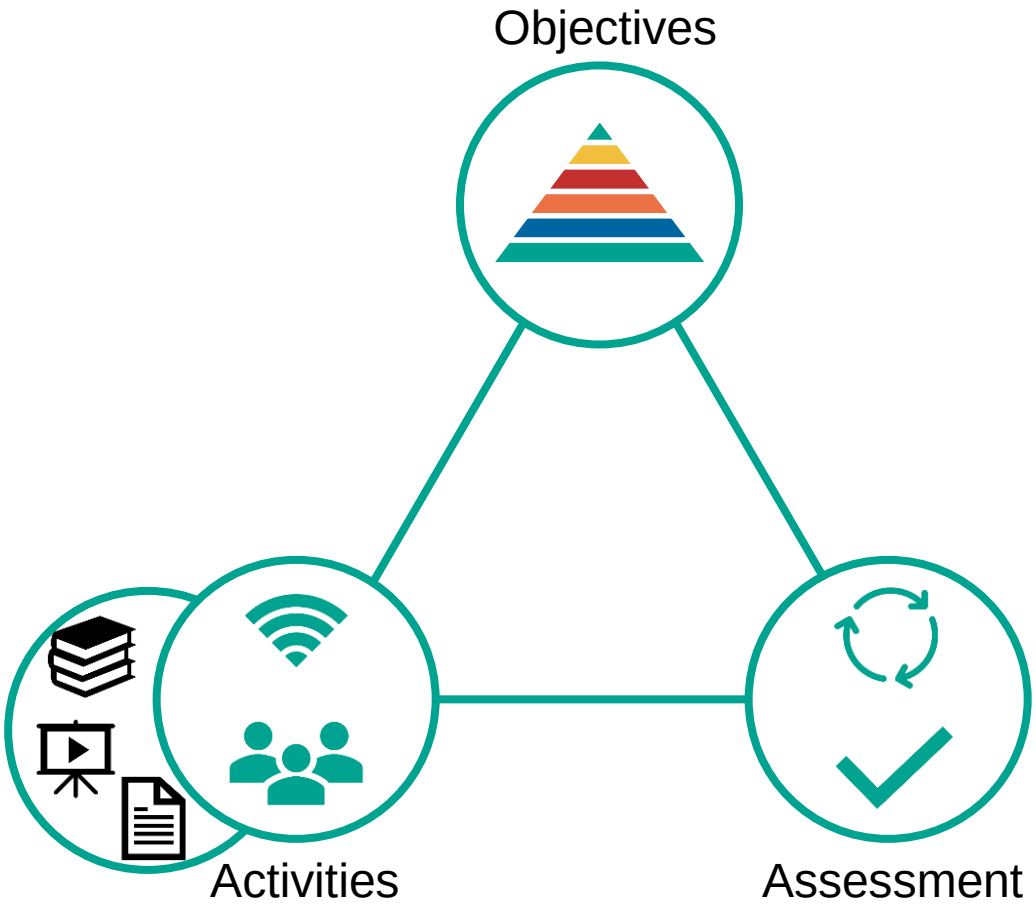
Summative assessment


Objectives
Activities
Assessment

Online Learning Activities

Face-2-face Learning activities


Objectives
Activities
Assessment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Assessment

