



AFTER SCHOOL ACTIVITY

OVERVIEW

WE KNOW SORT DOMESTIC WASTE, BUT IT IS NOT ENOUGH. WE NEED TO KNOW METHODS HOW CAN WE PREVENT PRODUCTION OF MORE WASTE AND HOW WE CAN RECYCLE SORTED PLASTIC MATERIAL AS A PRECIOUS MATERIAL RESOURCE.

THIS MATERIAL WAS CREATED FOR THOSE WHO ARE INTERESTED IN ACTIVALLY TACKLING THE USE OF PLASTIC WASTE AND CONTINUING TO TRANSFER EXPERIENCES ESTABLISHED MOSTLY IN THE WORLDWIDE PRECIOUS PLASTIC COMMUNITY BETWEEN ITS SURROUNDINGS.

THE OBJECTIVE IS TO INTRODUCE PROGRAM FOR CHILDREN AS REGULAR AFTER SCHOOL ACTIVITY. IT CONSISTS LESSONS WITH PRACTICAL METHODS ON WHICH PLASTIC MATERIAL CAN BE PROCESSED INTO NEW PRODUCTS. THE SECONDARY OBJECTIVE IS TO UNDERSTAND THE ADVANTAGES AND DISADVANTAGES OF PLASTICS AND HOW TO PREVENT CREATION OF ANOTHER PLASTIC WASTE.



3 EXAMPLES HOW TO PROMOTE PLASTIC RECYCLING

AFTER SCHOOL ACTIVITY

- + MANY TOPICS DESCRIBED ON DETAL
- + REGULAR BASIS
- + MORE TIME FOR CREATIVE ACTIVITIES
- + SPACE FOR DEVELOPMENT
- + INDIVIDUAL APPROACH
- SUITABLE ONLY FOR SMALL GROUP
- REQUIRES A FACILITY AND EQUIPMENT

PRESENTATION AT SCHOOL

- + LARGER IMPACT
- + DEMONSTRATION TECHNOLOGY ON SITE
- + CHEAPER THAN REGULAR HOBBY CLUB
- + PRESENTATION AT SCHOOL
- A BRIEF OVERVIEW ABOUT PROBLEM
- NOT ENOUGH TIME TO EXPLAIN EVERYTHING

WORKSHOP FOR PUBLIC

- + INDIVIDUAL APPROACH
- + CREATIVE AND EDUCATION ACTIVITIES
- + PARTICIPANTS MAKE THEIR OWN PRODUCT
- + PROVIDING ADVICES HOW TO JOIN PP
- + SINGLE AFTERNOON ACTIVITY
- SUITABLE FOR SMALL GROUPS
- REQUIRES A FACILITY AND EQUIPMENT



PLEASE PAY ATTENTION TO NOTES AND USED SOURCES AS PICTURES OR DATA.

ALL MENTIONED IN NOTES BELLOW SLIDES. EXAMPLE:

13			Polymer name	Polyethylene terephthalate	High-density polyethylene	Polyvinyl chloride	Low-density polyethylene	Polypropylene	Polystyrene	All other plastics, including acrylic ...	
14			Resin identification code	1	2	3	4	5	6	7	
15			Abbreviation	PET or PETE	HDPE	PVC	LDPE	PP	PS	other	
16			Recyclable	Commonly	Commonly	Sometimes	Sometimes	Occasionally	Commonly	Difficult	
17			Percentage recycled annually	36%	30-35%	<1%	6%	3%	34%	Depends on type	
18			How long to decompose under perfect conditions	450 years ¹	100 - 450 years ²	+450 years ²	20 years ²	200 - 450 years ²	+ 10 000 years ¹	Depends on type	
19			Max. temperature	70°C	120°C	70°C	70°C	135°C	90°C	Depends on type	
			Toxicity level	Skull and crossbones	Exclamation mark	Skull and crossbones	Exclamation mark	Exclamation mark	Skull and crossbones	Skull and crossbones	

Source: <https://alansfactoryoutlet.com/7-types-of-plastics-their-toxicity-and-most-commonly-used-for/>
[1] <https://www.e15.cz/magazin/infografika-jak-dlouho-se-rozklada-odpad-pet-lahvi-to-trva-skoro-pul-tisicileti-1347264#>
[2] <https://maesindopaperpackaging.com/does-plastic-decompose-how-long-does-it-take/>

SNÍMEK 18 Z 33

POZNÁMKY KOMENTÁŘE



CONTENT

BEFORE YOU START

HOW TO USE THIS MATERIAL

LESSON 1 - 10

MORE INFORMATION

CONTACT



PRECIOUS PLASTIC IS AN OPEN HARDWARE PLASTIC RECYCLING PROJECT AND IS A TYPE OF OPEN SOURCE DIGITAL COMMONS PROJECT. THE PROJECT WAS STARTED IN 2013 BY DAVE HAKKENS AND IS NOW IN ITS FOURTH ITERATION.

IT RELIES ON A SERIES OF MACHINES AND TOOLS WHICH SHREAD, MELT, AND INJECT RECYCLED PLASTIC, ALLOWING FOR THE CREATION OF NEW PRODUCTS OUT OF RECYCLED PLASTIC ON A SMALL SCALE.

BEFORE YOU START



WATCH VIDEO



SCAN OR CLICK

BEFORE YOU START



HOW TO USE
THIS MATERIAL?



HOW TO USE THIS MATERIAL?

THIS MATERIAL IS ONLY AN OVERVIEW WHICH DESCRIBES WHAT TO PREPARE FOR EACH LESSON AND RECOMMENDATIONS HOW TO TEACH ABOUT PLASTIC RECYCLING.

THE OVERVIEW IS PART OF INFORMATION PACKAGE THAT PEOPLE AROUND THE WORLD CAN DOWNLOAD FOR FREE, USE, EDIT, SHARE AND UPGRADE AS THEY WANT.

IN EACH LESSON THERE ARE BIG LETTERS:

G = GOAL OF LESSON,

K = KEY WORDS THAT SHOULD BE EXPLAINED IN LESSON

T = LESSON'S THEORY CONTENT

P = LESSON'S PRACTICE CONTENT



AFTER SCHOOL ACTIVITY - OVERVIEW



STORY OF PLASTIC

1/10



G

The aim is to find out the current knowledge of students, to present them data on how we are doing in the process as the Czech Republic. Introduce the content of the course, show the background, tools and acquaint them with safety instructions. Course participants will learn what types of plastics exist, where they are used. They will see a simplified recycling process, even with a demonstration of crushing plastic waste.

K

plastic, polymer, Precious plastic, material density, shredding, single use plastic

T

Pupils will recognize that there are several types of plastics and can name some of them. Pupils will know what plastics are made of, what their history is and what examples of suitable and unsuitable plastic products they will give. They will understand key concepts.

P

Pupils will have a basic orientation in the workshop. Emphasis on explaining safety in the workshop and in the operation of tools and equipment.



SUPPORTING MATERIAL

EXAMPLE OF ENTRY QUESTIONARE – [VIEW ON THIS LINK](#)

PLASTIC SYMBOLS ON PACKAGES – [DOWNLOAD HERE](#)

PLASTIC TYPES OVERVIEW – [DOWNLOAD HERE](#)

PRESENTATION FOR LESSON 01 – [DOWNLOAD HERE](#)

LESSON 1 – STORY OF PLASTIC



CHECKLIST BEFORE LESSON

- ☐ PREPARE PAPER NOTEBOOKS FOR CHILDREN
- ☐ EDIT PRESENTATION AS YOU NEED
- ☐ PREPARE ENTRY KNOWLEDGE TEST IN PAPER / ONLINE VERSION
- ☐ PREPARE LABELS FOR EACH TYPE OF PLASTIC TO ASSIGN TO REAL PRODUCTS
- ☐ PREPARE GLASS BOTTLE FILLED WITH WATER + LITTLE AMMOUNT OF PET + HDPE
- ☐ PREPARE SYMBOLS ON PACKAGES
- ☐ SELECT TOPICS FOR HOMEWORKS
- ☐ PREPARE WORKSPACE FOR PLASTIC SHREDDING
- ☐ CHOOSE PLACE AND TYPE OF MATERIAL THAT CAN BE DIG INTO GROUND



TIME SCHEDULE

- 10 MIN MUTUAL INTRODUCTION OF LECTURER AND PUPILS - DISTRIBUTION OF NOTEBOOKS
- 5 MIN COMPLETION OF THE BASIC KNOWLEDGE ENTRY TEST: ONLINE / PAPER
- 10 MIN INTRODUCTION OF PROJECT PRECIOUS PLASTIC + PLASTMAKERS, - PRESENTATION 1
- 10 MIN TYPES OF PLASTIC – ACTIVITY OF ASSIGNMENT OF PLASTIC TYPES TO INDIVIDUAL PRODUCTS
- 10 MIN INTRODUCTION OF WORKSPACE AND SAFETY INSTRUCTIONS
- 5 MIN BRIEF INTRODUCTION OF TECHNOLOGY FOR PLASTIC RECYCLING – PRESENTATION 1
- 10 MIN SHREDDING PLASTIC
- 10 MIN PRACTICE LABLES ON PACKAGES -> LAMINATED PAPERS
- 20 MIN DIG INTO GROUND DIFFERERNT TYPES OF MATERIAL (9TH LESSON SEE RESULTS)
- 5 MIN EXPLANATION OF HOMEWORK SYSTEM AND REWADS
- 10 MIN LESSON RECAP, QUESTIONS, CLEANING WORKSPACE.

LESSON 1 – STORY OF PLASTIC



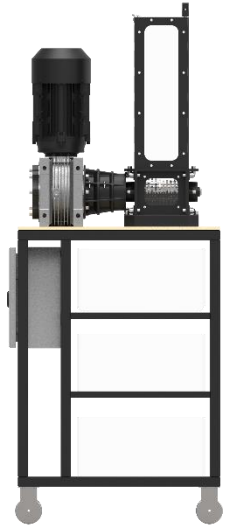
SAFETY

SHREDDER MACHINE AND INJECTION MACHINE CAN RUN ONLY UNDER SUPERVISION OF TEACHER.

DURING SHREDDING WEAR SAFETY GLASSES.



RECOMMENDED TOOLS



BUILD SHREDDER

BUY SHREDDER



LESSON 1 – STORY OF PLASTIC



PLASTIC COMPRESSION MOULDING (PART 1)

2/10



G

The aim of this lesson is to show students the technology of plastic compression moulding. In the beginning of the lesson, there is a short simple test about facts from previous lesson or a homework review. Then there will be an introduction to plastic molding technology with practical examples about compression moulding.

K

plastic compression moulding, separator, engraving, sandblasting

T

Pupils will know at what temperatures and forces it is possible to process plastics by compression moulding technology.