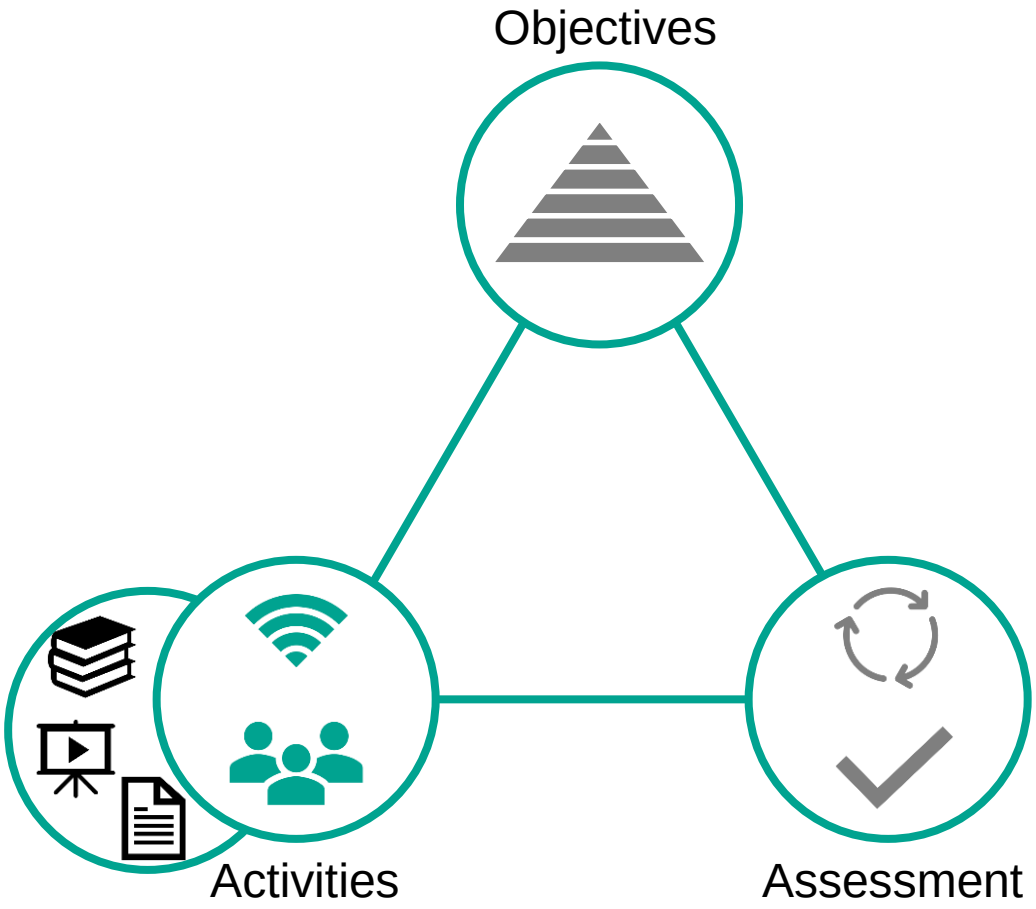
Objectives
Activities
Assessment

Image by TeroVesalainen from Pixabay

Why

would you blend?

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More active

More flexible

More feedback

More effective & efficient

Evidence informed principles

Prior knowledge

Active learning

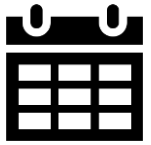
Examples

Image + Words

Feedback

Check understanding

Assessment for learning



Spaced practice

Examples

of blended learning courses

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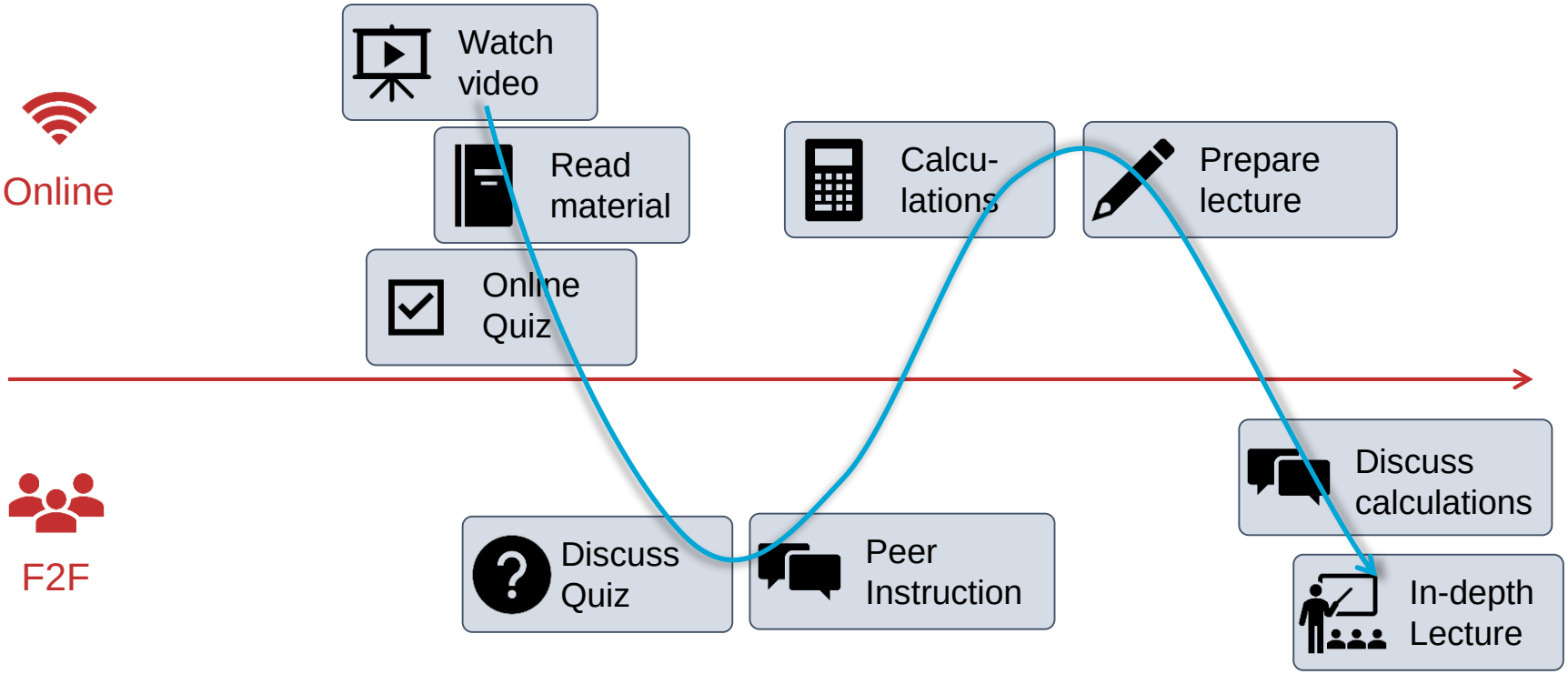
Blended Learning Wave

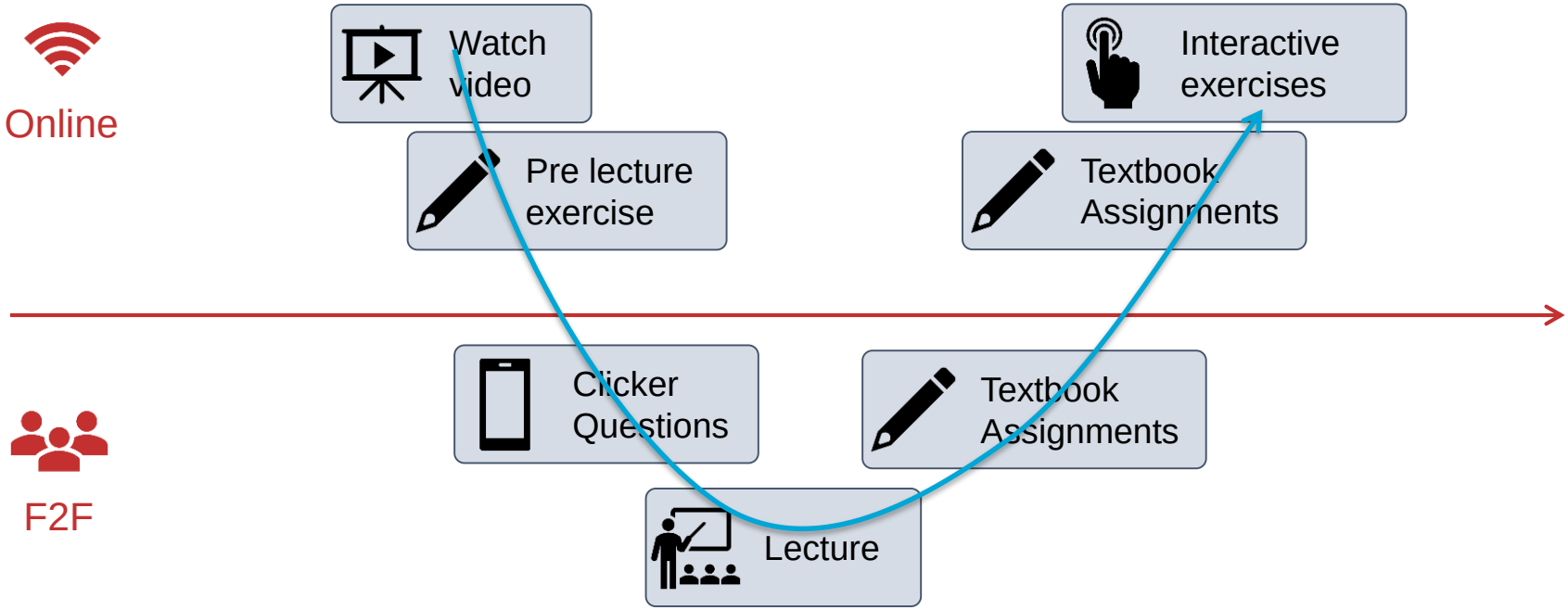


PRIME

- **PR**oject **I**nnovation **M**athematics **E**ducation
- Service Education
  1st and 2nd year Math courses
- Team of teachers

- **P**repare, **P**articipate, **P**ractice

Prime


Online
Watch video
Pre lecture exercise
Interactive exercises
Textbook Assignments
F2F
Clicker Questions
Textbook Assignments
Lecture

QUESTION 1

SKIP

Write the following product with a single base. Do not simplify further.

$$\left((2t)^5\right)^3$$

Check my answer

QUESTION 1

SKIP

Write the following product with a single base. Do not simplify further.

$$\left((2t)^5\right)^3$$

Your answer: $(2t)^8$

Your answer is incorrect.

retry

Use the power rule to simplify the expression

QUESTION 1

SKIP

Write the following product with a single base. Do not simplify further.