P

Independent work of preparation of the mold for pressing the coasters- understanding the principle of sanding and marking of sanding papers- work with oscillating grinder, screwing, edge grinding.



SUPPORTING MATERIAL

PRESENTATION FOR LESSON 02 – [DOWNLOAD HERE](#)



CHECKLIST BEFORE LESSON

- ☐ EDIT PRESENTATION AS YOU NEED
- ☐ PREPARE SYMBOLS ON PACKAGES (PART OF KNOWLEDGE TEST)
- ☐ PREPARE SCRAP PARTS TO EXPLAIN MISTAKES DURING COMPRESSION MOULDING
- ☐ PREPARE WORKSPACE FOR COMPRESSION MOULDING
- ☐ PREPARE ORBITAL SANDER AND SANDING PAPERS



TIME SCHEDULE

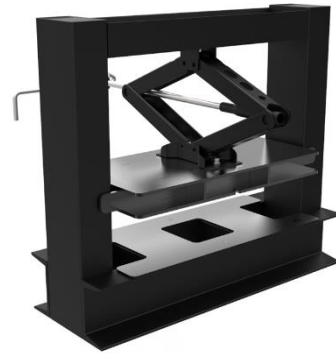
- 10 MIN HOMEWORK REVISION + ENTRY KNOWLEDGE TEST FROM PREVIOUS LESSON
- 10 MIN PREPARE MATERIAL AND COMPRESSION MOULD FOR COASTERS
- 10 MIN PRESENTATION ABOUT COMPRESSION MOULDING TECHNOLOGY
- 10 MIN SHOW AND EXPLAIN DIFFERENT COMPRESSION MOULDS + MOULD SEPARATION METHODS
- 5 MIN PROBLEMS DURING COMPRESSION MOULDING (SHOW SCRAP PARTS)
- 5 MIN PREPARATION OF MOULD AND MATERIAL FOR CLIPBOARD
- 5 MIN SWITCH MOULDS IN OVEN (COASTERS -> CLIPBOARD A4)
- 20 MIN SHOW OTHER COMPRESSION MOULD PRODUCTS FROM PRECIOUS PLASTIC COMMUNITY
- 15 MIN POSTPROCESSING COASTERS (CUTTING, SANDING)
- 10 MIN – LESSON RECAP, QUESTIONS, CLEANING WORKSPACE.



RECOMMENDED TOOLS

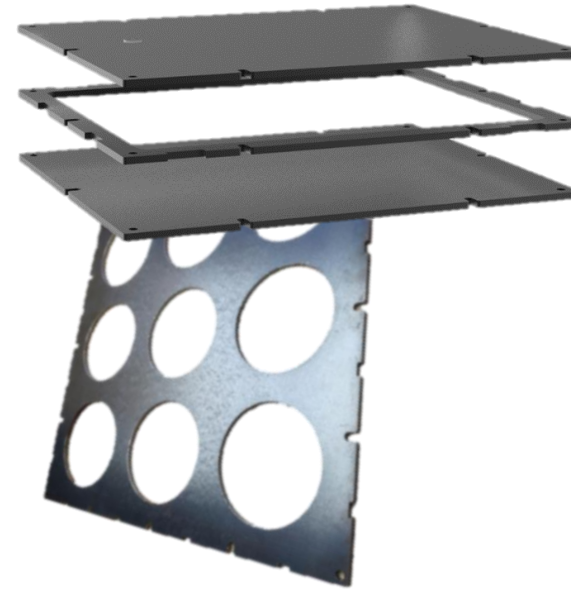


BUILD OVEN



BUILD MINI PRESS

BUY MINI PRESS



BUY MOULDS



SAFETY

MANIPULATION WITH HOT MOULDS CAN MAKE ONLY LECTURER IN HEAT RESISTANT GLOVES.

BE AWARE OF TOUCHING MOULDS DURING COOLING PROCESS.

USE KNIFE FOR CUTTING EDGES CARAFULLY.

WHEN YOU USE ORBITAL SANDER WEAR SAFETY GLOVES.



PLASTIC COMPRESSION MOULDING (PART 2)

3/10



G

The goal is to complete the products made in the last lesson + make new ones. Pupils will learn the process of assembling a clipboard (drilling, riveting, screwing) and assembling a clock mechanism. From the theoretical part, students should get an overview of the tetrapack material, an explanation of microplastics and understand the importance of opensource.

K

riveting, tetrapack, microplastic, sheetpress, opensource

T

Additional experience with plastic compression molding for more complex products. Knowledge of Tetrapack material incl. its advantages and disadvantages. Knowledge of microplastics and their effect on the organism. An overview of what open source means and what its advantages / disadvantages are.