$$\left((2t)^5\right)^3$$

Your answer: $(2t)^{15}$

Yeah! That's right. The correct answer is $(2t)^{15}$

retry

Use the power rule to simplify the expression

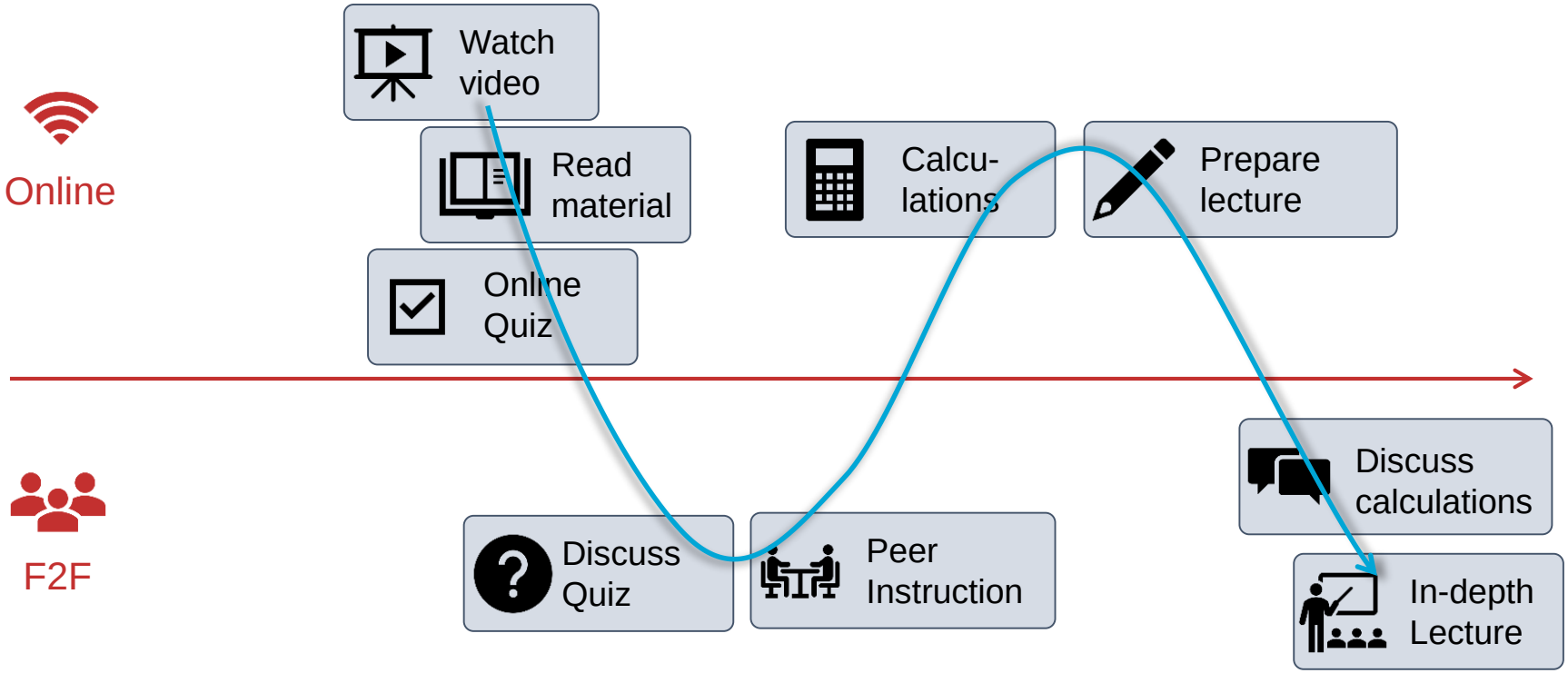
$$\left((2t)^5\right)^3 = (2t)^{5\cdot 3} = (2t)^{15}$$

Railway Engineering

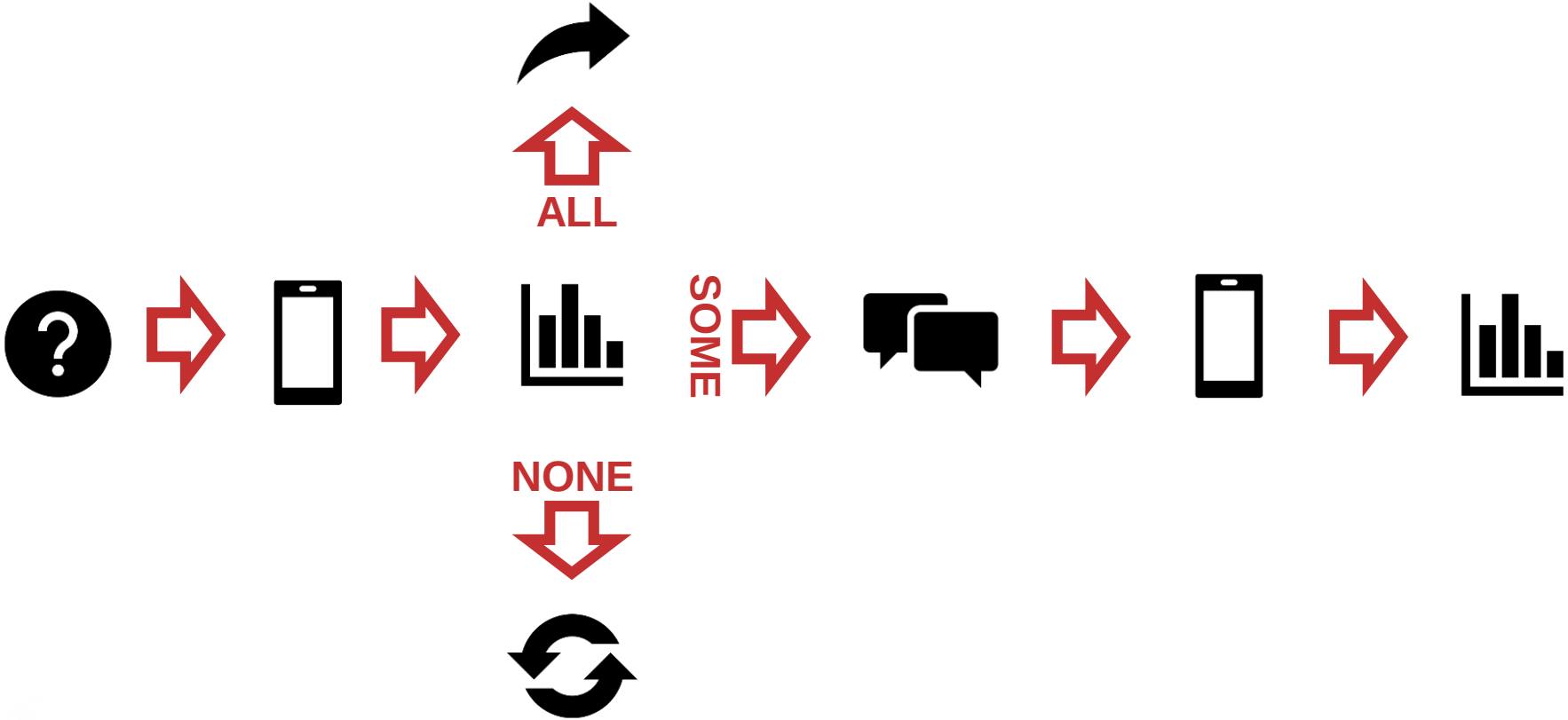
- Redesign 5 master course
- All blended