P

Recognition of drills for metal / wood / concrete. The student manages to measure the position of the hole, use a punch and drill a hole with subsequent re-measurement. Pupil handles riveting with rivet, application of rivet nut, screw rivet- Oscillating grinder grinding, screwing, edge grinding



SUPPORTING MATERIAL

PRESENTATION FOR LESSON 03 – [DOWNLOAD HERE](#)



CHECKLIST BEFORE LESSON

- ☐ EDIT PRESENTATION AS YOU NEED
- ☐ PREPARE SAMPLE TETRAPACK
- ☐ PREPARE WORKSPACE FOR COMPRESSION MOULDING
- ☐ PREPARE ORBITAL SANDER AND SANDING PAPERS



TIME SCHEDULE

- 10 MIN HOMEWORK REVISION + ENTRY KNOWLEDGE TEST FROM PREVIOUS LESSON
- 10 MIN PREPARATION MATERIAL + CLOCK MOULD + CLIPBOARD MOULD
- 30 MIN ASSEMBLY CLOCK + CLIPBOARD
- 5 MIN CHANGE MOULD IN OVEN
- 5 MIN PLAY VIDEO HOW TO MAKE WASTEBOARD (NL)
- 10 MIN EXPLANATION MORE ADVANCED COMPRESSION MOULDING PRODUCTS - PRESENTATION 03
- 5 MIN PREPARE MATERIAL AND MOULD 375X375 FOR NEXT LESSON
- 5 MIN VIDEO ABOUT MAKING SHEETS WITH SHEETPRESS
- 10 MIN OPEN SOURCE MEANING – PRESENTATION 03
- 5 MIN CHANGE MOULD IN OVEN
- 10 MIN LESSON RECAP, QUESTIONS, CLEANING WORKSPACE.

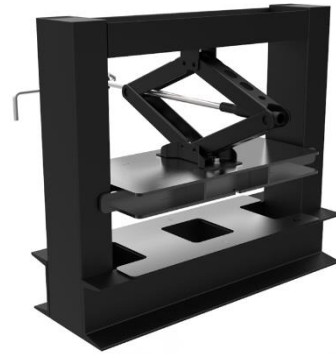
LESSON 3 – COMPRESSION MOULDING (PART 2)



RECOMMENDED TOOLS

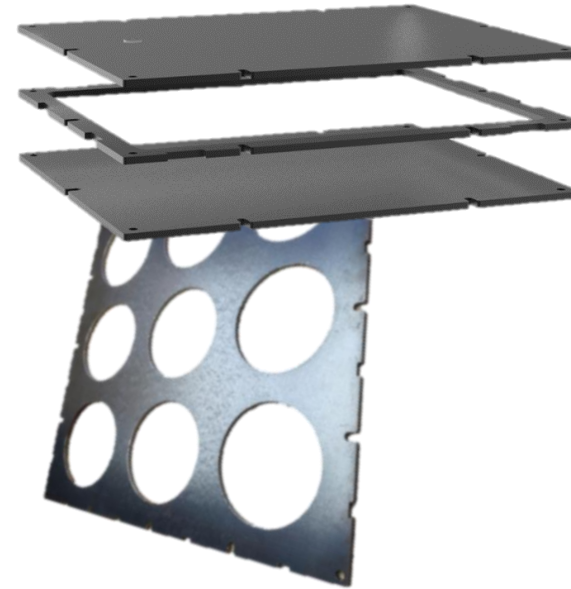


BUILD OVEN



BUILD MINI PRESS

BUY MINI PRESS



BUY MOULDS



SAFETY

MANIPULATION WITH HOT MOULDS CAN MAKE ONLY LECTURER IN HEAT RESISTANT GLOVES.

BE AWARE OF TOUCHING MOULDS DURING COOLING PROCESS.

USE KNIFE FOR CUTTING EDGES CARAFULLY.

WHEN YOU USE ORBITAL SANDER WEAR SAFETY GLOVES.



PLASTIC INJECTION MOULDING

4/10



G

Detailed description of the principle of plastic injection, how it differs from other technologies. What are the advantages and disadvantages. Practical demonstration of injection moulding technology.

K

injection molding machine, nozzle, thermocouple, thermostat

T

The student is able to briefly describe how plastic injection works. Can say how thermal control works with thermostat, thermocouple and heating elements. The student is able to list the advantages and disadvantages of injection moulding. Knows which materials are suitable for plastic injection. Knows the basic methods of determining the material properties of plastics. Pupils will know how the molds for compression molding and plastic injection differ.

P

Operation of a manual injection molding machine. Trimming of inlets or grinding of edges.



SUPPORTING MATERIAL

PRESENTATION FOR LESSON 04 – [DOWNLOAD HERE](#)

REPORT FROM PLASTIC PROPERTIES MEASUREMENT – [VIEW ON THIS LINK](#)

ELECTRIC WIRING DIAGRAM FOR INJECTION MACHINE – [VIEW ON THIS LINK](#)



CHECKLIST BEFORE LESSON

- ☐ EDIT PRESENTATION AS YOU NEED
- ☐ PREPARE SCRAP PARTS TO EXPLAIN MISTAKES DURING INJECTION MOULDING
- ☐ PREPARE WORKSPACE FOR INJECTION MOULDING
- ☐ PREPARE REPORT FROM PLASTIC PROPERTIES MEASUREMENT
- ☐ PRINT ELECTRIC WIRING DIAGRAM FOR INJECTION MOULDING MACHINE



TIME SCHEDULE

- 10 MIN HOMEWORK REVISION + KNOWLEDGE TEST FROM PREVIOUS LESSON
- 10 MIN PREPARATION MATERIAL + CLOCK MOULD + CLIPBOARD MOULD
- 10 MIN PRESENTATION ABOUT INJECTION MOULDING – PRESENTATION 04
- 10 MIN EXPLANATION OF ELECTRIC WIRING DIAGRAM FOR INJECTION MACHINE AND ITS REGULATION
- 30 MIN PRODUCTION OF INJECTED MOULDED PARTS (MEDAILS, CARABINES, ECT.)
 - 5 MIN DESCRIPTION OF DIFFERENT MOULD CONSTRUCTION PRESS VS. INJECTION: PRESENTATION 04
- 20 MIN ASSEMBLY CLOCK + CLIPBOARD UNDER SUPERVISION
 - 5 MIN WHICH MATERIALS ARE SUITABLE FOR INJECTION MOULDING – PRESENTATION 04
 - 5 MIN HOW TO MEASURE PLASTIC MATERIAL PROPERTIES
- 10 MIN LESSON RECAP, QUESTIONS, CLEANING WORKSPACE.