Photo by Johannes Plenio on Unsplash

Railway Engineering



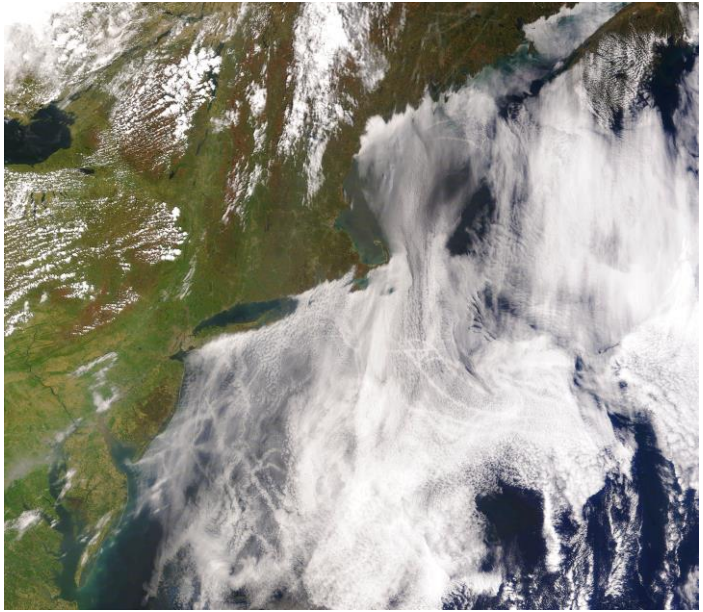
Peer Instruction



Climate Physics

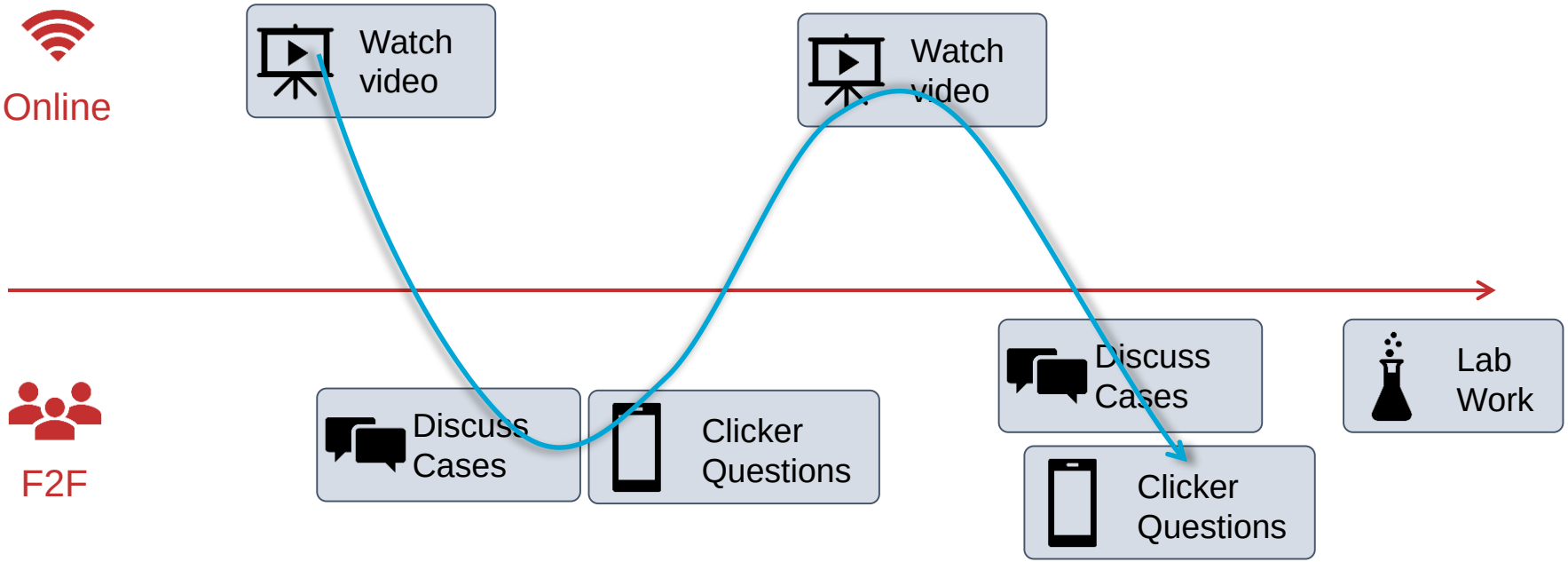
- Flipped course

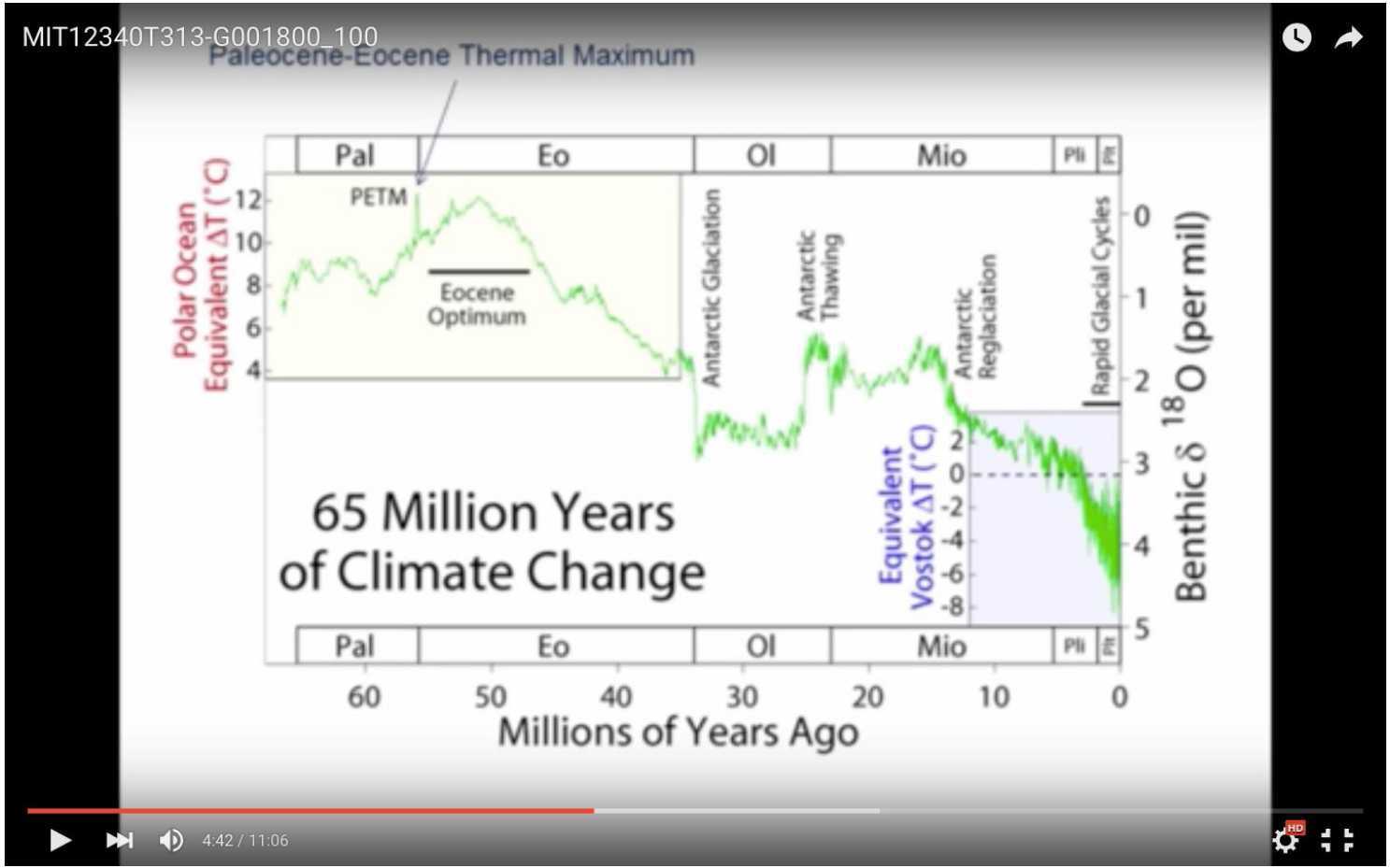
- Existing MOOC materials from:
  - Own MOOC ‘Water and Climate’
  - MIT MOOC ‘Global warming science



"Satellite image of ship tracks, clouds created by the exhaust of ship smokestacks." by Liam Gumley, NASA is in the Public Domain, CC0

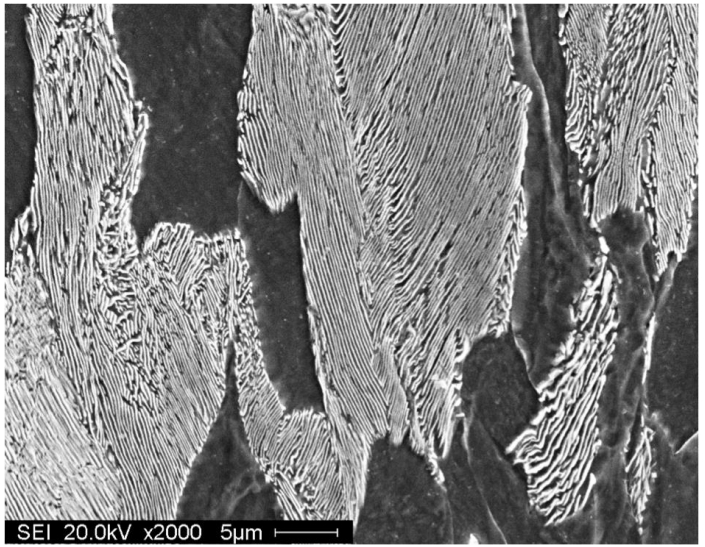
Climate Physics




MIT12340T313-G001800_100
Paleocene-Eocene Thermal Maximum
Pal
Eo
Ol
Mio
Pli
Pli
Polar Ocean Equivalent ΔT (°C)
12
10
8
6
4
PETM
Eocene Optimum
Antarctic Glaciation
Antarctic Thawing
Antarctic Reglaciation
Rapid Glacial Cycles
Equivalent Vostok ΔT (°C)
2
0
-2
-4
-6
-8
Benthic δ 18O (per mil)
0
1
2
3
4
5
65 Million Years of Climate Change
Pal
Eo
Ol
Mio
Pli
Pli
60
50
40
30
20
10
0
Millions of Years Ago
4:42 / 11:06