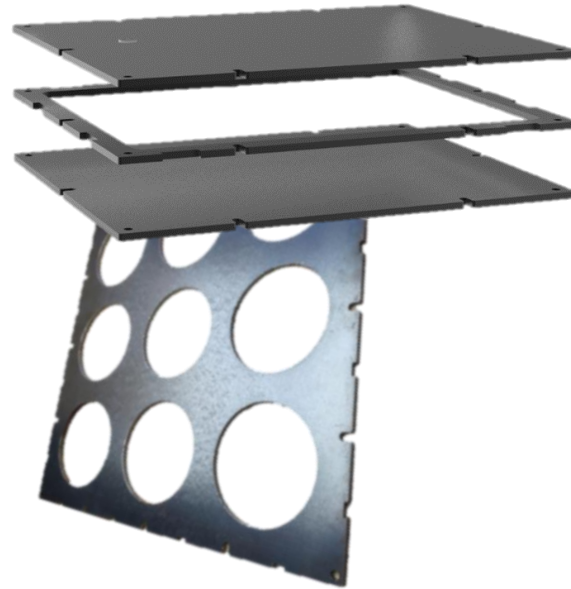
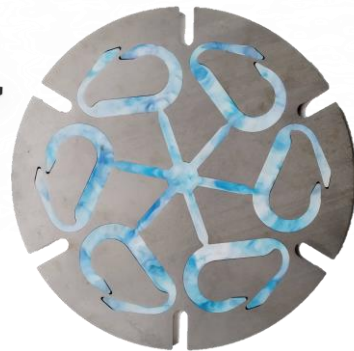


RECOMMENDED TOOLS



BUILD INJECTION
MOULDING MACHINE

BUY INJECTION
MOULDING MACHINE



BUY INJECTION
MOULDS



SAFETY

MANIPULATION WITH HOT MOULDS CAN MAKE ONLY LECTURER IN HEAT RESISTANT GLOVES.

DURING MANUFACTURING ON INJECTION MACHINE WEAR SAFETY GLOWES AND MAKE SURE SPACE IS VENTILATED WELL.

WHEN YOU INJECT PLASTIC, AVOID CONTACT WITH HEAT PARTS OF INJECTION MACHINE OR MELTED PLASTIC.

BE AWARE OF TOUCHING MOULDS DURING COOLING PROCESS.

USE KNIFE FOR CUTTING EDGES CARAFULLY.

WHEN YOU USE ORBITAL SANDER WEAR SAFETY GLOVES.



REDUCING AMOUNT OF PLASTIC WASTE

5/10



G

The aim of the lesson is for the students in the course to think about their own production of plastic waste, to be able to identify, quantify and find a suitable solution. Emphasis is placed on changing thinking when acquiring new things with respect to their life cycle, benefits for society. Simple presentation of the trend in landfilling / incineration and waste production in the Czech Republic and the EU. Explanation of the term Greenwashing. Finishing products (board with clip / clock).

K

downcycling, recycling, upcycling, zero-waste, plastic bottle deposit system

T

Pupils know the difference in terms of recycling, upcycling, downcycling. Pupils are aware of the amount of plastic produced. Pupils have an idea of the legislation and objectives of the Czech Republic + the EU in the field of landfilling / incineration and plastics production. Pupils know the concept of Greenwashing and try to think critically about the presentation of this concept.

P

Reading technical drawings. Drilling, sanding, practice measurement and cutting. Practice compression moulding.



SUPPORTING MATERIAL

PRESENTATION FOR LESSON 05 – [DOWNLOAD HERE](#)

DOWNLOAD AND PREPARE CARDS WITH TERMS – [DOWNLOAD HERE](#)

LOOK AT TUTORIAL HOW TO MAKE LEAF LAMP – [LINK HERE](#)



CHECKLIST BEFORE LESSON

- ☐ EDIT PRESENTATION AS YOU NEED
- ☐ PREPARE CARDS WITH TERMS: DOWNCYCLING, RECYCLING, UPCYCLING
- ☐ PREPARE WOODEN STICKS AND 3D CONNECTORS ACCORDING TO HOW-TO
- ☐ PREPARE WORKSPACE FOR COMPRESSION MOULDING

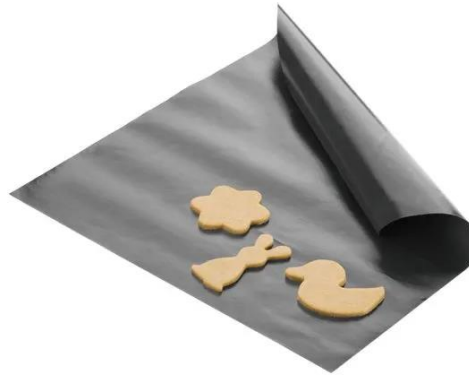
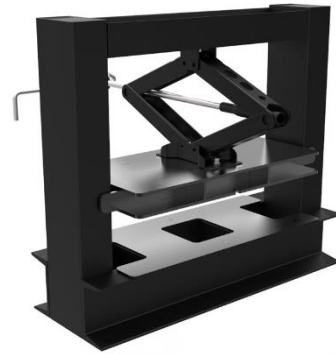
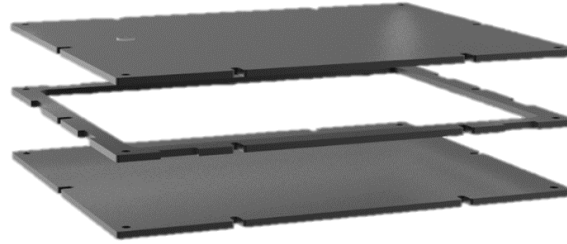


TIME SCHEDULE

- 5 MIN HOMEWORK REVISION + ENTRY KNOWLEDGE TEST FROM PREVIOUS LESSON
- 10 MIN EXPLANATION OF TERMS: DOWNCYCLING, RECYCLING, UPCYCLING, ZEROWASTE
- 5 MIN OVERVIEW OF EU AND CZECH TARGETS FOR REDUCING PLASTIC WASTE
- 10 MIN GREENWASHING – EXPLANATION + EXAMPLES – PRESENTATION 05
- 5 MIN PLASTIC BOTTLE DEPOSIT SYSTEM
- 5 MIN INTRODUCTION OF PROJECT „LEAF LAMP“
- 60 MIN ACTIVITIES
 - SORTING BOTTLE CAPS ACCORDING TO TYPE AND COLOUR
 - CLEANING BOTTLE CAPS
 - PRESSING BOTTLE CAPS
 - PREPARATION OF WOODEN STICKS ACCORDING TO TECHNICAL DRAWING
 - ASSEMBLY
- 10 MIN LESSON RECAP, QUESTIONS, CLEANING WORKSPACE.



RECOMMENDED TOOLS



LESSON 5 – REDUCING PLASTIC WASTE



SAFETY

MANIPULATION WITH HOT MOULDS CAN MAKE ONLY LECTURER IN HEAT RESISTANT GLOVES.

BE AWARE OF TOUCHING MOULDS DURING COOLING PROCESS.

USE KNIFE FOR CUTTING EDGES CARAFULLY.

WHEN YOU USE ORBITAL SANDER WEAR SAFETY GLOVES.



SUSTAINABILITY IN SPORT

6/10



G

The aim of the lesson is to identify where we encounter plastic equipment everywhere in sports. How it is possible to reduce the consumption of plastics at sporting events and find solutions for which products it is possible to set the circular life cycle of the product. Explain plastic extrusion technology. Finishing design lamp incl. lighting connection.

K

sustainability, plogging, plastic extrusion machine

T

Pupils understand the concept of ecology sustainability. Pupils know the concept of plogging + history and distribution worldwide. Understands the scale of major sporting events and their impact on the environment. Overview of plastic extrusion technology.

P

Production of plastic medals using plastic injection moulding technology. Familiar with work with a multimeter. Measurement of AC and DC voltage.



SUPPORTING MATERIAL

PRESENTATION FOR LESSON 06 – [DOWNLOAD HERE](#)

HOW TO MAKE MEDALS FROM RECYCLED PLASTIC – [LINK HERE](#)



CHECKLIST BEFORE LESSON

- ☐ EDIT PRESENTATION AS YOU NEED
- ☐ PREPARE WORKSPACE FOR INJECTION MOULDING



TIME SCHEDULE

- 10 MIN SUSTAINABILITY IN SPORT – PRESENTATION 06
- 10 MIN ACTIVITY - EVALUATION OF THE IMPACT OF PLASTIC WASTE DURING A SPORT EVENT
- 60 MIN PRACTICAL ACTIVITIES:
 - PRODUCTION OF PLASTIC MEDALS
 - PRODUCTION OF LEAF LAMP
 - MOUNTING OF COUPLINGS ON RODS- FINISHING PLASTIC LAMPS
- 10 MIN PRACTICAL EXAMPLE OF MOUNTING A LIGHT BULB
- 10 MIN EXPLANATION OF PLASTIC EXTRUSION
- 10 MIN RECAPITULATION AND CLEANING OF THE WORKPLACE



RECOMMENDED TOOLS



SAFETY

MANIPULATION WITH HOT MOULDS CAN MAKE ONLY LECTURER IN HEAT RESISTANT GLOVES.

BE AWARE OF TOUCHING MOULDS DURING COOLING PROCESS.

USE KNIFE FOR CUTTING EDGES CARAFULLY.

KIDS CAN MEASURE ONLY DC ELECTRIC VOLTAGE UP TO 12 VOLTS.

WIRING CONNECTIONS ONLY UNDER SUPERVISION OF LECTURER



PRODUCT DEVELOPMENT

7/10



G

The aim of the course is to get acquainted with product development, where plastics are used well and, conversely, in which cases the use of plastics is appropriate. What needs to be taken into account when developing a new product. Introduction to development phases. What is the difference between prototype production and series production. During the lesson, children will try to build a simple prototype of the product.

K

Single use packaging, product life cycle, prototype, mass production, open source

T

Be aware of products where materials are poorly chosen with regard to the product life cycle. Know the difference in process between prototype building and series production.

P

Try desing and build prototype of simple product.