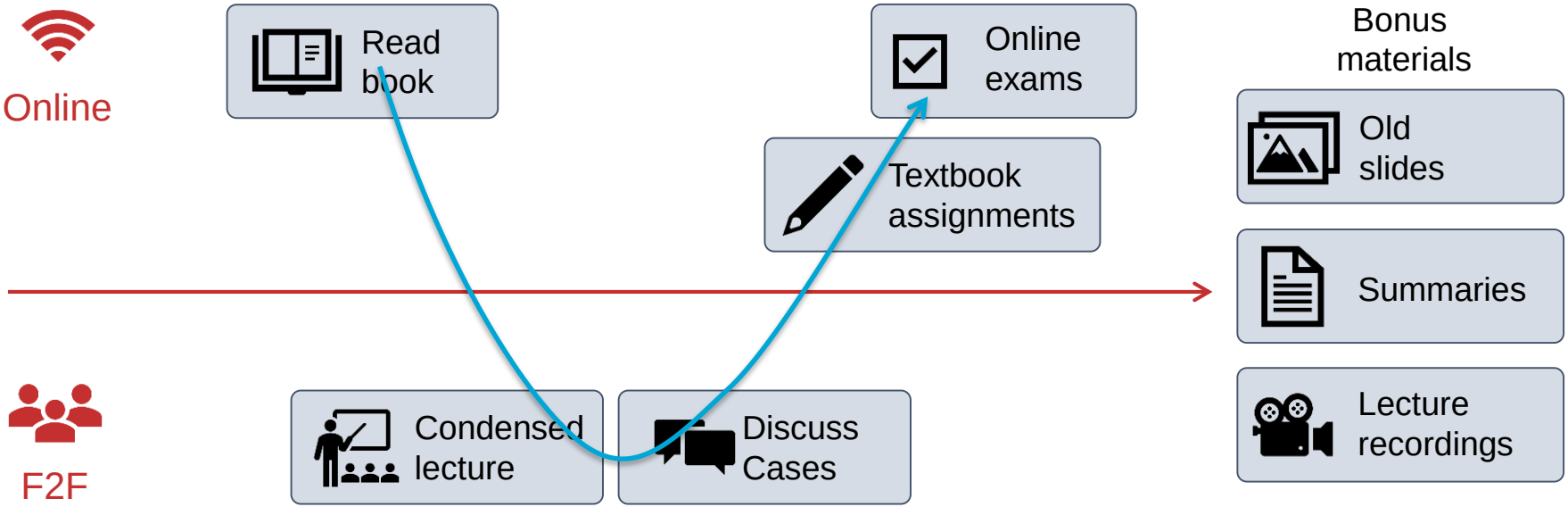
Material Sciences

- Online exam questions
- Condensed Lecture
- Problem solving



"Microstructure of pearlite" by Michelshock is in the Public Domain, CC0

Climate Physics

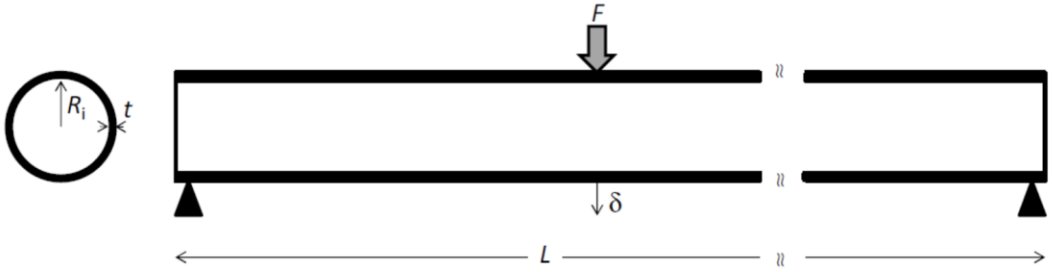


Question 1

1 point

Na de hoofdvraag krijg je nog 3 vragen waarmee je je antwoord onderbouwt.

Een lange, dunwandige buis met een gegeven lengte L en een gegeven inwendige straal R_i wordt op buiging belast door een centraal aangebrachte kracht F, zie figuur.



De buis wordt aan de uiteinden ondersteund zoals aangegeven in de figuur. De elastische uitwijking van de buis mag maximaal gelijk zijn aan δ .

De wanddikte van de buis, t, is tot op zekere hoogte een vrij te kiezen parameter. De enige beperking is dat de wanddikte van de buis veel kleiner moet zijn dan de inwendige straal: $t << R_i$.

De volgende benaderingen moeten toegepast worden (waar relevant):

$$R_u = R_i + t \approx R$$
$$R_u^2 - R_i^2 \approx 2\,\mathrm{Rt}$$
$$R_u^4 - R_i^4 \approx 4\,R^3 t$$

waarin R (m) de effectieve straal van de buis is. Gebruik deze benaderingen in de uitwerking van de vraag. Gebruik de effectieve straal R en niet R_i en R_u in de uitwerking.

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Start

with your blended course

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Online

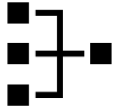
Video

Discussion board

Assignments

Interactive courseware

Peer feedback


Concept Map

Read a chapter

Quiz in the LMS

Online brainstorm

Collaborative writing

(Online) Portfolio

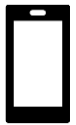
Student generated content

F2F

Explanation

Labwork

(Textbook) assignments


Clickers

Student presentations

Game

Peer instruction

Guest lecture

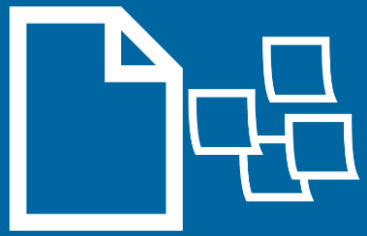
Fieldtrip

Modeling

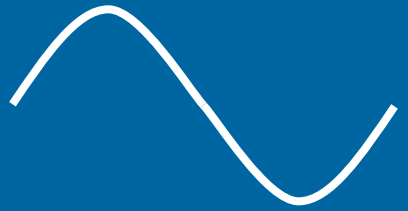
Face-2-face discussion

One minute paper

How can you start?



Get a sheet of paper and some post-its (or a digital canvas)



Create your blended learning wave

Design questions

What is the added value of the teacher?

How (often) do you communicate with your students?

How can you integrate feedback?

How much hours can students spend per week?

How do you use online activities as input?

Image by TeroVesalainen from Pixabay

“THE MOST VALUABLE TIME IS THE TIME WITH OUR STUDENTS”

SALMAN KHAN

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@wpdijkstra
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