SUPPORTING MATERIAL

PRESENTATION FOR LESSON 07 – [DOWNLOAD HERE](#)



CHECKLIST BEFORE LESSON

- ☐ EDIT PRESENTATION AS YOU NEED
- ☐ PREPARE WOOD STICKS AND PLASTELINA FOR ACTIVITY
- ☐ PREPARE RANDOM MATERIAL FOR MAKING PROTOTYPES



TIME SCHEDULE

- 10 MIN HOMEWORK REVISION + ENTRY KNOWLEDGE TEST FROM PREVIOUS LESSON
- 10 MIN GOOD AND BAD EXAMPLES OF PLASTIC PRODUCTS - PRESENTATION 07
- 10 MIN EXAMPLE OF PRODUCT DEVELOPMENT – PRESENTATION 07
- 15 MIN ACTIVITY WOOD STICKS AND PLASTICINE – BUILD AS HIGH CONSTRUCTION AS POSSIBLE
- 15 MIN ACTIVITY: „WHAT TO CHANGE, IF YOU WANT BUILD 100 OF THESE CONSTRUCTIONS?“
- 40 MIN ACTIVITY – BUILD YOUR OWN PROTOTYPE
- 10 MIN – LESSON RECAP, QUESTIONS, CLEANING WORKSPACE.



RECOMMENDED TOOLS



SAFETY

TAKE CARE WHEN YOU USE SCISSOR



3D PRINTING WORLD

8/10



G

The aim is to understand the principle of 3D printing technology, what plastics are used, what are the advantages, disadvantages, comparison with plastic injection technology, how the preparation of models for 3D printing works. Creating a place where empty spools can be handed over from the filament.

K

additive production, filament, PLA, PETG, model libraries, slicer, G-code

T

Pupils are able to describe the principle of 3D printing themselves. Pupils are able to describe the difference between 3D printing and plastic injection. They have an overview of the chronological process of preparing a 3D print

P

Pupils can turn on the 3D printer, change material, calibrate, set up the model and enter 3D printing. Presentation skills.



SUPPORTING MATERIAL

PRESENTATION FOR LESSON 08 – [DOWNLOAD HERE](#)



CHECKLIST BEFORE LESSON

- ☐ EDIT PRESENTATION AS YOU NEED
- ☐ PREPARE WORKSPACE FOR 3D PRINTING
- ☐ PREPARE WORKSPACE FOR INJECTION MOULDING



TIME SCHEDULE

10 MIN	HOMEWORK REVISION + ENTRY KNOWLEDGE TEST FROM PREVIOUS LESSON
10 MIN	INTRODUCTION TO 3D PRINTING - SEE PRESENTATION 08
5 MIN	EXPLANATION OF THE CONSTRUCTION OF A 3D PRINTER + PROPERTIES OF THE MATERIAL
20 MIN	INTRODUCTION / REPLACEMENT OF FILAMENT + 3D PRINTER CALIBRATION + START PRINT
10 MIN	CIRCULAR COLLECTION OF EMPTY COILS - BENEFITS IT BRINGS (COOPERATION ECO MB)
10 MIN	REAL CASE SCENARIO - COMPARISON OF CARABINER PRODUCTION USING 3D PRINTING AND USING AN INJECTION MOLDING MACHINE INCL. STRENGTH VERIFICATION.
20 MIN	EXPLANATION OF 3D GRANULATE PRINTING TECHNOLOGY- EXAMPLES OF 3D PRINTED VAN PLASTIK
15 MIN	INVENTING YOUR OWN PRODUCT
10 MIN	PRESENTATION OF IDEAS WITHIN THE GROUP (EVERYONE WILL HAVE SPACE FOR 2 MIN)
10 MIN	CONCLUSION AND CLEANING OF THE WORKPLACE



RECOMMENDED TOOLS



SAFETY

MANIPULATION WITH HOT MOULDS CAN MAKE ONLY LECTURER IN HEAT RESISTANT GLOVES.

BE AWARE OF TOUCHING MOULDS DURING COOLING PROCESS.

USE KNIFE FOR CUTTING INLET CARAFULLY.

DOT NOT TOUCH NOZZLE AND HEAT BEAD OF 3D PRINTER

DURING MANUFACTURING ON INJECTION MACHINE WEAR SAFETY GLOWES AND MAKE SURE SPACE IS VENTILATED WELL.

WHEN YOU INJECT PLASTIC, AVOID CONTACT WITH HEAT PARTS OF INJECTION MACHINE OR MELTED PLASTIC.



BIODEGRADABLE PLASTIC

9/10



G

The aim is to present bioplastics, where it is already used, advantages and disadvantages compared to standard plastics. A secondary topic is the proposal of community plastic recycling within the given region. Example: design of community plastic collection within a school / family / organization - promotion, system setup, product design.

K

bio degradable plastic, oxoplast

T

Knowledge of types of bioplastics- Introduction to the advantages and disadvantages of bioplastics. Understanding the principle of biopress. Difference between bioplast and oxoplast.

P

Practice of presentation skills, invention of new community collection point.



SUPPORTING MATERIAL

PRESENTATION FOR LESSON 09 – [DOWNLOAD HERE](#)



CHECKLIST BEFORE LESSON

- ☐ EDIT PRESENTATION AS YOU NEED
- ☐ PREPARE REAL PRODUCT MADE OUT OF BIOPLASTIC TO SHOW PUPILS



TIME SCHEDULE

10 MIN	HOMEWORK REVISION + ENTRY KNOWLEDGE TEST FROM PREVIOUS LESSON
15 MIN	INTRODUCTION TO BIOPLASTICS INCL. VIDEO BY DAVE HAKKENS – PRESENTATION 09
20 MIN	DIG OUT SAMPLES OF MATERIAL FROM 1ST LESSON AND COMPARE RESULTS AFTER 9 WEEKS
10 MIN	EXAMPLES OF COMMUNITY PLASTICS RECYCLING
10 MIN	EXAMPLE OF BIOPRESS CONSTRUCTION FROM PRECIOUS PLASTIC
15 MIN	BRAINSTORMING - EQUIPMENT FOR BIOPRESS PRODUCTION BY MINI PRESS TRANSFORMATION + POSSIBLE APPLICATIONS OF PRODUCT PRODUCTION
10 MIN	COME UP WITH YOUR OWN CONCEPT OF COMMUNITY RECYCLING + THE PRODUCT THEY WOULD LIKE TO PRODUCE
10 MIN	PRESENTATION OF YOUR OWN CONCEPT IDEA
5 MIN	PRESENTATION OF THE PROJECT KAM S NÍM + THE PROJECT UKLIÐME ČESKO
5 MIN	CONCLUSION AND CLEANING OF THE WORKPLACE.



RECOMMENDED TOOLS



SAFETY



GEODESIC DOME

10/10



G

The aim of the lesson is to explain the construction of a geodetic dome and its further use in practical applications. Understanding the principle of dome design incl. production and assembly process. Comparison of different structures and their mutual advantages / disadvantages.

K

geodesic dome, triangulation

T

Understand the geodetic dome as an architectural element. Understand the process of production and assembly

P

Be able to work in a team. Be able to assemble a geodetic dome from prepared components with simple manual.



SUPPORTING MATERIAL

PRESENTATION FOR LESSON 10 – [DOWNLOAD HERE](#)



CHECKLIST BEFORE LESSON

- ☐ EDIT PRESENTATION AS YOU NEED
- ☐ PREPARE PLACE WHERE TO BUILD GEODESIC DOME – FLAT, DIAMETER 5m
- ☐ PREPARE MATERIAL FOR ASSEMBLY ACCORDING TO TUTORIAL – [LINK HERE](#)



TIME SCHEDULE

- 5 MIN QUICK TEST FROM PREVIOUS LESSON
- 10 MIN POSSIBILITY TO CONSULT THE LAUNCH OF YOUR OWN COMMUNITY PLACE
- 10 MIN EXPLANATION OF THE GEODETIC DOME IN THE CONTEXT OF ARCHITECTURE - PRESENTATION
- 5 MIN DESCRIPTION OF THE CONSTRUCTION OF THE PRECIOUS PLASTIC DOME AND EXPLANATION OF THE PRODUCTION PROCESS - VIDEO TUTORIAL
- 2 HRS ASSEMBLY OF THE DOME
- 5 MIN BRAINSTORMING THE NEXT USE OF THE DOME
- 10 MIN RECAPITULATION AND CLEANING OF THE WORKPLACE



RECOMMENDED TOOLS

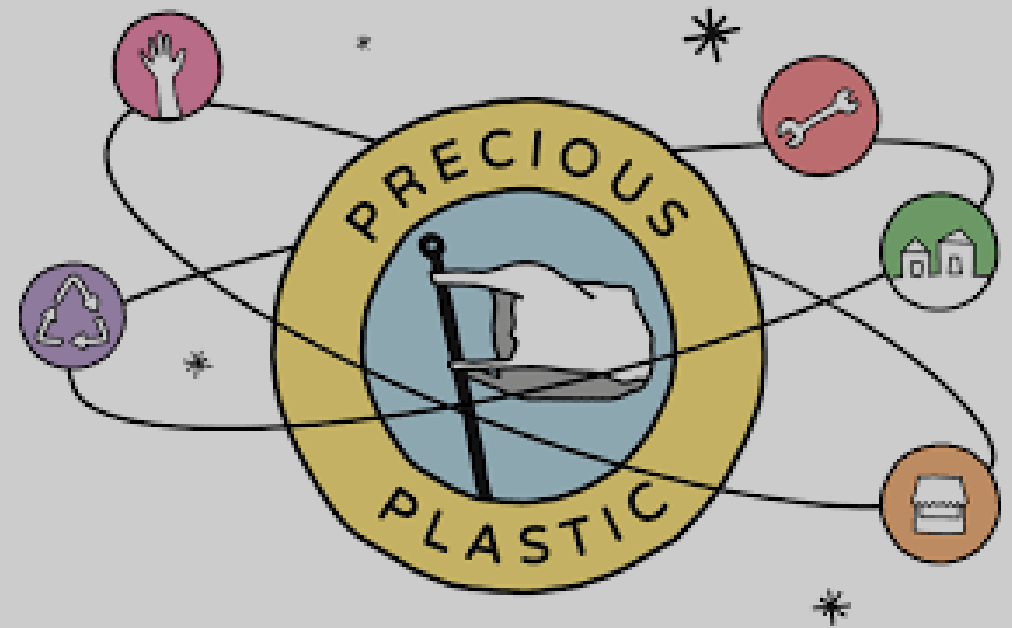


SAFETY

BEWARE OF HANDLING ON THE LADDERS



MORE INFORMATION



MORE INFORMATION

LEARN -> SHARE -> UPGRADE

VISIT PRECIOUS PLASTIC COMMUNITY [ON WEBSITE](#)

LOOK AT MAP AND [FIND WORKSPACE](#) CLOSE TO YOU

CHECK OTHER OPEN SOURCE CONTENT INSIDE [PLASTMAKERS STARTER PACK](#)

MORE INFORMATION



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